

PROJECT ID:

PV175AQUA

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 Zoo Aquarium Reconstruction

LOCATION: BOROUGH:

CITY OF NEW YORK

614 Broadway

Staten Island, NY 10310

CONTRACT NO. 1

GENERAL CONSTRUCTION WORK

Department of Cultural Affairs

LEESER Architecture



Date:

June 4, 2015

1 5-182

Bid Tab

PLA R Descripti		STATEN ISLAND Z BOROUGH OF STA	OO AQUARIUM RE TEN ISLAND	CONSTRUCTION-
Bid Date		10/23/2015	PV175AQUA	
Estimated Cost		\$4,089,935.00	Client Agency	DCA
Bid Security		Not less than 2% of Total Bid Price	PLA	Yes
Time Allowed		540 CCD	Contract Manager	Giovanni Matos
Addendum		2	Project Manager	Malla, Amar
PIN		8502015PV0020C	E-PIN	85015B0174
Selective	Bidding	□Yes □No	Consultant	Leeser Architecture
Bid Rank		Vendor	Bid Amoun	t Security Type
1	SIGNATU GROUP, I	RE CONSTRUCTION	\$6,954,871	1.79 Bond
2		RO GROUP TIONAL LLC	\$6,980,000	0.00 Bond
3	NSP ENTE	ERPRISES, INC.	\$7,353,641	1.80 Bond
4	PADILLA SERVICE	CONSTRUCTION S, INC	\$8,663,050	6.97 Bond

SUBCONTRACTORS:

Plumbing: Buttermark Plumbing \$212,628.00 HVAC: Master Cooling \$1,264,000.00 Electrical: Walsh Electrical \$852,600.00

Recorder: Brenda Barreiro ext. 1041

Approver

Page 1 of 1

Bid Tab

Pin: 8502015PV0020C



DR. FENIOSKY A. PEÑA-MORA Commissioner

CHARLETTE HAMAMGIAN Agency Chief Contracting Officer

April 14, 2016

CERTIFIED MAIL - RETURN RECEIPT REQUEST SIGNATURE CONSTRUCTION GROUP, INC. 160 SEVENTH STREET BROOKLYN, NY 11215

RE: FMS ID: PV175AQUA

E-PIN: 85015B0174001

DDC PIN: 8502015PV0020C STATEN ISLAND ZOO AQUARIUM

RECONSTRUCTION-BOROUGH OF

STATEN ISLAND NOTICE OF AWARD

Dear Contractor:

You are hereby awarded the above referenced contract based upon your bid in the amount of \$6,954,871.79 submitted at the bid opening on October 23, 2015. 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,

Romain Holley for Charlette Hamamgian



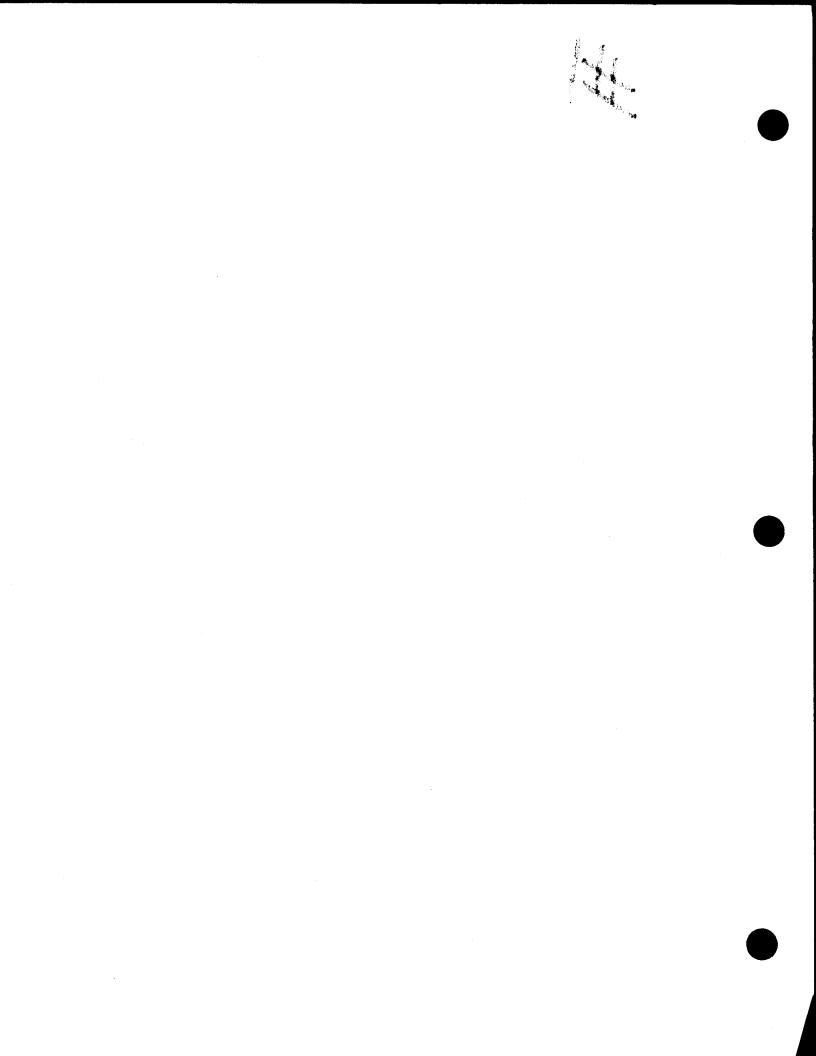
BID FORM THE CITY OF NEW YORK DEPARTMENT OF DESIGN AND CONSTRUCTION DIVISION OF PUBLIC BUILDINGS

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

PROJECT ID: PV175AQUA

Staten Island Zoo Aquarium Reconstruction 614 Broadway Staten Island, NY 10310

Name of Bidder: Signature Construction Group, Inc.
Date of Bid Opening: October 23, 2015
Bidder is: (Check one, whichever applies) Individual Partnership Corporation
Place of Business of Bidder: 160 7th Street, Brooklyn, NY
Bidder's Telephone Number: 718-788-1669 Bidder's Fax Number: 718-312-3534
Bidder's Email Address: dcremona@signatureconstruction.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:
Name and Home Address of Secretary: Michael O'Neill 160 7th Street, Brooklyn, NY 11215
Name and Home Address of Treasurer: 160 7th Street, Brooklyn, NY 11215



BID FORM

Signature Construction Group, 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 17 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 nondiscrimination provisions of Section 220a of the New York State Labor Law, as more expressly and in detail set forth in the Agreement; (2) will comply with Section 6-109 of the Administrative Code of the City of New York in relation to minimum wages and other stipulations as more expressly and in detail set forth in the Agreement; (3) have complied with the provisions of the aforesaid laws since their respective effective dates, and (4) will post notices to be furnished by the City, setting forth the requirements of the aforesaid laws in prominent and conspicuous places in each and every plant, factory, building and structure where employees engaged in the performance of the Contract can readily view it, and will continue to keep such notices posted until the supplies, materials and equipment, or work labor and services required to be furnished or rendered by the Contractor have been finally accepted by the City. In the event of any breach or violation of the foregoing, the Contractor may be subject to damages, liquidated or otherwise, cancellation of the Contract and suspension as a bidder for a period of three years. (The words, "the bidder", "he", "his", and "him" where used shall mean the individual bidder, firm, partnership or corporation executing this bid).

6. Compliance Report

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

The bidder, as an individual, or as a member, partner, director, or officer of the bidder, if the same be a firm, partnership, or corporation, executes this document expressly warranting that he will comply with: (1) the provision of the contract on providing records, Chapter 8.

- 7. By submission of this bid, the bidder certifies that it now has and will continue to have the financial capability to fully perform the work required for this contract. Any award of this contract will be made in reliance upon such certification. Upon request therefor, the bidder will submit written verification of such financial capability in a form that is acceptable to the department.
- 8. In accordance with Section 165 of the State Finance Law, the bidder agrees that tropical hardwoods, as defined in Section 165 of the State Finance Law, shall not be utilized in the performance of this Contract, except as the same are permitted by the foregoing provision of law.
- 9. The bidder has visited and examined the site of the work and has carefully examined the Contract in the form approved by the Corporation Counsel, and will execute the Contract and perform all its items, covenants and conditions, and will provide, furnish and deliver all the work, materials, supplies, tools and appliances for all labor and materials necessary or required for the hereinafter named work, all in strict conformity with the Contract, for the prices set forth in the Bid Schedule:
- 10. M/WBE UTILIZATION PLAN: By signing its bid, the bidder agrees to the Vendor Certification and Required Affirmations set forth below, unless a full waiver of the Participation Goals is granted. The Vendor Certification and Required Affirmations will be deemed to satisfy the requirement to complete Section V of Part II of Schedule B: M/WBE Utilization Plan.

Section V: Vendor Certification and Required Affirmations:

I hereby:

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

BID I	FORM
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PROJECT ID: PV175AQUA

			INCOLUE ID. I	1.01.2
TOTA	AL BID PRICE:	In the space	provided below, the Bidder s	hall indicate the total bid price in figures.
A.	forth below. Total	Price shall in		or all required work, excluding items (B) and (C) set i.e. labor, material overhead and profit for all the s.
	Total Price for Material Sold and Delivered		Total Price For Labor	
	\$	_ +	\$	Total Price for Item A= \$ 6,930,730.
В.	ALLOWANCE for (Section 028013 of			\$15,000.00
C.	AMOUNT for Proj	prietary Items	(pages 2a)	\$9,641.80
	TOTAL BID PRIC (a/k/a BID PROPO	•	3 + C)	\$ 6955 371 S
)	,	æ	BIDDER'S SIGNATURE A	ND AFFIDAVIT
*	Subcontractors" (pa (BID ENVELOPE #	nge 17) at the t (2). In the eve	ime you submit your bid. You	e and submit the form entitled "Bidder's Identification of must submit this form in a separate, sealed envelope made to the Bidder, the Bidder hereby authorizes the becontractors". Yes No
Bidder	:Signatu	u Cons	truction Grov	p Inc
By:	•	DA	ท	
			(Signature of Partner or con	porate officer)
Attest		· · · · · · · · · · · · · · · · · · ·	Se	cretary of Corporate Bidder
(Corpo	orate Seal)			

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 fore	egoing bid, and the several matters therein stated are in all respects true
·	
sina ara , , , ,	(Signature of the person who signed the Bid)
Subscribed and sworn to before me this	,
day of,	
3	
•	
Notary Public	
riotaly i done	
************	********
A POIDAVIT WILE	RE BIDDERS IS A PARTNERSHIP
ATTIDAVIT WHE	AE BIDDERS IS A PARTNERSHIP
STATE OF NEW VODE COUNTY OF	207
STATE OF NEW YORK, COUNTY OF	the state of the s
I who is a small state of	being duly sworn says:
1 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	e firm, and the several matters therein stated are in all respects true.
Andriquentum	
	(Signature of Partner who signed the Bid)
Subscribed and sworn to before me this	a = a
day of	
Notary Public	
**********	**********************
<u>AFFIDAVIT WHE</u> R	RE BIDDERS IS A CORPORATION
Now Vo	wlz ·
STATE OF NEW YORK, COUNTY OF New York	SS:
Desmond Cremona	being duly sworn says:
I am the Vice President/Treasurer of the above	e named corporation whose name is subscribed to and which executed
the foregoing bid. I reside at 160 7th Street, Brookl	yn, NY 11215
I have knowledge of the several matters therein stated,	and they are in all respects true.
	S A
	To the second se
· · · · · · · · · · · · · · · · · · ·	(Signature of Corporate Officer who signed the Bid)
Subscribed and sworn to before me this	
22 day of Octuber 2011	
	MARK T. WALTER
	Notary Public, State of New York
Notary Public	No. 01WA6258487
ivotaly I dolle	Qualified in New York County Commission Expires March 26, 2016
	Continuesion expires match 20, 2010

CITY OF NEW YORK DDC

Maria Signa of the state of the

AFFIRMATION

contract	et or taxe on declar ding per	ed bidder affirms and declares that said bidder is not in es and is not a defaulter, as surety or otherwise, upon of red not responsible, or disqualified, by any agency of the ading relating to the responsibility or qualification of the company o	obligation to the City of New York, and he City of New York, nor is there any	id has
(If non	e, the bi	dder shall insert the word "None" in the space provide	ed above.)	
		Bidder: Signature Construction Group, Inc.		
_	ss: 160 Brookly	Seventh Street n, State: New York	Zip Code: <u>11215</u>	
СНЕС	K ONE A -	BOX AND INCLUDE APPROPRIATE NUMBER: Individual or Sole Proprietorship * SOCIAL SECURITY NUMBER		
	В-	Partnership, Joint Venture or other unincorporated of EMPLOYER IDENTIFICATION NUMBER	rganization	
	C -	Corporation EMPLOYER IDENTIFICATION NUMBER 13-3572304		
Ву:	c. 1	Signature:		
Title:	<u>V</u>	ice Hesident		

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.

BID BREAKDOWN

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

X	YES	NO

Limitations on Use of Bid Breakdown:

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

Instructions for Preparing Bid Breakdown:

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



Project: Staten Island Zoo Aquarium Reconstruction

Location: 614 Broadway, Staten Island, NY 10310

Bidder: SIGNATURE CONSTRUCTION GROUP

CONTRACT 1 - GENERAL CONSTRUCTION WORK

DOC ID: PV175AQUA

CSI Number	Description	Quantity	Unit		Cost of erial	Total Cost of Material		Unit Cost of Labor	Total Cost of Labor		Total Cos Material and Labo
	CONTRACT 1 - GENERAL CONSTRUCTION WORK						T			1	
01 0000	GENERAL REQUIREMENTS						1			+-	
01 0000	MOBILIZATION						1			+	
	MOBILIZATION	1	LA	\$ 42	0,000.00	\$ 420,000.00	\$	1,455,800,00	\$ 1,455,800.00	5	1.875.80
	TEMPORARY HEAT	1	LS			\$ 96,000.00	1		\$ 41,276,75		
							GEN	IERAL REQUIRE	MENTS - Sub-total		
02 0000	EXISTING CONDITIONS			Г -	<u>1</u>		_		T		
02 4119	SELECTIVE DEMOLITION AND ALTERATION WORK			·			┢		 	┿	
	TEMPORARY PROTECTION	1	LS			\$ 13,000.00	-		\$ 16,800.00	Ś	20.00
	REMOVE EXISTING AQUARIUM - 13 EA	1	LS	 		\$ -	İ	5,500.00			29,80
	REMOVE EXISTING SUPPORT EQUIPMENT INCLUDING TANK	1 1	RMS	<u> </u>		\$ -	\$	5,500.00			5,50
	REMOVE EXISTING STEPS TO AQUARIUM AND ALL RELATED	80	LF	 		\$ -	Ś	200.00			5,50
	REMOVE CONCRETE RAISED FLOOR AT KEEPER AREA	550	· SF			<u> </u>	\$	7.00			16,00
	REMOVE EXISTING DISPLAY WALL	720	SF			š .	Š	5.00		_	3,85
	REMOVE DOORS	10	EA			\$ -	\$	175.00	\$ 3,600.00 \$ 1,750.00		3,60
	REMOVE GLAZED DOOR AT SECOND FLOOR, REINSTALL	1	EA			<u>\$</u>	ś	350.00	\$ 350.00		1,75
	REMOVE EXISTING FLOOR / CEILING / WALL FINISHES	1	SF				 			 	35
	REMOVE EXISTING DUMBWAITER AND RELATED STRUCTURE		LOC		- 1	\$ -	\$	15,000.00	\$ 15,000.00	\$	15,00
	REMOVE EXISTING PARTITION WALL	1760	SF			\$ -	\$	6.00	\$ 10,560.00	Ś	10,56
	REMOVE EXISTING BRICK WALL - 16 SF	1	LOC			\$ -	\$	6.00	\$ 6.00	_	
	REMOVE EXISTING STAIR STRUCTURE AT CELLAR	1	LOC			\$ -	\$	7,500.00	\$ 7,500.00	Ś	7,50
	REMOVE EXISTING SLAB ON GRADE	600	SF			\$ -	\$	12.00	\$ 7,200.00	Š	7,20
	PROVIDE TEMPORARY OPENING IN CONCRETE-WALL	36	SF			\$ -	\$	50.00	\$ 1,800.00	Ś	1,80
	REMOVE CEILING AND FRAMING AT SECOND FLOOR - 15 SF	1	FOC			\$ -	\$	5,500.00	\$ 5,500.00	\$	5,50
	REMOVE EXISTING-FLOOR AND FLOOR JOISTS AT ATTIC -	1	LOC			\$ -	Ś	2,500.00	\$ 2,500.00	Š	2,50
	REMOVE EXISTING CEILING AND CEILING JOISTS AT ATTIC -	6	LOC			\$ -	\$	500.00	\$ 3,000.00	Ś	3,000
	PROVIDE OPENING IN FLOOR FOR NEW HVAC DUCT - 5 SF	1	LOC			\$ -	\$	2,500.00	\$ 2,500.00	\$	2,500
	PROVIDE OPENING MASONRY CHIMNEY FOR NEW HVAC	1	LOC			\$ -	\$	5,500.00	\$ 5,500.00	Ś	5,500
	REMOVE STONE CHIMNEY CAP - 20 SF	1	EA			\$ -	\$	1,500.00	\$ 1,500.00	\$	1,500
	PROVIDE OPENING IN FACADE FOR NEW LOUVER - 8 SF	1	LOC		1	\$ -	\$	1,500.00	\$ 1,500.00	Ś	1,500
	REMOVE EXISTING WOOD JOIST	34	LF			\$ -	\$	6.00	\$ 204.00	Ś	204
	REMOVE CONVECTOR COVER	4	EA			\$ -	Ś	100.00	\$ 400.00		400
	REMOVE EXISTING WINDOW FRAME	1	LOC			5 -	\$		\$ 500.00		500
	REMOVE EXISTING ATTIC ACCESS LADDER	1	EA		- (-	\$		\$ 1,500.00	Ś	1,500
	REMOVE ROLL GATE - 6' W	1	EA			- 1	\$		\$ 2,000.00	Š	2,000
	REMOVE EXISTING SUMP PIT	1	ΕA				Ś			Ś	2,000
	MISC. CUTTING AND PATCHING	1	LS			-	\$	5,000.00		\$	5,000
	RUBBISH REMOVAL	1	LS		- 5		\$	28,000.00		Ś	28,000
									ONS - Sub-total:	<u> </u>	170,020



Project: Staten Island Zoo Aquarium Reconstruction

Location: 614 Broadway, Staten Island, NY 10310

SIGNATURE CONSTRUCTION GROUP

CONTRACT 1 - GENERAL CONSTRUCTION WORK PV175AQUA

DOC ID:

CSI Number	Description	Quantity	Unit		Unit Cost of Material	Total Cost of Material		Unit Cost of Labor		Total Cost of Labor		Total Cos Material and Labo
02 8213	ASBESTOS ABATEMENT			Ι			Т		_		1	
	ASBESTOS ABATEMENT	1	LS	\$	1,000.00	\$ 1,000.00	\$	30,500.00	s	30,500,00	5	30,500
							AS	BESTOS ABATI				31,50
											7 Y	31,30
03 0000	CONCRETE			Т			T		т-		т-	
03 3000	CONCRETE			Т			\vdash		╁┈		╂─	
	NEW 5" TH SLAB ON GRADE INCL. SUB BASE	600	SF	\$	8.00	\$ 4,800.00	\$	33.00	1	19,800.00	Ś	24,60
	4" CONCRETE PADS FOR MECH UNIT	220	SF	\$	19.00			63.00	Ś	13,860.00		18.04
	PATCH CONCRETE FLOOR AFTER DEMO WORK	300	SF	Ś	4.00			51.00		15,300.00		16,50
	1" NON SHRINK GROUT FOR TANKS	450	SF	5		\$ 1,800.00		40.00		18,000.00		19,80
	TRENCH DRAIN IN BOILER RM -6" W	30	LF	Ś	120.00	.,	· ·	264.00	Š	7,920.00		
	PRE-FAB ROOF CURB		LF	1		7 5,000.00	 	204.00	 	7,920.00	13	11,52
							L	CON	CDET	E - Sub-total:	 -	20.44
						·		CO14	CNE	E - Sub-total:	3	90,46
04 0000	MASONRY			Т					_			
04 0100	MASONRY RESTORATION AND CLEANING						-		_		<u> </u>	
	CUT POCKET IN WALL FOR BEAM INSTALLATION ON ROOF.	10	LOC	s	150.00	\$ 1,500.00	-	750.00	_	7500.00		
	MISC, MASONRY REPAIR	1	LS	ľ		\$ 1,300.00	3	750.00	<u> </u>	7,500.00		9,00
				<u> </u>		· -	Ь		\$	5,662.00	_	5,66
								MAS	ONR	Y - Sub-total:	\$	14,66
04 2000	MASONRY ASSEMBLIES			_								
	8" CMU PARTITION	130	SF	Ś	15.38	\$ 1,999,40			_			
	REPAIR MASONRY CHIMNEY	1 1	LS	3			\$	50.30	_	6,539.00		8,53
	NEW-STONE CHIMNEY CAP	1	EA	├		\$ -			\$	12,000.00	<u> </u>	12,00
	HETT STORE CHIMITET CA		EA	<u> </u>		\$ -			\$	9,000.00	\$	9,00
							MA	SONRY ASSEM	BLIE	S - Sub-total:	\$	29,53
05 0000	METALS											
05 1200	STRUCTURAL STEEL											
03 1200	STEEL DUNNAGE AT SECOND FLOOR/LOW ROOF			_		,						
	STEEL BONNAGE AT SECOND FLOOR/LOW ROOF	2272	LBS	\$			\$		\$		\$	19,340
·····	ADDITIONAL FRAMING AT CELLAR AND GROUND FLOOR	550	LBS	\$			\$		\$		\$	4,620
	STEEL DUNNAGE AT ATTIC	1350	LBS	\$		\$ 2,700.00			\$		\$	11,340
	STEEL BEARING PLATES	2500	LBS	\$		\$ 5,000.00		6.40	\$	16,000.00	\$	21,000
 	1 1/4" STEEL PLATE AT TANK - 8 EA	400	LBS	\$			\$	6.40	\$		\$	3,360
	METAL GRATING AT TRENCH DRAIN	18600		\$			\$	6.40	\$	119,040.00	\$	156,240
	INICIAL GRADING AT TRENCH DRAIN	30	LF	\$	10.00	\$ 300.00	\$	150.00	<	4,500,00	č	4,800
							·		<u> </u>	4,300.00	~	7,000



Project: Staten Island Zoo Aquarium Reconstruction

Location: 614 Broadway, Staten Island, NY 10310

Bidder: SIGNATURE CONSTRUCTION GROUP

CONTRACT 1 - GENERAL CONSTRUCTION WORK

DOC ID:

PV175AQUA

CSI Number	Description	Quantity	Unit	,	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor		Total Cost: Material and Labor
05 5000	MISCELLANEOUS METALS								Т	
	STEEL STAIR (CONCRETE FILL) WITH STEEL GUARD RAILING	1	FLT	\$	3,500.00		\$ 15,000.00	\$ 15,000.00	\$	18,500.0
	NEW LINTEL	12	LF	\$	25.00	\$ 300.00	\$ 350.00	\$ 4,200.00	\$	4,500.0
	NEW EXHAUST AIR LOUVER AT CHIMNEY	. 7	SF	\$	150.00		\$ 100.00	\$ 700.00	\$	1,750.
	NEW FRESH AIR INTAKE GRILL	7	SF	\$_	150.00	\$ 1,050.00	\$ 100.00	\$ 700.00	\$	1,750.
	MISC. FRAMING AND SUPPORT	1	LS			\$ -	\$ 6,300.00			9,300.
							MISCELLANEOUS M	IETALS - Sub-total	\$	35,800.
06 0000	WOOD, PLASTICS AND COMPOSITES			1				1	Т	
06 2000	CARPENTRY							T	1-	
	WOOD BLOCKING	12	LS	\$	150.00	\$ 1,800.00	\$ 450.00	\$ 5,400.00	\$	7,200.
	NEW WOOD FRAMING	40	LF	\$	45.00	\$ 1,800.00	\$ 100.00	\$ 4,000.00		5,800
	PTD PLYWOOD CEILING LIGHT COVE	74	LF	\$	20.00	\$ 1,480.00	\$ 100.00	\$ 7,400.00		8,880.
	BLACK FILM ADHERED TO OUTSIDE OF TANK	44	SF	\$	1.50	\$ 66.00	\$ 6.00	\$ 264.00		330.
	CUSTOM CUT REMOVABLE METAL COVER AT MONITOR	4	EA	\$	150.00	\$ 600.00	\$ 500.00	\$ 2,000.00	İs	2,600
	RECONNECT NEW AND EXISTING JOINTS	1	L\$	1		\$ -		\$ 3,000.00	15	3,000
	SOLID-SURFACE FABRICATIONS (INCLUDED W/ 092900)							1	Ħ	
						WOOD, P	LASTICS AND COMPO	OSITES - Sub-total	\$	27,810.
07 0000	THERMAL AND MOISTURE PROTECTION		<u> </u>							
074400	ELASTOMERIC COATING								П	
07 1420	EDATONIENIC CONTINO				0.50	\$ 850.00	\$ 3.50			6.800.
0/1420	ELASTOMERIC COATING ON EXPOSED CMU	1700	SF	\$	0.50	\$ 650.00	\$ 3.50	\$ 5,950.00	\$	0,000
071420		1700	SF	\$	0.50		D MOISTURE PROTE			
	ELASTOMERIC COATING ON EXPOSED CMU	1700	SF	\$	0.50]					
07 50-00	ELASTOMERIC COATING ON EXPOSED CMU EXISTING ROOF WORK	1700	SF LOC	\$				CTION - Sub-total:	\$	6,800.
	ELASTOMERIC COATING ON EXPOSED CMU EXISTING ROOF WORK CUT AND PATCH PORTION OF EXISTING CONCRETE ROOF			<u> </u>	400.00	THERMAL AN	\$ 1,500.00	\$ 9,000.00	\$	6,800. 11,400.
	ELASTOMERIC COATING ON EXPOSED CMU EXISTING ROOF WORK	6	LOC	<u> </u>	400.00	\$ 2,400.00	\$ 1,500.00 \$ 29,700.00	\$ 9,000.00	\$ \$	11,400. 29,700.
07 50-00	ELASTOMERIC COATING ON EXPOSED CMU EXISTING ROOF WORK CUT AND PATCH PORTION OF EXISTING CONCRETE ROOF MISC. ROOF REPAIR	6	LOC	<u> </u>	400.00	\$ 2,400.00	\$ 1,500.00 \$ 29,700.00	\$ 9,000.00 \$ 29,700.00	\$ \$	11,400.0 29,700.0
	ELASTOMERIC COATING ON EXPOSED CMU EXISTING ROOF WORK CUT AND PATCH PORTION OF EXISTING CONCRETE ROOF MISC. ROOF REPAIR FIRE STOPS AND SMOKE SEALS	6	LOC	<u> </u>	400.00	\$ 2,400.00 \$ -	\$ 1,500.00 \$ 29,700.00 EXISTING ROOF \	\$ 9,000.00 \$ 29,700.00 WORK - Sub-total:	\$ \$	11,400. 29,700. 41,100.
07 50-00	ELASTOMERIC COATING ON EXPOSED CMU EXISTING ROOF WORK CUT AND PATCH PORTION OF EXISTING CONCRETE ROOF MISC. ROOF REPAIR	6 1	LOC LS	<u> </u>	400.00	\$ 2,400.00 \$ -	\$ 1,500.00 \$ 29,700.00	\$ 9,000.00 \$ 29,700.00 WORK - Sub-total: \$ 2,000.00	\$ \$ \$	11,400. 29,700. 41,100.
07 50-00 07 8413	ELASTOMERIC COATING ON EXPOSED CMU EXISTING ROOF WORK CUT AND PATCH PORTION OF EXISTING CONCRETE ROOF MISC. ROOF REPAIR FIRE STOPS AND SMOKE SEALS CONT. SEALER AND BACKER ROD	6 1	LOC LS	<u> </u>	400.00	\$ 2,400.00 \$ -	\$ 1,500.00 \$ 29,700.00 EXISTING ROOF V	\$ 9,000.00 \$ 29,700.00 WORK - Sub-total: \$ 2,000.00	\$ \$ \$	11,400.0 29,700.0 41,100.0
07 50-00	ELASTOMERIC COATING ON EXPOSED CMU EXISTING ROOF WORK CUT AND PATCH PORTION OF EXISTING CONCRETE ROOF MISC. ROOF REPAIR FIRE STOPS AND SMOKE SEALS CONT. SEALER AND BACKER ROD	6 1	LOC LS	<u> </u>	400.00	\$ 2,400.00 \$ -	\$ 1,500.00 \$ 29,700.00 EXISTING ROOF V \$ 2,000.00 STOPS AND SMOKE	\$ 9,000.00 \$ 29,700.00 WORK - Sub-total: \$ 2,000.00	\$ \$ \$ \$	11,400.0 29,700.0 41,100.0 2,000.0 2,000.0
07 50-00 07 8413	ELASTOMERIC COATING ON EXPOSED CMU EXISTING ROOF WORK CUT AND PATCH PORTION OF EXISTING CONCRETE ROOF MISC. ROOF REPAIR FIRE STOPS AND SMOKE SEALS CONT. SEALER AND BACKER ROD	6 1	LOC LS	<u> </u>	400.00	\$ 2,400.00 \$ -	\$ 1,500.00 \$ 29,700.00 EXISTING ROOF V \$ 2,000.00 STOPS AND SMOKE	\$ 9,000.00 \$ 29,700.00 WORK - Sub-total: \$ 2,000.00	\$ \$ \$ \$	11,400.6 29,700.6 41,100.6



Project: Staten Island Zoo Aquarium Reconstruction

Location: 614 Broadway, Staten Island, NY 10310
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CONTRACT 1 - GENERAL CONSTRUCTION WORK

DOC ID:

PV175AQUA

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost Material and Labo
08 0000	<u>OPENINGS</u>							
08 1113	STEEL DOORS AND FRAMES						1	
	HM DOOR - SINGLE	3	EA	\$ 2,600.00	\$ 7,800.00	\$ 450.00	\$ 1,350.00	\$ 9,150
	HM DOOR - DOUBLE, FIRE RATED	1	PR	\$ 5,450.00	\$ 1,100.00			
	REMOVE EXISTING ENTRANCE DOOR, REFURBISH AND REINSTALL	1	PR		\$ -	\$ 6,000.00		
	FRP DOOR - SINGLE	5	EA	\$ 3,000.00	\$ 15,000.00			
	MDF PANEL	1100	SF	\$ 3.00	\$ 3,300.00			
							NINGS - Sub-total:	
								47,230
08 3113	ACCESS DOORS			<u> </u>			I	
	GFRG ACCESS PANEL	8	EA	\$ 450.00	\$ 3,600.00	\$ 450.00	\$ 3,600.00	\$ 7,200
							OORS - Sub-total:	
							COMO COLOR	7 7,200
08 3323	ROLL UP DOORS					I		
	ROLL UP GATE - 6' X 10'	2	EA	\$ 5,100.00	\$ 10,200.00	\$ 2,000.00	\$ 4,000.00	\$ 14,200
					1 20,200.00	-,000.00	OORS - Sub-total:	
	*						OCAS SUB-total.	3 14,200
08 7000	FINISH HARDWARE (included w/ section 081113)				· · · · · · · · · · · · · · · · · · ·			
				FIN	ISH HARDWARE (in	cluded w/ section 0	1112) Cub total	*
		····			IST TIAND WAKE (III	icidaea w/ section of	51113) - Sub-totai:	\$.
08 8000	GLASS AND GLAZING	7						
	INTERIOR WINDOW	8	SF	\$ 350.00	\$ 2,800.00	\$ 150.00	4	
	The state of the s		3,	3 330,00	3 2,800.00			
					 	GLASS AND GL	AZING - Sub-total:	\$ 1,550.
09 0000	FINISHES	T						
09 2713	GLASS-FIBER-REINFORCED GYPSUM (GFRG) FABRICATIONS	1					<u> </u>	
	GFRG CEILING	834	SF	\$ 37.00	\$ 30,858.00	ć	<u> </u>	·
	PTD. MTL TRIM AT GFRG (Inc In Carpentry)	034	LF LF	> 57.00	30,858.00	\$ 45.00	\$ 37,530.00	\$ 68,388.
 	properties and a control time in earliering)		LF					
							ISHES - Sub-total:	\$ 68,388.



Project: Staten Island Zoo Aquarium Reconstruction

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CSI Number	Description	Quantity	Unit	ı	Unit Cost of Material	Total Cost of Material	Unit Co of Lab			Total Cost of Labor		Total Cost: Material and Labor
09 2900	GYPSUM DRYWALL								П		Т	
	TYPE 3- (1) LAYER 5/8" MOLD RESISTANT CEMENT BOARD	540	SF	\$	5.00	\$ 2,700.00	\$	17.00	\$	9,180.00	\$	11,880.
	TYPE 4 - 1 5/8" FRP STUDS, (1) LAYER 5/8" MOLD RESISTANT	120	SF	\$	7.00	\$ 840.00	\$	17.00	\$	2,040.00	\$	2,880
	TYPE 5 - (1) LAYER 1/2" MDF ON Z-CLIPS	384	SF	\$	9.00	\$ 3,456.00	\$	27.00	\$	10,368.00	\$	13,824
	TYPE 6 - (1) LAYER 1" GYPSUM SHAFT LINER ONE SIDE,	48	SF	\$	9.00	\$ 432.00	\$	22.00	\$	1,056.00	\$	1,488
	TYPE 7 - 1 -5/8" MTL STUD, (1) LAYER 5/8" GWB ONE SIDE	312	SF	\$	4.50			17.00	\$	5,304.00	\$	6,708
	TYPE 8- 2 1/2" MTL STUD, (1) LAYER 5/8" MOISTURE / MOLD	312	SF	\$	5.00	\$ 1,560.00	\$	17.00	\$	5,304.00	\$	6,864
	TYPE 9 - (1) LAYER 5/8" MOLD RESISTANT CEMENT BOARD,	600	SF	\$	7.00	\$ 4,200.00	\$	19.00	\$	11,400.00	\$	15,600
	TYPE 12 - (1) LAYER 1" GYPSUM SHAFT LINER ONE SIDE,	120	\$F	\$	9.00	\$ 1,080.00	\$	19.00	\$	2,280.00	\$	3,360
	GWB-2 MOUNTED ON STL STUDS AT TOP OF TANKS	528	SF	\$	4.00	\$ 2,112.00	\$	17.00	\$	8,976.00	\$	11,088
	PERFORATED GWB CEILING	220	SF	\$	22.00	\$ 4,840.00	\$	35.00	\$	7,700.00	\$	12,540
		· .					GYPS	UM DRY	/WAL	L - Sub-total:	\$	86,232
09 3013	CERAMIC TILING			<u> </u>				-	L_			
	Ceramic TILE FLOOR	50	SF	\$	12.00	\$ 600.00	\$	35.00	\$	1,750.00	\$	2,350.
				Ś	12.00	\$ 2,640.00	Ś	35.00	Ś	7,700.00	Ś	10,340
	CERAMIC TILE WALLS	220	SF	-	12.00	7 2,0.000	. · ·	55.00	<u> </u>	-,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
	CERAMIC TILE WALLS CERAMIC TILE BASE	220	LF	<u>, </u>	12.00					G - Sub-total:	\$	
09 5113	CERAMIC TILE BASE ACOUSTICAL PANEL CEILINGS	220	LF		12.00							12,690
09 5113	CERAMIC TILE BASE	220			12.00			RAMIC T	ILING	3 - Sub-total:	\$	12,690
09 5113	CERAMIC TILE BASE ACOUSTICAL PANEL CEILINGS	220	LF		12:00		CEF	RAMIC T	ILING	3 - Sub-total:	\$	12,690 5,000
09 5113	CERAMIC TILE BASE ACOUSTICAL PANEL CEILINGS	220	LF		12:00		CEF	RAMIC T	ILING	3 - Sub-total:	\$	12,690
	CERAMIC TILE BASE ACOUSTICAL PANEL CEILINGS ACOUSTIC INSULATION AT CEILING	693	LF	\$			CEF	RAMIC T	LING	3 - Sub-total:	\$ \$	12,690 5,000 5,000
	ACOUSTICAL PANEL CEILINGS ACOUSTIC INSULATION AT CEILING THIN SET EPOXY TERRAZZO		SF			AC \$ 13,860.00	CEF OUSTICAL PA	NEL CEI	LING	5 - Sub-total:	\$ \$	5,000. 5,000. 42,273.
	CERAMIC TILE BASE ACOUSTICAL PANEL CEILINGS ACOUSTIC INSULATION AT CEILING THIN SET EPOXY TERRAZZO TERRAZZO FLOOR	693	SF SF	\$	20.00	AC \$ 13,860.00	CEF OUSTICAL PA	NEL CEI	LINGS	5 - Sub-total: 5 - Sub-total: 28,413.00	\$ \$ \$	5,000. 5,000. 42,273. 9,680.
	CERAMIC TILE BASE ACOUSTICAL PANEL CEILINGS ACOUSTIC INSULATION AT CEILING THIN SET EPOXY TERRAZZO TERRAZZO FLOOR PRECAST TERRAZZO BASE - 7" HT	693 176	SF SF LF	\$ \$	20.00	\$ 13,860.00 \$ 3,520.00 \$ -	CEF OUSTICAL PA	NEL CEI 41.00 35.00 29.00	LINGS \$ \$	5 - Sub-total: 5 - Sub-total: 28,413.00 6,160.00 3,741.00	\$ \$ \$ \$ \$	5,000 5,000 42,273 9,680 3,741
09 6623	CERAMIC TILE BASE ACOUSTICAL PANEL CEILINGS ACOUSTIC INSULATION AT CEILING THIN SET EPOXY TERRAZZO TERRAZZO FLOOR PRECAST TERRAZZO BASE - 7" HT REFINISHED EXISTING - TERRAZZO FLOOR FINISH AT FOYER	693 176	SF SF LF	\$ \$	20.00	\$ 13,860.00 \$ 3,520.00 \$ -	CEF OUSTICAL PA	NEL CEI 41.00 35.00 29.00	LINGS \$ \$	5 - Sub-total: 5 - Sub-total: 28,413.00 6,160.00 3,741.00	\$ \$ \$ \$ \$	5,000 5,000 42,273 9,680 3,741
	CERAMIC TILE BASE ACOUSTICAL PANEL CEILINGS ACOUSTIC INSULATION AT CEILING THIN SET EPOXY TERRAZZO TERRAZZO FLOOR PRECAST TERRAZZO BASE - 7" HT REFINISHED EXISTING - TERRAZZO FLOOR FINISH AT FOYER EPOXY RESIN COMPOSITION FLOORING	693 176 129	SF SF LF SF	\$ \$	20.00 20.00	\$ 13,860.00 \$ 3,520.00 \$ -	CEF OUSTICAL PA \$ \$ \$ \$ HIN SET EPO	NEL CEI 41.00 35.00 29.00 KY TERR	LINGS \$ \$ \$ AZZC	5 - Sub-total: 5 - Sub-total: 28,413.00 6,160.00 3,741.00 5 - Sub-total:	\$ \$ \$ \$ \$ \$	12,690. 5,000. 5,000. 42,273. 9,680. 3,741. 55,694.
09 6623	CERAMIC TILE BASE ACOUSTICAL PANEL CEILINGS ACOUSTIC INSULATION AT CEILING THIN SET EPOXY TERRAZZO TERRAZZO FLOOR PRECAST TERRAZZO BASE - 7" HT REFINISHED EXISTING - TERRAZZO FLOOR FINISH AT FOYER	693 176	SF SF LF	\$ \$	20.00	\$ 13,860.00 \$ 3,520.00 \$ -	CEF OUSTICAL PA \$ \$ \$ \$ HIN SET EPO	NEL CEI 41.00 35.00 29.00 XY TERR	LING:	5 - Sub-total: 28,413.00 6,160.00 3,741.00 0 - Sub-total: 14,284.40	\$ \$ \$ \$ \$	5,000. 5,000. 42,273. 9,680. 3,741. 55,694.
09 6623	CERAMIC TILE BASE ACOUSTICAL PANEL CEILINGS ACOUSTIC INSULATION AT CEILING THIN SET EPOXY TERRAZZO TERRAZZO FLOOR PRECAST TERRAZZO BASE - 7" HT REFINISHED EXISTING - TERRAZZO FLOOR FINISH AT FOYER EPOXY RESIN COMPOSITION FLOORING	693 176 129	SF SF LF SF	\$ \$	20.00 20.00	\$ 13,860.00 \$ 3,520.00 \$ -	CEF OUSTICAL PA \$ \$ \$ \$ HIN SET EPO	NEL CEI 41.00 35.00 29.00 XY TERR	LING:	5 - Sub-total: 28,413.00 6,160.00 3,741.00 0 - Sub-total: 14,284.40	\$ \$ \$ \$ \$	12,690. 5,000. 5,000. 42,273. 9,680. 3,741. 55,694.
09 6623 09 6723	CERAMIC TILE BASE ACOUSTICAL PANEL CEILINGS ACOUSTIC INSULATION AT CEILING THIN SET EPOXY TERRAZZO TERRAZZO FLOOR PRECAST TERRAZZO BASE - 7" HT REFINISHED EXISTING - TERRAZZO FLOOR FINISH AT FOYER EPOXY RESIN COMPOSITION FLOORING	693 176 129	SF SF LF SF	\$ \$	20.00 20.00	\$ 13,860.00 \$ 3,520.00 \$ -	CEF OUSTICAL PA \$ \$ \$ \$ HIN SET EPO	NEL CEI 41.00 35.00 29.00 XY TERR	LING:	5 - Sub-total: 28,413.00 6,160.00 3,741.00 0 - Sub-total: 14,284.40	\$ \$ \$ \$ \$	5,000. 5,000. 42,273. 9,680. 3,741. 55,694.
09 6623	CERAMIC TILE BASE ACOUSTICAL PANEL CEILINGS ACOUSTIC INSULATION AT CEILING THIN SET EPOXY TERRAZZO TERRAZZO FLOOR PRECAST TERRAZZO BASE - 7" HT REFINISHED EXISTING - TERRAZZO FLOOR FINISH AT FOYER EPOXY RESIN COMPOSITION FLOORING EPOXY COATED FLOOR	693 176 129	SF SF LF SF	\$ \$	20.00 20.00	\$ 13,860.00 \$ 3,520.00 \$ - \$ - \$ 6,700.00 EPOXY RESIN	OUSTICAL PA	NEL CEI 41.00 35.00 29.00 XY TERR	S S AZZC	5 - Sub-total: 28,413.00 6,160.00 3,741.00 0 - Sub-total: 14,284.40	\$ \$ \$ \$ \$ \$	12,690. 5,000. 5,000. 42,273. 9,680. 3,741. 55,694. 20,984. 20,984.



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Sponsor Agency: Department of Cultural Affairs

CSI Number	Description	Quantity	Unit	Ľ	Unit Cost of Material	l	Total Cost of Material		Unit Cost of Labor		Total Cost of Labor		Total Cost: Material and Labor
09 7800	REINFORCED PLASTIC PANELING SYSTEM											Т	
	BLACK FRP WALL OUTSIDE OF TANK	150	SF	\$	3.00	\$	450.00	\$	7.00	\$	1,050.00	\$	1,500
	FRP CLADDING AT TOP OF TANKS	200	SF	\$	3.00	\$	600.00	\$	7.00	\$	1,400.00	\$	2,000
	FULLY ADHERED FRP PANEL (PARTITIONS TYPE 3, 9)	850	SF	\$	3.00	\$	2,550.00		7.00		5,950.00		8,500
						R	EINFORCED I	PLAS	TIC PANELING S	/STE	M - Sub-total:	\$	12,000
	DANIETING AND FINISHING			т	i			_		_		_	
09 9000	PAINTING AND FINISHING	3550	SF	 _	0.35	 	4 246 00	<u> </u>	4.50	۱.		<u> </u>	
	PAINT NEW CMU WALL AND EXISTING WALLS	3560	SF SF	\$	0.35		1,246.00		1.50		5,340.00		6,586
	PAINT GWB CEILING	4548		\$	0.30	\$	1,364.40	\$_	1.50		6,822.00	\$	8,186
	PAINT EXISTING CEILING	250	SF	١.		\$		_		\$	2,500.00	\$	2,500
	PAINT EXPOSED MECH PIPING CONDUITS, DUCTWORK	1	LS	\$	500.00	\$	500.00	ļ		\$	14,000.00	\$	14,500
	PAINT DOOR	4	LVS	 		\$	-	\$	200.00	\$	800.00	\$	800
	PATCH EXISTING CEILING AT SECOND FLOOR	250	LS	-		\$	-	\$	5.00	\$	1,250.00	\$	1,250
	PAINT EXISTING LADDER	1	EA	ـ		\$	- '			\$	2,000.00	\$	2,000
	MISCELLANEOUS FINISHES	1	LS	<u> </u>		\$	-			\$	8,750.00		8,750
								PAII	NTING AND FINIS	HIN	G - Sub-total:	\$	44,572
10 0000	SPECIALTIES			Т		I				_	···	_	
10 4400	DIMENSIONAL LETTERS - CUT ACRYLIC			1		 							
20 4400	CUT ACRYLIC WAY FINDING SIGNAGE ADHERED TO WALLPAPER -		LS	t				_		\vdash		Ś	5,000
	COTACH DE COMPANIE CO								SPECIA	ITIE	S - Sub-total:	Ś	5,000
					-				0.10.			Y	3,000
11 0000	EQUIPMENT												
11 4580	DISAPPEARING STAIRWAY	1	EΑ	\$	4,070.00	\$	4,070.00			\$	3,200.00	\$	7,270
									EQUIPI	MEN.	Γ - Sub-total։	\$	7,270
	A THE SAME AND SACROSCOPING MUSIC SYSTEM												
<u>11 5200</u>	VIDEO DISPLAY AND BACKGROUND MUSIC SYSTEM			_	4.425.00								
	TYPICAL TANK FISH ID LCD DISPLAY	4	LS	\$	1,435.00			\$		\$	3,440.00		9,180
					2,849.00	15	2,849.00	\$		\$	2,060.00	\$	4,909
	GRAPHIC MANAGEMENT SERVER SYSTEM	1				-							4,171
	BACKGROUND MUSIC SYSTEM	1	LS	\$	1,971.00			\$	2,200.00		2,200.00	\$	
					1,971.00 1,511.00	\$	1,511.00	\$	1,800.00	\$	1,800.00	\$	3,311
	BACKGROUND MUSIC SYSTEM	1	LS	\$	1,971.00 1,511.00	\$	1,511.00	\$		\$	1,800.00		3,311
13 0000	BACKGROUND MUSIC SYSTEM AV EQUIPMENT RACK SYSTEM	1	LS	\$	1,971.00 1,511.00	\$	1,511.00	\$	1,800.00	\$	1,800.00	\$	3,311
13 0000 13 1000	BACKGROUND MUSIC SYSTEM AV EQUIPMENT RACK SYSTEM SPECIAL CONSTRUCTION	1	LS	\$	1,971.00 1,511.00	\$	1,511.00	\$	1,800.00	\$	1,800.00	\$	3,311
13 0000 13 1000	BACKGROUND MUSIC SYSTEM AV EQUIPMENT RACK SYSTEM SPECIAL CONSTRUCTION AQUATIC LIFE SUPPORT SYSTEMS	1 1	LS LS	\$	1,971.00 1,511.00 VIDEO	\$ DISPL	1,511.00 AY AND BAC	\$	1,800.00	\$ STEM	1,800.00	\$	3,311 21,571
	BACKGROUND MUSIC SYSTEM AV EQUIPMENT RACK SYSTEM SPECIAL CONSTRUCTION AQUATIC LIFE SUPPORT SYSTEMS LIFE SUPPORT EQUIPMENT	1	LS	\$	1,971.00 1,511.00	\$ DISPL	1,511.00	\$	1,800.00 DUND MUSIC SY	\$ STEM	1,800.00 I - Sub-total:	\$	3,311 21,571 256,000
	BACKGROUND MUSIC SYSTEM AV EQUIPMENT RACK SYSTEM SPECIAL CONSTRUCTION AQUATIC LIFE SUPPORT SYSTEMS	1 1	LS	\$	1,971.00 1,511.00 VIDEO	\$ DISPL	1,511.00 AY AND BAC	\$ KGR	1,800.00	\$ STEM	1,800.00	\$	3,311. 21,571. 256,000. 240,000.



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CSI Number	Description	Quantity	Unit	ı	Unit Cost of Material	Tota Cost Mater	of		t Cost .abor		Total Cost of Labor	Total Cost Material and Labo
13 1300	AQUARIUM TANKS AND HABITATS											
	TANKS INCL. STANDS AND INSTALLATION	4	EA	\$	106,123.00	\$ 424,	192.00	\$	52,000.00	\$	208,000.00	\$ 632,49
	RIGGING / INSTALLATION	1	LS	<u> </u>		\$			-	\$	18,000.00	 12,00
	TANK SHIPPING	2	LS			\$	-	\$	9,100.00		18,200.00	18,2
	IN TANK THEMING MATERIALS	1	LS	ļ		\$	-		.48,500.00	•	148,500.00	148,5
						,	QUAR	UM TANK	S AND HA	BITAT	S - Sub-total:	\$ 811,1
13 5060	AQUARIUM EXHIBIT TANK LIGHTING (included w/ Division 26			<u> </u>								
			AQUAF	RIUM	EXHIBIT TANK	LIGHTING (nclude	l w/ Divisi	on 26 sect	ions)	- Sub-total:	\$
21 0000	FIRE SUPPRESSION		T				-			Г		
21 1300	AUTOMATIC SPRINKLER SYSTEM											
	WET SPRINKLER SYSTEM:											
	3" DIA PIPE (BLACK STEEL SCH-10)	60	LF	\$			180.00		58.00	\$	3,480.00	\$ 3,90
	2 1/2" DIA PIPE (BLACK STEEL SCH-10)	160	LF	\$	7.00		20.00			\$		\$ 9,44
	2" DIA PIPE (BLACK STEEL SCH-40)	20	LF	\$	6.00		120.00			\$		\$ 1,08
	1 1/2" DIA PIPE (BLACK STEEL SCH-10)	25	ŁF	\$	5.00	·	125.00		38.00	\$		\$ 1,07
	1 1/4" DIA PIPE (BLACK STEEL SCH-10)	40	LF	\$	4.00		160.00	· ·		\$	1,440.00	\$ 1,60
	1" DIA PIPE (BLACK STEEL SCH-10)	100	LF	\$	3.00		300.00		28.00	\$	2,800.00	\$ 3,10
	2" DIA DRAIN DOWN PIPE (BLACK STEEL SCH-10)	1	LF	\$	508.00		08.00		2,286.00	\$	2,286.00	\$ 2,79
	SPRINKLER HEAD	46	EA	\$	34.00		64.00		42.00	\$	1,932.00	\$ 3,49
	FLOOR CONTROL VALVE ASSEMBLY & TEST CONNECTION	1	EA	\$	1,120.00	\$ 1,1	20.00	\$	1,312.00	\$	1,312.00	\$ 2,43
	TIE-IN	3	EA			\$	-	\$	630.00	\$	1,890.00	\$ 1,89
****	SYSTEM DRAIN DOWN AND FILL	5	EA			\$	-	\$		\$	3,150.00	\$ 3,15
	CLEAN, FLUSH AND TEST	1	LŞ			\$	-	\$		\$	1,250.00	\$ 1,25
	SYSTEM ID, LABELS AND COLOR CODING	1	LS	\$	242.00		42.00	\$		\$	492.00	\$ 73
	CORE DRILLING CUTTING, PATCHING AND FIRE STOPPING	4	LS	\$	22.00	·		\$		\$	1,320.00	\$ 1,40
	PAINTING OF MAIN PIPE	1	LS	\$	150.00			\$		\$	3,067.00	\$ 3,21
	SEISMIC RESTRAINTS / MISC. SYSTEM SUPPORTS	8	LS	\$	500.00		00.00			\$	1,000.00	\$ 5,00
	THE COURSE COURSE OF THE COURS	1	LS	\$	5,500.00	\$ 5,5	00.00	\$	9,800.00	\$	9,800.00	\$ 15,30
	MISC. (SUB-CONTRACTOR) JOB EXPENSES										- Sub-total:	 60,92



Project: Staten Island Zoo Aquarium Reconstruction

Location: 614 Broadway, Staten Island, NY 10310

Bidder: SIGNATURE CONSTRUCTION GROUP

CONTRACT 1 - GENERAL CONSTRUCTION WORK

DOC ID: PV175AQUA

REMOVE EXISTING FLOOR DRAIN W/ ASSOC. PIPING 1	CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor		Total Cost of Labor	Total Cos Materia and Labe
DEMOLITION: REMOVE EXISTING PLUMBING FIXTURE W/ ASSOC. PIPING 8	22 0000	PLUMBING								
REMOVE EXISTING PLUMBING FIXTRE W/ ASSOC. PIPING 5	22 0500	GENERAL REQUIREMENTS FOR PLUMBING WORK								1
REMOVE EXISTING FLOOR DRAIN W/ ASSOC. PIPING 1		DEMOLITION:								1
REMOVE EXISTING SUMP PUMP W/ ASSOC. PIPING REMOVE EXISTING PIPE 116 REMOVE EXISTING PIPE 118 REA S S S 10.00 \$ 1.860 S 1.000 \$ 1.860 DISCONNECT AND CAP PIPE 118 REA S S S \$ 10.00 \$ 1.860 S 1.500 MISC DEMOLITION (INCL. CARTING AND DISPOSAL) MISC DEMOLITION (INCL. CARTING AND DISPOSAL) 1 LS S S S S 20.00 \$ 2.500 WATER FOR CONSTRUCTION 1 LS S S S S 20.00 \$ 2.500 DISTRIBUTION (FIXTURES AND PIPE) 1 LS S S S S 1.200.00 \$ 1.200 CORE DRILL, CUTTING, PATCHING AND FIRE STOPPING 23 LS S S S 1.200.00 \$ 4.692 BREAK CONCRETE AND EXCAVATE TO SUIT SYSTEM STARTUP AND COMMISSION 1 LS S S S 1.200.00 \$ 1.200 MISC. (SUB-CONTRACTOR) JOB EXPENSES 1 LS S S S 1.200.00 \$ 1.200 MISC. (SUB-CONTRACTOR) JOB EXPENSES 1 LS S S S S.00.00 \$ 3.500 PLUMBING - SUB-TO-TO-TO-TO-TO-TO-TO-TO-TO-TO-TO-TO-TO-		REMOVE EXISTING PLUMBING FIXTURE W/ ASSOC. PIPING	8	EA		\$ -	\$ 26	0.00	\$ 2,080.00	\$ 2,08
REMOVE EXISTING PIPE		REMOVE EXISTING FLOOR DRAIN W/ ASSOC. PIPING	5	EA		\$ -	\$ 26	0.00	\$ 1,300.00	\$ 1,30
CUT AND CAP PIPE		REMOVE EXISTING SUMP PUMP W/ ASSOC. PIPING	1		J	\$ -	\$ 26	0.00	\$ 260.00	
DISCONNECT AND CAP AQUARIUM EQUIPMENT AND PIPING 1		REMOVE EXISTING PIPE	116	LF		\$ -	\$ 1	0.00	\$ 1,160.00	\$ 1,16
MISC DEMOLITION (INCL. CARTING AND DISPOSAL) 1		CUT AND CAP PIPE	18	EA		\$ -	\$ 1	0.00	\$ 180.00	\$ 18
MISC DEMOLITION (INCL. CARTING AND DISPOSAL) 1		DISCONNECT AND CAP AQUARIUM EQUIPMENT AND PIPING	1	LS		\$ -	\$ 1,50	0.00	\$ 1,500.00	\$ 1,50
WATER FOR CONSTRUCTION 1		MISC DEMOLITION (INCL. CARTING AND DISPOSAL)	1	L\$		\$ -	\$ 2,50	0.00		\$ 2,50
DISTRIBUTION (FIXTURES AND PIPE)		WATER FOR CONSTRUCTION	1	LS		\$ -	\$ 20	0.00		\$ 20
CORE DRILL, CUTTING, PATCHING AND FIRE STOPPING BREAK CONCRETE AND EXCAVATE TO SUIT SYSTEM STARTUP AND COMMISSION MISC. (SUB-CONTRACTOR) JOB EXPENSES 1 LS SYSTEM STARTUP AND COMMISSION MISC. (SUB-CONTRACTOR) JOB EXPENSES 1 LS SYSTEM STARTUP AND COMMISSION MISC. (SUB-CONTRACTOR) JOB EXPENSES 1 LS SYSTEM STARTUP AND COMMISSION ILS SYSTEM STARTUP AND COMMISSION ILS SYSTEM STARTUP AND COMMISSION ILS SYSTEM STARTUP AND COMMISSION FLUMBING CONTRACTOR) JOB EXPENSES 1 LS SYSTEM STARTUP AND COMMISSION FLUMBING CONTRACTOR) JOB EXPENSES 1 LS SYSTEM STARTUP AND COMMISSION ELECTRIC MOTORS AND MOTOR CONTROLLERS (Included w/ section 223000) - Sub-total- ELECTRIC MOTORS AND MOTOR CONTROLLERS (Included w/ section 223000) - Sub-total- ELECTRIC MOTORS AND MOTOR CONTROLLERS (Included w/ section 223000) - Sub-total- ELECTRIC MOTORS AND MOTOR CONTROLLERS (Included w/ section 223000) - Sub-total- ELECTRIC MOTORS AND MOTOR CONTROLLERS (Included w/ section 223000) - Sub-total- ELECTRIC MOTORS AND MOTOR CONTROLLERS (Included w/ section 223000) - Sub-total- ELECTRIC MOTORS AND MOTOR CONTROLLERS (Included w/ section 223000) - Sub-total- ELECTRIC MOTORS AND MOTOR CONTROLLERS (Included w/ section 223000) - Sub-total- ELECTRIC MOTORS AND MOTOR CONTROLLERS (Included w/ section 223000) - Sub-total- ELECTRIC MOTORS AND MOTOR CONTROLLERS (Included w/ section 223000) - Sub-total- ELECTRIC MOTORS AND MOTOR CONTROLLERS (Included w/ section 223000) - Sub-total- ELECTRIC MOTORS AND MOTOR CONTROLLERS (Included w/ section 223000) - Sub-total- ELECTRIC MOTORS AND MOTOR CONTROLLERS (Included w/ section 223000) - Sub-total- ELECTRIC MOTORS AND MOTOR CONTROLLERS (Included w/ section 223000) - Sub-total- ELECTRIC MOTORS AND MOTOR CONTROLLERS (Included w/ section 223000) - Sub-total- ELECTRIC MOTORS AND MOTOR CONTROLLERS (Included w/ section 223000) - Sub-total- ELECTRIC MOTORS AND MOTOR CONTROLLERS (Included w/ section 223000) - Sub-total- ELECTRIC MOTORS AND MOTOR CONTROLLERS (Included w/ section 223000) - Sub-total		DISTRIBUTION (FIXTURES AND PIPE)		LS			1			
CORE DRILL, CUTTING, PATCHING AND FIRE STOPPING 23			1	LS		\$ -	\$ 1,20	0.00	\$ 1,200.00	\$ 1,20
BREAK CONCETTE AND EXCAVATE TO SUIT LS S S 1,200.00 S 1,200.		CORE DRILL, CUTTING, PATCHING AND FIRE STOPPING	23	LS		\$ -				
MISC. (SUB-CONTRACTOR) JOB EXPENSES 1				LS						,,,,,,
MISC. (SUB-CONTRACTOR) JOB EXPENSES 1		SYSTEM STARTUP AND COMMISSION	1	LS		\$ -	\$ 1.20	0.00	1,200.00	\$ 1.20
PLUMBING - Sub-total: 22 0513		MISC. (SUB-CONTRACTOR) JOB EXPENSES	1	LS		\$ -				
PLUMBING CONNECTION @ AQUARIUM EQUIPMENT LS	<u>22 0513</u>	ELECTRIC MOTORS AND MOTOR CONTROLLERS (included w/		TRIC MACY	TOPS AND MOTOR S			T		
2" RPZA 1 EA \$ 758.00 \$ 758.00 \$ 262.00	<u>22 0513</u>	ELECTRIC MOTORS AND MOTOR CONTROLLERS (Included w/	ELEC	TRIC MOT	ORS AND MOTOR C	ONTROLLERS (Incl		T		\$ 19,77
1" RPZA 1 EA \$ 388.00 \$ 388.00 \$ 262.00			ELEC	TRIC MOT	ORS AND MOTOR C	ONTROLLERS (Incl		T		
1" RPZA		VALVES	ELEC		ORS AND MOTOR C	ONTROLLERS (Incl		T		
1 1/4" WATER METER		VALVES PLUMBING CONNECTION @ AQUARIUM EQUIPMENT		LS			uded w/ section	223000) - Sub-total:	\$
VALVES - Sub-tot VALVES - Su		VALVES PLUMBING CONNECTION @ AQUARIUM EQUIPMENT 2" RPZA	1	LS EA	\$ 758.00	\$ 758.00	uded w/ section	223000) - Sub-total: 262.00	\$ 1,02
VALVES - Sub-tot 22 0529 HANGERS AND SUPPORTS		VALVES PLUMBING CONNECTION @ AQUARIUM EQUIPMENT 2" RPZA 1" RPZA	1	LS EA EA	\$ 758.00	\$ 758.00	uded w/ section	223000) - Sub-total: 262.00	\$
HANGERS AND SUPPORTS (INCL. SEISMIC SUPPORTS) 1 LS \$ 1,192.00 \$ 6,650.00 \$ 6,650.00 HANGERS AND SUPPORTS - Sub-tot 22 0553 IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT		VALVES PLUMBING CONNECTION @ AQUARIUM EQUIPMENT 2" RPZA 1" RPZA 1 1 1/4" WATER METER	1 1	LS EA EA	\$ 758.00 \$ 388.00	\$ 758.00 \$ 388.00	uded w/ section \$ 26:	223000 2.00 \$ 2.00 \$) - Sub-total: 262.00 262.00	\$ 1,02 \$ 65
HANGERS AND SUPPORTS (INCL. SEISMIC SUPPORTS) 1 LS \$ 1,192.00 \$ 6,650.00 \$ 6,650.00 HANGERS AND SUPPORTS - Sub-tot 22 0553 IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT		VALVES PLUMBING CONNECTION @ AQUARIUM EQUIPMENT 2" RPZA 1" RPZA 1 1 1/4" WATER METER	1 1	LS EA EA	\$ 758.00 \$ 388.00	\$ 758.00 \$ 388.00	uded w/ section \$ 26:	223000 2.00 \$ 2.00 \$	262.00 262.00 3,500.00	\$ 1,02 \$ 65 \$ 6,00
HANGERS AND SUPPORTS - Sub-tot 22 0553 IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT	22 0523	VALVES PLUMBING CONNECTION @ AQUARIUM EQUIPMENT 2" RPZA 1" RPZA 1 1/4" WATER METER VALVES AND ACCESSORIES	1 1	LS EA EA	\$ 758.00 \$ 388.00	\$ 758.00 \$ 388.00	uded w/ section \$ 26:	223000 2.00 \$ 2.00 \$	262.00 262.00 3,500.00	\$ 1,02 \$ 65 \$ 6,00
22 0553 IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT	22 0523	VALVES PLUMBING CONNECTION @ AQUARIUM EQUIPMENT 2" RPZA 1" RPZA 1 1/4" WATER METER VALVES AND ACCESSORIES HANGERS AND SUPPORTS	1 1	LS EA EA EA LS	\$ 758.00 \$ 388.00 \$ 2,500.00	\$ 758.00 \$ 388.00 \$ 2,500.00	uded w/ section \$ 26; \$ 26; \$ 3,500	223000 2.00 \$ 2.00 \$ 2.00 \$ VAL	262.00 262.00 262.00 3,500.00 VES - Sub-total:	\$ 1,02 \$ 65 \$ 6,00
	22 0523	VALVES PLUMBING CONNECTION @ AQUARIUM EQUIPMENT 2" RPZA 1" RPZA 1 1/4" WATER METER VALVES AND ACCESSORIES HANGERS AND SUPPORTS	1 1	LS EA EA EA LS	\$ 758.00 \$ 388.00 \$ 2,500.00	\$ 758.00 \$ 388.00 \$ 2,500.00	\$ 26; \$ 26; \$ 3,500	223000 2.00 \$ 2.00 \$ 2.00 \$ VAL) - Sub-total: 262.00 262.00 3,500.00 VES - Sub-total: 6,650.00	\$ 1,02 \$ 65 \$ 6,00
SYSTEM ID/ VALVE TAGS 1 LS \$ 400.00 \$ 400.00 \$ 800.00 \$ 800.00 \$	22 0523	VALVES PLUMBING CONNECTION @ AQUARIUM EQUIPMENT 2" RPZA 1" RPZA 1 1/4" WATER METER VALVES AND ACCESSORIES HANGERS AND SUPPORTS	1 1	LS EA EA EA LS	\$ 758.00 \$ 388.00 \$ 2,500.00	\$ 758.00 \$ 388.00 \$ 2,500.00	\$ 26; \$ 26; \$ 3,500	223000 2.00 \$ 2.00 \$ 2.00 \$ VAL) - Sub-total: 262.00 262.00 3,500.00 VES - Sub-total: 6,650.00	\$ 1,02: \$ 65: \$ 6,00: \$ 7,67:
	22 0523	VALVES PLUMBING CONNECTION @ AQUARIUM EQUIPMENT 2" RPZA 1" RPZA 1 1/4" WATER METER VALVES AND ACCESSORIES HANGERS AND SUPPORTS HANGERS AND SUPPORTS (INCL. SEISMIC SUPPORTS)	1 1	LS EA EA EA LS	\$ 758.00 \$ 388.00 \$ 2,500.00	\$ 758.00 \$ 388.00 \$ 2,500.00	\$ 26; \$ 26; \$ 3,500	223000 2.00 \$ 2.00 \$ 2.00 \$ VAL) - Sub-total: 262.00 262.00 3,500.00 VES - Sub-total: 6,650.00	\$ 1,02 \$ 65 \$ 6,00 \$ 7,676
	22 0523	VALVES PLUMBING CONNECTION @ AQUARIUM EQUIPMENT 2" RPZA 1" RPZA 1 1/4" WATER METER VALVES AND ACCESSORIES HANGERS AND SUPPORTS HANGERS AND SUPPORTS (INCL. SEISMIC SUPPORTS)	1 1 1	LS EA EA EA LS	\$ 758.00 \$ 388.00 \$ 2,500.00 \$ 1,192.00	\$ 758.00 \$ 388.00 \$ 2,500.00 \$ 1,192.00	\$ 26: \$ 26: \$ 3,500 \$ 6,650 HANGERS AND	2.00 \$ 2.00 \$ 2.00 \$ VALV	3,500.00 VES - Sub-total:	\$ 1,02 \$ 65 \$ 6,00 \$ 7,67 \$ 7,842
IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT - Sub-tot	22 0523	VALVES PLUMBING CONNECTION @ AQUARIUM EQUIPMENT 2" RPZA 1" RPZA 1 1/4" WATER METER VALVES AND ACCESSORIES HANGERS AND SUPPORTS HANGERS AND SUPPORTS (INCL. SEISMIC SUPPORTS) IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT SYSTEM ID/ VALVE TAGS	1 1 1	LS EA EA EA LS LS	\$ 758.00 \$ 388.00 \$ 2,500.00 \$ 1,192.00	\$ 758.00 \$ 388.00 \$ 2,500.00 \$ 1,192.00 \$ 400.00	\$ 266 \$ 266 \$ 3,500 \$ 6,650 HANGERS AND 9	223000 2.00 \$ 2.00 \$ VALV	262.00 262.00 262.00 3,500.00 VES - Sub-total: 6,650.00 RTS - Sub-total:	\$ 1,02 \$ 65 \$ 6,00 \$ 7,676



Project: Staten Island Zoo Aquarium Reconstruction

Location: 614 Broadway, Staten Island, NY 10310

Bidder: SIGNATURE CONSTRUCTION GROUP

CONTRACT 1 - GENERAL CONSTRUCTION WORK

DOC ID:

PV175AQUA

CSI Number	Description	Quantity	Unit		nit Cost of Material	Co	otal st of terial	•	nit Cost of Labor		Total Cost of Labor	٨	otal Cost Material and Labo
22 0577	PLUMBING SYSTEM TESTS												
	PLUMBING SYSTEM TESTS	1	LS	<u> </u>				\$	2,500.00		2,500.00		2,500
								PLUME	ING SYSTEM	TEST	S - Sub-total	\$	2,500
22 0700	PLUMBING INSULATION			—		<u> </u>		ļ		<u> </u>			
	DOMESTIC WATER-PIPE INSULATION	1	EA	_		\$	-	\$	5,085.00		5,085.00		5,08
	SANITARY WASTE PIPE INSULATION (DWG P-100)	1	EA	<u> </u>		\$		\$	1,500.00	•	1,500.00		1,50
								PLUA	IBING INSUL	OITA	l - Sub-total:	\$	6,58
		·											
22 1000	PIPE, TUBE AND FITTINGS			├ ─		ļ		<u> </u>		_			
	FITTINGS (INCLUDED W/ 221100, 221300, 231123)			١.		ļ				I		L	
	DRIP PAN @ ELECTRICAL ROOM	1 1	L\$	\$	200.00	1 \$	200.00	\$	800.00		800.00	\$	1,00
								PIPE, T	UBE AND FIT	TINGS	- Sub-total:	\$	1,00
22 1100	WATER SUPPLY SYSTEMS			т	·	T				_			
22 1100	DOMESTIC WATER PIPE:		 	┼	-					├			
	2" DIA	60		Ś	12.00	Ś	720.00	Ś	55.00	c -	3,300.00	-	4,02
	1" DIA	250	 	 * -			2,000.00	Ś	48.00	Ś	12,000.00		14,00
	3/4" DIA	210	<u> </u>	Š		\$	840.00		42.00	<u> </u>	8,820.00		9,66
	3/4" - 1" VALVED AND CAPPED OUTLET	20		Š	34.00	\$		Ś	80.00		1,600.00		2,28
	2" DIA	2		Ś		\$	330.00	\$	100.00		200.00		<u>2,28</u> 53
	TIE-IN DOMESTIC WATER PIPE	1		 	105.00	3	330.00	Ś	800.00		800.00		80
	HOSE BIBB	2		5	28.00	Ś	56.00	Ś	56.00		112.00		16
	TRAP PRIMER (INCL. TRAP PRIMER VALVE, DISTRIBUTION	7		Ś		Ś	672.00	7	55.00			Š	1,05
	THE THINK HOLD THE THE THE THE THE THE THE THE THE THE	<u> </u>		7	30.00	· ·			SUPPLY SYS			<u> </u>	32,51
										Livio	Jun-total.	7	32,31
22 1300	DRAINAGE SYSTEMS			T									
	DUPLEX SEWAGE EJECTOR AND SUMP PUMP SP-C/1-75 GPM, 1 BHP	1	PKG	\$	83,044.00	\$ 8	3,044.00	\$	1,865.00	Ś	1,865.00	Ś	84,90
	SANITARY WASTE AND VENT PIPE:			T								-	5.700
	4" DIA (UNDER SLAB)	40	LF	\$	28.00	\$	1,120.00	\$	14.00	Ś	560.00	Ś	1,68
	3" DIA (UNDER SLAB)	15	LF	\$	19.00	\$	285.00	\$	12.00	Ś		\$	46
	4" DIA (ABOVE GROUND)	50	LF	\$	15.00	\$	750.00	\$		Ś		\$	1,400
	3" DIA (ABOVE GROUND)	50	LF	\$	14.00	\$	700.00		11.00	Ś		\$	1,250
	2" DIA (ABOVE GROUND)	220	LF	\$	12.00	\$	2,640.00	\$	9.00	\$		\$	4,620
	2" DIA PUMP DISCHARGE PIPE	30	LS	\$	12.00	\$	360.00		9.00	\$	·	Ś	630
	TIE- IN SANITARY WASTE AD VENT	1	EA	\$	100.00	\$	100.00	\$		\$		Ś	1,300
	CLEAN-OUT	1	EA	\$	250.00	\$	250.00	\$		\$		\$	565
	FLOOR DRAIN	7	EA	\$	1,200.00	\$ 8	3,400.00	\$		\$			16,800
	TRENCH DRAIN (CONNECTION ONLY)	1	EA			\$	- 1	\$	2,500.00	\$		\$	2,500
										·		<u> </u>	



Project: Staten Island Zoo Aquarium Reconstruction

Location: 614 Broadway, Staten Island, NY 10310

SIGNATURE CONSTRUCTION GROUP

CONTRACT 1 - GENERAL CONSTRUCTION WORK

DOC ID: PV175AQUA

CSI Number	Description	Quantity	Unit		Unit Cost of Material	Total Cost of Material		Unit Cost of Labor		otal Cost of Labor		Total Cos Materia and Labo
22 3000	PLUMBING EQUIPMENT, SPECIAL TIES AND ACCESSORIES		1	т-	· · · · · · · · · · · · · · · · · · ·	T	_				_	
	SPECIALTIES & ACCESSORIES (INCL. PIPE EXPANSION	1	LS	Ś	3,000.00	\$ 3,000.00	-	2,000.00	s	2,000.00	S	5.00
				1.7.		EQUIPMENT, SPEC		IES AND ACCES	SORIES	2,000.00 S - Sub-total	13	5,00 5,00
											7	3,00
22 4000	PLUMBING FIXTURES			Т					T		T	
	P-2 - SHOWER (TRIM ONLY)	1	EA	\$	250.00	\$ 250.00	\$	185.00	\$	185.00	15	43
	P-4 - SLOP SINK	3	EA	\$	450.00	\$ 1,350.00	\$	380.00		1,140.00		2,49
	FIXTURE ROUGHING	4	EA	\$	550.00	\$ 2,200.00	\$	1,200.00	\$	4,800.00		7,00
								PLUMBING FIX	TURES	- Sub-total:	\$	9,92
23 0000	IHVAC		1				т					
23 0000	GENERAL REQUIREMENTS FOR HVAC WORK			╁─			├		 		├_	
	DEMOLITION:			┪					-		├-	
	REMOVE EXISTING BOILER W/ ASSOC. PIPING AND			1								
	CONTROLS	3	EA	\$	500.00	\$ 1,500.00	\$	2,500.00	\$	7,500.00	\$	9,00
	REMOVE EXISTING BOILER FLUE	1	LS	5	1,000.00	\$ 1,000.00	5	3,000.00	-	3,000.00	-	4,00
	DISCONNECT AND CAP EXISTING BOILER FLUE AS			1.						3,000.00	7	4,00
	INDICATED	1	EA	\$	50.00	\$ 50.00	\$	250.00	\$	250.00	\$	30
	REMOVE EXISTING BOILER FEED PUMP	1	EA	\$	200.00	\$ 200.00	Ś	1,300.00	3	1,300.00	<	1,50
	REMOVE EXISTING CAST IRON RADIATOR (INCL.			1							_	1,30
	TEMPORARY CAPS @ STEM PIPE	1	EA	\$	50.00	\$ 50.00	\$	800.00	\$	800.00	\$	85
	DISCONNECT AND REMOVE EXISTING DUCT @ ATTIC	1	LS	\$	50.00	\$ 50.00	\$	1,000.00	s	1,000.00	\$	1,05
	REMOVE EXISTING PIPE	600	LF			\$ -	\$	5.00	Ś		\$	3,00
	CUT AND CAP PIPE	25	EA	\$	30.00	\$ 750.00	\$	70.00	Ś		Ś	2,50
	MISC. DEMOLITION (INCL. CARTING AND DISPOSAL)	1	LS			\$ -	\$	2,500.00	Ś	2,500.00	Ś	2,50
	TEMPORARY BOILER (12 MONTHS)		LS						- -	-/	<u></u>	2,50
	DRIP PAN	1	EA	\$	300.00	\$ 300.00	\$	300.00	Ś	300.00	Ś	60
	HEAT TRACING	110	LF	\$	60.00	\$ 6,600.00			Ś		Ś	6,60
	RIGGING AND EQUIPMENT HANDLING	1	L\$	\$	-	\$ -	\$	5,000.00	\$	12,000.00	Ś	12,00
	MATERIAL DISTRIBUTION LS	l.	L\$								-	
	CORE DRILL, CUTTING, PATCHING AND FIRE STOPPING	1	LS			\$ -			\$	1,000.00	Ś	1,000
	MISC. (SUB-CONTRACTOR JOB EXPENSES	1	LS			\$ -			\$	2,000.00	\$	2,000
	· · · · · · · · · · · · · · · · · · ·								HVAC -	Sub-total:	\$	46,900
23 0513	ELECTRIC MOTORS AND MOTOR CONTROLLERS			r—								
23 0323	VFD	1	LS	5	2,175.00	\$ 2,175.00			_		_	
	Tily		LJ	٧.		CTRIC MOTORS AN			\$		\$	2,175



Project: Staten Island Zoo Aquarium Reconstruction

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CONTRACT 1 - GENERAL CONSTRUCTION WORK

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CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cos Materia
23 0548	VIBRATION CONTROL						 	and Labo
	VIBRATION ISOLATION SEISMIC	1	LS		\$ -	 	ļ	L
				<u> </u>	17	VIDDATION	\$ 2,100.00	\$ 2,10
			· · · · · · · · · · · · · · · · · · ·	······································		VIBRATION CO	NTROL - Sub-total:	\$ 2,10
23 0593	TESTING AND BALANCING		T	T				
	INSPECTION EXISTING FLUE	1	LS		s -			
	TEST AND BALANCE (EQUIPMENT AND AIR SIDE SYSTEM)	1	LS	 	2	\$ 1,700.00	\$ 1,700.00	\$ 1,70
	TEST (PIPING SYSTEMS)	1	LS	 	\$.	\$ 2,100.00	\$ 2,100.00	\$ 2,10
			1 13	<u> </u>		\$ 1,300.00	\$ 1,300.00	\$ 1,30
						TESTING AND BALAN	ICING - Sub-total:	\$ 5,10
23 0700	HVAC INSULATION	T						-
	6" DIA LPS/R PIPE INSULATION (FIBERGLASS 3" WALL)	30	LF	\$ 260				
	4" DIA LPS/R PIPE INSULATION (FIBERGLASS 3" WALL)	120	LF	2.00	7 .0.00	\$ 3.00	\$ 90.00	\$ 168
	3" DIA LPS/R PIPE INSULATION (FIBERGLASS 3" WALL)	65	LF	4.77			\$ 260.40	\$ 469
	2" DIA LPS/R PIPE INSULATION (FIBERGLASS 3" WALL)	200	LF	\$ 1.74 \$ 0.87		\$ 2.17	\$ 141.05	\$ 254
	1 1/4" - 1 1/2" DIA LPS/R PIPE INSULATION (FIBERGLASS 3" WALL)	200	LF		\$ 174.00	\$ 1.50	\$ 300.00	\$ 474
	INSULATION MAKE-UP WATER PIPE @ BOILER (FIBERGLASS 1" WALL)	150	LF	\$ 0.87	\$ 174.00		\$ 300.00	\$ 474
	NEW INSULATION FOR EXIST. LPS/C PIPE@ BOILER RM (INCL.	150		\$ 0.87	\$ 130.50	7 1,00	\$ 199.50	
	2" DIA CHWS/R PIPE INSULATION (FIBERGLASS 1 1/2" WALL)	200	LS	\$ 3,900.00	\$ 3,900.00	\$ 6,900.00	\$ 6,900.00	\$ 10,800
	REFRIGERANT PIPE INSULATION (FIBERGLASS 1 1/2" WALL)	350	LF	\$ 1.74		\$ 1.78	\$ 356.00	\$ 704
	INSULATION PREFABRICATED ROOF CURB (REFRIGERANT	350	LF	\$ 1.74	\$ 609.00	\$ 2.00	\$ 700.00	\$ 1,309
	1" DIA CONDENSATE DRAIN PIPE INSULATION (FIBERGLASS 1" WALL)	200	LS	\$ 260.00	\$ 260.00	\$ 870.00	\$ 870.00	\$ 1,130
	1 1/2" THINK DUCT INSULATION	3500	LF	\$ 0.87	\$ 174.00	\$ 1.75	\$ 350.00	5 524
	EQUIPMENT INSULATION INCL. SHEET METAL ENCLOSURE	3500	SF	\$ 3.48	\$ 12,180.00	\$ 5.00	\$ 17,500.00	29,680.
	WEATHER PROOF JACKET @ OUTDOOR PIPING		LS	\$ 653.00		-,500.00	\$ 1,300.00	
		180	LF	\$ 35.00	\$ 6,300.00	\$ 110.00	\$ 19,800.00	
						HVAC INSULAT	ION - Sub-total: 5	



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CSI Number	Description	Quantity	Unit		nit Cost of Material	Total Cost of Material		Unit Cost of Labor		Total Cost of Labor	'	otal Cos Materia and Labo
23 0913	AUTOMATIC TEMPERATURE CONTROLS								_		╁	allu Labi
	BOILER (INCL. 1 CONTROL PANEL)	5	EA	\$	870.00	\$ 4,350,00	Ś	1,740.00	1 5	8,700.00	s	13,05
	FAN COIL UNIT	6	UNIT	\$	261.00	\$ 1,566.00	5	1,044.00		6,264.00		7,83
	CONDENSING UNIT	1	UNIT	\$	348.00			1,305.00		1,305.00	7	1,65
	ENERGY RECOVERY UNIT	1	UNIT	\$	2,610.00			5,655.00		5,655.00		8,26
	AHU	1	UNIT	\$	4,350.00			8,700.00		8,700.00		
	BOILER FEED PUMP RECEIVER	1	PKG	\$	870.00			1,740.00		1,740.00		13,0
	CONTROL VALVE @ CAST IRON RADIATOR	1	EA	S	174.00			870.00		870.00		2,61
	PRE-HEAT COIL (STEAM)	1	EA	Ś	175.00			1,740.00				1,04
	CABINET UNIT HEATER	1	EA	Ś	175.00		3	1,305.00		1,740.00		1,9
	CONDENSATE DRAIN PUMP	1	EA	s	130.00		<u> </u>	435.00	-	1,305.00	\$	1,48
	FSD./ AD	5	EA	Ś	600.00			740.00		435.00	\$	50
	MD	4	EA	Š	435.00			740.00		3,700.00		6,70
	CO AND METHANE DETECTOR	1	LS	5	435.00	1 -7. 10100	_	435.00		2,960.00		4,70
	EMERGENCY BREAK GLASS STATION	5	EA	Ś		\$ 600.00	_		-	435.00		87
	T-STAT	1	EA	Ś		\$ 500.00		150.00			\$	1,35
	LEAK DETECTOR	1	LS	Š		\$ 435.00		2,000.00		2,000.00	\$	2,50
	MISC. CONTROL REQUIREMENTS	1	LS	Š		\$ 15,250.00		870.00	<u> </u>	870.00	-	1,30
				Y	15,250.00	7 13,230.00	>	17,000.00	\$	17,000.00	· ·	32,25 101.13
23 1123	FUEL GAS SYSTEM			· · · ·					_			
	4" DIA BLACK STEEL SCH-40	10	LF	Ś	35.00	\$ 350.00	_		ļ	[
	1 1/2" DIA BLACK STEEL SCH-40	25	LF	÷ -					\$		\$	1,39
	CONNECTION TO HVAC EQUIPMENT (EXIST. BOILER) W/ SHUT-OFF	5 5	EA	2				44.00	\$	1,100.00	<u> </u>	1,52
	TIE-IN NATURAL GAS PIPE	10	EA EA	2					\$		\$	6,07
-	MISC. NATURAL GAS SYSTEM REQUIREMENTS (INCL. NEW CAPS)	1 1		\$	35.00				\$		\$	1,050
	THE CAPS		13	\$	1,300.00	\$ 1,300.00	\$	2,175.00		2,175.00	\$	3,475
			• • • • • • • • • • • • • • • • • • • •	·				FUEL GAS SY	STEM	Sub-total:	\$	13,51
23 1553	IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT	T - T										
	SYSTEM ID/ VALVE TAGS	1 1	LS	\$	1,740.00	\$ 1,740.00						
	PAINTING	1 1		\$	870.00	7 -7. 10100		4,350.00				6,090
		<u> </u>	ادا	7				2,175.00	\$	2,175.00	\$	3,045
					IDENTIFI	CATION FOR HVAC	. PIPII	NG AND EQUIPA	MENT -	Sub-total:	š	9,135



Project: Staten Island Zoo Aquarium Reconstruction

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CSI Number	Description	Quantity	Unit		Unit Cost of Material	Total Cost of Material		Unit Cost of Labor	Total Cost of Labor		otal Cost: Material and Labor
23 2113	PIPING SYSTEMS AND ACCESSORIES		<u> </u>	Т							
	LPS/C PIPE		LF	┸						T	
	6" DIA BLACK STEEL SCH-40	30	LF	\$	57.00			126.00	\$ 3,780.00	\$	5,490.00
	4" DIA BLACK STEEL SCH-40	120	LF	\$	35.00	.,		85.00	\$ 10,200.00	\$	14,400.00
	3" DIA BLACK STEEL SCH-40	65	LF	\$	26.00			74.00	\$ 4,810.00	\$	6,500.00
	2" DIA BLACK STEEL SCH-40	200	LF	\$	17.00			40.00	\$ 8,000.00	\$	11,400.00
	1 1/4" - 1 1/2" DIA BLACK STEEL SCH-80	200	LF	\$	16.00			40.00	\$ 8,000.00	\$	11,200.00
	TIE-IN LPS/C PIPE @ BOILER ROOM	15	EA	\$	35.00	\$ 525.00		61.00	\$ 915.00	\$	1,440.00
	TIE-IN LPS/C PIPE @ NEW RADIATOR	15	EA	\$	35.00	\$ 525.00	\$	61.00	\$ 915.00	\$	1,440.00
	MAKE-UP WATER PIPE @ BOILER	50	LF	\$	16.00	\$ 800.00	\$	41.00	\$ 2,050.00	Š	2,850.00
	CHWS/R PIPE:						T				
	2" DIA COPPER-L	200	LF	\$	17.00	\$ 3,400.00	\$	40.00	\$ 8,000.00	Ś	11,400.00
	TIE-IN CHWS/R PIPE	35	EA	\$	35.00	\$ 1,225.00	\$	26.00	\$ 910.00	Ś	2,135.00
	REFRIGERANT PIPE- COPPER:			\Box						 	- 2,255.00
	5/8" DIA	50	LF	\$	15.00	\$ 750.00	s	26.00	\$ 1,300.00	Ś	2,050.00
	1/2" DIA	50	LF	\$	13.00	\$ 650.00	5	26.00	\$ 1,300.00	Š	1,950.00
	3/8" DIA	50	LF	\$	11.00	\$ 550.00	Ś		\$ 1,300.00	Š	1,850.00
	1/4" DIA	30	LF	\$	10.00	\$ 300.00	Ś	26.00	\$ 780.00	Ś	1,080.00
	1" DIA CONDENSATE DRAIN PIPE - PVC SCH-40	2000	LF	\$	16.00	\$ 32,000.00		24.00	\$ 48,000.00	Š	80,000.00
	MISC. CONNECTION AND RE-CONSTRUCTION (PIPE) @ BOILER	1	LS	\$	2,175.00	\$ 2,175.00		4,350.00	\$ 4,350.00	Ś	6,525.00
	MISC. PIPE SUPPOERTS, SLEEVES	1	LS	Ś	600.00	\$ 600.00		1,300.00	\$ 1,300.00	Š	1,900.00
	4" GATE VALVE (CHAIN OPERATED)	10	EA	5	520.00	\$ 5,200.00		1,040.00	\$ 10,400.00	\$	15,600.00
	3" GATE VALVE	10	EA	Ś	435.00	\$ 4,350.00		1,040.00	\$ 10,400.00	\$	14,750.00
	THERMOSTATIC STEAM TRAP	12	EA	İs	330.00	\$ 3,960.00		548.00	\$ 6,576.00	s S	10,536.00
	MISC. VALVES AND SPECIALTIES (ALL SYSTEMS)	1	LS	Ś	1,300.00	\$ 1,300.00	Ś	2,175.00	\$ 2,175.00	ŝ	
	HOOK-UP EQUIPMENT:			Ť	2,500.00	7 1,500.00	 	2,175.00	3 2,175.00	>	3,475.00
	BOILER (INCL. CONTROL PANEL)	8	EA	\$	39.00	\$ 312.00	Ś	566.00	\$ 4,528.00	Ś	4.040.00
	FAN COIL UNIT	6	UNIT	\$	218.00	\$ 1,308.00	Š	375.00	\$ 2,250.00	<u> </u>	4,840.00
	CONDENSING UNIT	1	UNIT	Š		\$ 218.00	\$	375.00		\$	3,558.00
	ENERGY RECOVERY UNIT	1	UNIT	Š	305.00	\$ 305.00		375.00			593.00
	AIR HANDLING UNIT	1	UNIT	÷		\$ 305.00	\$				680.00
	BOILER FEED PUMP RECEIVER	1 1	PKG	5		\$ 305.00	\$	375.00			680.00
	CAST IRON RADIATOR	i	EA	ŝ	80.00	\$ 305.00	7	375.00	\$ 375.00	\$	680.00
	CONDENSATE DRAIN PUMP	2	EA	12	105.00		\$	140.00	\$ 140.00	5	220.00
	PRE-HEAT COIL (STEAM)	1	EA	5			_	175.00		\$	560.00
	PRE-HEAT COIL (STEAM)	<u> </u>	ŁA j	<u> </u>	120.00		\$		\$ 185.00	\$	305.00
·						PIPING S	STEM	S AND ACCESSO	ORIES - Sub-total:	\$ 2	20,087.00
23 2500	WATER TREATMENT AND CHEMICAL CLEANING										
	WATER TREATMENT & CHEMICAL CLEANING SYSTEM	1		\$	1,740.00	,		2,500.00			4,240.00
					W/	TER TREATMENT	ANDO	HEMICAL CLEA	NING - Sub-total:		4,240.00



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CSI Number	Description	Quantity	Unit	 it Cost of laterial	Total Cost of Material		Unit Cost of Labor	Total Cost of Labor		Total Cost Material and Labor
23 -3113	SHEET METAL DUCT-WORK								_	
	GALVANIZED STEEL DUCT	4750	LBS	\$ 7.50	\$ 35,625.0	0 \$	8.75	\$ 41,562.50	s	77,18
	VD	25	EA	\$ 30.00	\$ 750.0	5 \$	87.00		Š	2.92
	FSD / AD	5	SF	\$ 522.00	\$ 2,610.0	5 5	870.00			6,96
	FD / AD	10	SF	\$ 130.00	\$ 1,300.0) \$	348.00			4,78
	MD	4	SF	\$ 520.00	\$ 2,080.0) \$	870.00		Ś	5,56
	BAROMETRIC DAMPER (14" DIA.)	5	EA	\$ 300.00	\$ 1,500.0) \$	210.00		Ś	2,55
	FLEXIBLE CONNECTION @ EQUIPMENT	1	LS	\$ 3,900.00	\$ 3,900.0	\$	1,300.00	\$ 1,300.00	\$	5,20
	WMS	35	SF	\$ 17.00	\$ 595.0) \$	44.00	\$ 1,540.00	\$	2,13
	DUCT SMOKE DETECTOR HOUSING - INSTALL ONLY	6	EA	\$ -	\$ -	\$	130.00	\$ 780.00	5	78
	24" BOILER FLUE LINER	45	LF	\$ 191.00	\$ 8,595.0) \$	305.00	\$ 13,725.00	\$	22,32
	BOILER FLUE W/ INSULATION - 20" DIA	50	LF	\$ 157.00	\$ 7,850.00	\$	305.00	\$ 15,250.00	Ś	23,10
	BOILER FLUE W/ INSULATION - 18" DIA	25	LF	\$ 139.00	\$ 3,475.00	\$	305.00	\$ 7,625.00	Ś	11.10
	BOILER FLUE W/ INSULATION - 14" DIA	50	. LF	\$ 122.00	\$ 6,100.00	\$	305.00	\$ 15,250.00	\$	21,35
	TIE-IN DUCT	25	EA	\$ 	\$ 1,425.00		113.00	\$ 2,825.00	\$	4,25
	DISCONNECT AND RECONNECT EXISTING DUCT	10	roc	\$ 130.00	\$ 1,300.00	\$	348.00	\$ 3,480.00	\$	4,780
	MISC. DUCT SUPPORTS	1	LS	\$ 3,260.00	\$ 3,260.00	\$	7,830.00	\$ 7,830.00	\$	11.090
	MISC. SHEETMETAL REQUIREMENTS	1	LS	\$ 2,175.00	\$ 2,175.00	\$	4,350.00	\$ 4,350.00	Ś	6,525
									\$	212,59
23 3117	ACCOUSTICAL TREATMENT					Т				
	1" ACOUSTICAL LINING	2500	EA	\$ 2.75	\$ 6,875.00	\$	4.00	\$ 10,000.00	Ś	16.875
	1 1/2" ACOUSTICAL LINING	2500	EA	\$ 2.75	\$ 6,875.00	\$	4.00	\$ 10,000,00		16,875
				 		ACCC	OUSTICAL TREAT	MENT - Sub-total:	\$	33,750
23 2713	GRILLS, REGISTERS AND DIFFUSERS			I		Т	·	1		
	AIRE DEVICE	14	EA	\$ 100.00	\$ 1,400.00	\$	174.00	\$ 2,436.00	Ś	3,836
	LINEAR DIFFUESER	24	EA	\$ 185.00	\$ 4,440.00	5	250.00		\$	10,440
								SERS - Sub-total:		14,276
				 				our totali	<u> </u>	47,270



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CSI Number	Description	Quantity	Unit	ľ	Jnit Cost of Material	Total Cost of Material		Unit Cost of Labor		Total Cost of Labor		Fotal Cost: Material and Labor
23 7000	HVAC EQUIPMENT		<u> </u>									
	BOILER. B-1, 2, 3, 4, 5 - 1005 MBH , 30 HP	5	EA	\$	64,500.00	\$ 322,500.00	\$	21,000.00	\$	105,000.00	\$	427,500.0
	FAN COIL UNIT								1			
	AC-1, 2, 4, 5 - 8.5 MBH HEATING , 7.5 MBH COOLING	4	UNIT	\$	1,500.00	\$ 6,000.00	\$	1,300.00	\$	5,200.00	\$	11,200.
	AC-3 - 13.5 MBH HEATING, 12 MBH COOLING	1	UNIT	\$	1,040.00		\$	2,174.15	\$	2,174.15	\$	3,214.
-	AC-6 - 11.1 MBH HEATING, 14 MBH COOLING	1	UNIT	\$	1,213.00		\$	2,175.00	\$	2,175.00	\$	3,388.
	CONDENSING UNIT: VRV CU - 4 TONS	1	UNIT	\$	8,000.00	\$ 8,000.00	\$	4,350.00	\$	4,350.00	\$	12,350.
	AIR HANDLING UNIT: AHU-1 - 2200 CFM, 122.2 MBH COOLING,	1	UNIT	\$	6,500.00	\$ 6,500.00	\$	13,900.00	\$	13,900.00	\$	20,400
	BOILER FEED PUMP RECEIVER: BFP-1 - DUPLEX - 21 GPM,	1	PKG	\$	11,850.00	\$ 11,850.00	\$	4,350.00	\$	4,350.00	\$	16,200
	CAST IRON - RADIATOR	1	EA	\$	870.00	\$ 870.00	\$	1,300.00	\$	1,300.00	Ś	2,170
	ENCLOSURE	1	ÉA	\$	218.00	\$ 218.00	\$	130.00	\$	130.00	\$	348
	CABINET UNIT HEATER: EUH-1 - 5 KW	1	EA	\$	1,143.00	\$ 1,143.00	\$	-	\$	- 1	Ś	1,143.
	RE-HEAT COIL (STEAM): SHC-1 - 2200 CFM	1	EA	\$	870.00	\$ 870.00	\$	1,740.00	s	1,740.00	Ś	2,610
	CONDENSATE DRAIN PUMP	1	EA	\$	175.00	\$ 175.00	\$	260.00	Ś		Ś	435.
	CU UNIT INSTALL ONLY (DRAWING M-101.00, NOTE 2)	4	EA	\$	-	\$ -	Ś	4,350.00		17,400.00	\ \	17,400.
	MISC. EQUIPMENT SUPPORT	1	LS	\$	1,500.00	\$ 1,500.00	Š	4,765.00		4,765.00	Ś	6,265.
										T - Sub-total:	<u> </u>	524,623.
											<u> </u>	327,023.
26 0000	ELECTRICAL			Г			Г					
26 0500	COMMON WORK RESULTS FOR ELECTRICAL WORK						Г		1			
	TEMP POWER & LIGHT	1	LS			\$ -			\$	6,325.00	Ś	7,525.
¥181	DEMOLITION	1	LS			\$ -	Π		Ś	20,900,00		20.900
	DEMOLITION	1	LS			\$ -		ELECT			\$ \$	
	DEMOLITION	1	LS			\$ -	<u> </u>	ELECT			\$	
26 0519	DEMOLITION BASIC MATERIALS AND METHODS	1	LS			\$ -		ELECT			\$	
26 0519		300	LS LF	\$	4.94		Ś		RICA	L - Sub-total:	\$ \$	28,425.
26 0519	BASIC MATERIALS AND METHODS			\$		\$ 1,482.00	\$	3.22	RICA \$	966.00	\$ \$ \$	2,448.
26 0519	BASIC MATERIALS AND METHODS 4/0 AWG (FEEDER) 3/0 AWG (FEEDER)	300	LF	· · · · · · · · · · · · · · · · · · ·	4.00	\$ 1,482.00 \$ 3,200.00	\$	3.22 2.81	\$ \$	966.00 2,248.00	\$ \$ \$ \$	2,448. 5,448.
26 0519	BASIC MATERIALS AND METHODS 4/0 AWG (FEEDER)	300 800	LF LF	\$	4.00 2.08	\$ 1,482.00 \$ 3,200.00 \$ 3,744.00	\$	3.22 2.81 2.02	\$ \$ \$	966.00 2,248.00 3,636.00	\$ \$ \$ \$ \$	2,448. 5,448. 7,380.
26 0519	BASIC MATERIALS AND METHODS 4/0 AWG (FEEDER) 3/0 AWG (FEEDER) 1 AWG (FEEDER)	300 800 1800	LF LF LF	\$	4.00 2.08 0.25	\$ 1,482.00 \$ 3,200.00 \$ 3,744.00 \$ 3,625.00	\$ \$ \$	3.22 2.81 2.02 0.84	\$ \$ \$ \$	966.00 2,248.00 3,636.00 12,180.00	\$ \$ \$ \$ \$	2,448. 5,448. 7,380. 15,805.
26 0519	BASIC MATERIALS AND METHODS 4/0 AWG (FEEDER) 3/0 AWG (FEEDER) 1 AWG (FEEDER) 10 AWG 12 AWG	300 800 1800 14500	LF LF LF	\$ \$ \$	4.00 2.08 0.25 0.16	\$ 1,482.00 \$ 3,200.00 \$ 3,744.00 \$ 3,625.00 \$ 2,880.00	\$ \$ \$ \$	3.22 2.81 2.02 0.84 0.79	\$ \$ \$ \$	966.00 2,248.00 3,636.00 12,180.00 14,220.00	\$ \$ \$ \$ \$ \$	2,448. 5,448. 7,380. 15,805. 17,100.
26 0519	BASIC MATERIALS AND METHODS 4/0 AWG (FEEDER) 1 AWG (FEEDER) 10 AWG	300 800 1800 14500 18000	LF LF LF LF	\$ \$ \$ \$	4.00 2.08 0.25 0.16	\$ 1,482.00 \$ 3,200.00 \$ 3,744.00 \$ 3,625.00 \$ 2,880.00 \$ 1,770.00	\$ \$ \$ \$	3.22 2.81 2.02 0.84 0.79 0.97	\$ \$ \$ \$ \$	966.00 2,248.00 3,636.00 12,180.00 14,220.00 1,455.00	\$ \$ \$ \$ \$ \$	2,448. 5,448. 7,380. 15,805. 17,100. 3,225.
26 0519	BASIC MATERIALS AND METHODS 4/0 AWG (FEEDER) 3/0 AWG (FEEDER) 1 AWG (FEEDER) 10 AWG 12 AWG	300 800 1800 14500 18000	LF LF LF LF	\$ \$ \$ \$	4.00 2.08 0.25 0.16	\$ 1,482.00 \$ 3,200.00 \$ 3,744.00 \$ 3,625.00 \$ 2,880.00 \$ 1,770.00	\$ \$ \$ \$	3.22 2.81 2.02 0.84 0.79	\$ \$ \$ \$ \$	966.00 2,248.00 3,636.00 12,180.00 14,220.00 1,455.00	\$ \$ \$ \$ \$ \$	2,448. 5,448. 7,380. 15,805. 17,100. 3,225. 51,406.
26 0519 26 0533	BASIC MATERIALS AND METHODS 4/0 AWG (FEEDER) 3/0 AWG (FEEDER) 1 AWG (FEEDER) 10 AWG 12 AWG	300 800 1800 14500 18000	LF LF LF LF	\$ \$ \$ \$	4.00 2.08 0.25 0.16	\$ 1,482.00 \$ 3,200.00 \$ 3,744.00 \$ 3,625.00 \$ 2,880.00 \$ 1,770.00	\$ \$ \$ \$	3.22 2.81 2.02 0.84 0.79 0.97	\$ \$ \$ \$ \$	966.00 2,248.00 3,636.00 12,180.00 14,220.00 1,455.00	\$ \$ \$ \$ \$ \$	2,448. 5,448. 7,380. 15,805. 17,100. 3,225.
	BASIC MATERIALS AND METHODS 4/0 AWG (FEEDER) 3/0 AWG (FEEDER) 1 AWG (FEEDER) 10 AWG 12 AWG 12 AWG (FIRE ALARM SYSTEM)	300 800 1800 14500 18000 1500	LF LF LF LF LF	\$ \$ \$ \$	4.00 2.08 0.25 0.16 1.18	\$ 1,482.00 \$ 3,200.00 \$ 3,744.00 \$ 3,625.00 \$ 2,880.00 \$ 1,770.00 BASIC I	\$ \$ \$ \$ MATE	3.22 2.81 2.02 0.84 0.79 0.97 RIALS AND MET	\$ \$ \$ \$ \$ \$ HOD:	966.00 2,248.00 3,636.00 12,180.00 14,220.00 1,455.00 5 - Sub-total:	\$ \$ \$ \$ \$ \$ \$ \$ \$	2,448. 5,448. 7,380. 15,805. 17,100. 3,225. 51,406.
	BASIC MATERIALS AND METHODS 4/0 AWG (FEEDER) 1 AWG (FEEDER) 10 AWG 12 AWG 12 AWG (FIRE ALARM SYSTEM) EMPTY CONDUIT SYSTEMS 2 1/2" 316 SS CONDUIT (FEEDER)	300 800 1800 14500 18000 1500	LF LF LF LF LF	\$ \$ \$ \$ \$	4.00 2.08 0.25 0.16 1.18	\$ 1,482.00 \$ 3,200.00 \$ 3,744.00 \$ 3,625.00 \$ 2,880.00 \$ 1,770.00 BASIC	\$ \$ \$ \$ MATE	3.22 2.81 2.02 0.84 0.79 0.97 RIALS AND MET	\$ \$ \$ \$ \$ \$ HOD:	966.00 2,248.00 3,636.00 12,180.00 14,220.00 1,455.00 S - Sub-total:	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$	2,448. 5,448. 7,380. 15,805. 17,100. 3,225. 51,406.
	BASIC MATERIALS AND METHODS 4/O AWG (FEEDER) 3/O AWG (FEEDER) 1 AWG (FEEDER) 10 AWG 12 AWG 12 AWG 12 AWG (FIRE ALARM SYSTEM) EMPTY CONDUIT SYSTEMS 2 1/2" 316 SS CONDUIT (FEEDER) 2" 316 SS CONDUIT (FEEDER)	300 800 1800 14500 18000 1500	LF LF LF LF LF	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	4.00 2.08 0.25 0.16 1.18	\$ 1,482.00 \$ 3,200.00 \$ 3,744.00 \$ 3,625.00 \$ 1,770.00 BASIC I \$ 7,777.20 \$ 83,508.40	\$ \$ \$ \$ #ATE	3.22 2.81 2.02 0.84 0.79 0.97 RIALS AND METI	\$ \$ \$ \$ \$ HOD:	966.00 2,248.00 3,636.00 12,180.00 14,220.00 1,455.00 S - Sub-total: 2,906.40 44,323.60	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$	2,448. 5,448. 7,380. 15,805. 17,100. 3,225. 51,406.
	BASIC MATERIALS AND METHODS 4/0 AWG (FEEDER) 3/0 AWG (FEEDER) 1 AWG (FEEDER) 10 AWG 12 AWG 12 AWG 12 AWG 12 AWG (FIRE ALARM SYSTEM) EMPTY CONDUIT SYSTEMS 2 1/2" 316 SS CONDUIT (FEEDER) 2" 316 SS CONDUIT (FEEDER) 1 1/2" 316 SS CONDUIT (FEEDER)	300 800 1800 14500 18000 1500	LF LF LF LF LF LF	\$ \$ \$	4.00 2.08 0.25 0.16 1.18 129.62 71.99 59.77	\$ 1,482.00 \$ 3,200.00 \$ 3,744.00 \$ 3,625.00 \$ 2,880.00 \$ 1,770.00 BASIC I	\$ \$ \$ \$ MATE	3.22 2.81 2.02 0.84 0.79 0.97 RIALS AND MET	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	966.00 2,248.00 3,636.00 12,180.00 14,220.00 1,455.00 5 - Sub-total: 2,906.40 44,323.60 2,459.20	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	28,425. 2,448. 5,448. 7,380. 15,805. 17,100. 3,225. 51,406. 10,683.6 127,832.0 7,240.8
	BASIC MATERIALS AND METHODS 4/O AWG (FEEDER) 3/O AWG (FEEDER) 1 AWG (FEEDER) 10 AWG 12 AWG 12 AWG 12 AWG (FIRE ALARM SYSTEM) EMPTY CONDUIT SYSTEMS 2 1/2" 316 SS CONDUIT (FEEDER) 2" 316 SS CONDUIT (FEEDER)	300 800 1800 14500 18000 1500	LF LF LF LF LF LF	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	4.00 2.08 0.25 0.16 1.18 129.62 71.99 59.77 24.60	\$ 1,482.00 \$ 3,200.00 \$ 3,744.00 \$ 3,625.00 \$ 1,770.00 BASIC I \$ 7,777.20 \$ 83,508.40	\$ \$ \$ \$ #ATE	3.22 2.81 2.02 0.84 0.79 0.97 RIALS AND METI	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	966.00 2,248.00 3,636.00 12,180.00 14,220.00 1,455.00 5 - Sub-total: 2,906.40 44,323.60 2,459.20	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	2,448. 5,448. 7,380. 15,805. 17,100. 3,225. 51,406.



Project: Staten Island Zoo Aquarium Reconstruction

Location: 614 Broadway, Staten Island, NY 10310

Bidder: SIGNATURE CONSTRUCTION GROUP

CONTRACT 1 - GENERAL CONSTRUCTION WORK

PV175AQUA DOC ID:

CSI Number	Description	Quantity	Unit		Unit Cost of Material	Total Cost of Material		Init Cost of Labor		otal Cost of Labor	1	otal Cost Material and Labo
26 2416	ELECTRICAL DISTRIBUTION SYSTEM		T	Т	· · · · · · · · · · · · · · · · · · ·		T		T		_	
	PANEL LPX-3-4 (2 SECTION 225A)	1	EA	\$	11,500.00	\$ 11,500.00	\$	1,343.35	\$	1,343.35	\$	12,843
	LPX-1, LPX-2 (150A)	2	EA	\$	11,500.00	\$ 23,000.00	\$	1,791.24	\$	3,582.48	\$	26,58
	LPX-5 (10A)	1	EA	\$	11,500.00	\$ 11,500.00	\$	3,134.67	\$	3,134.67	\$	14,63
	TIME CLOCK	1	ĒΑ	\$	1,729.30	\$ 1,729.30	\$	1,291.18	\$	1,291.18	\$	3,02
						ELECTRI	CAL DIS	TRIBUTION SY	STEM	- Sub-total:	\$	57,08
		 						74 400 00	1.0	74 400 00	<u> </u>	
26 2923	ELECTRICAL DISTRIBUTION SYSTEM	1	EA	 		\$ -	\$	71,493.00		71,493.00		71,49
	DUPLEX REC	20	EA	\$		\$ 1,600.20	\$	329.89	\$	6,597.80	\$	8,19
	QUAD REC		EA	\$	114.27		\$	380.64	ļ		<u> </u>	
	CEILING REC	4	EA	\$	80.01		\$	329.89		1,319.56		1,6
	WP GFCI REC	15	EA	\$	288.02			624.45		9,366.75		13,6
	WP SINGLE POLE SWITCH	1	EA	\$	146.80			364.22				5
	SINGLE POLE SWITCHES	1	EA	\$	88.66	\$ 88.66		329.89	\$	329.89	\$	4:
	SINGLE POLE DIMMER SWITCHES		EA	\$	160.21		\$	509.01			<u> </u>	
	VARIABLE FREQUENCY DRIVES (F.B.O)		EA	\$	-		\$	1,044.89	<u> </u>		<u></u>	
	TERMINATIONS SINGLE PHASE 20A (VARIOUS)	71	EA	\$	<u> </u>	\$ -	\$	73.14	\$	5,192.94	\$	5,19
	TERMINATIONS SINGLE PHASE 40A (VARIOUS)	6	EA	\$	-	\$ -	\$	91.05	\$	546.30	_	5
	TERMINATIONS THREE PHASE 20A (VARIOUS)	5	EA	\$	-	\$ -	\$	86.58		432.90	\$	43
	HEAT TRACE	1	LS	\$	-	\$ -			\$	-	\$	35,67
						ELECTRIC	CAL DIST	RIBUTION SY	STEM -	Sub-total:	\$	137,79
26 5100	INTERIOR LIGHTING	T	T									
26 5100	JELLY JAR FIXTURE (MECHANICAL ROOF LIGHT)	1	EA	\$	85.00	\$ 85.00	Ś	564.42	-	564.42	¢	64
	FIXTURE TYPE AU1 -	19	EA	Ś	218.15	·		361.73		6,872.87		11,01
	FIXTURE TYPE AU1 - em	8	EA	Ś	560.00			361.73		2,893.84		7,37
	FIXTURE TYPE AR1	2	EA	Ś		\$ 2,226.90		598.98		1,197.96		3,42
	FIXTURE TYPE AR1 - em	2	EA	š	1,304.35			598.98			Ś	3,80
	FIXTURE TYPE AD1	9	EA	Ś		\$ 6,365,25		433.29			\$	10,26
	FIXTURE TYPE AT1	8	EA	Š		\$ 2,800.00		538.63	·		\$	7.10
	FIXTURE TYPE AC1	12	EA	5		\$ 8,736.00	3	506.57			Ś	14,81
	FIXTURE TYPE AC1 - em	12	EA	Š		\$ 8,736.00	Ž.	506.57			Š	14,81
	FIXTURE TYPE AC2	8	EA	\$		\$ 2,320.00		506.00			\$	6,36
	FIXTURE TYPE DL1	24	EA	č	920.00	\$ 22,080.00		598.00			\$	36,43
	FIXTURE TYPE DL2	40	EA	Ś		\$ 31,000.00				23,920.00	-	54,92
	EXIT SIGNS	2	EA	\$		\$ 294.00	-	644.96		1,289.92	~	1,58
SEE BELOW****	the transfer of the transfer o	1	EA	3	47,329.35	\$ 47,329.35	~	044.30	7	1,203.32		47,32
	LIGHTING CONTROLS		L.A.	ν.	41,323.33	41,323.33 L						41.34



Project: Staten Island Zoo Aquarium Reconstruction

Location: 614 Broadway, Staten Island, NY 10310

Bidder: SIGNATURE CONSTRUCTION GROUP

CONTRACT 1 - GENERAL CONSTRUCTION WORK

DOC ID:

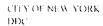
PV175AQUA

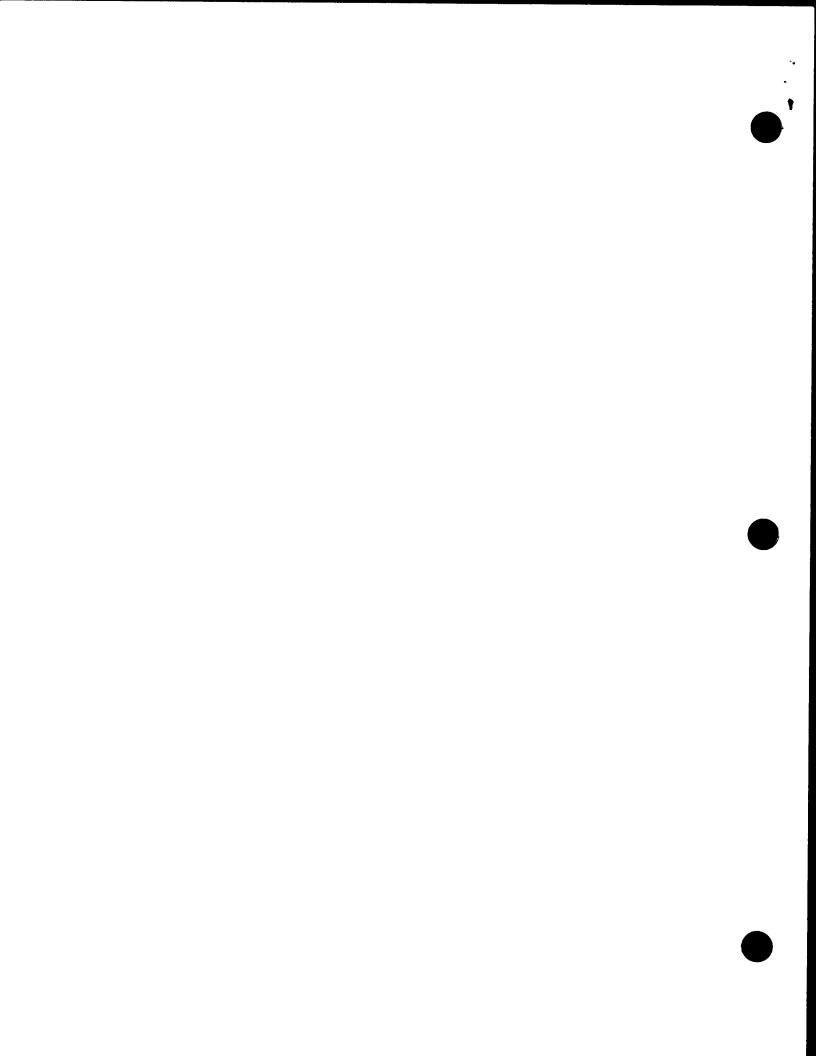
CSI Number	Description	Quantity	Unit	Unit Cost of Material		Total Cost of Material	Unit C of Lab			al Cost Labor	Total Cost: Material and Labor
28 0000	ELECTRONIC SAFTEY AND SECURITY										
28 3111	FIRE ALARM SYSTEM			<u> </u>					<u> </u>		
	SMOKE DETECTOR	. 7	EA	\$ 1,010.		7,072.94	<u> </u>	996.19		6,973.33	
	HEAT DETECTOR	1	EA	\$ 1,010.		1,010.42		996.19	\$	996.19	\$ 2,006.6
· · · · · · · · · · · · · · · · · · ·	ADDRESSABLE CONTROL MODULE	1	EA		72 \$	708.72		667.24	\$	667.24	\$ 1,375.9
	MONITOR MODULE FOR WATERFLOW AND TAMPERS	2	EA		72 \$	1,417.44		667.24		1,334.48	\$ 2,751.9
	CONTROL MODULE FOR FSD	5	EA		97 \$	3,944.85		667.24	\$	3,336.20	
	CEILING MOUNTED HORN STROBE UNIT	1	EA		35 \$	699.35	\$ 1	,016.53	\$	1,016.53	\$ 1,715.8
	DUCT DETECTORS	3	EA	\$ 1,220.		3,661.38	\$	785.66	\$	2,356.98	\$ 6,018.3
	WATER FLOW SWITCHES	1	EA		48 \$	964.48		890.00	<u> </u>	890.00	
	TAMPER SWITCHES	1	EA	\$ 964.	48 \$	964.48	\$	890.00	\$	890.00	\$ 1,854.4
	FIRE SMOKE DAMPERS	5	EA	\$ 1,987.		9,937.75		,615.00	\$	8,075.00	\$ 18,012.7
	REMOVE / REINSTALL DEVICE	10	EA	\$ 37.	71 \$	377.10	\$	223.91	\$	2,239.10	\$ 2,616.2
	TIE-IN TO EXISTING SYSTEM	1	LS		\$	-			\$ 1	1,890.00	\$ 11,890.0
						ELECTRO	NIC SAFTEY	AND SEC	URITY - S	Sub-total:	\$ 71,423.9
31 0000	EARTHWORK	I									
	EARTHWORK										
	EXCAVATION / BACKFILL FOR UNDER SLAB DRAINAGE	45	LF		00 \$	225.00		200.00		9,000.00	
	EXCAVATION / BACKFILL FOR SUMP PIT	1	LS	\$ 150.	00 \$	150.00	\$ 4	,000.00	\$ 4	4,000.00	\$ 4,150.0
								EARTH	WORK - S	ub-total:	\$ 13,375.0
					TOTA	AL: CONTRAC	T 1 - GENERA	L CONS	TRUCTIO	N WORK:	\$ 6,955,371.8

^{*****}General Contractor will be purchasing lighting package not included in electrician scope of work

BID BOND 1 FORM OF BID BOND

KNOW ALL MEN BY THESE PRESENTS. That we, SIGNATURE CONSTRUCTION GROUP, INC. 160 7TH STREET, BROOKLYN, NY 11215					
hereinafter referred to as the "Principal", and PHILADELPHIA INDEMNITY INSURANCE COMPANY ONE BALA PLAZA, SUITE 100, BALA CYNWYD, PA 19004					
hereinafter referred to as the "Surety" are held and firmly bound to THE CITY OF NEW YORK, hereinafter referred to as the "CITY", or to its successors and assigns in the penal sum of					
*TEN PERCENT OF AMOUNT BID *					
10% OF BID AMOUNT (\$					
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 PROJECT ID: PV175AQUA					
STATEN ISLAND ZOO AQUARIUM RECONSTRUCTION, 614 BROADWAY, STATEN ISLAND, NY 10310					
E-PIN: 85015B0174 /DDC PIN: 8502015PV0020C					
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 ______ day of _______ 2015___.

(Seal)	SIGNATURE CONSTRUCTION GROUP, INC. $(L.S.$
	Principal
	By: / / m / Gmai
	DUIL ADEL DUILA INDEMNITY INCLIDANCE COMPANY
(Seal)	PHILADELPHIA INDEMNITY INSURANCE COMPANY
	By: Surety .
	DAVID A GOLDSTEIN ATTORNEY-IN-FACT

BID BOND 3

ACKNOWLEDGEMENT OF PRINCIPAL, IF A CORPORATION County of State of Octuber, 2015. before me personally came day of this to me known, who, being by me duly sworn, did depose and say that he Tomai States resides at 101 Oceanic Signature Construction Group Inc that he is the President 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. MARK T. WALTER

Notary Public, State of New York No. 01WA6258487 Qualified in New York County Commission Expires March 26, 2016 Notary Public

ACKNOWLEDGEMENT OF PRINCIPAL, IF A PARTNERSHIP

State of	County of	SS:
On this	day of	ss: , before me personally appeared nown and known to me to be one of the members of the firm of
***************************************	to me ki	nown 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 i	ne that he executed the same	e as and for the act and deed of said firm.
		Notary Public
		•
	ACKNOWLEDG	EMENT OF PRINCIPAL, IF AN INDIVIDUAL
	The Control of the Co	
State of	County of	SS:
On this	day of	ss: , , before me personally appeared
	to me ki	nown and known to me to be the person described in and who
executed the foreg	going instrument and acknow	vledged that he executed the same.
		Notary Public
		14May 1 don't

AFFIX ACKNOWLEDGEMENTS AND JUSTIFICATION OF SURETIES

CITY OF NEW YORK DDC

BID BOOKLET December 2013

大学の大学を表現しませます。 Apple 100 man 100 ma THIS PAGE INTENTIONALLY LEFT BLANK

ACKNOWLEDGEMENT OF SURETY

State of NEW YORK)
	:ss:
County of SUFFOLK)

On the 20th day of , 20 15, before me personally came DAVID A. GOLDSTEIN to me known, who, being by me duly sworn, did depose and say the (s)he resides at MERRICK, NY that (s)he is the Attorney-In-Fact of PHILADELPHIA INDEMNITY INSURANCE COMPANY the Corporation described in and which executed the above instrument; that (s)he knows the seal of said Corporation; that one of the seals affixed by order of the Board of Directors of said Corporation; and that (s)he signed his/her name thereto by like order.

Notary Public

JENNIFER SPADARO
Notary Public State of New York
No. 01SP5017514
Qualified in Suffolk County
Commission Expires Sept. 7

Tunifir Spadars

PHILADELPHIA INDEMNITY INSURANCE COMPANY

231 St. Asaph's Rd., Suite 100 Bala Cynwyd, PA 19004-0950 Power of Attorney

KNOW ALL PERSONS BY THESE PRESENTS: that PHILADELPHIA INDEMNITY INSURANCE COMPANY (the Company), a corporation organized and existing under the laws of the Commonwealth of Pennsylvania, does hereby constitute and appoint: <u>David A. Goldstein and Glenn Glubiak of Omni Risk</u>

Management, Inc.

Its true and lawful Attorney(s) in fact with full authority to execute on its behalf bonds, undertakings, recognizances and other contracts of indemnity and writings obligatory in the nature thereof, issued in the course of its business and to bind the Company thereby, in an amount not to exceed \$25,000,000.00

This Power of Attorney is granted and is signed and sealed by facsimile under and by the authority of the following Resolution adopted by the Board of Directors of PHILADELPHIA INDEMNITY INSURANCE COMPANY at a meeting duly called the 1st day of July, 2011.

RESOLVED:

That the Board of Directors hereby authorizes the President or any Vice President of the Company to: (1) Appoint Attorney(s) in Fact and authorize the Attorney(s) in Fact to execute on behalf of the Company bonds and undertakings, contracts of indemnity and other writings obligatory in the nature thereof and to attach the seal of the Company thereto; and (2) to remove, at any time, any such Attorney-in-Fact and revoke the authority given. And, be it

FURTHER RESOLVED:

That the signatures of such officers and the seal of the Company may be affixed to any such Power of Attorney or certificate relating thereto by facsimile, and any such Power of Attorney so executed and certified by facsimile signatures and facsimile seal shall be valid and biding upon the Company in the future with the respect to any bond or undertaking to which it is attached.

IN TESTIMONY WHEREOF, PHILADELPHIA INDEMNITY INSURANCE COMPANY HAS CAUSED THIS INSTRUMENT TO BE SIGNED AND ITS CORPORATE SEALTO BE AFFIXED BY ITS AUTHORIZED OFFICE THIS 7TH DAY OF FEBRUARY 2013.



(Seal)

RowneOH

Robert D. O'Leary Jr., President & CEO Philadelphia Indemnity Insurance Company

On this 7th day of February 2013, before me came the individual who executed the preceding instrument, to me personally known, and being by me duly sworn said that he is the therein described and authorized officer of the PHILADELPHIA INDEMNITY INSURANCE COMPANY; that the seal affixed to said instrument is the Corporate seal of said Company; that the said Corporate Seal and his signature were duly affixed.

COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
DANIELLE PORATH, Notary Public
t nume Marine Tium Mentitrement Coultry
My Commission Expires March 22, 2016
Milk Childringson Cubros money, my maria.

Notary Public:

New Il

residing at:

Bala Cynwyd, PA

(Notary Seal)

My commission expires:

March 22, 2016

I, Craig P. Keller, Executive Vice President, Chief Financial Officer and Secretary of PHILADELPHIA INDEMNITY INSURANCE COMPANY, do herby certify that the foregoing resolution of the Board of Directors and this Power of Attorney issued pursuant thereto are true and correct and are still in full force and effect. I do further certify that Robert D. O'Leary Jr., who executed the Power of Attorney as President, was on the date of execution of the attached Power of Attorney the duly elected President of PHILADELPHIA INDEMNITY INSURANCE COMPANY,

In Testimony Whereof I have subscribed my name and affixed the facsimile seal of each Company this 20th

1927

Craig P. Keller, Executive Vice President, Chief Financial Officer & Secretary PHILADELPHIA INDEMNITY INSURANCE COMPANY

PHILADELPHIA INDEMNITY INSURANCE COMPANY

Statutory Statements of Admitted Assets, Liabilities and Capital and Surplus (in thousands, except par value and share amounts)

A T. Statud Aurosan	As of Dece	mber 31,
Admitted Assets	2014	2013
Bonds (fair value \$6,153,215 and \$5,687,336)	\$ 5, 869 ,602	\$ 5,603,006
Preferred stocks (fair value \$59,525 and \$-)	59,413	-
Common stocks (cost \$110,951 and \$3,594)	97,616	3,594
Mortgage loans	21,402	÷
Other invested assets (cost \$156,141 and \$26,678)	154,549	26,678
Cash and short-term investments	45,054	<u>2,441</u>
Cash and invested assets	6,247,636	5,635,719
Cash diff invested above		
Premiums receivable, agents' balances and other receivables	673,590	626,337
Reinsurance receivable on paid losses	27,162	26,176
Accrued investment income	65,074	61,467
Receivable from affiliates	4,104	2,948
Net deferred tax asset	164,545	162,476
Federal income taxes receivable	•	10,909
Guaranty funds receivable	<u>106</u>	29
Total admitted assets	<u>\$ 7,182,217</u>	<u>\$ 6,526,061</u>
Liabilities and Capital and Surplus		
Liabilities:	A 0.450.010	n 2005 002
Net unpaid losses and loss adjustment expenses	\$ 3,169,910	\$ 2,895,803
Net unearned premiums	1,260,065	1,164,576 3,621
Reinsurance payable on paid loss and loss adjustment expenses	3,747	63,156
Ceded reinsurance premiums payable	63,104	204,448
Commissions payable, contingent commissions and other similar charges	226,034	204,440
Federal income taxes payable	13,990	31,505
Accrued expenses and other liabilities	50,060	4,695
Payable to affiliates	9,877	1,323
Provision for reinsurance	1,000 221	220
Payable for policyholders' dividends	46,833	220
Payable for purchased securities	4,844,841	4,369,347
Total liabilities	4,844,041	4,507,547
Capital:		
Common stock, par value of \$10 per share; 1,000,000 shares	3,600	3,600
authorized, 359,995 shares issued and outstanding	•,•••	•
Surplus:	386,970	386,970
Gross paid-in and contributed surplus	1,946,806	1,766,144
Unassigned surplus	2,333.776	2,153,114
Total surplus	2,337,376	2,156,714
Total capital and surplus	\$ 7,182,217	\$ 6,526,061
Total liabilities and capital and surplus		

The undersigned, being duly sworn, says: That she is the Executive Vice President and Chief Financial Officer of Philadelphia Indemnity Insurance Company; that said Company is a corporation duly organized in the state of Pennsylvania, and licensed and engaged in the State of Pennsylvania and has duly complied with all the requirements of the laws of the said State applicable of the said Company and is duly qualified to act as Surety under such laws; that said Company has also complied with and is duly qualified to act as Surety under the Act of Congress. And that to the best of her knowledge and belief the above statement is a full, true and correct statement of

COMMONWEALTH OF PENNSYLVANIA

Attest:

Notarial Seal
Kimberly A. Kessleski, Notary Public
Lower Merion Twp., Montgomery County
My Commission Expires Dec. 18, 2016
MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES

Sworn to before me this 8th day of June 2015.

Karen Gilmer-Pauciello, EVP & CFO

Kimberly Kessleski, Notary

State of New York

DEPARTMENT OF FINANCIAL SERVICES

WHEREAS IT APPEARS THAT

Philadelphia Indemnity Insurance Company

Home Office Address

Bala Cynwyd, Pennsylvania

Organized under the Laws of

Pennsylvania

has complied with the necessary requirements of or pursuant to law, it is hereby

licensed to do within this State the business of

accident and health, fire, miscellaneous property, water damage, burglary and theft, glass, boiler and machinery, elevator, animal, collision, personal injury liability, property damage liability, workers' compensation and employers' liability, fidelity and surety, credit, motor vehicle and aircraft physical damage, marine and inland marine, marine protection and indemnity, residual value, legal services and gap insurance, as specified in paragraph(s) 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 20, 21, 22, 29 and 26(A)(B)(C)(D) of Section 1113(a) of the New York Insurance Law and also such workers' compensation insurance as may be incident to coverages contemplated under paragraphs 20 and 21 of Section 1113(a), including insurances described in the Longshoremen's and Harbor Workers' Compensation Act (Public Law No. 803, 69 Cong. as amended; 33 USC Section 901 et seq. as amended) to the extent permitted by certified copy of its charter document on file in this Department until July 1, 2016.



In Witness Whereof, I have hereunto set my hand and affixed the official seal of this Department at the City of Albany, New York, this 1st day of July, 2015

> Anthony J. Albanese Acting Superintendent

Ву

Jacquelino Catalfamo

Jacqueline Catalfamo Special Deputy Superintendent

Tex ID#		<u></u>	4.78	N# 85	015B0174		verse and the second
rangangangangan kanadan da da da da da da da da da da da da da		. :		Contrac	t#1 - Gen	eral Constructi	on Work
SCHEDULE B - N	V1. 7	n Plan					
Part I: M/WBE Parti							
Part I to be completed b	y contracting agency	X					
Contract Overview				a region of			
APT E-Pin#	85015B0174		FMS	Project ID#	; P1	V175AQUA	·
Project Title/Agency	Staten Island Zo	oo Aquarlum Rec	onstructi	ion			
PIN# Bid/Proposal	8502015PV002	OC	p š				
Response Date:	October 23, 20	15			apperatus program ias	-	,, ,
Gentracting Agency	Department of D	esign and Cons	truction		أعنان مم بريانات	- بسب عابلات ند پشرشک	· · · · · · · · · · · · · · · · · · ·
Agency Address	30-30 Thomson	Avenue City	Long Isl	and City Sta	te <u>NY</u>	Zlp Code	11101
Contact Person	Norma Negrón	Title	MWBI	E Liaison & (Complianc	e Analyst	marine of the same for marinets.
	Communication of the Communication Communica	Emal	i v	negronn@c	de nve n	กับ	
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APTE	2 -	
PIN#:	85015B0174	

Tax ID#:		
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SCHEDULE B - Part II: M/WBE Participation Plan

Part II to be completed by the bidder/proposer:

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

Section I: Prin	ne Contractor Contact Infor	mation				opolitinassa karamana kita kini katan katan kini katan karamana kini katan karamana katan karamana katan katan
Tax ID# Business Nam	13-3572304 Signature Constru	ction Group Inc.		FMS Vendor ID #	smond (Cremona
Address Telephone#	160 Seventh Street, Broc 718-788-1669		lcrei	mona@signatureconstru	action.co)ni
	VBE Utilization Goal Calcul					
PRIME CO	NTRACTOR ADOPT	NG AGENCY M/	NB	E PARTICIPATION :	GOALS	
For Prime	Contractors (including t Ventures and M/WBE g Agency M/WBE	Total Bid/Proposal Value		Agency Total Participation Goals (Line 1, Page 6)		Calculated M/WBE Participation Amount
Calculate the to bid that you ago MAWBE subcon	otal dollar value of your total ree will be awarded to thractors for services and/or MWBE prime contractor or		n jan entranske må det ombidelikken en med 1888 i se efterformelle betydelse se entra		- comp. The first process consumption to make the second consu	
Contractors for	he Notice to Prospective more information on how to MWBE participation.	6,176,22 _f 3	o x	5%		\$347,768.59
	NTRACTOR OBTAIN RTICIPATION GOAL	S .	İV		OPTIN	organ gan ya wasan sa saniya da kababan naggan dan sa saniya da kababan kababan kababan kababan kababan kababa
Qualified Join	Contractors (Including Ventures and M/WBE g Modified M/WBE	Total Bid/Proposal Value		Adjusted Participation Goal (From Partial Walver)		Calculated MWBE Participation Amount
Participation C	oals.			Manual control of the		
bid that you agr M-WBE subcon	ital dollar value of your total se will be awarded to tractors for services and/or WBE prime contractor or Venture.	V				
Contractors for	he Notice to Prospective more information on how to MWBE participation.	.	×			\$ Line 3

Section V: Vendor Certification and Required Affirmations 1) acknowedge my understanding of the MWBE participation requirements as set forth herein, and the pertinent provisions of Section 6-123 of the Administrative Code of the Cily of New Yo9rk (Section 6-129), and the rules promiligated thereunder.

2) affirm that the information support of this fWWBE Utilization Plan is true and correct,
3) agree, if awarded this Contract, to comply with the M/WBE participation requirements of this Contract, the pertinent provisions of Section 6-129, and

25. Lighting -3rd quarter

26. Miscellaneous - 1st thru 4th quarter

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 macrial torm of this Contract that the Vendor will award the total dollar value of the MAVBE Participation Goals to certified

MBEs and/or WBEs, unless a full waiver is obtained or such goals are modiled by the Agency: and
5) agree and affirm, if awarded this Contract, to make all reasonable, good faith efforts to meet the M/WBE Participation Goals, or if a partial waiver is

obtained or such goals are modified by the Agency, to meet the modified Participation Goals by soliciting and obtaining the participation of certified

WIDE GIROT STEEL STREET	
Signature	Date //- 4-15
Signature	Vi and Control of the
Print Name Dresmand Cremons	Title Vice President
Print Name DESIMONAL CATIONIS	

Tax ID#:

that apply to Prime Contractor:

Trailer Cassone (WBE)

Electrical - Walsh (WBE)

Fencing:

Demo

Steel

Celling

Epoxy

Concrete

Masonry

Misc. Metal

Doors & Hardware

Drywall & Carpentry

Painting/Wall-covering

Aquarium Spec

Audio Visual

Plumbing

Sprinkler

HVAC

Lighting

Miscellaneous

<u>Abatement</u>

Roll Up Gate - Able Door(WBE)

Ceramic Tile - Baybrent (MBE)

Roofing & Moisture Patching

Terrazzo - Amodeus Floor (WBE)

Photos-Bernstein Associates (WBE/DBE)

\$1,264,000.00

\$143,206,00

\$240,000.00

Tax ID #:		*	
Tax ID#.	9		

APT E-PIN#:

85015B0174

Contract # 1 - General Construction Work

SCHEDULE B - M/WBE Utilization Plan

art I: M/WBE Participation Goals

Part I to be completed by contracting agency

Contract Overview		
APT E-Pin #	85015B0174	FMS Project ID#: PV175AQUA
Project Title/Agency	Staten Island Zoo Aquariur	m Reconstruction
PIN#	8502015PV0020C	
Bid/Proposal Response Date:	TO BE DETERMINED BE	FORE ISSUANCE
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 Negrón	Title MWBE Liaison & Compliance Analyst
Telephone #	(718) 391-1502	Email <u>negronn@ddc.nyc.gov</u>

Project Description (attach additional pages if necessary)

This Project consists of the reconstruction of the zoo's aquarium exhibit, foyer and central boiler plant. The aquarium is located on the ground floor of the main zoo building and the boiler plant is located beneath the aquarium in the double height cellar space. The reconstruction of the aquarium involves demolition of the existing exhibit followed by installation of new state-of-the-art tanks and life support systems. The project also includes installation of dedicated MEP/FP systems to support the aquarium exhibit space. The new HVAC units are to be located in the attic space 2 floors above the exhibit and new condensing units are to be installed on the flat roof above the adjacent Reptile Wing. This work is to be undertaken whilst the adjacent zoo wings remain open to the public and should be phased accordingly to maintain egress from the building. The reconstruction of the central boiler plant involves demolition of the existing boiler equipment serving the building and installation of new modular boiler units. The work is to be undertaken whilst the building is open to the public. A temporary boiler unit is to be installed at the exterior of the building to maintain full operational capacity for the animal wings the existing boiler serves.

M/WBE Participation Goals for Services

Enter the percentage amount for each group or for an unspecified goal. Please note that there are no goals for Asian Americans in Professional Services.

Prime Contract Industry: <u>Construction</u>

Group	Percentage			
Unspecified *	5	%		
or				
Black American	Unspecified	%		
Hispanic American	Unspecified	%		
Asian American	Unspecified	%		
Women	Unspecified	<u>%</u>		
Total Participation Goals	5	%	Line 1	

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

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Tax ID #:	
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PIN#:

85015B0174

SCHEDULE B - Part II: M/WBE Participation Plan

Part II to be completed by the bidder/proposer:

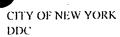
Please note: For Non-M/WBE Prime Contractors who will NOT subcontract any services and will self-perform the entire contract, you must obtain a FULL waiver by completing the Waiver Application on pages 9 and 9a and timely submitting it to the contracting agency pursuant to the Notice to Prospective Contractors.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

Section I: Prime Contractor Contact Infor	manuli .		
Tax ID# 13-35 123	04	FMS Vendor ID #	
Business Name Signature (onstruction	Group Contact Person De	smond Cremona
Address 160 Sevenths	St Brook1	YNNY	
Telephone # 718-788-1669	Email _	DCREMONA @SI	gnatureConstruction.com
Section II: M/WBE Utilization Goal Calcul	ation: Check the appl	icable box and complete subsec	ction.
PRIME CONTRACTOR ADOPTI	NG AGENCY M/	WBE PARTICIPATION G	OALS
For Prime Contractors (including Qualified Joint Ventures and M/WBE firms) adopting Agency M/WBE	Total Bid/Proposal Value	Agency Total Participation Goals (Line 1, Page 6)	Calculated M/WBE Participation Amount
Participation Goals. Calculate the total dollar value of your total hat you agree will be awarded to BE subcontractors for services and/or credited to an MWBE prime contractor or Qualified Joint Venture.			
Please review the Notice to Prospective Contractors for more information on how to obtain credit for M/WBE participation.	\$	x	\$ Line 2
PRIME CONTRACTOR OBTAIN M/WBE PARTICIPATION GOAL		AIVER APPROVAL: ADO	PTING MODIFIED
For Prime Contractors (Including Qualified Joint Ventures and M/WBE firms) adopting Modified M/WBE	Total Bid/Proposal Value	Adjusted Participation Goal (From Partial Waiver)	Calculated M/WBE Participation Amount
Participation Goals.			
Calculate the total dollar value of your total bid that you agree will be awarded to M/WBE subcontractors for services and/or credited to an M/WBE prime contractor or Qualified Joint Venture.			
Please review the Notice to Prospective Contractors for more information on how to obtain credit for M/WBE participation.	\$	x =	\$ Line 3

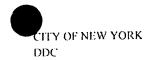
I dx IU #.	 	- Control of the Cont	Companies the first specific companies to the companies of the companies o
Section III: MWBE Utilization Pl	oser or Bidder will fulfill the M	WBE Participation Goals:	
As an M:WBE Prime Contract contract the value of which is at les subcontracted to non-M:WBE firm that apply to Prime Contractor:	or that will self-perform and/or su ast the amount located on Lines is will not be credited towards fulf	bcontract to other M/WBE firm 2 or 3 above, as applicable. Th illment of M/WBE Participation	Goals. Please check all
MBE WBE As a Qualified Joint Venture w value of any work subcontracted to The value of any work subcontracted Goals.	ted to non M/WBE firms will not	be credited towards fulfillment of	of M/WBE Participation
Goals. As a non MWBE Prime Contramount located on Lines 2 or 3 ab	actor that will enter into subcontri ove, as applicable.	acts with M/WBE times the valo	e or which is at loads the
Section IV: General Contract Info	mation		
What is the expected percentag services, regardless of M/WBE	e of the total contract dollar value the status? % [4]	at you expect to award in subconti	racts for
	Enter brief description of the type (s) and subcontracting if awarded this contract, participation by MBEs and/or WBEs and Use additional sheets if necessary.	dollar value of subcontracts for all'any For each item, indicate whether the wo The time frame in which such work is s	services you plan on ork is designated for cheduled to begin and end.
Trailor-Cassone	1. Temporary office to	Ver from Start to Finis	sh \$ 10,000
Photos-Bernstein Ass	2 Progress photos-S	tart to fimish	412,000
Electrical-Walsh 1	3. Electrical		4852610
	4 halfway thru job		8 14,200
PollopGate-Able Door	5 Toward and of job	- 38d Quarter	81 12.400 T
umicTile-Baybent	6.4th Quarter of job	*	8 55, 740
1019220 - Amodeus Floor	7		
	8,		
✓ Scopes of Subcontract Work	9.		
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	11	Parado and the parado and analysis of the parado and the parado an	
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	17.		
Section V: Vendor Certification	and Required Affirmations		
I hereby: 1) acknowedge my understanding of the M	IWBE participation requirements as se	t forth herein and the pertinent provisi	ons of Section 6-129 of the
- A - Law in infrastrum Carlo of the City of NOW VA	urk (Sention n. 129). Billu lite Tutes DiVit	mgated thoraditation,	
2) affirm that the information supplied in state 3) agree, if awarded this Contract, to comp	ipport of this MWBE Utilization Plan is	true and correct; ements of this Contract, the pertinent t	provisions of Section 6-129, and
 agree, if awarded this Contract, to comp the rules promulgated thereunder, all of w 	oich shall he deemed to be material ten	ns of this Contract	
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obtained or such goals are modified by the	r Agency, to meet the modified Fattiops		
MBE and/or WBE firms.		Date 10 23 15	
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Print Name Desmond (n	emona	THE VICE PRESIDENT	

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

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asis for Waiver I	Request: C	heck appropriate box & explain i	n detail below (attach a	dditional pages if needed)
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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 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: PV175AQUA

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

BID BOOKLET

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

SPECIAL NOTICE TO BIDDERS

BID SUBMISSION REQUIREMENTS

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

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

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

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

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

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

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

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

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

NOTES:

- (1) All of the above referred to blank forms to be completed and submitted with the bid are included in the BID BOOKLET.
- (2) If the bidder has any questions or requires additional information, please contact the Department of Design and Construction by phone (718-391-2601) or by fax (718-391-2615).
- (3) <u>VENDEX QUESTIONNAIRES:</u> 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) <u>SPECIAL EXPERIENCE REQUIREMENTS:</u> 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) <u>SPECIAL EXPERIENCE REQUIREMENTS FOR ASBESTOS:</u> 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 Notice to Bidders - Proprietary Items

- A. General: A proprietary item required for the Project is specified below. The contractor is required to provide and install such proprietary item. The Contractor must provide the specified item from the designated manufacturer. Substitutions are not permissible and will not be approved. More detailed information regarding the item is set forth in the Specifications. Such information includes item description, as well as requirements for installation and related materials.
- B. <u>Payment:</u> For the required proprietary item, an allowance amount is indicated. The allowance provides a stipulated amount to reimburse the Contractor for the purchase of the proprietary item from the designated manufacturer. Payment from the allowance shall be limited to the purchase price of the specified proprietary item and shall exclude any costs above and beyond the purchase price. Payment from the allowance shall not include any of the following costs with respect to the specified proprietary item: (1) any mark-up for the Contractor's overhead and profit, (2) any costs for transportation, including delivery, shipping or special handling costs, (3) any costs for installation, and (4) any costs for related materials. Payment for the specified proprietary item shall be based on the invoice actually provided by the manufacturer.
- C. Bid Form: A total allowance amount for the purchase of all required proprietary items is set forth on the Bid Form. In preparing the lump sum portion of its bid, the Contractor shall:
 - (1) Exclude from its bid any costs for the purchase of the proprietary items, and
 - (2) Include in its bid any costs above and beyond the purchase price, including without limitation, costs for transportation, delivery, installation, related materials and overhead.
- D. Required Proprietary Item(s):

CONTRACT NO. 1:

1. Proprietary Item:

Smoke detector with Base

Specification Section:

28311

Manufacturer:

Edwards – SIGA-PS plus SIGA-SB

Quantity:

10

Allowance Amount:

\$120.00 (Total \$1,200.00)

2. Proprietary Item:

Heat detector with Base

Specification Section:

28311

Manufacturer:

Edwards - SIGA-HRS plus SIGA-SB

Quantity:

1

Allowance Amount:

\$94.00

3. Proprietary Item:

Addressable Control Module

Specification Section:

28311

Manufacturer:

Edwards - SIGA-CR

Quantity:

1

Allowance Amount:

\$97.40

4. Proprietary Item:

Monitor Module for Waterflow and Tampers

Specification Section:

28311

Manufacturer:

Edwards - SIGA-CT1

Quantity:

2

Allowance Amount:

\$70.70 (Total \$141.40)

5. Proprietary Item:

Control Module for FSD

Specification Section:

28311

Manufacturer:

Edwards - SIGA-CR and MR201C

Quantity:

5

Allowance Amount:

\$97.40 + \$37.40 (Total \$674.00)

6. Proprietary Item:

Horn Strobe

Specification Section:

28311

Manufacturer:

Edwards – G1RF-HDVM

Quantity:

1

Allowance Amount:

\$73.00

7. Proprietary Item:

Smoke Duct Detector with Tube and Shut Down Relay

Specification Section:

28311

Manufacturer:

Edwards - SIGA-PS, SIGA-DH, SIGA-SB, SIGA-CR, 6261

Quantity:

3

Allowance Amount:

\$2,454.00 (Total \$7362.00)

SPECIAL EXPERIENCE REQUIREMENTS

Bidder:	General Construction	X YES	NO
Specific Areas of Work:	General Construction	X YES	NO
Manufacturer(s):	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(s) indicated above 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) <u>CONDITIONS</u>: 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) <u>JOINT VENTURES</u>: In the event the bidder is a joint venture, at least one firm in the joint venture must meet the above described experience requirements.
- 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 075000: Existing Roof Work

• Section 131000: Aquatic Life Support Systems

Section 131300: Aquarium Exhibit Tanks & Habitats

- (2) Special experience requirements apply to the contractor or subcontractor that will perform specific areas of work specified in the section(s) set forth below. Such experience requirements are set forth in full in the Addendum to the General Conditions.
 - The contractor or subcontractor that will perform the specific areas of work specified above 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.
- (F) EXPERIENCE REQUIREMENTS FOR MANUFACTURER(S): The special experience requirements set forth below apply to the manufacturer(s) that will supply or fabricate specific material or equipment. Compliance with such experience requirements will be evaluated after an award of contract. Within two (2) weeks of award, the contractor will be required to submit the qualifications of the proposed manufacturer(s). Once approved, no substitution will be permitted, unless the qualifications of the proposed replacement have been approved in writing in advance by the City.
 - (1) Special experience requirements apply to the manufacturer(s) of material and/or equipment specified in the section(s) set forth below.

General Construction

- Section 131300: Aquarium Exhibit Tanks & Habitats
- (2) Special experience requirements applicable to the manufacturer(s) of specified material or equipment are summarized below. Such experience requirements are set forth in full in the Addendum to the General Conditions.
 - The manufacturer providing the material or equipment specified in this section must, for the past five (5) 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 five (5) years.

Qualification Form

Project ID: PV175AQUA

Name of Contractor:		
Name of Project:		
Location of Project:		
Owner or Owner's representative (Archi	tect or Engineer) who is familiar with the work performed:	
Name:		
Title:		
Brief description of work completed:		
Was the work performed as a prime or a	subcontractor:	
Amount of Contract:		
Date of Completion:		
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MWBE PROGRAM

M/WBE UTILIZATION PLAN

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

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

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

Rejection of the Bid: The bidder must complete Schedule B: M/WBE Utilization Plan (Part II) set forth in this Bid Booklet on the pages following the section entitled "Notice to All Prospective Contractors". A Schedule B submitted by the bidder which does not include the Vendor Certification and Required Affirmations (See Section V of Part II) will be deemed to be non-responsive, unless a full waiver of the Participation Goals is granted (Schedule B, Part III). In the event that the City determines that the bidder has submitted a Schedule B where the Vendor Certification and Required Affirmations are completed but other aspects of the Schedule B are not complete, or contain a copy or computation error that is at odds with the Vendor Certification and Required Affirmations, the bidder will be notified by the Agency and will be given four (4) calendar days from receipt of notification to cure the specified deficiencies and return a completed Schedule B to the Agency. Failure to do so will result in a determination that the Bid is non-responsive.

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

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

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NOTICE TO ALL PROSPECTIVE CONTRACTORS

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

ARTICLE I. M/WBE PROGRAM

Local Law No. 129 of 2005 added and Local Law 1 of 2013 amended Section 6-129 of the Administrative Code of the City of New York (hereinafter "Section 6-129"). Section 6-129 establishes the program for participation in City procurement ("M/WBE Program") by minority- owned business enterprises ("MBEs") and women-owned business enterprises ("WBEs"), certified in accordance with Section 1304 of the New York City Charter. As stated in Section 6¬-129, the intent of the program is to address the impact of discrimination on the City's procurement process, and to promote the public interest in avoiding fraud and favoritism in the procurement process, increasing competition for City business, and lowering contract costs. The contract provisions contained herein are pursuant to Section 6-129, and the rules of the Department of Small Business Services ("DSBS") promulgated thereunder.

If this Contract is subject to the M/WBE Program established by Section 6-129, the specific requirements of MBE and/or WBE participation for this Contract are set forth in Schedule B of the Contract (entitled the "M/WBE Utilization Plan"), and are detailed below. The Contractor must comply with all applicable MBE and WBE requirements for this Contract.

All provisions of Section 6-129 are hereby incorporated in the Contract by reference and all terms used herein that are not defined herein shall have the meanings given such terms in Section 6-129. Article I, Part A, below, sets forth provisions related to the participation goals for construction, standard and professional services contracts. Article I, Part B, below, sets forth miscellaneous provisions related to the M/WBE Program.

PART A

PARTICIPATION GOALS FOR CONSTRUCTION, STANDARD AND PROFESSIONAL SERVICES CONTRACTS OR TASK ORDERS

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

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

- 2. If **Participation Goals** have been established for this Contract or Task Orders issued pursuant to this Contract, Contractor agrees or shall agree as a material term of the Contract that Contractor shall be subject to the **Participation Goals**, unless the goals are waived or modified by Agency in accordance with Section 6-129 and Part A, Sections 10 and 11 below, respectively.
- 3. If **Participation Goals** have been established for this Contract or Task Order issued pursuant to this Contract, a Contractor that is an MBE and/or WBE shall be permitted to count its own participation toward fulfillment of the relevant **Participation Goal**, provided that in accordance with Section 6-129 the value of Contractor's participation shall be determined by subtracting from the total value of the Contract or Task Order, as applicable, any amounts that the Contractor pays to direct subcontractors (as defined in Section 6-129(c)(13)), and provided further that a Contractor that is certified as both an MBE and a WBE may count its own participation either toward the goal for MBEs or the goal for WBEs, but not both.

A Contractor that is a qualified joint venture (as defined in Section 6-129(c)(30)) shall be permitted to count a percentage of its own participation toward fulfillment of the relevant **Participation Goal**. In accordance with Section 6-129, the value of Contractor's articipation shall be determined by subtracting from the total value of the Contract or Task Order, as applicable, any amounts that Contractor pays to direct subcontractors, and then multiplying the remainder by the percentage to be applied to total profit to

determine the amount to which an MBE or WBE is entitled pursuant to the joint venture agreement, provided that where a participant in a joint venture is certified as both an MBE and a WBE, such amount shall be counted either toward the goal for MBEs or the goal for WBEs, but not both.

- 4. A. If Participation Goals have been established for this Contract, a prospective contractor shall be required to submit with it or proposal, as applicable, a completed Schedule B, M/WBE Utilization Plan, Part II (see Pages 2-4) indicating: (a) whether the contractor is an MBE or WBE, or qualified joint venture; (b) the percentage of work it intends to award to direct subcontractors; and (c) in cases where the contractor intends to award direct subcontracts, a description of the type and dollar value of work designated for participation by MBEs and/or WBEs, and the time frames in which such work is scheduled to begin and end. In the event that this M/WBE Utilization Plan indicates that the bidder or proposer, as applicable, does not intend to meet the Participation Goals, the bid or proposal, as applicable, shall be deemed non-responsive, unless Agency has granted the bidder or proposer, as applicable, a pre- award waiver of the Participation Goals in accordance with Section 6-129 and Part A, Section 10 below.
- B. (i) If this Contract is for a master services agreement or other requirements type contract that will result in the issuance of Task Orders that will be individually registered ("Master Services Agreement") and is subject to M/WBE Participation Goals, a prospective contractor shall be required to submit with its bid or proposal, as applicable, a completed Schedule B, M/WBE Participation Requirements for Master Services Agreements That Will Require Individually Registered Task Orders, Part II (page 2) indicating the prospective contractor's certification and required affirmations to make all reasonable good faith efforts to meet participation goals established on each individual Task Order issued pursuant to this Contract, or if a partial waiver is obtained or such goals are modified by the Agency, to meet the modified Participation Goals by soliciting and obtaining the participation of certified MBE and/or WBE firms. In the event that the Schedule B indicates that the bidder or proposer, as applicable, does not intend to meet the Participation Goals that may be established on Task Orders issued pursuant to this Contract, the bid or proposal, as applicable, shall be deemed non-responsive.
- (ii) Participation Goals on a Master Services Agreement will be established for individual Task Orders issued after the Master Services Agreement is awarded. If Participation Goals have been established on a Task Order, a contractor shall be required to submit a Schedule B M/WBE Utilization Plan For Independently Registered Task Orders That Are Issued Pursuant to Master Services Agreements, Part II (see Pages 2-4) indicating: (a) whether the contractor is an MBE or WBE, or qualified joint venture; (b) the percentage of work it intends to award to direct subcontractors; and (c) in cases where the contractor intends to award direct subcontracts, a description of the type and dollar value of work designated for participation by MBEs and/or WBEs, and the time frames in which such work is scheduled to begin and end. The contractor must engage in good faith efforts to meet the Participation Goals as established for the Task Order unless Agency has granted the contractor a pre-award waiver of the Participation Goals in accordance with Section 6-129 and Part A, Section 10 below.
- C. THE BIDDER/PROPOSER MUST COMPLETE THE SCHEDULE B INCLUDED HEREIN (SCHEDULE B, PART II). A SCHEDULE B SUBMITTED BY THE BIDDER/PROPOSER WHICH DOES NOT INCLUDE THE VENDOR CERTIFICATION AND REQUIRED AFFIRMATIONS (SEE SECTION V OF PART II) WILL BE DEEMED TO BE NON-RESPONSIVE, UNLESS A FULL WAIVER OF THE PARTICIPATION GOALS IS GRANTED (SCHEDULE B, PART III). IN THE EVENT THAT THE CITY DETERMINES THAT THE BIDDER/PROPOSER HAS SUBMITTED A SCHEDULE B WHERE THE VENDOR CERTIFICATION AND REQUIRED AFFIRMATIONS ARE COMPLETED BUT OTHER ASPECTS OF THE SCHEDULE B ARE NOT COMPLETE, OR CONTAIN A COPY OR COMPUTATION ERROR THAT IS AT ODDS WITH THE VENDOR CERTIFICATION AND AFFIRMATIONS, THE BIDDER/PROPOSER WILL BE NOTIFIED BY THE AGENCY AND WILL BE GIVEN FOUR (4) CALENDAR DAYS FROM RECEIPT OF NOTIFICATION TO CURE THE SPECIFIED DEFICIENCIES AND RETURN A COMPLETED SCHEDULE B TO THE AGENCY. FAILURE TO DO SO WILL RESULT IN A DETERMINATION THAT THE BID/PROPOSAL IS NON-RESPONSIVE. RECEIPT OF NOTIFICATION IS DEFINED AS THE DATE NOTICE IS E-MAILED OR FAXED (IF THE BIDDER/PROPOSER HAS PROVIDED AN E-MAIL ADDRESS OR FAX NUMBER), OR NO LATER THAN FIVE (5) CALENDAR DAYS FROM THE DATE OF MAILING OR UPON DELIVERY, IF DELIVERED.
- 5. Where an M/WBE Utilization Plan has been submitted, the Contractor shall, within 30 days of issuance by Agency of a notice to proceed, submit a list of proposed persons or entities to which it intends to award subcontracts within the subsequent 12 months. In the case of multi-year contracts, such list shall also be submitted every year thereafter. The Agency may also require the Contractor report periodically about the contracts awarded by its direct subcontractors to indirect subcontractors (as defined in Section 6-129(c)(22)). PLEASE NOTE: If this Contract is a public works project subject to GML §101(5) (i.e., a contract valued at or

below \$3M for projects in New York City) or if the Contract is subject to a project labor agreement in accordance with Labor Law §222, and the bidder is required to identify at the time of bid submission its intended subcontractors for the Wicks trades (plumbing and gas fitting; steam heating, hot water heating, ventilating and air conditioning (HVAC); and electric wiring), the contractor must identify all those to which it intends to award construction subcontracts for any portion of the Wicks trade work at the time of bid submission, regardless of what point in the life of the contract such subcontracts will occur. In identifying intended subcontractors in the bid submission, bidders may satisfy any Participation Goals established for this Contract by proposing one or more subcontractors that are MBEs and/or WBEs for any portion of the Wicks trade work. In the event that the Contractor's selection of a subcontractor is disapproved, the Contractor shall have a reasonable time to propose alternate subcontractors.

- MBE and WBE firms must be certified by DSBS in order for the Contractor to credit such firms' participation toward the attainment of the **Participation Goals**. Such certification must occur prior to the firms' commencement of work. A list of MBE and WBE firms may be obtained from the DSBS website at www.nyc.gov/buycertified, by emailing DSBS at buyer@sbs.nyc.gov, by calling (212) 513-6356, or by visiting or writing DSBS at 110 William St., New York, New York, 10038, 7th floor. Eligible firms that have not yet been certified may contact DSBS in order to seek certification by visiting www.nyc.gov/getcertified, emailing MWBE@sbs.nyc.gov, or calling the DSBS certification helpline at (212) 513-6311. A firm that is certified as both an MBE and a WBE may be counted either toward the goal for MBEs or the goal for WBEs, but not both. No credit shall be given for participation by a graduate MBE or graduate WBE, as defined in Section 6-129(c)(20).
- 7. Where an M/WBE Utilization Plan has been submitted, the Contractor shall, with each voucher for payment, and/or periodically as Agency may require, submit statements, certified under penalty of perjury, which shall include, but not be limited to,: the total amount the Contractor paid to its direct subcontractors, and, where applicable pursuant to Section 6-129(j), the total amount direct subcontractors paid to indirect subcontractors; the names, addresses and contact numbers of each MBE or WBE hired as a subcontractor by the Contractor, and, where applicable, hired by any of the Contractor's direct subcontractors; and the dates and amounts paid to each MBE or WBE. The Contractor shall also submit, along with its voucher for final payment: the total amount it paid to subcontractors, and, where applicable pursuant to Section 6¬-129(j), the total amount its direct subcontractors paid directly to their indirect subcontractors; and a final list, certified under penalty of perjury, which shall include the name, address and contact information of each abcontractor that is an MBE or WBE, the work performed by, and the dates and amounts paid to each.
- 8. If payments made to, or work performed by, MBEs or WBEs are less than the amount specified in the Contractor's **M/WBE** Utilization Plan, Agency shall take appropriate action, in accordance with Section 6-129 and Article II below, unless the Contractor has obtained a modification of its **M/WBE** Utilization Plan in accordance with Section 6-129 and Part A, Section 11 below.
- 9. Where an M/WBE Utilization Plan has been submitted, and the Contractor requests a change order the value of which exceeds the greater of 10 percent of the Contract or Task Order, as applicable, or \$500,000, Agency shall review the scope of work for the Contract or Task Order, as applicable, and the scale and types of work involved in the change order, and determine whether the Participation Goals should be modified.
- 10. Pre-award waiver of the **Participation Goals.** (a) A bidder or proposer, or contractor with respect to a Task Order, may seek a pre-award full or partial waiver of the **Participation Goals** in accordance with Section 6-129, which requests that Agency change one or more **Participation Goals** on the grounds that the **Participation Goals** are unreasonable in light of the availability of certified firms to perform the services required, or by demonstrating that it has legitimate business reasons for proposing a lower level of subcontracting in its M/WBE Utilization Plan.
- (b) To apply for a full or partial waiver of the **Participation Goals**, a bidder, proposer, or contractor, as applicable, must complete Part III (Page 5) of Schedule B and submit such request no later than seven (7) calendar days prior to the date and time the bids, proposals, or Task Orders are due, in writing to the Agency by email at zhangji@ddc.nyc.gov or via facsimile at (718) 391-1886. Bidders, proposers, or contractors, as applicable, who have submitted requests will receive an Agency response by no later than two (2) calendar days prior to the due date for bids, proposals, or Task Orders; provided, however, that if that date would fall on a weekend or holiday, an Agency response will be provided by close-of-business on the business day before such weekend or holiday date.
- (c) If the Agency determines that the **Participation Goals** are unreasonable in light of the availability of certified firms to erform the services required, it shall revise the solicitation and extend the deadline for bids and proposals, or revise the Task Order, as applicable.

- (d) Agency may grant a full or partial waiver of the Participation Goals to a bidder, proposer or contractor, as applicable, who demonstrates—before submission of the bid, proposal or Task Order, as applicable—that it has legitimate business reasons for proposing the level of subcontracting in its M/WBE Utilization Plan. In making its determination, Agency shall consider factors that shall include, but not be limited to, whether the bidder, proposer or contractor, as applicable, has the capacity and the bona fide intention to perform the Contract without any subcontracting, or to perform the Contract without awarding the amount of subcontracts represented by the Participation Goals. In making such determination, Agency may consider whether the M/WBE Utilization Plan is consistent with past subcontracting practices of the bidder, proposer or contractor, as applicable, whether the bidder, proposer or contractor, as applicable, has made efforts to identify other portions of the Contract that it intends to subcontract.
- 11. Modification of M/WBE Utilization Plan. (a) A Contractor may request a modification of its M/WBE Utilization Plan after award of this Contract. PLEASE NOTE: If this Contract is a public works project subject to GML §101(5) (i.e., a contract valued at or below \$3M for projects in New York City) or if the Contract is subject to a project labor agreement in accordance with Labor Law §222, and the bidder is required to identify at the time of bid submission its intended subcontractors for the Wicks trades (plumbing and gas fitting; steam heating, hot water heating, ventilating and air conditioning (HVAC); and electric wiring), the Contractor may request a Modification of its M/WBE Utilization Plan as part of its bid submission. The Agency may grant a request for Modification of a Contractor's M/WBE Utilization Plan if it determines that the Contractor has established, with appropriate documentary and other evidence, that it made reasonable, good faith efforts to meet the Participation Goals. In making such determination, Agency shall consider evidence of the following efforts, as applicable, along with any other relevant factors:
- (i) The Contractor advertised opportunities to participate in the Contract, where appropriate, in general circulation media, trade and professional association publications and small business media, and publications of minority and women's business organizations;
- (ii) The Contractor provided notice of specific opportunities to participate in the Contract, in a timely manner, to minority and women's business organizations;
- (iii) The Contractor sent written notices, by certified mail or facsimile, in a timely manner, to advise MBEs or WBEs that their interest in the Contract was solicited;
- (iv) The Contractor made efforts to identify portions of the work that could be substituted for portions originally designated for participation by MBEs and/or WBEs in the M/WBE Utilization Plan, and for which the Contractor claims an inability to retain MBEs or WBEs;
- (v) The Contractor held meetings with MBEs and/or WBEs prior to the date their bids or proposals were due, for the purpose of explaining in detail the scope and requirements of the work for which their bids or proposals were solicited;
- (vi) The Contractor made efforts to negotiate with MBEs and/or WBEs as relevant to perform specific subcontracts, or act as suppliers or service providers;
- (vii) Timely written requests for assistance made by the Contractor to Agency's M/WBE liaison officer and to DSBS;
- (viii) Description of how recommendations made by DSBS and Agency were acted upon and an explanation of why action upon such recommendations did not lead to the desired level of participation of MBEs and/or WBEs.

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

- (b) The Agency may modify the **Participation Goals** when the scope of the work has been changed by the Agency in a manner that affects the scale and types of work that the Contractor indicated in its **M/WBE** Utilization Plan would be awarded to subcontractors.
- 12. If this Contract is for an indefinite quantity of construction, standard or professional services or is a requirements type contract and the Contractor has submitted an **M/WBE** Utilization Plan and has committed to subcontract work to MBEs and/or WBEs in order to meet the **Participation Goals**, the Contractor will not be deemed in violation of the M/WBE Program requirements for this Contract with regard to any work which was intended to be subcontracted to an MBE and/or WBE to the extent that the Agency has determined that such work is not needed.
- 13. If **Participation Goals** have been established for this Contract or a Task Order issued pursuant to this Contract, at least once annually during the term of the Contract or Task Order, as applicable, Agency shall review the Contractor's progress toward attainment of its M/WBE Utilization Plan, including but not limited to, by reviewing the percentage of work the Contractor has actually awarded to MBE and/or WBE subcontractors and the payments the Contractor made to such subcontractors.

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

PART B: MISCELLANEOUS

- 1. The Contractor shall take notice that, if this solicitation requires the establishment of an **M/WBE** Utilization Plan, the resulting contract may be audited by DSBS to determine compliance with Section 6-129. See §6-129(e)(10). Furthermore, such resulting contract may also be examined by the City's Comptroller to assess compliance with the **M/WBE** Utilization Plan.
- 2. Pursuant to DSBS rules, construction contracts that include a requirement for an **M/WBE** Utilization Plan shall not be subject to the law governing Locally Based Enterprises set forth in Section 6-108.1 of the Administrative Code of the City of New York.
- 3. DSBS is available to assist contractors and potential contractors in determining the availability of MBEs and/or WBEs to participate as subcontractors, and in identifying opportunities that are appropriate for participation by MBEs and/or WBEs in contracts.
- 4. Prospective contractors are encouraged to enter into qualified joint venture agreements with MBEs and/or WBEs as defined by Section 6-129(c)(30).
- 5. By submitting a bid or proposal the Contractor hereby acknowledges its understanding of the M/WBE Program requirements set forth herein and the pertinent provisions of Section 6-129, and any rules promulgated thereunder, and if awarded this Contract, the Contractor hereby agrees to comply with the M/WBE Program requirements of this Contract and pertinent provisions of Section 6-129, and any rules promulgated thereunder, all of which shall be deemed to be material terms of this Contract. The Contractor hereby agrees to make all reasonable, good faith efforts to solicit and obtain the participation of MBEs and/or WBEs to meet the required Participation Goals.

ARTICLE II. ENFORCEMENT

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

- assessing liquidated damages or reducing fees, provided that liquidated damages may be based on amounts representing costs of delays in carrying out the purposes of the M/WBE Program, or in meeting the purposes of the Contract, the costs of meeting utilization goals through additional procurements, the administrative costs of investigation and enforcement, or other factors set forth in the Contract:
- exercising rights under the Contract to procure goods, services or construction from another contractor and charge the cost of such (i) contract to the Contractor that has been found to be in noncompliance; or
- taking any other appropriate remedy.
- If an M/WBE Utilization Plan has been submitted, and pursuant to this Article II, Section 3, the Contractor has been found to 4. have failed to fulfill its Participation Goals contained in its M/WBE Utilization Plan or the Participation Goals as modified by Agency pursuant to Article I, Part A, Section 11, Agency may assess liquidated damages in the amount of ten percent (10%) of the difference between the dollar amount of work required to be awarded to MBE and/or WBE firms to meet the Participation Goals and the dollar amount the Contractor actually awarded and paid, and/or credited, to MBE and/or WBE firms. In view of the difficulty of accurately ascertaining the loss which the City will suffer by reason of Contractor's failure to meet the Participation Goals, the foregoing amount is hereby fixed and agreed as the liquidated damages that the City will suffer by reason of such failure, and not as a penalty. Agency may deduct and retain out of any monies which may become due under this Contract the amount of any such liquidated damages; and in case the amount which may become due under this Contract shall be less than the amount of liquidated damages suffered by the City, the Contractor shall be liable to pay the difference.
- Whenever Agency has reason to believe that an MBE and/or WBE is not qualified for certification, or is participating in a contract in a manner that does not serve a commercially useful function (as defined in Section 6-129(c)(8)), or has violated any provision of Section 6- 129, Agency shall notify the Commissioner of DSBS who shall determine whether the certification of such business enterprise should be revoked.
- Statements made in any instrument submitted to Agency pursuant to Section 6-129 shall be submitted under penalty of perjury and any false or misleading statement or omission shall be grounds for the application of any applicable criminal and/or civil penalties for perjury. The making of a false or fraudulent statement by an MBE and/or WBE in any instrument submitted pursuant to Section 129 shall, in addition, be grounds for revocation of its certification.
- The Contractor's record in implementing its M/WBE Utilization Plan shall be a factor in the evaluation of its performance. Whenever Agency determines that a Contractor's compliance with an M/WBE Utilization Plan has been unsatisfactory, Agency shall, after consultation with the City Chief Procurement Officer, file an advice of caution form for inclusion in VENDEX as caution data.

Tax ID #:			

APT E-

PIN#:

85015B0174

Contract # 1 - General Construction Work

SCHEDULE B - M/WBE Utilization Plan

Part I: M/WBE Participation Goals

Part I to be completed by contracting agency

Contract Overview					
APT E-Pin #	85015B0174		FMS Project ID#:	PV175AQUA	
Project Title/Agency	Staten Island Zoo Aquariu	m Recons	truction		
PIN#	8502015PV0020C				
Bid/Proposal Response Date:	October 23, 2015				
Contracting Agency	Department of Design and	l Construct	ion		
Agency Address	30-30 Thomson Avenue	City Lor	ng Island City State_	NY Zip Code 1	1101
Contact Person	Norma Negrón	TitleN	WBE Liaison & Com	pliance Analyst	
Telephone #	(718) 391-1502	_Email	negronn@ddc.	nyc.gov	

Project Description (attach additional pages if necessary)

This Project consists of the reconstruction of the zoo's aquarium exhibit, foyer and central boiler plant. The aquarium is located on the ground floor of the main zoo building and the boiler plant is located beneath the aquarium in the double height cellar space. The reconstruction of the aquarium involves demolition of the existing exhibit followed by installation of new state-of-the-art tanks and life support systems. The project also includes installation of dedicated MEP/FP systems to support the aquarium exhibit space. The new HVAC units are to be located in the attic space 2 floors above the exhibit and new condensing units are to be installed on the flat roof above the adjacent Reptile Wing. This work is to be undertaken whilst the adjacent zoo wings remain open to the public and should be phased accordingly to maintain egress from the building. The reconstruction of the central boiler plant involves demolition of the existing boiler equipment serving the building and installation of new modular boiler units. The work is to be undertaken whilst the building is open to the public. A temporary boiler unit is to be installed at the exterior of the building to maintain full operational capacity for the animal wings the existing boiler serves.

M/WBE Participation Goals for Services

Enter the percentage amount for each group or for an unspecified goal. Please note that there are no goals for Asian Americans in Professional Services

Prime Contract Industry:	Construction			
Group		Percentage		
Unspecifie	<u>d *</u>	5	%	
	or			_
Black Am	nerican	Unspecified	%	
Hispanic Am	nerican	Unspecified	<u>%</u> _	
Asian Am	nerican	Unspecified	%	
V	Vomen	Unspecified	<u>%</u> _	
Total Participation	on Goals	5	%	Line 1

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

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APT E-		
PIN#:	85015B0174	

Tax ID #:		

SCHEDULE B - Part II: M/WBE Participation Plan

to be completed by the bidder/proposer:

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

Section I: Prime Contractor Contact Inform	nation						
Tax ID#		FMS Vendor ID#					
Business Name		Contact Person					
Address							
Telephone #	Email						
	\$60 (FE) (FE) (FE)	Control Contro	100 C				
Section II: M/WBE Utilization Goal Calcula	ition: Check the appl	cable box and complete subs	section.				
PRIME CONTRACTOR ADOPTIN	NG AGENCY M/N	WBE PARTICIPATION	GOALS				
For Prime Contractors (including Qualified Joint Ventures and M/WBE firms) adopting Agency M/WBE	Total Bid/Proposal Value	Agency Total Participation Goals (Line 1, Page 6)	Calculated M/WBE Participation Amount				
Participation Goals. Calculate the total dollar value of your total bid that you agree will be awarded to VBE subcontractors for services and/or lited to an MWBE prime contractor or calculation of the contractor or calculations.							
Please review the Notice to Prospective Contractors for more information on how to obtain credit for M/WBE participation.	s	x	\$ = Line 2				
	PRIME CONTRACTOR OBTAINED PARTIAL WAIVER APPROVAL: ADOPTING MODIFIED M/WBE PARTICIPATION GOALS						
For Prime Contractors (including Qualified Joint Ventures and M/WBE firms) adopting Modified M/WBE	Total Bid/Proposal Value	Adjusted Participation Goal (From Partial Waiver)	Calculated M/WBE Participation Amount				
Participation Goals. Calculate the total dollar value of your total bid that you agree will be awarded to M/WBE subcontractors for services and/or credited to an MWBE prime contractor or Qualified Joint Venture. Please review the Notice to Prospective Contractors for more information on how to obtain credit for MWBE participation.	s		\$ = Line 3				

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

Contract Overview		EMC Vandar ID #	
Tax ID #		FMS Vendor ID #	
Business Name		42	
Contact Name	Telephone		Email
Type of Procureme	nt 🔲 Competitive Sealed Bids 🔲 🤇	Other Bid/Response	Due vate
APT E-PIN # (for this procurement):		Contracting a	Agency:
M/WBE Participa	tion Goals as described in bid/solicite	ntion documents	
%	Agency M/WBE Participation Goal		
Proposed M/WBE Pa	rticipation Goal as anticipated by vend	or seeking waiver	
%	of the total contract value anticipated	in good faith by the bidder	/proposer to be subcontracted for
	services and/or credited to an MWBE		
Basis for Waiver R	equest: Check appropriate box & expl	ain in detail below (attach	additional pages if needed)
☐ Vendor dose not	subcontract services, and has the	capacity and good faith	intention to perform all such work
vendor does not tself with its own e	nployees.		-
☐ Vendor subcontr	acts some of this type of work but a	at a <i>lower</i> % than bid/sol	icitation describes, and has the
on box viloena	od faith intention to do so on this c	ontract. (Attach subcor	ntracting plan outlining services that
he vender will self-	perform and subcontract to other Vi	endors or consultants.)	•
the vendor will self-	perform and subcontract to other ve	endors or consultants.)	·
the vendor will self-	perform and subcontract to other ve	endors or consultants.)	
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the vendor will self- Vendor has othe	perform and subcontract to other ve	endors or consultants.)	rticipation Goal above. Explain unde
he vendor will self- Vendor has othe	perform and subcontract to other ve	endors or consultants.)	
he vendor will self- Vendor has othe separate cover.	perform and subcontract to other ve	endors or consultants.)	
Vendor will self- Vendor has othe separate cover.	perform and subcontract to other ver legitimate business reasons for p	roposing the M/WBE Pa	rticipation Goal above. Explain unde
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List 3 most recent contracts performed for other entities. Include information for each subcontract awarded in performance of such contracts. Add more pages if necessary. (Complete ONLY if vendor has performed fewer than 3 New York City contracts.) **TYPE OF Contract ENTITY** DATE COMPLETED Manager at entity that hired vendor (Name/Phone No./Email) **Total Contract Total Amount** Amount \$ Subcontracted \$ Type of Work Subcontracted **TYPE OF Contract** AGENCY/ENTITY **DATE COMPLETED** Manager at agency/entity that hired vendor (Name/Phone No./Email) **Total Contract Total Amount** Amount \$ Subcontracted \$ Item of Work Item of Work Subcontracted Item of Work Subcontracted and and Value of Subcontracted and Value of subcontract subcontract Value of subcontract **TYPE OF Contract** AGENCY/ENTITY DATE COMPLETED Manager at entity that hired vendor (Name/Phone No JEmail) **Total Contract Total Amount** Amount \$ Subcontracted \$ Item of Work Item of Work Subcontracted Item of Work Subcontracted and and Value of Subcontracted and Value of subcontract subcontract Value of subcontract VENDOR CERTIFICATION: I hereby affirm that the information supplied in support of this waiver request is true and correct and that this request is made in good faith. Signature: Date: Print Name: Title: Shaded area below is for agency completion only AGENCY CHIEF CONTRACTING OFFICER APPROVAL Signature: Date: CITY CHIEF PROCUREMENT OFFICER APPROVAL Signature: _ Date: Waiver Determination Full Waiver Approved: Waiver Denied: Partial Waiver Approved: Revised Participation Goal:

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

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

PROJECT ID: PV175AQUA

Staten Island Zoo Aquarium Reconstruction 614 Broadway Staten Island, NY 10310

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:

BID FORM

ne 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 the responsibility or qualification of the bidder to receive public contracts except as set forth on the Affirmation included as page 17 of this Bid Booklet.

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

Section V: Vendor Certification and Required Affirmations:

I hereby:

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

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PROJECT ID: PV175AQUA

TOTA	AL BID PRICE: In the	ne space provided below, the Bidder sl	nall indicate the total bid price	in figures.
A.	forth below. Total Price	Total price for all labor and material for e shall include all costs and expenses, own in the drawings and specification	i.e. labor, material overhead an	
	Total Price for Material Sold and Delivered	Total Price For Labor		
	\$ +	- \$	Total Price for Iter	n A= \$
В.	ALLOWANCE for Inc (Section 028013 of the	dental Asbestos Abatement Specifications)		\$15,000.00
C.	AMOUNT for Propriet	ary Items (pages 2a)	•	\$9,641.80
	TOTAL BID PRICE (A (a/k/a BID PROPOSA)			\$
*	Subcontractors" (page 1 (BID ENVELOPE #2).	BIDDER'S SIGNATURE ADDENTIFICATION: You MUST complete 7) at the time you submit your bid. You in the event an award of contract is not n entitled "Bidder's Identification of Su	e and submit the form entitled "] must submit this form in a sepa made to the Bidder, the Bidder	rate, sealed envelope hereby authorizes the
Bidde	r:			
By:				
		(Signature of Partner or con	porate officer)	
Attest (Corp	: orate Seal)	Se	cretary of Corporate Bidder	
	Affidavit on	the following page should be subscribe	ed and sworn to before a Notar	y Public

BID FORM (TO BE NOTARIZED)

AFFIDAVIT WHERE BIDDERS IS AN INDIVIDUAL

STATE OF NEW YORK, COUNTY OF	SS:
I am the person described in and who executed	being duly sworn says: 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,	(Signature of the person who signed the Did)
Notary Public	

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. alf of the firm, and the several matters therein stated are in all respects true.
subscribed the name of the firm discrete on sexual	
	(Signature of Partner who signed the Bid)
Subscribed and sworn to before me this	
day of,	
Notary Public	
·	
	·*************************************
AFFIDAVII	WHERE BIDDERS IS A CORPORATION
STATE OF NEW YORK, COUNTY OF	SS:
	being duly sworn says: the above named corporation whose name is subscribed to and which executed
I have knowledge of the several matters therein	n stated, and they are in all respects true.
Subscribed and sworn to before me this day of,	(Signature of Corporate Officer who signed the Bid)
·	
Notary Public	

AFFIRMATION

not be	ect or take en declared eding pe	kes and is not a defaulter, as surety or otherwared not responsible, or disqualified, by any	der is not in arrears to the City of New York uvise, upon obligation to the City of New York, agency of the City of New York, nor is there a fication of the bidder to receive public contract
(If no	ne, the b	idder shall insert the word "None" in the sp	ace provided above.)
	Jame of	Bidder:	
Addre City:	ss:	State:	Zip Code:
<u> </u>			Zip Code:
CHEC	CK ONE	BOX AND INCLUDE APPROPRIATE N	JMBER:
	A -	Individual or Sole Proprietorship * SOCIAL SECURITY NUMBER	
	В -	Partnership, Joint Venture or other uninco	rporated organization ER
	C -	Corporation EMPLOYER IDENTIFICATION NUMBER	ER
		·	
By:			
Title:		Signature:	
-		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

<u>SUBMISSION</u>: The Bidder must, at the time of the bid, submit the completed 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.

All listed subcontractors must be used to perform the work identified on this form for the amount listed. The listed subcontractors are not alternatives to each other. The list of subcontractors is to be submitted in a separate sealed envelope by completing the form 'Bidders Identification of Subcontractors' for 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 complete this form using its own name.

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 Schedule B (Subcontractor Utilization Plaan), the bid will be non-responsive unless the bidder requests and obtains a Waiver of Target Subcontracting Percentage (Schedule B, Part III) in advance of bid submission. Failure to submit the completed 'BIDDERS IDENTIFICATION OF SUBCONTRACTORS' form that includes the names of subcontractors and the agreed upon amounts to be paid to such subcontractors will render the bid non-responsive.

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: PV175AQUA

<u>SUBMISSION:</u> In addition to its Bid (Bid Envelope # 1), the Bidder must, at the time of the bid, complete and submit this form 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:	Description of P	lumbing Work:
	(Print Name)		
	Agreed amont to be paid Subcontractor: \$		
2.	HVAC CONTRACTOR:	Description of H	VAC Work:
	(Print Name)		
	Agreed amont to be paid Subcontractor: \$		
3.	ELECTRICAL CONTRACTOR:	Description of El	ectrical Work:
	(Print Name)		
	Agreed amont to be paid Subcontractor: \$		
BIDI	DER'S SIGNATURE: The Bidder must sign a		ided below:
(Bidde	er's Signature)	(Print Name)	
(Addr	ess)		
(Title)	(Phone #)	(Fax#)	(Date)
- CITI	OF NEW YORK		

BID BOND 1 FORM OF BID BOND

KNOW ALL M	MEN BY THESE PRESENTS. That we,
hereinafter refe	erred to as the "Principal", and
hereinafter referred to as the	erred to as the "Surety" are held and firmly bound to THE CITY OF NEW YORK, hereinafter he "CITY", or to its successors and assigns in the penal sum of
and truly to be	_), Dollars lawful money of the United States, for the payment of which said sum of money well made, we, and each of us, bind ourselves, our heirs, executors, administrators, successors and and severally, firmly by these presents.
Whereas	, the Principal is about to submit (or has submitted) to the City the accompanying proposal, hereby reof, to enter into a contract in writing for
Proposal with	THEREFORE, the conditions of this obligation are such that if the Principal shall not withdraw said out the consent of the City for a period of forty-five (45) days after the opening of bids and in the stance of the Principal's Proposal by the City, if the Principal shall:
(a) all the execute the proposal a	Within ten (10) days after notification by the City, execute in quadruplicate and deliver to the City ed counterparts of the Contract in the form set forth in the Contract Documents, in accordance with a accepted, and
(b) faithful perfor City and shall	Furnish a performance bond and separate payment bond, as may be required by the City, for the rmance and proper fulfullment of such Contract, which bonds shall be satisfactory in all respects to the be executed by good and sufficient sureties, and
(c) Information fo then this oblig	In all respects perform the agreement created by the acceptance of said Proposal as provided in the or Bidders, bound herewith and made a part hereof, or if the City shall reject the aforesaid Proposal, gation 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.

their proper officers the	day of	s to be hereto affixed and these pre	is or orgined by
		4	
(Seal)		Principal	(L.S.
•	Ву:		
(Seal)		Surety	
	Ву:		

BID BOND 3

ACKNOWLEDGEMENT OF PRINCIPAL, IF A CORPORATION

State of	of	County of	ss: , before me personally came
On 1	this	day of	, before me personally came
		to me known, who	o, being by me duly sworn, did depose and say that he
resides	s at	of	
that he	e is the	OIOI	oregoing instrument; that he knows the seal of said
corpor	ration; that or	ne of the seals affixed to said instruction, and that he signed his national	ment is such seal; that it was so affixed by order of the
			Notary Public
		<u>ACKNOWLEDGEMENT</u>	OF PRINCIPAL, IF A PARTNERSHIP
State (of	County of	SS:
On t	this	day of	ss: before me personally appeared.
• • • • • • • • • • • • • • • • • • • •		to me known and	d known to me to be one of the members of the firm of
		describe	d in and who executed the foregoing instrument, and no
ackno	wledged to m	ne that he executed the same as and	for the act and deed of said firm.
			Notary Public
			·
		<u>ACKNOWLEDGEMEN</u>	T OF PRINCIPAL, IF AN INDIVIDUAL
State	of	County of	SS:
On	this	day of	d known to me to be the person described in and who
		to me known an	d known to me to be the person described in and who
execu	ited the foreg	oing instrument and acknowledged	that he executed the same.
			Notary Public

AFFIX ACKNOWLEDGEMENTS AND JUSTIFICATION OF SURETIES

CITY OF NEW YORK DDC

BID BREAKDOWN

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

X	YES	NO
	1 2 3	

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.



Project: Staten Island Zoo Aquarium Reconstruction

Location: 614 Broadway, Staten Island, NY 10310

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION WORK

DDC ID: PV175AQUA

Sponsor Agency: Department of Cultural Affairs

Bidder:

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	CONTRACT 1 - GENERAL CONSTRUCTION WORK							
01 0000	GENERAL REQUIREMENTS							
01 1000	MOBILIZATION							
	MOBILIZATION		≤					
	TEMPORARY HEAT		LS					
	Subtotal							
02 0000	EXISTING CONDITIONS							
02 4119	SELECTIVE DEMOLITION AND ALTERATION WORK							
	TEMPORARY PROTECTION		S					
	REMOVE EXISTING AQUARIUM - 13 EA		S					
	REMOVE EXISTING SUPPORT EQUIPMENT INCLUDING TANK		RMS					
	STRUCTURAL SUPPORT							
	REMOVE EXISTING STEPS TO AQUARIUM AND ALL RELATED		ц					
Managhina and Managhina and An	DISPLAY STRUCTURE		j					
	REMOVE CONCRETE RAISED FLOOR AT KEEPER AREAS		SF					
	REMOVE EXISTING DISPLAY WALL		SF					
	REMOVE DOORS		Ę					
	REMOVE GLAZED DOOR AT SECOND FLOOR, REINSTALL		ĘĄ					
	REMOVE EXISTING FLOOR / CEILING / WALL FINISHES		SF					
	REMOVE EXISTING DUMBWAITER AND RELATED STRUCTURE		207					
	REMOVE EXISTING PARTITION WAI I		T.C.					
	REMOVE EXISTING BRICK WALL - 16SF		200					
	REMOVE EXISTING STAIR STRUCTURE AT CELLAR		COC					
	REMOVE EXISTING SLAB ON GRADE		SF	THE PART OF THE PA				
	PROVIDE TEMPORARY OPENING IN CONCRETE WALL		R					THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TW
	1 1 1		POC	The second second second				
	REMOVE EXISTING FLOOR AND FLOOR JOISTS AT ATTIC -		207					



CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION WORK

DDC ID: PV175AQUA

Sponsor Agency: Department of Cultural Affairs

Project: Staten Island Zoo Aquarium Reconstruction Location: 614 Broadway, Staten Island, NY 10310 Bidder:

CSI	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	REMOVE EXISTING CEILING AND CEILING JOISTS AT ATTIC -		ГОС					
	20SF PROVIDE OPENING IN FLOOR FOR NEW HVAC DUCT - 5SF		207					
	PROVIDE OPENING MASONRY CHIMNEY FOR NEW HVAC		700					
	DUCT - 3 LF REMOVE STONE CHIMNEY CAP - 20SF		EA					
	PROVIDE OPENING IN FACADE FOR NEW LOUVER -8 SF		ГОС					
	REMOVE EXISTING WOOD JOIST		4					
	REMOVE CONVECTOR COVER		EA					
	REMOVE EXISTING WINDOW FRAME		LOC					
	REMOVE EXISTING ATTIC ACCESS LADDER		Ā					
	REMOVE ROLL GATE - 6' W		EA					
	DEMOVE EXISTING SUMP PIT		EA					
	MISC CLITTING AND PATCHING		rs					
	WIBSISH REMOVALS		LS					
	Subtotal							
02 8243	ASRESTOS ABATEMENT							
0.20.20	ANDREATON ABATEMENT		ΓS					
	Subtotal							
03 0000								
03 3000			SF					
	NEW 5 TH SLAB ON GRADE INCL. SOBBACE		S.					
	A CONCRETE PAUS FOR MECH DINI		SF					
	4" NON CHRIMK GROLLT FOR TANKS		SF					
	TOENCH IN BOIL ER RM -6" W		占					
	DRE-FAR ROOF CLIRB		LF					
	Subtotal	_						



CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION WORK

DDC ID: PV175AQUA

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Project: Staten Island Zoo Aquarium Reconstruction Location: 614 Broadway, Staten Island, NY 10310 Bidder:

CSI	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
04 0000	MASONRY							
04 0100	MASONRY RESTORATION AND CLEANING							
	CUT POCKET IN WALL FOR BEAM INSTALLATION ON ROOF,		707					
	BRICK UP POCKET		rs					
	Subtotal							
0000	WASSIEMBIES							
04 2000	8" CMI DARTITION		SF					
	REPAIR MASONRY CHIMNEY		LS					
	NEW STONE CHIMNEY CAP		EA					
	Subtotal							
02 0000	METALS							
05 1200	1							
			LBS					
	STEEL BEAM AT TANK FRAME SPLICE		LBS					
	ADDITIONAL FRAMING AT CELLAR AND GROUND FLOOR		LBS					
	STEEL DUNNAGE AT ATTIC		LBS					
	STEEL BEARING PLATES		EA					
	1 1/4" STEEL PLATE AT TANK - 8 EA		LBS					
			٢					
	Subtota							
0003	MISCELL ANEOLIS METAL S							
none en	STEEL STAIR (CONCRETE FILL) WITH STEEL GUARD RAILING		FLT					
			ц					
	NEW LINTEL		ב ל					
	NEW EXHAUST AIR LOUVER AT CHIMNEY		Y G					
	NEW FRESH AIR INTAKE GRILL		ည					
	MISC. FRAMING AND SUPPORT		LS					
	Subtotal							



Project: Staten Island Zoo Aquarium Reconstruction

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CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION WORK

DDC ID: PV175AQUA

Sponsor Agency: Department of Cultural Affairs

					Total	4	Total Cant	Total Cost:
CSI Number	Description	Quantity	Unit	Unit Cost of Material	Cost of Material	Unit Cost of Labor	of Labor	Materials and Labor
0000 90	WOOD, PLASTICS AND COMPOSITES							
06 2000	CARPENTRY							
2027	KING		LS.					
	NEW WOOD FRAMING		L					
	PTD PI YWOOD CEILING LIGHT COVE		L					
	BLACK FILM ADHERED TO OUTSIDE OF TANK		SF					
	CUSTOM CUT REMOVABLE METAL COVER AT MONITOR	-	Ë					
	DE-CONNECT NEW AND EXISTING JOINTS		LS					
	SOI ID-SURFACE FABRICATIONS (INCLUDED W/ 092900)							
0000 20	THERMAL AND MOISTURE PROTECTION							
07 1420	ELASTOMERIC COATING							
	ELASTOMERIC COATING ON EXPOSED CMU		SF					
	Subtotal							
002 2000	EXISTING ROOF WORK							
	ICUI AND PAICH PORTION OF EXISTING CONCRETE NOOF		COC					
	MISC. ROOF REPAIR		LS					
	Subtotal							
	9 9 1							
07 8413	FIRESTOPS AND SMOKESEALS		щ					
	Subtotal							
07 9200	JOINT SEALERS							
2010	JOINT SEALERS		LS					
	Subtotal							
3.1								



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CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION WORK

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Sponsor Agency: Department of Cultural Affairs

Total Cost: and Labor **Materials Total Cost** of Labor **Unit Cost** of Labor Material Cost of Total Unit Cost of Material Unit 농 ΕĀ Æ R EA PR PR A A Quantity Subtotal Subtotal Subtotal Subtotal Subtotal GLASS-FIBER-REINFORCED GYPSUM (GFRG) FABRICATIONS REMOVE EXISTING ENTRANCE DOOR, REFURBISH AND FINISH HARDWARE (included w/ section 081113) Description HM DOOR - DOUBLE, FIRE RATED REINSTALL AFTER TANK INSTALL STEEL DOORS AND FRAMES PTD. MTL TRIM AT GFRG ROLL UP GATE - 6' X 10' **GLASS AND GLAZING** GFRG ACCESS PANEL FRP DOOR - SINGLE INTERIOR WINDOW HM DOOR - SINGLE ROLL UP DOORS ACCESS DOORS GFRG CEILING MDF PANEL OPENINGS FINISHES 09 0000 09 2713 08 8000 08 0000 08 1113 08 3113 08 7000 08 3323 Number SS



CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION WORK

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Sponsor Agency: Department of Cultural Affairs

Project: Staten Island Zoo Aquarium Reconstruction Location: 614 Broadway, Staten Island, NY 10310 Bidder:

CSI	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
09 2900	GYPSUM DRYWALL TYPE 3 - (1) LAYER 5/8" MOLD RESISTANT CEMENT BOARD EACH SIDE, FRP STUDS, SOUND ATTENUATION BLANKET, (1)		SF					
	TYPE 4 - 1 5/8" FRP STUDS, (1) LAYER 5/8" MOLD RESISTANT CEMENT BOARD, (1) LAYER 1/2" MDF ON Z-CLIPS, NON RATED -		SF					
	TYPE 5- (1) LAYER 1/2" MDF ON Z-CLIPS		SF					
	TYPE 6 - (1) LAYER 1" GYPSUM SHAFT LINER ONE SIDE, (2) LAYERS 5/8" TYPE 'X' GWB ONE SIDE, 2 1/2" MTL CH-STUD, 4) MDE ON 2-CLIPS - 2HR RATED		SF					
	TYPE 7.1 5/8" MTI STUD (1)LAYER 5/8" GWB ONE SIDE		SF					
	TYPE 8- 2 1/2" MTL STUD, (1)LAYER 5/8" MOISTURE / MOLD DESISTANT GWR		SF					
	TYPE 9 - (1) LAYER 5/8" MOLD RESISTANT CEMENT BOARD, FIJERING CHANNEL ON EXIST.		SF					
	TYPE 12 - (1) LAYER 1" GYPSUM SHAFT LINER ONE SIDE, (2)LAYERS 5/8" TYPE 'X' GWB ONE SIDE, 2 1/2" MTL CH-STUD		SF					
	GWB-2 MOLINTED ON STL STUDS AT TOP OF TANKS		SF					
	PERFORATED GWB CEILING		SF					
	Subtotal							
09 3013	CERAMIC TILING							
	CERAMIC TILE FLOOR		SF					
	CERAMIC TILE WALLS		SF.					
			۳					
	Subtota							
09 5113	ACOUSTICAL PANEL CEILINGS		l l					
	ACOUSTIC INSULATION AT CEILING Subtotal		5					



CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION WORK

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Sponsor Agency: Department of Cultural Affairs

Location: 614 Broadway, Staten Island, NY 10310 Bidder:

Project: Staten Island Zoo Aquarium Reconstruction

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
09 6623	THIN SET EPOXY TERRAZZO		טב					
	TERRAZZO FLOOR DDECAST TERRAZZO RASE - 7" HT		占					
	REFINISH EXISTING TERRAZZO FLOOR FINISH AT FOYER		SF					
	Subtotal							
000	TOONS DESIN COMPOSITION ELONGING							
03 0173	FPOXY COATED FLOOR		SF					
	Subtotal							
09 7200	WALL COVERING							
	EDUCATIONAL GRAPHIC WALLPAPER		SF					
	Subtotal							
09 7800	REINFORCED PLASTIC PANELING SYSTEM							
	BLACK FRP WALL OUTSIDE OF TANK		SF					
	FRP CLADDING AT TOP OF TANKS		SF					
	FULLY ADHERED FRP PANEL (PARTITIONS TYPE 3, 9)		SF					
	Subtotal							
0006 60	PAINTING AND FINISHING							
	PAINT NEW CMU WALL AND EXISTING WALLS		R					
	PAINT GWB CEILING		SF					
	PAINT EXISTING CEILING		SF					
	PAINT EXPOSED MECH. PIPING, CONDUITS, DUCTWORK		rs					
	PAINT DOOR		FVS					
	PATCH EXISTING CEILING AT SECOND FLOOR		rs					
	PAINT EXISTING LADDER		EA					
	MISCEL LANEOUS FINISHES		LS					
	Subtotal							



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Bidder:

Project: Staten Island Zoo Aquarium Reconstruction

Location: 614 Broadway, Staten Island, NY 10310

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
10 0000	SPECIALTIES DIMENSIONAL LETTERS - CUT ACRYLIC							
2	CUT ACRYLIC WAYFINDING SIGNAGE ADHERED TO WAI I PAPER - 24 LETTER		rs					
	Subtotal							
11 0000	EQUIPMENT							
11 4580	DISAPPEARING STAIRWAY							
	ADDER W/ RAILING TO ATTIC		<u>a</u>					
	Subtotal							
77 77	MISIO SYSTEM							
0076			LS					
	GRAPHIC MANAGEMENT SERVER SYSTEM		r _S					
	BACKGROUND MUSIC SYSTEM		rs LS					
			LS					
	Subtotal							
13 0000	SPECIAL CONSTRUCTION							
13 1000	AQUATIC LIFE SUPPORT SYSTEMS		0					
	LIFE SUPPORT EQUIPMENT		2 v					
	LIFE SUPPORT CONTROLS		2 4					
	Subtotal							Address
13 1300	AQUARIUM TANKS AND HABITATS		i					
	TANKS INCL. STANDS AND INSTALLATION		EA					
	RIGGING / INSTALLATION		rs					
			S					
	JG MATERIALS		LS					
	Subtotal							



CONTRACT 1 - GENERAL CONSTRUCTION WORK

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Project: Staten Island Zoo Aquarium Reconstruction

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CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
13 5060	AQUARIUM EXHIBIT TANK LIGHTING (included w/ Division 26 sections)							
21 0000	FIRE SUPPRESSION							
21 1300	AUTOMATIC SPRINKLER SYSTEM							
	WET SPRINKLER SYSTEM:							
	3" DIA PIPE (BLACK STEEL SCH-10)		느					
	2 1/2" DIA PIPE (BLACK STEEL SCH-10)		F					
	2" DIA PIPE (BLACK STEEL SCH-40)		님					
	1 1/2" DIA PIPE (BLACK STEEL SCH-40)		느					
	1 1/4" DIA PIPE (BLACK STEEL SCH-40)		۳					
	1" DIA PIPE (BLACK STEEL SCH-40)		4					
	2" DIA DRAIN DOWN PIPE (BLACK STEEL SCH-40)		느					
	SPRINKLER HEAD		EA					
	FLOOR CONTROL VALVE ASSEMBLY & TEST CONNECTION		EA					
	TE-IN		E			÷		
	SYSTEM DRAIN DOWN AND FILL		LS					
	CLEAN, FLUSH AND TEST		LS					
	COLOR CODING		LS					
	CORE DRILL, CUTTING, PATCHING AND FIRE STOPPING		LS					
	PAINTING OF MAIN PIPE		۳					
	SEISMIC RESTRAINTS / MISC. SYSTEM SUPPORTS		S					
	MISC. (SUB-CONTRACTOR) JOB EXPENSES		LS					
	Subtotal							
22 0000	PLUMBING							
22 0500	GENERAL REQUIREMENTS FOR PLUMBING WORK							
	DEMOLITION:							
			Ā					
	REMOVE EXISTING FLOOR DRAIN W/ ASSOC. PIPING		E					
A 10001	REMOVE EXISTING SUMP PUMP W/ ASSOC. PIPING		Ā					



CONTRACT 1 - GENERAL CONSTRUCTION WORK

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Bidder:

DDC ID: PV175AQUA

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CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	REMOVE EXISTING PIPE		TE					
	CUT AND CAP PIPE		EA					
	DISCONNECT AND CAP AQUARIUM EQUIPMENT AND PIPING		S					
	MISC. DEMOLITION (INCL. CARTING AND DISPOSAL)		LS					
	WATER FOR CONSTRUCTION		rs					
	DISTRIBUTION (FIXTURES AND PIPE)		rs					
	CLEAN, FLUSH		LS					
	CORE DRILL, CUTTING, PATCHING AND FIRE STOPPING		rs					
	BREAK CONCRETE AND EXCAVATE TO SUIT		F					
	SYSTEM START-UP AND COMMISSION		rs					
	MISC. (SUB-CONTRACTOR) JOB EXPENSES		rs					
	Subtotal							
				MATERIAL PROPERTY OF THE PROPE				
22 0543	ELECTRIC MOTORS AND MOTOR CONTROLLERS (included w/							
6160 22	section 223000)					-		
22 0523	VALVES							
	PLUMBING CONNECTION @ AQUARIUM EQUIPMENT		LS					
	2" RPZA		EA					
	1" RPZA		EA					
	1 1/4" WATER METER		Æ					
	VALVES AND ACCESSORIES		LS					
	Subtotal							
22 0529	HANGERS AND SUPPORTS							
	HANGERS AND SUPPORTS (INCL. SEISMIC SUPPORTS)		rs					
	Subtotal							
1						:		
22 0553	IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT							
	SYSTEM ID/VALVE TAGS		S					



CONTRACT 1 - GENERAL CONSTRUCTION WORK

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Project: Staten Island Zoo Aquarium Reconstruction Location: 614 Broadway, Staten Island, NY 10310

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CSI	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	PAINTING		ST					
	Subtotal							
22 0577	PLUMBING SYSTEM TESTS							
	PLUMBING SYSTEM TESTS		LS					
	Subtotal							
22 0700	PLUMBING INSULATION							
	DOMESTIC WATER PIPE INSULATION		EA					
	SANITARY WASTE PIPE INSULATION (DWG P-100)		EA					
	Subtotal							
22 1000	PIPE, TUBE AND FITTINGS							
	FITTINGS (INCLUDED W/ 221100, 221300, 231123)							
	DRIP PAN @ ELECTRICAL ROOM		LS					
	Subtotal	100000000000000000000000000000000000000						
22 1100	WATER SUPPLY SYSTEMS							
	DOMESTIC WATER PIPE:							
	2" DIA		5					
	1" DIA		F					
	3/4" DIA		Щ.					
The second secon	3/4" - 1" VALVED AND CAPPED OUTLET		EA					
	TIE-IN DOMESTIC WATER PIPE		EA					
	HOSE BIBB		EA					
	TRAP PRIMER (INCL. TRAP PRIMER VALVE, DISTRIBUTION UNIT ASSOC. PIPE & TIE-IN)		ST					
	Subtotal							



Project: Staten Island Zoo Aquarium Reconstruction

Location: 614 Broadway, Staten Island, NY 10310

Bidder:

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION WORK

Sponsor Agency: Department of Cultural Affairs DDC ID: PV175AQUA

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
22 1300	DRAINAGE SYSTEMS DUPLEX SEWAGE EJECTOR AND SUMP PUM SP-C/1-75 GPM, 18HP		PKG					
	SANITARY WASTE AND VENT PIPE:		Ц					-
	3" DIA (UNDER SLAB)		<u>.</u> 5					
	4" DIA (ABOVE GROUND)		F					
	3" DIA (ABOVE GROUND)		H					
	2" DIA (ABOVE GROUND)		4					
	2" DIA PUMP DISCHARGE PIPE		LS					
	TIE-IN SANITARY WASTE AD VENT		БA					
	CLEAN-OUT		ЕĀ					
	FLOOR DRAIN		EA					
	TRENCH DRAIN (CONNECTION ONLY)		EA					
	Subtotal					-		
22 3000	PLUMBING EQUIPMENT, SPECIALTIES AND ACCESSORIES							
	SPECIALTIES & ACCESSORIES (INCL. PIPE EXPANSION COMPENSATORS)		LS					
	Subtotal							
	♦ = 41 140 151 1							
22 4000	PLUMBING FIXTURES		C L					
	P-2 - SHOVVER (TRIM CIVET)		בן ב					
	7-4 - SLOF SINK		۲ <u>۱</u>					
and the second s	Subtotal							
23 0000	HVAC							
23 0500	GENERAL REQUIREMENTS FOR HVAC WORK							
	DEMICE LICIN.							



CONTRACT 1 - GENERAL CONSTRUCTION WORK

DDC ID: PV175AQUA

Sponsor Agency: Department of Cultural Affairs

Bidder:

Location: 614 Broadway, Staten Island, NY 10310

Project: Staten Island Zoo Aquarium Reconstruction

			ľ					
CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	REMOVE EXISTING BOILER W/ ASSOC. PIPING AND		EA					
	REMOVE EXISTING BOILER FLUE		ട					
	DISCONNECT AND CAP EXISTING BOILER FLUE AS		E					
	REMOVE EXISTING BOILER FEED PUMP		EA					
	REMOVE EXISTING CAST IRON RADIATOR (INCL.		EA					
	DISCONNECT AND REMOVE EXISTING DUCT @ ATTIC		LS.					
			L					
	CUT AND CAP PIPE		ËĄ					
	MISC. DEMOLITION (INCL. CARTING AND DISPOSAL)		LS					
	TEMPORARY BOILER (12 MONTHS)		ĽS					
	DRIP PAN		EA					
	HEAT TRACING		Ľ					
	RIGGING AND EQUIPMENT HANDLING		വ					
	MATERIAL DISTRIBUTION		LS					
	CORE DRILL, CUTTING, PATCHING AND FIRE STOPPING		LS					
	MISC. (SUB-CONTRACTOR) JOB EXPENSES		LS					
	Subtotal							
A. O. C. C. C. C. C. C. C. C. C. C. C. C. C.								
23 0513	ELECTRIC MOTORS AND MOTOR CONTROLLERS		U					
	VFD		3					
23.0548	VIBRATION CONTROL							
	VIBRATION ISOLATION / SIESMIC		LS					
	Subtotal							
23 0593	TESTING AND BALANCING		υ.					
	INSPECTION EXISTING THOE)					



Project: Staten Island Zoo Aquarium Reconstruction

Location: 614 Broadway, Staten Island, NY 10310

Bidder:

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION WORK

Sponsor Agency: Department of Cultural Affairs

DDC ID: PV175AQUA

Total Cost: and Labor **Materials Total Cost** of Labor Unit Cost of Labor Cost of Material Total Unit Cost of Material Unit ۲ SF 임 S മ 出 占 Щ Ч Σ 出 മ 占 占 出 Quantity INSULATION MAKE-UP WATER PIPE @ BOILER (FIBERGLASS 1" 1" DIA CONDENSATE DRAIN PIPE INSULATION (FIBERGLASS 1" Subtotal Subtotal NEW INSULATION FOR EXIST. LPS/C PIPE @ BOILER RM (INCL. 2" DIA CHWS/R PIPE INSULATION (FIBERGLASS 1 1/2" WALL) REFRIGERANT PIPE INSULATION (FIBERGLASS 1 1/2" WALL) EQUIPMENT INSULATION INCL. SHEET METAL ENCLOSURE INSULATION PREFABRICATED ROOF CURB (REFRIGERANT TEST AND BALANCE (EQUIPMENT AND AIR SIDE SYSTEM) 1 1/4" - 1 1/2" DIA LPS/R PIPE INSULATION (FIBERGLASS 3" 2" DIA LPS/R PIPE INSULATION (FIBERGLASS 3" WALL) 6" DIA LPS/R PIPE INSULATION (FIBERGLASS 3" WALL) 4" DIA LPS/R PIPE INSULATION (FIBERGLASS 3" WALL) 3" DIA LPS/R PIPE INSULATION (FIBERGLASS 3" WALL) WEATHER PROOF JACKET @ OUTDOOR PIPING Description 1 1/2" THINK DUCT INSULATION REMOVE EXIST. INSULATION) TEST (PIPING SYSTEMS) **HVAC INSULATION** WALL) 23 0700 Numbel CSI

UNIT LINO LNN

LINO

AUTOMATIC TEMPERATURE CONTROLS

23 0913

BOILER (INCL. 1 CONTROL PANEL)

ENERGY RECOVERY UNIT

AHD

CONDENSING UNIT

FAN COIL UNIT



Project: Staten Island Zoo Aquarium Reconstruction

Location: 614 Broadway, Staten Island, NY 10310

Bidder:

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION WORK

Sponsor Agency: Department of Cultural Affairs DDC ID: PV175AQUA

Total Cost: and Labor Materials **Total Cost** of Labor **Unit Cost** of Labor Material Cost of Total Unit Cost of Material r_S ഗ Unit S_{1} Æ Æ EA Æ Æ rs ΕĄ Æ 느느 Quantity CONNECTION TO HVAC EQUIPMENT (EXIST. BOILER) W/ SHUT-Subtotal Subtotal Subtotal MISC. NATURAL GAS SYSTEM REQUIREMENTS (INCL. NEW IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT CONTROL VALVE @ CAST IRON RADIATOR PIPING SYSTEMS AND ACCESSORIES EMERGENCY BREAK GLASS STATION Description MISC. CONTROL REQUIREMENTS 1 1/2" DIA BLACK STEEL SCH-40 BOILER FEED PUMP RECEIVER CO AND METHANE DETECTOR 4" DIA BLACK STEEL SCH-40 CONDENSATE DRAIN PUMP TIE-IN NATURAL GAS PIPE SYSTEM ID / VALVE TAGS PRE-HEAT COIL (STEAM) CABINET UNIT HEATER FUEL GAS SYSTEM LEAK DETECTOR **PAINTING** FSD / AD T-STAT CAPS) OFF 9 23 1553 23 1123 Number SS

LPS/C PIPE:

23 2113



CONTRACT 1 - GENERAL CONSTRUCTION WORK

Sponsor Agency: Department of Cultural Affairs

DDC ID: PV175AQUA

Project: Staten Island Zoo Aquarium Reconstruction Location: 614 Broadway, Staten Island, NY 10310

Bidder:

Total Cost: **Materials** and Labor **Total Cost** of Labor **Unit Cost** of Labor Material Cost of Total Unit Cost of Material Unit E Æ EA Æ 占 4 Æ 出 EA 占 占 出 4 ዟ Quantity MISC. CONNECTION AND RE-CONNECTION (PIPE) @ BOILER MISC. VALVES AND SPESIALTIES (ALL SYSTEMS) 1" DIA CONDENSATE DRAIN PIPE - PVC SCH-40 1 1/4" - 1 1/2" DIA BLACK STEEL SCH-80 TIE-IN LPS/C PIPE @ BOILER ROOM TIE-IN LPS/C PIPE @ NEW RADIATOR Description 4" GATE VALVE (CHAIN OPERATED) BOILER (INCL. CONTROL PANEL) MISC. PIPE SUPPORTS, SLEEVES MAKE-UP WATER PIPE @ BOILER REFRIGERANT PIPE - COPPER THERMOSTATIC STEAM TRAP 4" DIA BLACK STEEL SCH-40 3" DIA BLACK STEEL SCH-40 2" DIA BLACK STEEL SCH-40 6" DIA BLACK STEEL SCH-40 HOOK-UP EQUIPMENT TIE-IN CHWS/R PIPE 2" DIA COPPER-L 3" GATE VALVE CHWS/R PIPE: 5/8" DIA 3/8" DIA 1/2" DIA 1/4" DIA ROOM Number SS

PKG

BOILER FEED PUMP RECEIVER

ENERGY RECOVERY UNIT

CONDENSING UNIT

FAN COIL UNIT

AIR HANDLING UNIT

FIN

LNO



CONTRACT 1 - GENERAL CONSTRUCTION WORK

DDC ID: PV175AQUA

Sponsor Agency: Department of Cultural Affairs

Project: Staten Island Zoo Aquarium Reconstruction Location: 614 Broadway, Staten Island, NY 10310 Bidder:

			Unit Cost of	Total	Unit Cost	Total Cost	Total Cost:
Description	Quantity	Unit	Material	Cost of Material	of Labor	of Labor	Materials and Labor
		EA					
		Æ					
		EA					
Subtotal							
WAIER IREALMENT AND CHEMICAL CLEANING							
WATER TREATMENT & CHEMICAL CLEANING SYSTEM REQUIREMENTS		LS					
Subtotal							
		LBS					
		EA					
		SF					
		SF					
		SF					
		EA					
FLEXIBLE CONNECTION @ EQUIPMENT		rs					
		SF					
DUCT SMOKE DETECTOR HOUSING - INSTALL ONLY		EA					
		LF					
BOILER FLUE W/ INSULATION - 20" DIA		노					
BOILER FLUE W/ INSULATION - 18" DIA		上					
BOILER FLUE W/ INSULATION - 14" DIA		님					
		Æ					
DISCONNECT AND RECONNECT EXISTING DUCT		207					
		LS					
MISC. SHEETMETAL REQUIREMENTS		rs					
Subtotal				relate a			



Project: Staten Island Zoo Aquarium Reconstruction

Location: 614 Broadway, Staten Island, NY 10310

Bidder:

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION WORK

DDC ID: PV175AQUA

Sponsor Agency: Department of Cultural Affairs

Total Cost: and Labor **Materials Total Cost** of Labor **Unit Cost** of Labor Cost of Material Total Unit Cost of Material LNO Unit LIND L N N LNO LNN. LIND Æ EAE Æ E Æ 유 E E Quantity Subtotal Subtotal Subtotal AIR HANDLING UNIT: AHU-1 - 2200 CFM, 122.2 MBH COOLING, BOILER FEED PUMP RECEIVER: BFP-1 - DUPLEX - 21 GPM, 1 ENERGY RECOVERY UNIT: ERU - 2200 CFM, 90.5 MBH CU UNIT - INSTALL ONLY (DRWNG M101.00, NOTE 2) AC-1, 2, 4, 5 - 8.5 MBH HEATING, 7.5 MBH COOLING AC-3 - 13.5 MBH HEATING, 12 MBH COOLING AC-6 - 11.1 MBH HEATING, 14 MBH COOLING PRE-HEAT COIL (STEAM): SHC-1 - 2200 CFM BOILER: B-1, 2, 3, 4, 5 - 1005 MBH, 30 HP GRILLES, REGISTERS AND DIFFUSERS CONDENSING UNIT: VRV CU - 4 TONS CABINET UNIT HEATER: EUH-1 - 5 KW Description MISC. EQUIPMENT SUPPORTS CONDENSATE DRAIN PUMP ACOUSTICAL TREATMENT 1 1/2" ACOUSTICAL LINING 1" ACOUSTICAL LINING CAST IRON RADIATOR 84.7 MBH HEATING LINEAR DIFFUSER HVAC EQUIPMENT FAN COIL UNIT: ENCLOSURE AIR DEVICE 23 7000 23 3713 23 3117 Number SS



CONTRACT 1 - GENERAL CONSTRUCTION WORK

Sponsor Agency: Department of Cultural Affairs DDC ID: PV175AQUA

> Location: 614 Broadway, Staten Island, NY 10310 Bidder:

Project: Staten Island Zoo Aquarium Reconstruction

CSI	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
26 0000	ELECTRICAL COMMON WORK RESULTS FOR FLECTRICAL WORK							
0000	TEMP POWER & LIGHT		LS.					
	DEMOLITION		LS					
	Subtotal							
26 0519	BASIC MATERIALS AND METHODS							
	4/0 AWG (FEEDER)		느					
	3/0 AWG (FEEDER)		ᆈ					
	1 AWG (FEEDER)		님					
	10 AWG		Щ					
	12 AWG		H.					
	12 AWG (FIRE ALARM SYSTEM)		H					
7.7 8	Subtotal							
26 0533	EMPTY CONDUIT SYSTEMS							
	2 1/2" 316 SS CONDUIT (FEEDER)		느	d d				
	2" 316 SS CONDUIT (FEEDER)		LF					
	1 1/2" 316 SS CONDUIT (FEEDER)		ዛ					
	3/4" CONDUIT		H.					
	3/4" CONDUIT (FIRE ALARM SYSTEM)		F					
	Subtotal							
26 2416	FI ECTRICAL DISTRIBUTION SYSTEM							
	PANEL LPX-3-4 (2 SECTION 225A)		EA					
	LPX-1 LPX-2 (150A)		EA					
	LPX-5 (100A)		EA					
	TIME CLOCK		EA					
	Subtota							
26 2923	ELECTRICAL DISTRIBUTION SYSTEM		< U					
	DUPLEX REC		5					



CONTRACT 1 - GENERAL CONSTRUCTION WORK

DDC ID: PV175AQUA

Sponsor Agency: Department of Cultural Affairs

Project: Staten Island Zoo Aquarium Reconstruction Location: 614 Broadway, Staten Island, NY 10310 Bidder:

					;			•
CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	QUAD REC		EA					
	CEILING REC		EA					
	WP GFCI REC		Æ					:
	WP SINGLE POLE SWITCH		E					
	SINGLE POLE SWITCHES		EA					
	SINGLE POLE DIMMER SWITCHES		Ę					
	VARIABLE FREQUENCY DRIVES (F.B.O.)		Ę				-	
	TERMINATIONS SINGLE PHASE 20A (VARIOUS)		EA					
The state of the s	TERMINATIONS SINGLE PHASE 40A (VARIOUS)		Æ					
And the second s	TERMINATIONS THREE PHASE 20A (VARIOUS)		EA					
	HEAT TRACE		rs					
	Subtotal							
26 5100	INTERIOR LIGHTING							
	JELLY JAR FIXTURE (MECHANICAL ROOF LIGHT)		EA					
	FIXTURE TYPE AU1		Ę					
	FIXTURE TYPE AU1 em		EA					
	FIXTURE TYPE AR1		EA					
	FIXTURE TYPE AR1 em		EA					
	FIXTURE TYPE AD1		EA					
	FIXTURE TYPE AT1		EA					
	FIXTURE TYPE AC1		Ľ.					
	FIXTURE TYPE AC1 em		Ł					
	FIXTURE TYPE DL1		EA					
	FIXTURE TYPE DL2		EA					
	EXIT SIGNS		EA					
	Subtotal							
110 110			. !					



NEW YORK CITY DEPARTMENT OF DESIGN + CONSTRUCTION

Project: Staten Island Zoo Aquarium Reconstruction

Location: 614 Broadway, Staten Island, NY 10310

Bidder:

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION WORK

DDC ID: PV175AQUA

Sponsor Agency: Department of Cultural Affairs

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
28 0000	ELECTRONIC SAFTEY AND SECURITY							
28 3111	FIRE ALARM SYSTEM							
	SMOKE DETECTORS		EA					
	HEAT DETECTORS		EA					
	ADDRESSABLE CONTROL MODULE		EA					
	MONITOR MODULE FOR WATERFLOW AND TAMPERS		EA					
	CONTROL MODULE FOR FSD		EA					
	CEILING MNTD HORN STROBE UNIT		E					
	DUCT DETECTORS		Ā					
	WATER FLOW SWITCHES		Ā					
	TAMPER SWITCHES		Ā					
	FIRE SMOKE DAMPERS		E					
	REMOVE / REINSTALL DEVICE		EA					
	TIE IN TO EXISTING SYSTEM		LS					
	Subtotal							
0000	VOCANITAVE							
31 2000	FARTHWORK							
	EXCAVATION / BACKFILL FOR UNDER SLAB DRAINAGE		J7					
	EXCAVATION / BACKFILL FOR SUMP PIT		rs					
	Subtotal							
	TOTAL CONTRACT 1 - GENERAL CONSTRUCTION WORK							

ATTACHMENT 1 - BID INFORMATION PROJECT ID: PV175AQUA

DESCRIPTION AND LOCATION OF WORK:

STATEN ISLAND ZOO AQUARIUM RECONSTRUCTION

614 Broadway

Staten Island, New York 10310

E-PIN: 85015B0174 / DDC PIN: 8502015PV0020C

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: FRIDAY, OCTOBER 23, 2015

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:	FRIDAY, OCTOBER 23, 2015 AT 2:00 PM
	LATE BIDS WILL NOT BE ACCEPTED

PRE-BID WALK-THRU AND CONFERENCE:

PLACE	Staten Island Zoo 614 Broadway Staten Island, New York 10310
DATE AND HOUR	WEDNESDAY, OCTOBER 07, 2015 AT 11:00 A.M.
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 the amount of \$1,000,000.00 or more. 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) 391-3170 or (718) 391-1016 Fax: (718) 391-2615

BID BOOKLET PART B

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 the	han ten (10) employees	
Company has previously worked for DDC	YES	NO
2. Type(s) of Construction Work		
TYPE OF WORK	LAST 3 YEARS	THIS PROJECT
General Building Construction		. West of
Residential Building Construction		<u> </u>
Nonresidential Building Construction		
Heavy Construction, except building		·
Highway and Street Construction		
Heavy Construction, except highways		
Plumbing, Heating, HVAC		<u> </u>
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 Contracte with less than	or must indicate it three years of ex	s <u>Intra</u> state and <u>Inter</u> state EM perience, the EMR will be co	IR for the past three years. [Note onsidered to be 1.00].	: For contractors
YEAR		INTRASTATE RATE	<u>INTER</u> STATE RA	TE
				
must	attach, to this que	Interstate EMR for any of the stionnaire, a written explana situation resulting in that ration	ne past three years is greater than tion for the rating and identify w	1.00, the contractor
4. OS	HA Information:			
YES	NO	Contractor has received a willf Department of Buildings (NYC	ul violation issued by OSHA or New CDOB) within the last three years.	York City
YES	NO	related fatalities) or an incider	nt requiring OSHA notification with nt requiring OSHA notification with ns, all amputations and all losses of a	in 24 hours (all work-
employees, on a	n yearly basis to con esses". This form i	h Act (OSHA) of 1970 requires applete and maintain on file the for sommonly referred to as the O	employers with ten or more orm entitled "Log of Work-related ISHA 300 Log (OSHA 200 Log	
The OSHA 300 employees.	Log must be submi	tted for the last three years for c	ontractors with more than ten	
The Contracto for the past thi	r must indicate the	e total number of hours work	ed by its employees, as reflected	in payroll records
years. The I year, the tota	ncident Rate is o l number of inci og. The 200,000	calculated in accordance w dents is the total number o	ime Injuries (the Incident Rate with the formula set forth below of non-fatal injuries and illness divalent of 100 employees work	v. For each given es reported on the
Incident Rate =	=		er of Incidents X 200,000 urs Worked by Employees	

YEAR	TOTAL	L NUMBERS OF HOURS WORKED BY EMPLOYEES	INCIDENT RATE			
for the type of	f constru	ident Rate for any of the past three years is action it performs (listed below), the contractor the relatively high rate.	one point higher than the Incident Rate ctor must attach, to this questionnaire, a			
General Buildi			8.5			
Residential Bu			7.0			
Nonresidential			10.2			
Heavy Constru	ction, ex	cept building	8.7			
Highway and S	Street Co	nstruction	9.7			
Heavy Constru	ction, ex	cept highways	8.3			
Plumbing, Hea	ting, HV	AC	11.3			
Painting and Pa	aper Han	ging	6.9			
Electrical Work			9.5			
Masonry, Stonework and Plastering			10.5			
Carpentry and	Floor Wo	ork	12.2			
Roofing, Sidin		neet Metal	10.3			
Concrete Work			8.6			
Specialty Trade Contracting			8.6			
5. Safety Perf	formanc	e on Previous DDC Project(s)				
YES1	NO	Contractor previously audited by the DDC O	ffice of Site Safety.			
		DDC Project Number(s):				
YES	VO	Accident on previous DDC Project(s).				
		DDC Project Number(s):				
YES1	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].				
		DDC Project Number(s):	,,			
Date:		By:				
		By:(Signature of Owner, Parts	ner, Corporate Officer)			
		Title:				

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:
 - 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.

PROJECT REFERENCES – SIMILAR CONTRACTS COMPLETED BY THE BIDDER

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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.

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

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

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

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

BID BOOKLET
December 2013

PROJECT REFERENCES – PENDING CONTRACTS NOT YET STARTED BY THE BIDDER ن

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

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

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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 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) <u>Vendex Fees</u>: 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 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 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) <u>Confirmation of Vendex Compliance</u>: 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. Submission of Vendex Questionnaires to MOCS: By signing in the space provided below, the Bidder certifies (1)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: Submission of Certification of No Change to DDC: By signing in the space provided below, the Bidder **(2)** 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. (Signature of Partner or corporate officer) Print Name:

THIS PAGE INTENTIONALLY LEFT BLANK

DIRECTIONS: Please execute two originals (both with original signature).

Please forward directly to the agency (not M.O.C.S.).

Certificate of No Change Form



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

I,, being duly swom, state that I have read Enter Your Name		
and understand all the items contained in the vendor questionnaire and any submission of change as identified on page one of this form and certify that as of this date, these items have not changed. I further certify that, to the best of my knowledge, information and belief, those answers are full, complete, and accurate; and that, to the best of my knowledge, information, and belief, those answers continue to be full, complete, and accurate.		
In addition, I further certify on behalf of the submitting vendor that the information contained in the principal questionnaire(s) and any submission of change identified on page two of this form have not changed and have been verified and continue, to the best of my knowledge, to be full, complete and accurate.		
I understand that the City of New York will rely on the information supplied in this certification as additional inducement to enter into a contract with the submitting entity.		
Vendor Questionnaire This section is required. This refers to the vendor questionnaire(s) submitted for the vendor doing business with the City.		
Name of Submitting Entity:		
Vendor's Address:		
Vendor's EIN or TIN: Requesting Agency:		
Are you submitting this Certification as a parent? (Please circle one) Yes No		
Signature date on the last full vendor questionnaire signed for the submitting vendor:		
Signature date on change submission for the submitting vendor:		



Principal Questionnaire
This section refers to the most recent principal questionnaire submissions.

Principal Name	Date of signature on last full Principal Questionnaire	Date(s) of signature on submission of change
1		
2		
3		
4		
5		
6		
Certification This section This form must be signed and no Certified By: Name (Print)	is required. Starized. Please complete this twice. Co	opies will not be accepted.
Title	<u> </u>	
Name of Submitting Entity	·	
Signature		Date
Notarized By:		
Notary Public	County License Issued	License Number
Sworn to before me on:		,

DIRECTIONS: Please execute two originals (both with original signature).

Please forward directly to the agency (not M.O.C.S.).

Certificate of No Change Form



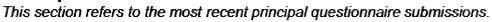
Please submit two completed forms. Copies will not be accepted.

Signature date on change submission for the submitting vendor:

- 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
I,, being duly swom, 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.

Principal Questionnaire





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 subr	mitted and attach a document with the	date of additional submissions.
This form must be signed and notarize 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		

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.

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

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

BIDDER'S CERTIFICATION OF COMPLIANCE WITH IRAN DIVESTMENT ACT

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

[Please Check One] **BIDDER'S CERTIFICATION** By submission of this bid or proposal, each bidder/proposer and each person signing on behalf of any bidder/proposer certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief, that each bidder/proposer is not on the list created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the State Finance Law. I am unable to certify that my name and the name of the bidder/proposer does not appear on the list created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the State Finance Law. I have attached a signed statement setting forth in detail why I cannot so certify. Dated: _____, New York , 20 **SIGNATURE** PRINTED NAME TITLE Sworn to before me this day of_____, 20 Notary Public

Dated:

CITY OF NEW YORK

DIVISION OF LABOR SERVICES

CONSTRUCTION EMPLOYMENT REPORT

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

Fax: (212) 618-8879 CONSTRUCTION EMPLOYMENT REPORT

GENERAL INFORMATION

1.	Your contractual relationship in this contract is:	Prime contractor	Subcontractor
1a.	Are M/WBE goals attached to this project? Yes _	No	
2.	Please check one of the following if your firm woul City of New York as a:		now to certify with the
	Minority Owned Business EnterpriseWomen Owned Business EnterpriseDisadvantaged Business Enterprise		ed Business Enterprise usiness Enterprise
2a.	If you are certified as an MBE, WBE, LBE, EBE of certified with?	or DBE , what city/state Are you DBE certif	e agency are you ied? Yes No
3.	Please indicate if you would like assistance from S contracting opportunities: Yes No	SBS in identifying certi	fied M/WBEs for
4.	Is this project subject to a project labor agreement	? Yes No _	
5.	Are you a Union contractor? Yes No with	If yes, please list wh	ich local(s) you affiliated
6.	Are you a Veteran owned company? Yes N	o	
PART	1: CONTRACTOR/SUBCONTRACTOR INFORMA	ATION	
7.			
	Employer Identification Number or Federal Tax I.D		Email Address
8.	Company Name		
9.	Company Numb		
J.	Company Address and Zip Code		
10.			
	Chief Operating Officer	Telephone N	umber
11.	Designated Equal Opportunity Compliance Officer (If same as Item #10, write "same")	Telephone N	umber
12.	Name of Prime Contractor and Contact Person (If same as Item #8, write "same")		

13.	Number of employees in your company:	
14.	Contract information:	
	(a) Contracting Agency (City Agency)	(b) Contract Amount
	(c) Procurement Identification Number (PIN)	(d) Contract Registration Number (CT#)
	(e) Projected Commencement Date	(f)Projected Completion Date
	(g) Description and location of proposed contract	:
15.	Has your firm been reviewed by the Division of La and issued a Certificate of Approval? Yes No.	abor Services (DLS) within the past 36 months
	If yes, attach a copy of certificate.	
16.	Has DLS within the past month reviewed an Empand issued a Conditional Certificate of Approval?	loyment Report submission for your company Yes No
	If yes, attach a copy of certificate.	
W	OTE: DLS WILL NOT ISSUE A CONTINUED CER TH THIS CONTRACT UNLESS THE REQUIRED INDITIONAL CERTIFICATES OF APPROVAL HA	CORRECTIVE ACTIONS IN PRIOR
17.	Has an Employment Report already been submit Employment Report) for which you have not yet r	
	Date submitted: Agency to which submitted: Name of Agency Person:	
	Contract No:	
18.	Has your company in the past 36 months been a Labor, Office of Federal Contract Compliance Pro	udited by the United States Department of
	If yes,	

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FOR OFFICIAL USE ONLY: File No._____

	(a) Na — —	ame and address of OFCCP office.
	(b) W Ye	as a Certificate of Equal Employment Compliance issued within the past 36 months? S No
	lf :	yes, attach a copy of such certificate.
	(c) W	ere any corrective actions required or agreed to? Yes No
	Îf	yes, attach a copy of such requirements or agreements.
	(d) W	ere any deficiencies found? Yes No
	lf :	yes, attach a copy of such findings.
19.	is res	r company or its affiliates a member or members of an employers' trade association which consible for negotiating collective bargaining agreements (CBA) which affect construction ring? Yes No
	If yes,	attach a list of such associations and all applicable CBA's.
PART	II: DO	CUMENTS REQUIRED
20.	brochi	e following policies or practices, attach the relevant documents (e.g., printed booklets, ures, manuals, memoranda, etc.). If the policy(ies) are unwritten, attach a full explanation 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)	

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FOR OFFICIAL USE ONLY: File No._____

21.	To comply with the Immigration Reform and Control Act of 1986 when and of whom does your firm require the completion of an I-9 Form?
	(a) Prior to job offer Yes No
	(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
22.	Explain where and how completed I-9 Forms, with their supportive documentation, are maintained and made accessible.
23.	Does your firm or any of its collective bargaining agreements require job applicants to take a medical examination? Yes No
	If yes, is the medical examination given:
	(a) Prior to a job offer Yes No
	(b) After a conditional job offer Yes No
	(c) After a job offer Yes No
	(d) To all applicants Yes No
	(e) Only to some applicants Yes No
	If yes, list for which applicants below and attach copies of all medical examination or questionnaire forms and instructions utilized for these examinations.
24.	Do you have a written equal employment opportunity (EEO) policy? Yes No If yes, list the document(s) and page number(s) where these written policies are located.
25.	Does the company have a current affirmative action plan(s) (AAP) Minorities and Women Individuals with handicaps Other. Please specify
26.	Does your firm or collective bargaining agreement(s) have an internal grievance procedure with respect to EEO complaints? Yes No
	If yes, please attach a copy of this policy.
	If no, attach a report detailing your firm's unwritten procedure for handling EEO complaints.

27.	Has any employee, within the past three years, filed a complaint pursuant to an internal grievance procedure or with any official of your firm with respect to equal employment opportunity? Yes No
	If yes, attach an internal complaint log. See instructions.
28.	Has your firm, within the past three years, been named as a defendant (or respondent) in any administrative or judicial action where the complainant (plaintiff) alleged violation of any anti-discrimination or affirmative action laws? Yes No
	If yes, attach a log. See instructions.
29.	Are there any jobs for which there are physical qualifications? Yes No
	If yes, list the job(s), submit a job description and state the reason(s) for the qualification(s).
30.	Are there any jobs for which there are age, race, color, national origin, sex, creed, disability, marital status, sexual orientation, or citizenship qualifications? Yes No
	If yes, list the job(s), submit a job description and state the reason(s) for the qualification(s).

SIGNATURE PAGE

Notary Public	Authorized Signatu	ire Da	to
Sworn to before me this	day of	20	
	Only original signatu	res accepted.	
To the extent permitted by law Charter Chapter 56 of the City and Regulations, all information	Charter and Executive O	rder No. 50 (1980) ar	nd the implementing Rules
Willful or fraudulent falsification termination of the contract between the contracts for a period of up to forminal prosecution.	veen the City and the bid	der or contractor and	in disapproval of future
Contractors who fail to comply noncompliance may be subjec	with the above mentione t to the withholding of fina	d requirements or are al payment.	e found to be in
If contractors are found to be u 56 Section 3H, the Division of data and to implement an emp	Labor Services reserves	nd females in any give the right to request th	en trade based on Chapter ne contractor's workforce
Signature of authorized official		Da	ate
Telephone Number			
Name of official authorized to	sign on behalf of the cont	ractor Tit	tle
Name of person who prepared	I this Employment Repor	t Tit	tle
Contractor's Name			
the information submitted here submitted with the understand requirements, as contained in amended, and the implementi behalf of the company to subma monthly basis.	ling that compliance with Chapter 56 of the City C ng Rules and Regulation	New York City's equa harter, Executive Ord s, is a contractual obli	owledge and belief and al employment er No. 50 (1980), as igation. I also agree on
I, (print name of authorized of	iciai sigriirig)		hereby certify that

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FOR OFFICIAL USE ONLY: File No.______

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

- Do you plan to subcontractor work on this contract? Yes____
- If yes, complete the chart below. ci

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

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

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

OWNERSHIP CODES

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

Female

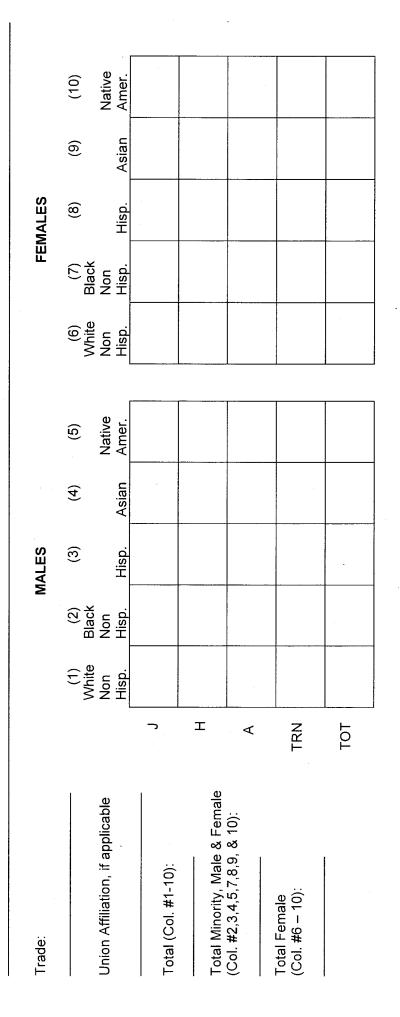
FORM B: PROJECTED WORKFORCE

TRADE CLASSIFICATION CODES

(J) Journeylevel Workers (H) Helper (TÓT) 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.



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:			2	MALES				H	FEMALES		
		(1) White	(2) Black	(3)	(4)	(5)	(6) White	(7) Black	(8)	(6)	(10)
Union Affiliation, if applicable		Non Hisp.	Non Hisp.	Hisp.	Asian	Native Amer.	Non Hisp.	Non Hisp.	Hisp.	Asian	Native Amer.
Total (Col. #1-10):	¬	·			·						
Total Minority, Male & Female	I										
(Col. #2,3,4,5,7,8,9, & 10):	∢			,							
Total Female (Col. #6 – 10):	TRN N							:			
	T0T	Y						:			
	1										

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

FORM C: CURRENT WORKFORCE

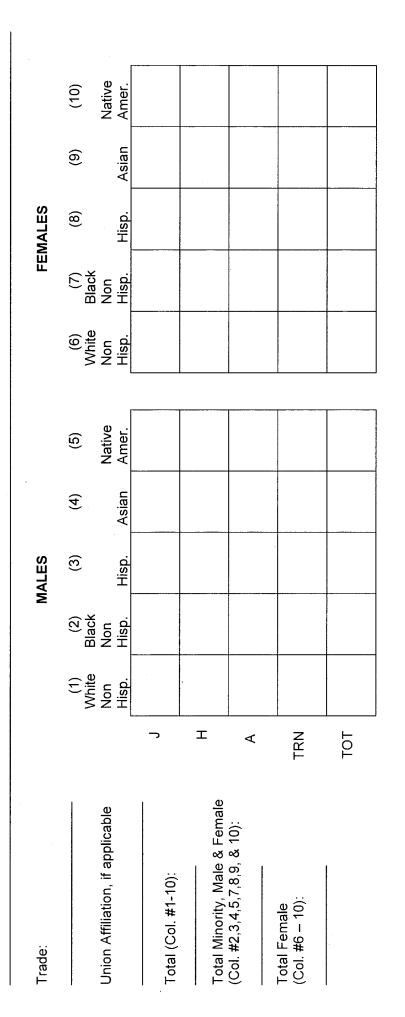
TRADE CLASSIFICATION CODES

(J) Journeylevel Workers(H) Helper

(TOT) Total by Column

(A) Apprentice (TRN) Trainee

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



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 C: CURRENT WORKFORCE

Trade:			2	MALES	£.,			#	FEMALES		
I Inion Affiliation if annlicable		(1) White	(2) Black	(3)	(4)	(5)	(6) White	Black	(8)	(6)	(10)
		Hisp.	Hisp.	Hisp.	Asian	Mative Amer.	Non Hisp	Non Hisp.	Hisp.	Asian	Native Amer.
Total (Col. #1-10):	7										
Total Minority, Male & Female	I										
(Col. #2,3,4,5,7,8,9, & 10):	∢				•						
Total Female (Col. #6 – 10):	F Z Z										
	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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	IVI	O	1 L.	

PV175AQUA



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 Zoo Aquarium Reconstruction

LOCATION: BOROUGH: CITY OF NEW YOR	614 Broadway Staten Island, NY 10310 K	
Contractor		
Dated		, 20
Entered in the Compl	troller's Office	
First Assistant Bookk	eeper	
·		
Dated		20





PROJECT ID:

PV175AQUA

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 Zoo Aquarium Reconstruction

LOCATION:

BOROUGH: CITY OF NEW YORK

614 Broadway

Staten Island, NY 10310

CONTRACT NO. 1

GENERAL CONSTRUCTION WORK

Department of Cultural Affairs

LEESER Architecture

Date:

June 4, 2015

15-182





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



2015 Project Labor Agreement

NOTICE: THIS CONTRACT IS SUBJECT TO A NEW PROJECT LABOR AGREEMENT EXECUTED IN 2015

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.

In addition, please note that there are significant revisions between the 2015 PLA attached to this bid and the prior Citywide Renovation PLA. The Contractor is urged to review the entire PLA. Significant changes include:

- Micro Work Orders: For JOCS and Requirements contracts, Task Orders or Work Orders that do not exceed \$10,000 are not subject to the PLA. See PLA Article 3, Section 1.
- On Call Contracts: Provisions have been added regarding the referral of workers for on call contracts where Contractors are required to respond on an expedited basis. See PLA Article 4, Section 8.
- Grievances: The grievance procedure governing disputes under the PLA has been clarified. See PLA Article 9, Section 1.
- Delinquent Contractors: Contractors and Subcontractors who do not make required payments to union funds on a timely basis are subject to requirements to submit cancelled checks or another form of proof of payment in addition to certified payroll reports when requesting payment. See PLA Article 11, Section 2.
- Payment to Union Funds for Non-Union Workers: Non-union Contractors with bona fide private benefit plans that satisfy the requirements of Labor Law 220 will not be required to pay into union benefit funds for "core" non-union employees (working pursuant to Article 4, Section 2 of the PLA) who are already covered under such bona fide private benefit plans. See PLA Article 11, Section 2.
- Veterans Day: Veterans Day has been added to the list of standard holidays. See Article 12, Section 4.
- Reporting Pay for Weather Events: The usual reporting pay requirement of two hours for employees who report to their work location pursuant to their regular schedule does not apply when the National Weather Service issues a Weather Advisory and the Contractor speaks to the employee at least four hours before their shift starting time. See Article 12, Section 6.

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 week, 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 implemented pursuant to New York City Administrative Code §6-129, 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 certified M/WBE firms may be obtained from the Department of Small Business Services (DSBS) website at www.nyc.gov/getcertified, by emailing DSBS at MWBE@sbs.nyc.gov, by calling the DSBS certification hotline at (212) 513-6311, or by visiting or writing DSBS at 110 William St., 7th floor, New York, New York, 10038.

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:

- 1. Q. 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.
- 2. Q. Does a Contractor agreeing to the PLA and signing the Letter of Assent create a labor agreement with these unions outside of the project covered by the PLA?
 - A. No, the PLA applies only to those projects that the Contractor agrees to perform under the PLA and makes no labor agreement beyond those projects.
- 3. Q. Do the provisions of the PLA apply equally to subcontractors as well as contractors and how does the PLA affect the subcontractors that a bidder may utilize on the project?
 - A. Yes, the PLA applies to subcontractors and all subcontractors must agree to become party to the PLA. See PLA Art. 2, Sec. 8. 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.
- 4. Q. Are bidders required to submit Letters of Assent signed by proposed subcontractors with their bid in order to be found responsive?
 - A. No, bidders do not have to submit signed Letters of Assent from their subcontractors with their bid. Subcontractors, however, will be required to sign the Letter of Assent prior to being approved by the Department.
- 5. Q. May a Contractor or subcontractor use any of its existing employees to perform this work?
 - A. Generally labor will be referred to the Contractor from the respective signatory local unions. 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 M/WBEs 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 M/WBEs 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 M/WBEs, 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.
- Q. Must the City set M/WBE participation goals for the particular project or contract in order for a certified M/WBE to utilize the provisions of PLA Article 4, Section 2C?
 A. No. PLA Article 4, Section 2(C) specifies what categories of M/WBEs are
 - A. No. PLA Article 4, Section 2(C) specifies what categories of M/WBEs are eligible to take advantage of this provision (i.e., those M/WBEs for which the City is

authorized to set participation goals under §6-129). For purposes of 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.

- 7. Q. May a Contractor bring in union members from locals that are not signatory unions?
 - A. Referrals will be from the respective signatory locals and/or locals listed in Schedule A of the PLA. Contractors may utilize 'traveler provisions' contained in the local collective bargaining agreements (local CBAs) where such provisions exist and/or in accordance with the provisions of PLA Article 4, Section 2.
- 8. Q. Does a non-union employee working under the PLA automatically become a union member?
 - A. No, the non-union employee does not automatically become a union member by working on a project covered by the PLA. 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 except in certain circumstances as set forth in the PLA. See PLA Article 4, Section 6 and Article 11.
- 9. Q. When will the agency shop dues payer affiliate workers become eligible for union benefits?
 - A. Union benefit plans have their own plan documents that determine eligibility and workers will become eligible for certain benefits at different points in time. Contractors who will have agency shop dues payer affiliate workers should speak with the respective union(s) as to benefit eligibility thresholds.
- 10. Q. 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. Except in certain circumstances, as described in the following paragraph, Contractors and subcontractors working under the PLA will be required to contribute on behalf of all employees covered by the PLA to established jointly 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 D.

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

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

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

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

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

- 12. Q. Does signing on to the PLA satisfy the Apprenticeship Requirements established for this bid?
 - A. Yes. By agreeing to perform the Work subject to the PLA, the bidder demonstrates compliance with the apprenticeship requirements imposed by this Invitation for Bids.
- 13. **Q.** Who decides on the number of workers needed?
 - A. Except as expressly limited by a specific provision of the PLA, a Contractor retains full and exclusive authority for the management of their operations, including the determination as to the number of employees to be hired and the qualifications therefore and the promotion, transfer, and layoff of its employees. See PLA Article 6, Section 1.
- 14. Q. May a contractor discharge a union referral for lack of productivity?
 A. Again, except as expressly limited by a specific provision of the PLA, a Contractor retains full and exclusive authority for the management of their operations, including the right to discipline or discharge for just cause its employees. See PLA Article 6, Section 1.
- 15. Q. May a contractor assign a management person to site?

- A. Yes. Managers are not subject to the provisions of the PLA, so there is no restriction on management and/or other non-trade personnel, as long as such personnel do not perform trade functions. See Article 3, Section 1.
- 16. Q. Does the PLA provide a standard work day across all the signatory trades?

 A. Yes, all signatory trades will work an eight (8) hour day, Monday through Friday with a day shift at straight time as the standard work week. 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). The standard work week may be reduced to 35 or 37 ½ hours of work in those limited circumstances where the City states in the bid documents that the Contractor will not be given access to the site to accommodate an 8 hour day. The 8 hour, 7 ½ hour or 7 hour work day must be established at the commencement of the project and may not be altered by the Contractor.
- 17. Q. Does the PLA create a common holiday schedule for all the signatory trades?

 A. Yes, the PLA recognizes nine (9) common holidays, including Veterans Day. See PLA Article 12, Section 4.
- 18. Q. 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.
- 19. Q. May the Contractor schedule overtime work, including work on a weekend?

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

 A. Yes, all overtime pay incurred Monday through Saturday will be at time and one half (1 ½). There will be no stacking or pyramiding of overtime pay under any

circumstances. See PLA Article 12, Section 2. Sunday and holiday overtime will be paid according to each trade's CBA.

21. Q. 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.

22. Q. 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.
- 23. Q. What do the workers get paid when work is terminated early in a day due to inclement weather or otherwise cut short of 8 hours?
 - A. The PLA provides that employees who report to work pursuant to regular schedule and not given work will be paid two hours of straight time. Work terminated early for severe weather or emergency conditions will be paid only for time actually worked. In other instances where work is terminated early, the worker will be paid for a full day. See PLA Article 12, Sections 6 and 8. The usual reporting pay requirement of two hours for employees who report to their work location pursuant to their regular schedule does not apply when the National Weather Service issues a Weather Advisory and the Contractor speaks to the employee at least four hours before their shift starting time. See PLA Article 12, Section 6.
- 24. Q. Should a local collective bargaining agreement of a signatory union expire during the project will a work stoppage occur on a project subject to the PLA?
 - A. No. All the signatory unions are bound by the 'no strike' agreement as to the PLA work. Work will continue under the PLA and the otherwise expired local CBA(s) until the new local CBA(s) are negotiated and in effect. See PLA Articles 7 and 19.
- 25. Q. May a Contractor working under the PLA be subject to a strike or other boycott activity by a signatory union at another site while the Contractor is a signatory to the PLA?
 - A. Yes. The PLA applies ONLY to work under the PLA and does not regulate labor relations at other sites even if those sites are in close proximity to PLA work.
- 26. Q. If a Contractor has worked under other PLAs in the New York City area, are the provisions in this PLA generally the same as the others?
 - A. While 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.
- 27. Q. What happens if a dispute occurs between the Contractor and an employee during the project?
 - A. The PLA contains a grievance and arbitration process to resolve disputes between the Contractor and the employees. See PLA Article 9.
- 28. Q. What happens if there is a dispute between locals as to which local gets to provide employees for a particular project or a particular aspect of a project?
 - A. The PLA provides for jurisdictional disputes to be resolved in accordance with the NY Plan. 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.

- 29. **Q.** Does the 2015 Renovation PLA contain special provisions for JOCS or task order based Contracts?
 - A. The PLA does not apply to Task Orders or Work Orders that do not exceed \$10,000 issued under JOCS or Requirements Contracts otherwise subject to the PLA. See PLA Article 3, Section 1.

NYC Project Labor Agreements

CONTACT INFORMATION FOR LOCAL UNIONS

BOILER MAKERS LOCAL NO. 5

24 Van Siclen Avenue Floral Park, NY 11001 Phone: (516) 326-2500

Fax: (516) 326-3435

Business Manager: Steve Ludwigson

BLASTERS & DRILLERS LOCAL NO. 29

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

Business Manager: Thomas Russo

BRICKLAYERS LOCAL NO. 1

4 Court Square #1

Long Island City, NY 11101

Phone: (718) 392-0525

Business Manager: Jeramiah Sullivan

CARPENTERS DISTRICT COUNCIL

395 Hudson Street, 9th Fl New York, New York 10014

Phone: (212) 366-7500 Fax: (212) 675-3140

Business Manager: Joe Geiger

John Sheehy, D.C. Rep.

CEMENT MASONS NO. 780

150-50 14th Rd Suite 4 Whitestone, NY 11357 Phone: (718) 357-3750

Fax: (718) 357-2057

Business Manager: Gino Castingnoli

CONCRETE WORKERS DISTRICT COUNCIL NO. 16

29-18 35th Avenue

Long Island City, NY 11106

Phone: (718) 392-5077 Fax: (718) 392-5087

Business Manager: Alex Castaldi

DERRICKMEN AND RIGGERS LOCAL 197

35-53 24th Street

Long Island City, NY 11101

Phone: (718) 361-6534 Fax: (718) 361-6584

William Hayes Bus. Manager Billhayes 197@yahoo.com

DRYWALL TAPERS 1974

265 West 14th Street

New York, NY 10011

Phone: (212) 242-8500 Fax: (212) 242-2356

Business Manager: Sal Marsala

ELECTRICAL LOCAL NO. 3

158-11 Harry Van Arsdale, Jr. Avenue

Flushing, NY 11365 Phone: (718) 591-4000

Fax: (718) 380-8998

Business Manager: Chris Erickson Raymond Melville, Asst. Bus. Mgr.

Construction

ELEVATOR CONSTRUCTORS NO. 1

47-24 27th Avenue

Long Island City, NY 11101

Phone: (718) 767-7004 Fax: (718) 767-6730

Business Manager: Lenny Legotte

llegotte@localoneiuec.com

ENGINEERS LOCAL UNION NO. 14

141-57 Northern Boulevard

Flushing, NY 11354 Phone: (718) 939-0600

Fax: (718) 939-3131

Business Manager: Edwin Christian

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

265 West 14th Street

New York, NY 10011

Phone: (212) 929-5327-8-9

Fax: (718) 729-3070

Business Manager: Tom Callahan

ENGINEERS NO. 30

115-06 Myrtle Avenue

Richmond Hill, NY 11418

Phone: (718) 847-8484

Fax: (718) 850-0524

Business Manager: William Lynn

ENGINEERS No. 94

331-337 West 44th Street

New York, NY 10036

Phone: (212) 245-7040

Fax: (212) 245-7886 Business Manager: Kuba Brown

kubabrown@local94.com

GLAZIERS NO. 1087

45 West 14th Street

New York, NY 10011

Phone: (212) 924-5200

Fax: (212) 255-1151

Business Manager: Joseph Azzopardi

HEAT & FROST INSULATORS AND ALLIED WORKERS **LOCAL UNION NO. 12**

35-53 24th Street

Long Island City, NY 11101

Phone: (718) 784-3456

Fax: (718) 784-8357

Business Manager: Matty Aracich matty@insulatorslocal12.com

HEAT & FROST INSULATORS LOCAL UNION NO. 12A

1536 127th Street

College Point, NY 11356

Phone: (718) 886-7226

Business Manager: Jaime Soto

IRON WORKERS DISTRICT

505 White Plains Road, Suite 200

Tarrytown, NY 10591 Phone: (914) 332-4430

Fax: (914) 332-4431

Business Manager: Edward Walsh

iwnys@verizon.net

IRON WORKERS NO. 40 (Manhattan, The Bronx & Staten Island)

451 Park Avenue South New York, NY 10016 Phone: (212) 889-1320

Fax: (212) 779-3267

Business Manager: Bob Walsh

IRON WORKERS NO. 361 (Brooklyn & Queens)

89-19 97TH Avenue Ozone Park, NY 11416 Phone: (718) 322-1016-17

Fax: (718) 322-1053

Business Manager: Matthew Chartrand

LABORERS LOCAL NO. 78 ASBESTOS & LEAD ABATEMENT

30 Cliff Street

New York, New York 10038-2825

Phone: (212) 227-4803 Fax: (212) 406-1800

Business Manager: Edison Severino

LABORERS, CONSTRUCTION AND GENERAL BUILDING NO. 79

520 8th Avenue

New York, NY 10018 Phone: (212) 465-7900 Fax: (212- 465-7903

Business Manager: Michael Prohaska

LABORERS NO. 731

34-11 35th Avenue Astoria, NY 11106 (718) 706-0720

Business Manager: Joseph D'Amato

LATHERS METAL LOCAL NO. 46

1322 Third Avenue

New York, NY 10021

Phone: (212) 737-0500 Fax: (212) 249-1226

Business Manager: Terrance Moore

MASON TENDERS DIST. COUNCIL

520 8th Avenue

New York, NY 10018

Phone: (212) 452-9400

Fax: (212) 452-9499

Business Manager: Robert Bonanza

METAL POLISHERS LOCAL UNION NO. 8A

36-18 33rd Street 2nd Fl.

Long Island City, 11106

Phone: (718) 361-1770 Fax: (718) 361-1934

Business Manager: Hector Lopez

MILLWRIGHT AND MACHINERY **ERECTORS LOCAL NO. 740**

89-07 Atlantic Avenue

Woodhavaen, NY 11412

Phone: (718) 849-3636 Fax: (718) 849-0070

Business Manager: Joseph Geiger

ORNAMENTAL IRON WORKERS

NO. 580

501 West 42nd Street

New York, NY 10036

Phone: (212) 594-1662

Fax: (212) 564-2748

Business Manager: Pete Myers

PAINTERS DISTRICT **COUNCIL NO. 9**

45 West 14th Street

New York, NY 10011

Phone: (212) 255-2950

Fax: (212) 255-1151

Business Manager: Joseph Ramaglia

PAINTERS STRUCTURAL STEEL

NO. 806

40 West 27th Street

New York, New York 10001

Phone: (212) 447-1838/0149

Fax: (212) 545-8386

Business Manager: Angelo Serse

PAVERS & ROAD BUILDERS DISTRICT COUNCIL NO. 1

136-25 37TH Avenue, Suite 502

Flushing, NY 11354 Phone: (718) 779-8850 Fax: (718) 779-8857

Business Manager: Keith Lozcalzo

PLASTERS LOCAL UNION NO. 262

2241 Conner Street Bronx, NY 10466 Phone: (718) 547-5440

Fax: (718) 547-5435

Business Manager: Michael Hubler

PLUMBERS NO. 1

158-29 Cross Bay Boulevard Howard Beach, NY 11414

Phone: (718) 738-7500 Fax: (718) 835-0896

Business Manager: John Murphy

PRIVATE SANITATION LOCAL NO. 813

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

Fax: (718) 937-7003

Business Manager: Sean Campbell

ROOFERS & WATERPROOFERS NO. 8

12-11 43rd Avenue

Long Island City, NY 11101

Phone: (718) 361-1169 Fax (718) 361-8330

Business Manager: Nick Siciliano

SHEET METAL WORKERS

LOCAL NO. 28

MANHATTAN OFFICE

500 Greenwich Street

New York, NY 10013

Phone: (212) 941-7700 Fax: (212) 226-0304

1 dx. (212) 220-0304

Business Manager: Robert D'Orio

SHEET METAL WORKERS LOCAL 137

21-42 44th Drive

Long Island City, NY 11101

Phone: (718)) 937-4514 Fax: (718) 937-4113

Business Manager: Dante Dano

STEAMFITTERS LOCAL UNION

NO. 638

32-32 48th Avenue

Long Island City, NY 11101

Phone: (718) 392-3420 Fax: (718) 784-7285

Business Manager: Richard Roberts

TEAMSTERS LOCAL UNION 282

2500 Marcus Avenue

Lake Success, NY 11042

Phone: (516) 488-2822

Fax: (516) 488-4895

Business Manager: Tom Gesauldi

TEAMSTERS LOCAL UNION 814

21-42 44th Drive

Long Island City, NY 11101

Phone: (718) 609-6407 Fax: (718) 361-9610

Business Manager: Jason Ide

TILE, MARBLE & TERRAZO B.A.C.

LOCAL UNION 7

45-34 Court Square

Long Island City, NY 11101

Phone: (718) 786-7648 Fax: (718) 472-2370

Business Manager: Tom Lane

TIMBERMEN LOCAL 1556

395 Hudson Street

New York, NY 10014

Phone: (212) 242-1320

Business Manager: Joseph Geiger

PROJECT LABOR AGREEMENT

COVERING SPECIFIED

RENOVATION & REHABILITATION OF CITY OWNED BUILDINGS AND STRUCTURES

2015 - 2018

NYC AGENCY RENOVATION & REHAB OF CITY OWNED BUILDINGS/STRUCTURES $$\operatorname{PLA}$$

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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) in a manner designed to afford the lowest costs to the Agencies covered by this Agreement, and the Public it represents, and the advancement of permissible statutory objectives;

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

- (1) providing a mechanism for responding to the unique construction needs associated with this Program Work and achieving the most cost effective means of construction, including direct labor cost savings, by the Building and Construction Trades Council of Greater New York and Vicinity and the signatory Local Unions and their members waiving various shift and other hourly premiums and other work and pay practices which would otherwise apply to Program Work;
- (2) expediting the construction process and otherwise minimizing the disruption to the covered Agencies' ongoing operations at the facilities that are the subject of the Agreement;
- (3) avoiding the costly delays of potential strikes, slowdowns, walkouts, picketing and other disruptions arising from work disputes, reducing jobsite friction on common situs worksites, and promoting labor harmony and peace for the duration of the Program Work;
- (4) standardizing the terms and conditions governing the employment of labor on Program Work;
- (5) permitting wide flexibility in work scheduling and shift hours and times to allow maximum work to be done during off hours yet at affordable pay rates;

- (6) permitting adjustments to work rules and staffing requirements from those which otherwise might obtain;
- (7) providing comprehensive and standardized mechanisms for the settlement of work disputes, including those relating to jurisdiction;
 - (8) 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 Correction (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 ["BCTC" or "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 will be performed under the terms and conditions set out in the Schedule A agreements of Operating Engineers Locals 14 and 15. The Collective Bargaining Agreements of the affiliated local unions that cover the particular type of construction work to be performed by the contractor, and as set forth in the Schedule A list of Agreements, shall be deemed the Schedule A Collective Bargaining Agreements ("Schedule A CBA") under this Agreement. Where association and independent Collective Bargaining Agreements for a particular type of construction work are both set forth in Schedule A, association members shall treat the applicable association agreement as the Schedule A CBA and independent contractors shall treat the applicable independent agreement as the Schedule A CBA. Subject to the foregoing, where a subject covered by the provisions of this Agreement is also covered by a Schedule A Collective Bargaining Agreement, 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 December 31, 2018. 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, except where the City specifically applies this Project Labor Agreement to such work in its bid documents, 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 December 31, 2018;
 - 2. Contracts procured on an emergency basis;
 - 3. Contracts that do not exceed \$250,000;
- 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;
- 8. Contracts for installation of information technology that are not otherwise Program Work;
- 9. Task Orders or Work Orders issued under JOCS or Requirements Contracts that do not exceed \$10,000, and JOCS or Requirements Contracts where the monetary value of such contracts predominantly involves such Task Orders or Work

Orders; and

10. Contracts that do not exceed \$1 Million that are awarded pursuant to prequalified lists (PQLs) established by City agencies where entry on to the PQL is restricted to MWBEs, or a combination of MWBEs together with joint ventures which include at least one MWBE, or contractors who agree to subcontract at least 50% of the contract to MWBEs.

SECTION 2. TIME LIMITATIONS

In addition to falling within the scope of Article 3, Section 1, to be covered by this Agreement Program Work must be (1) advertised and let for bid after the effective date of this Agreement, and (2) let for bid prior to December 31, 2018, 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 forth in 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, FEMALE, LOCAL AND SECTION 3 REFERRALS

In the event a Local Union either fails, or is unable to refer qualified minority or female applicants in percentages equaling the workforce participation goals adopted by the City and set forth in the Agency's (or, if applicable, Construction Manager's) bid

specifications, within 48 hours of the request for same, the Contractor may employ qualified minority or female applicants from any other available source.

In the event that the City or a City agency determines to adopt local workforce participation goals to be set forth in an Agency's (or, if applicable Construction Manager's) bid specifications, the City and BCTC will work together to seek agreement on appropriate goals to be set forth in applicable bid documents and to be subject to the provisions of this section.

For any Program Work that may become subject to requirements under Section 3 of the Housing and Urban Development Act of 1968, as amended by the Housing and Community Development Act of 1992, and any rules, including new or revised rules, that may be published thereunder, the Local Unions will acknowledge the Section 3 obligations of the Construction Manager or Contractor, as applicable, and agree to negotiate a method to implement this Article in a manner that would allow the Construction Manager or Contractor to meet its Section 3 obligations to the greatest extent feasible, and to post any required notices in the manner required by Section 3. The parties also acknowledge that the Construction Manager and Contractor may also fulfill its Section 3 requirements on Program Work by promoting opportunities for excluded employees, as defined by Article 3, Section 3 of this Agreement, on Program Work and, to the extent permitted by Section 3, by promoting opportunities for craft and other employees on non-Program Work.

SECTION 5. CROSS AND QUALIFIED REFERRALS

The Local Unions shall not knowingly refer to a Contractor an employee then employed by another Contractor working under this Agreement. The Local Unions

will exert their utmost efforts to recruit sufficient numbers of skilled and qualified crafts employees to fulfill the requirements of the Contractor.

SECTION 6. 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.

SECTION 8. ON CALL REPAIR REFERRALS

- A. When an Agency awards a contract that requires the Contractor to have employees available on short notice to make time sensitive repairs with such contract requiring the Contractor to respond within as little as two hours from the time the Contractor is contacted by the Agency ("On Call, Repair Contract"), the Contractor will, within ten (10) days of being awarded an On Call, Repair Contract subject to this Agreement, notify the appropriate affiliated Union that it has been awarded such a contract and immediately enter into good faith negotiations with such relevant affiliated Union to establish a procedure to receive time sensitive referrals from such affiliated Union(s).
- B. In the event the Contractor and the relevant affiliated Union(s) are unable to negotiate a specific, mutually agreeable procedure for on call repair referral procedure within twenty (20) days of commencement of negotiations or prior to commencement of performance of the contract, whichever is earlier, the Contractor and the relevant affiliated Unions will follow the following procedure:
- 1. Upon notification by a Contractor that it has been awarded an On Call Repair Contract pursuant to paragraph A above, each relevant affiliate Union shall provide the Contractor with the name and twenty four (24) hour contact information of an On Call, Repair Contract contact person for urgent on call repair referrals.
- 2. The relevant affiliated Unions shall prepare a list of individuals eligible and prepared for referral on an immediate basis to respond to the on call repair contractor. Such list shall be provided to and in the possession of the designated on call repair contact person for the affiliated Union and available for immediate reference.

- 3. Individuals on such list must be able to comply with the Contractor's response time pursuant to contract requirements.
- 4. The Union's On Call, Repair Contract contact person shall respond to a contractor's request for referrals within a reasonable time of the request so that compliance with the contract shall be possible.
- C. In the event that the Contractor makes a request for an on call referral that is compliant with this procedure and a Union is not able to respond to the request, that Union will be deemed to have waived the forty-eight (48) hour referral rule contained in Section 2 above and the Contractor may employ qualified applicants from any other available source that can meet contract requirements for that time sensitive on call repair work only; provided, however, that any work related to the repair work that is not of a time sensitive nature under the contract shall comply with Section 2. If a Union fails to timely refer a worker and the Contractor employs other workers, the Contractor will e-mail the agency within 72 hours and the agency will forward that e-mail to the designated Labor Management Committee contacts.

ARTICLE 5- UNION REPRESENTATION

SECTION 1. LOCAL UNION REPRESENTATIVE

Each Local Union representing on-site employees shall be entitled to designate in writing (copy to Contractor involved and Construction Manager) one representative, and/or the Business Manager, who shall be afforded access to the Program Work site during such time as bargaining unit work is occurring and subject to otherwise applicable policies pertaining to visitors to the site.

SECTION 2. STEWARDS

- A. Each Affiliated Union shall have the sole discretion to designate any journey person as a Steward and an alternate Steward. The Union shall notify the Owner and/or Construction Manager as well as the Contractor of the identity of the designated Steward (and alternate) prior to the assumption of such duties. Stewards shall not exercise supervisory functions 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 Contractor's choice of materials, techniques, methods, technology or design, or, regardless of source or location, upon the use and installation of equipment, machinery, package units, pre-cast,

pre-fabricated, pre-finished, or pre-assembled materials or products, tools, or other labor-saving devices. Contractors may, without restriction, install or use materials, supplies or equipment regardless of their source; provided, however, that where there is a Schedule "A" that includes a lawful union standards and practices clauses, then such clause as set forth in Schedule A Agreements will be complied with, unless there is a lawful Agency specification (or specification issued by a Construction Manager which would be lawful if issued by the Agency directly) that would specifically limit or restrict the Contractor's choice of materials, techniques, methods, technology or design, or, regardless of source or location, upon the use and installation of equipment, machinery, package units, pre-cast, pre-fabricated, pre-finished, or pre-assembled materials or products, tools, or other labor-saving devices, and which would prevent compliance with such Schedule A clause. The on-site installation or application of such items shall be performed by the craft having jurisdiction over 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. Grievances shall include the City contract number and the Program Work address; such information is posted at the Program Work Site if already commenced, and is available in the City Record and Notice to Proceed for projects not already commenced.

Grievances as to whether a scope of work is included or excluded from this Agreement shall be submitted to the Labor Management Committee (LMC) in the first instance rather than Step 1 below. To be timely, such notice must be given no later than ten days prior to a bid opening if the grievance is challenging a determination by an Agency that the contract is not subject to this Agreement. For other grievances as to contractor scope of work issues, notice of such challenges shall be submitted to the LMC within 7 calendar days after the act, occurrence or event giving rise to the grievance. If the scope of work grievance is not resolved within 21 days of its submission to the LMC, then the grievance may proceed directly to Step 3 below.

Step 1:

- When any employee covered by this Agreement feels aggrieved by (a) 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:

A Step 2 grievance shall be filed with the Agency, the BCTC, the Contractor, and, if the grievance is against a subcontractor, the subcontractor. The Business Manager or designee of the involved Local Union, together with representatives of the involved Contractor, Council, the Construction Manager (or designee), and, if the grievance is against a subcontractor, the subcontractor, shall meet in Step 2 within 7 calendar days of service of the written grievance to arrive at a satisfactory settlement. The BCTC shall schedule the Step 2 meeting.

Step 3:

(a) If the grievance shall have been submitted but not resolved in Step 2, any of the participating Step 2 entities may, within 21 calendar days after the initial Step 2 meeting, submit the grievance in writing (copies to other participants, including the Construction Manager or designee) to the BCTC, In the event the matter is not resolved at Step 2, either J.J. Pierson or Richard Adelman, who shall act, alternately (beginning with Arbitrator J.J. Pierson), as the Arbitrator under this procedure, shall be designated at the Step 2 hearing and the BCTC will notify the arbitrator of his designation. After such notification by the BCTC, the local demanding arbitration shall within a reasonable time request the arbitrator to schedule the matter for an arbitration hearing date. The Labor Arbitration Rules of the American Arbitration Association shall govern the conduct of the arbitrator shall be final and binding on the involved Contractor, Local Union and employees and the fees and expenses of such arbitrations shall be borne equally by the involved Contractor and Local Union.

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

SECTION 2. LIMITATION AS TO RETROACTIVITY

No arbitration decision or award, with the exception of those related to compliance with requirements to pay prevailing wages and supplements in accordance with federal or State law, may 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 the applicable Collective Bargaining Agreements 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. 1. Notwithstanding Section 2 (A) above, and subject to 2 (B)(2) below, Contractors who designate employees pursuant to Article 4, Section 2 (B) and (C) ("core" employees) that are not signatory to a Schedule A Agreement and who maintain bona fide private benefit plans that satisfy the requirements of Section 220 of the Labor Law, may

satisfy the above benefit obligation with respect to those employees by providing those employees with coverage under their private benefit plans (to the extent consistent with Section 220). The total benefit payments to be made on behalf of each such employee must be equal to the total Section 220 supplement amount and any shortfall must be paid by cash supplement to the employee.

- 2. A contractor that will satisfy its Section 220 obligations in accordance with subsection 2(B)(1) above shall make available to the Agency at the time of contract award a complete set of plan documents for each non-Schedule A benefit plan into which contributions will be made and/or coverage provided pursuant to the provisions of Section 2(B)(I) above. The Contractor shall also provide certification from a certified public accountant as to the annualized hourly value of such benefits consistent with the requirements of Section 220:
- 3. The City shall verify that the alternate benefit plan(s), together with any cash supplement to the employee, is compliant with Section 220 prior to awarding the Contractor a contract covered by this Agreement. In the event the Contractor's alternate benefit plan(s), together with any cash supplement to the employee, is determined to be compliant with Section 220 and will be utilized by the Contractor on behalf of Article 4, Section 2(B) and (C) core employees, the Local Unions have no duty to enforce the Contractor's obligations on the alternate benefit plan(s) as they are not party to the alternate plan(s) or privy to the terms and conditions of the plan obligations. In the event the City determines the alternate benefit plan(s), together with any cash supplement to the employee, is not compliant with Section 220, the Contractor may, upon executing a Letter

of Assent, satisfy its obligations for all employees, including core employees, by contributing to the Schedule A benefit plans in accordance with the terms of the Schedule A Agreements.

- C. 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.
- D. 1. To the extent consistent with New York City's Procurement Policy Board Rules with respect to prompt payment, as published at www.nyc.gov/ppb, §4-06(e), and in consideration of the unions' waiver of their rights to withhold labor from a contractor or subcontractor delinquent in the payment of fringe benefits contributions ("Delinquent Contractor"); the Agency agrees that where any such union and/or fringe benefit fund shall notify the Agency, the General Contractor, and the Delinquent Contractor in writing with back-up documentation that the Delinquent Contractor has failed to make fringe benefit contributions to it as provided herein and the Delinquent Contractor shall fail, within ten (10) calendar days after receipt of such notice, to furnish either proof of such payment or notice that the amount claimed by the union and/or fringe benefit fund is in dispute, the Agency shall withhold from amounts then or thereafter becoming due and payable to the General Contractor an amount equal to that portion of such payment due to the General Contractor that relates solely to the work performed by

the Delinquent Contractor which the union or fringe benefit fund claims to be due it, and shall remit the amount when and so withheld to the fringe benefit fund and deduct such payment from the amounts then otherwise due and payable to the General Contractor, which payment shall, as between the General Contractor and the Agency, be deemed a payment by the Agency to the General Contractor; provided however, that in any month, such withholding shall not exceed the amount contained in the General Contractor's monthly invoice for work performed by the Delinquent Contractor. The union or its employee benefit funds shall include in its notification of delinquent payment of fringe benefits only such amount it asserts the Delinquent Contractor failed to pay on the specific project against which the claim is made and the union or its employee benefit funds may not include in such notification any amount such Delinquent Contractor may have failed to pay on any other City or non-City project.

2. In addition, where a union or employee benefit fund gives notice to the City that a Contractor is Delinquent as defined in subsection 2(D)(1) above and the City determines that the notice includes appropriate back-up documentation that the Contractor is delinquent, the City will promptly, but not later than twenty (20) days after receipt of the notice, provide a copy of said notice to City Agencies. In the event the City determines there is insufficient back-up documentation, it will notify the appropriate union and/or fringe benefit fund promptly, but not later than twenty (20) days after receipt of the Delinquency Notice, and shall include notice of what additional documentation is requested. Any determination by the City that there is insufficient back-up must be reasonable. This provision is intended to enhance compliance with the prevailing wage

law and the PLA with respect to the payment of fringe benefits, and is not intended as a substitute for the resolution of a disputed claim pursuant to any applicable law or agreement.

The City and the relevant Agency(s) will thereafter require the Delinquent Contractor to provide cancelled checks or other equivalent proof of payment of benefit contributions that have come due, to be submitted with certified payroll reports for all Program Work covered by this Agreement on which the Delinquent Contractor is engaged, for at least a one-year period or such earlier period if the Contractor is ultimately determined not be a Delinquent Contractor. Such proof of payment when required is a condition of payment of the Delinquent Contractor's invoices by any entity, including, but not limited to, the City, the relevant Agency(s), Construction Manager, General Contractor, the prime or higher level subcontractor, as is appropriate under the Delinquent Contractor's engagement. The union and the funds shall upon request receive copies of the certified payrolls, cancelled checks, or other proof of payment from the City and/or the relevant Agency(s).

E. In the event the General Contractor or Delinquent Contractor shall notify the Agency as above provided that the claim of the union or fringe benefit fund is in dispute, the Agency shall withhold from amounts then or thereafter becoming due and payable to the General Contractor an amount equal to that portion of such payment due to the General Contractor that relates solely to the work performed by the Delinquent Contractor that the union and/or fringe benefit fund claims to be due it, pending resolution of the dispute pursuant to the union's Schedule A agreement, and the amount shall be paid to the party or parties ultimately determined to be entitled thereto, or held until the

Delinquent Contractor and union or employee benefit fund shall otherwise agree as to the disposition thereof; provided however, that such withholding shall not exceed the amount contained in the General Contractor's monthly invoice for work performed by the Delinquent Contractor. In the event the Agency shall be required to withhold amounts from a General Contractor for the benefit of more than one fringe benefit fund, the amounts so withheld in the manner and amount prescribed above shall be applied to or for such fund in the order in which the written notices of nonpayment have been received by the Agency, and if more than one such notice was received on the same day, proportionately based upon the amount of the union and/or fringe benefit fund claims received on such day. Nothing herein contained shall prevent the Agency from commencing an interpleader action to determine entitlement to a disputed payment in accordance with section one thousand six of the civil practice law and rules or any successor provision thereto.

F. Payment to a fringe benefit fund under this provision shall not relieve the General Contractor or Delinquent Contractor from responsibility for the work covered by the payment. Except as otherwise provided, nothing contained herein shall create any obligation on the part of 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. The standard work week may be reduced to 35 or 37 ½ hours of work at straight time rates, Monday to Friday, 7 or 7 ½ hours per day, plus ½ hour unpaid lunch period in those limited circumstances where the City states in the bid documents that the Contractor will not be given access to the site to accommodate an 8 hour day. The 8 hour, 7 ½ hour or 7 hour work day must be established at the commencement of the project and may not be altered by the Contractor.
- 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 Except as provided above, 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 (i) over an employee's regularly scheduled work day, i.e., work over eight (8) hours in a day where 5/8s is scheduled, work over ten (10) hours in a day where 4/10s is scheduled, or work over seven (7) or seven and one half (7½) hours where such hours are scheduled pursuant to Article 12, section 1(A) and (ii) over forty (40) hours in a week, or over thirty five (35) or thirty seven and one-half (37½) where such hours are scheduled pursuant to Article 12, section 1(A). Overtime shall be paid at time and one half (1½) Monday through Saturday. All overtime work performed on Sunday and Holidays will be paid pursuant to the applicable 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 the employee's regularly scheduled work week, i.e., 40 hours in the week or thirty five (35) or thirty seven and one half (37 ½) pursuant to Article 12, section 1(A). 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 nine (9) recognized holidays on the

Project:

New Year's Day

Martin Luther King Day

President's Day

Memorial Day

Veteran's Day

Labor Day

Thanksgiving Day

Independence Day

Christmas Day

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

- B. Payment Regular holiday pay, if any, for work performed on such a 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 $(1\frac{1}{2})$. 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. Contractors shall not be permitted to call, text or email or voicemail employees in advance of their regularly scheduled shift starting time to avoid reporting pay. Notwithstanding the above, in the event that the National Weather Service issues a weather advisory for the area in which the work location is situated, and the entire project is shut down as a result of the Weather Advisory, the contractor shall be permitted to speak to employees no less than four (4) hours in advance of their shift starting time, unless the Local Union consents to a shorter notice in writing, to advise them not to report to work due to the National Weather Service advisory, and employees who are so notified shall not receive two (2) hours reporting pay if they report to the work location. The contractor shall make every effort to

notify each employee directly and confirm that notification has been received. Voice, text, and email messages left for employees without confirmation of delivery and receipt by employee do not constitute sufficient notice under this provision.

- B. When an employee, who has completed their scheduled shift and left the Program Work site, is "called out" to perform special work of a casual, incidental or irregular nature, the employee shall receive overtime pay at the rate of time and one-half of the employee's straight time rate for hours actually worked.
- C. When an employee leaves the job or work location of their own volition or is discharged for cause or is not working as a result of the Contractor's invocation of Section 7 below, they shall be paid only for the actual time worked.
- 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 a full day's pay in accordance with the employee's regularly scheduled work day under Article 12, section (1)(A). 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, climate control, water, power and light, shall only be required upon the determination of the Agency or Construction Manager, and when used shall be staffed and assigned to the appropriate trade(s) with jurisdiction. Temporary services shall be provided by the appropriate Contractors' existing employees during working hours in which a shift is scheduled for employees of this Contractor. The Agency or Construction Manager may determine the need for temporary services requirements during non-working hours, and when used shall be staffed and assigned to the appropriate trades(s). There shall be no stacking of trades on temporary services, provided this does not constitute a waiver of primary trade jurisdiction. In the event a temporary system component is claimed by multiple trades, the matter shall be resolved through the New York Plan for Jurisdictional Disputes.

ARTICLE 16 - NO DISCRIMINATION

SECTION 1. COOPERATIVE EFFORTS

The Contractors and Unions agree that they will not discriminate against any employee or applicant for employment because of creed, race, color, religion, sex, sexual orientation, national 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 that are the basis for the Schedule A notify the Agency and Construction Manager in writing of the 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 New York City 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 Program 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	d this Agreement to be executed and
effective as of the day of,	
FOR BUILDING AND CONSTRUCTION TRADE OF GREATER NEW YORK AND VICINITY	ES COUNCIL
BY:	<u>-</u>
FOR NEW YORK CITY	
BY: Anthony Shorris First Deputy Mayor	
APPROVED AS TO FORM:	
ACTING CORPORATION COUNSEL NEW YORK CITY	-

LIST OF SIGNATORY UNIONS
Boiler Makers Local No. 5
Carpenters District Council
Cement Masons No. 780
Concrete Workers, District Council No. 16
Derrickmen and Riggers, Local Union No. 197
Drywall Tapers 1974, District Council 9
Electrical Workers Local No. 3
Glaziers Local Union No. 1087 District Council 9
Heat & Frost Insulators, Local Union No. 12A
Heat & Frost Insulators, Local Union No. 12
Iron Workers District Council
Iron Workers Local Union No. 40
Iron Workers Local No. 361
Laborers Local No. 78, Asbestos & Lead Abatement
Laborers Local 1010 Pavers and Road Builders District Council
Laborers 79 Construction and General Building Laborers
Laborers Local No. 731 Excavators
Mason Tenders District Council
Metal Lathers Local No. 46
Metal Polishers District Council 9
Ornamental Iron Workers Local No. 580
Painters District Council 9
Plumbers Local No. 1
Painters, Decorators & Wallcoverers District Council 9
Painters Structural Steel No. 806
Plasterers Local Union No. 262
Roofers & Waterproofers Local 8
Steamfitters Local Union No. 638
Sheet Metal Workers Local No. 28
Sheet Metal Workers Local No. 137
Teamsters Local Union No. 282
Teamsters Local Union 814
Teamsters Local No. 813 Private Sanitation
Tile, Marble & Terrazzo B.A.C. Local Union No. 7
The, Maible & Terrazzo B.A.C. Local Union No. 7

SCHEDULE "A"

Charles	Chemineter Agreematerentist
Architectural and Ornamental Iron Workers Local Union 580, AFL-CIO	Allied Building Metal Industries, Inc.
Building, Concrete, Excavating & Common Laborers Local 731	Independent
Building, Concrete, Excavating & Common 😅 Laborers Local 731 👙 👵 🗯 🙀 📜	Association of New York, Inc.
District Council No. 9, I U P A T'Glaziers Lical 1087	Windowand Plate Glass Dealers Association 1
Drywall Tapers and Pointers Local 1974, affiliated with International Union of Painters & Allied Trades and Drywall Taping Contractor's Association & Association of	Independent
Wall-Ceiling & Carpentry Industries NY, Inc. Enterprise Association of Steamlitters and Apprentices Local 638 Enterprise Association of Steamlitters and Apprentices Local 638	Mechanical Contractors Association of NY, Inc.
Highway Road and Street Laborers Local Union 1010 of the District Council of Pavers and Road Builders of the Laborers International Union of North America AFL-CIO	Independent
Union 1010 of the District Council of Pavers and Road Builders of the Laborers', he had been supported by the Laborers' and the Laborers'	The State of the S
International Association of Heat and Frost Insulators and Allied Workers Local No. 12 of	1 architect
International Association of Heat and Frost Insulators and Allied Workers Local No. 12 of New York City	The Insulation Contractors Association of New York City, Inc.
International Association of Heat and Frost Insulators and Allied Workers Local No. 12A of New York City	Independent

International Association of Heat and Frost Insulators and Allied Workers Local No. 12A of New York City	Environmental Contractors Association, Inc.
International Brotherhood of Boilermakers, Iron Ship Builders, Blacksmiths, Forgers and Helpers, AFL-GIO, Local Lodge No. 5	Boilermakers Association of Greater New York
Local Union No. 3 International Brotherhood of Electrical Workers, AFL-CIO	New York Electrical Contractors Association
International Brotherhood of Teamsters, Local 282, High Rise contract	Building Contractors Association & Independents
Local 46 Metallic Lathers Union and Reinforcing Iron Workers of NY and Vicinity of the International Association of Bridge, Structural, Ornamental and Reinforcing Iron Workers	Cement League
Local 46 Metallic Lathers Union and Reinforcing Iron Workers of NY and Vicinity of the International Association of Bridge, Structural, Ornamental and Reinforcing Iron Workers	Independent
Local 8 Roofers, Waterproofers & Allied Workers	Roofing and Waterproofing Contractors Association of New York and Vicinity
Local Union: I of the United Association of Journeymen and Apprentices of the Pipe Fitting Industry of the United States and Canada	Association of Contracting Plumbers of the City of New York
Local Union Number 40 & 361 of Bridge, Structural Ornamental and Reinforcing Iron Workers AFL-CIO	Independent
Operative Plasterers' and Cement Masons' International Association Local No. 262	Independent
Painters and Allied Trades AFL-CIO, District Council No. 9 (Painting and Protective Coatings CBA)	Independent

Painters and Allied Trades AFL-CIO, District Council No. 9 (Painting and Protective Coatings CBA)	The Association of Master Painters & Decorators of NY, Inc. and The Association of Wall, Ceiling & Carpentry Industries of NY, Inc. and The Window and Plate Glass Dealers Association
Sheet Metal Workers' International a Association, Local 28	Sheet Metal & Air Conditioning Contractors Association of New York City, Inc.
Sheet Metal Workers' International Association, Local-137:	The Greater New York Sign Association
Structural Steel and Bridge Painters Local 806, DC 9 International Union of Painters and Allied Trades, AFL-CIO	New York Structural Steel Painting Contractors Association
Teamsters Local 818	Independent
Teamsters Local 813	TEST NY Corporation
Teamsters Local 814	Greater New York Movers and Warehousemen's Bargaining Group
The Cement Masons' Union, Local 780	Cement League
The District Council of Cement and Concrete Workers (comprised of Local 6A; Local 18A and Local 20)	Cement League
The District Council of Cement and Concrete Workers (comprised of Local 6A; Local 18A and Local 20)	Independent

The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Heavy Carpenters	GCA
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Dockbuilders Local No. 1556	Concrete Contractors of NY
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Dockbuilders Local 1556	Independent
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Millwright Local 740	lindependent
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Timbermen Local 1556.	Jindependenti
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Timbermen Local 1556	GCA
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Heavy Carpenters	Independent
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Carpenters	Manufacturing Woodworkers Association of Greater New York Incorporated
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America.	The Hoisting Trade Association of New York, Inc.
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America	The Test Boring Association

The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America	Building Contractors Association
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America	The Association of Wall-Ceiling & Carpentry Industries of New York, Incorporated
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners	The Cement League
The District Council of NYC and Vicinity of the United Brotherhood of Carpenters and Joiners of America	New York City Millwright Association
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners	Greater New York Floor Covering Association
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Carpenters The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for	Association of Architectural Metal & Glass Concrete Contractors of NY
Carpenters The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Building Construction Carpenters The District Council of New York City and	Independent (1997)
-Vicinity of the United Brotherhood of Carpenters and Joiners of America for Local 2287	Independent Expression
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Shop Carpenters	Independent
The Tile Setters and Tile Finishers Union of New York and New Jersey, Local 7 of the International Bricklayers and Allied Craftworkers	The Greater New York and New Jersey. Contractors Association

United Derrickmen & Riggers Association, Local 197 of NY, LI, Westchester & Vicinity	Contracting Stonesetters Association Inc.
United Derrickmen & Riggers Association L. 197 of NY, LI, Westchester and Vicinity	Building Stone and Pre-cast Contractors Association
International Union of Operating Engineers Local 14-14B	Building Contractors Association
International Union of Operating Engineers Local 14-14B	Contractors Association of Greater NY
International Union of Operating Engineers Local-14-14B	GCA
International Union of Operating Engineers Local 14-14B	The Cement League
International Union of Operating Engineers Local 14-14B	Allied Building Metal Industries, Inc.
International Union of Operating Engineers Local 14-14B	Brick Association
International Union of Operating Engineers Local 14-14B	Independent
International Union of Operating Engineers Local 15	Allied Building Metal Industries, Inc.
International Union of Operating Engineers Local 15-15A	General Contractors Association
International Union of Operating Engineers Local 15D	General Contractors Association
International Union of Operating Engineers Local 15D	Structural Steel Erectors

International Union of Operating Engineers Local 15-15Acres (1997)	Building Contractors Association
International Union of Operating Engineers Local 15D	Building Contractors Association
International Union of Operating Engineers Local 15: 15A	Contractors Association of Greater NY
International Union of Operating Engineers Local 15D	Contractors Association of Greater NY
International Union of Operating Engineers Local (15-175)	The Cement League
International Union of Operating Engineers Local 150	The Cement League

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; local trust agreements for employee benefit funds; and trust documents for joint apprentice programs as well as apprentice program rules and procedures but only to the extent of Program Work and as required by the PLA.
- (3) Authorizes the parties to such local trust agreements to appoint trustees and successor trustees to administer the trust funds and hereby ratifies and accepts the trustees so appointed as if made by the Contractor but only to the extent of Program Work as required by the PLA.
- (4) Certifies that it has no commitments or agreements that would preclude its full and complete compliance with the terms and conditions of said Agreement. The Contractor agrees to employ labor that can work in harmony with all other labor on the Project and shall require labor harmony from every lower tier subcontractor it has engaged or may engage to work on the Project. Labor harmony disputes/issues shall be subject to the Labor Management Committee provisions.
- (5) Agrees to secure from any Contractor(s) (as defined in said Agreement) which is or becomes a Subcontractor (of any tier), to it, a duly executed Agreement to be Bound in from identical to this document.

Provide description of the Work, identify craft jurisdiction(s) and all contract numbers below:

Dateu.	(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,	
Notary Public	

NEW YORK CITY BUILDING AND CONSTRUCTION TRADES COUNCIL STANDARDS OF EXCELLENCE

The purpose of this Standard of Excellence is to reinforce the pride of every construction worker and the commitment to be the most skilled, most productive and safest workforce available to construction employers and users in the City of New York. It is the commitment of every affiliated local union to use our training and skills to produce the highest quality work and to exercise safe and productive work practices.

The rank and file members represented by the affiliated local unions acknowledge and adopt the following standards:

- > Provide a full 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.



Codes of Conduct

BuildSafeNYC establishes that all BTEA member companies and BCTC member unions establish minimum safety standards on all building construction projects in NYC as follows:

- The workforce shall adhere to the michanum personal protective equipment (PPE) usage to include;
 ANSI compliant Hard Hats (with ratchet suspension) at all times (supplied by employer)
 Construction-type Work Boots at all times

 - c. Long Pants and shirts with at least short sleeves at all times (no shorts or tank tops)
 - d. ANSI compliant Eye Protection in their possession and used as needed (supplied by employer)

 e. Adequate Hearing Protection in their possession and used as needed (supplied by employer)

 f. High-vis traffic vests at street level and when around heavy equipment (supplied by employer)
- CM and Subcontractor management shall implement a fair and consistent disciplinary policy for all site personnel regarding the adherence to site safety rules and requirements.
 Likewise, a joint labor / management team will periodically assess project wide implementation of these Codes.
- 3. CM firms shall maintain minimum standards for workforce restroom, hygiene facilities and housekeeping, initially and throughout the duration of the project.
- 4. All personnel shall achiere to a strict policy against drug and alcohol possession and use on sites and during hours of work.
- 5. All personnel shall attend a site safety orientation prior to beginning work. Worker certifications of safety training for specific tasks such as fire watch, flagmen, and safety ettendant must be verified.
- 6. No cell phones, portable media devices, radios or other devices that limit hearing and altention shall be used while working on sites.
- 7. Bround Fault Circuit Interrupters (GFCI) will be used on all power looks and extension cords.
- 8. Union trade representatives shall participate in a regularly scheduled site safety meeting on all projects regardless of size.
- 9. Extreme effort shall be made to isolate the public from all construction activity. Specifically, systems shall be put in place to control falling materials and pedestrian exposure. This should be a top priority for the entire project worldorce.
- 10. Workers shall honor security access control systems to establish entry to also by authorized personnel only, where applicable.
- 11. Fall protection management shall be a top project priority. Workers shall maintain and use necessary fall protection systems and procedures where appropriate. Engineering controls and work methods which aliminate, guard, or otherwise control fall bazards shall take priority over personal fall errest system usage.
- 12. Where hazardous materials are present, projects shall implement efforts to communicate and control potential exposure to the workforce.

With Full Support and Endorsement of: Wales You BTEANYCE NY TRUMOCKES A.C.

NOTICE TO BIDDERS

Please be advised that the City of New York has issued a new Standard Construction Contract. The new Contract, which is incorporated in this bid, is significantly different from the 2008 version previously used by the City. A listing of some of the significant changes is provided below. This notice is only a partial listing. Please refer to the Contract itself for a full understanding of the changes and the actual text of the changes that were made. 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.

Significant changes include the following:

ARTICLE 11 DAMAGES CAUSED BY DELAYS

In 2008, the City embarked on a pilot project to test the use of new construction contract language altering the allocation of the risk of project delays, as between the City and the contractor. The City has determined to make the pilot project language the standard language for all City construction contracts. Accordingly, there is now one Standard City Construction Contract that it to be used by all agencies for all bids released after the release of the new contract. The damages for delay language is Article 11. Please note that changes have been made to the damages for delay provisions from the pilot to the adopted version.

ARTICLE 22 INSURANCE

Changes have been made to the insurance provisions, including incorporating requirements that the insurance provided comply with recent NYC Department of Buildings regulations specifying required dollar limits for CGL insurance for certain projects and requiring proof of builder's risk insurance prior to Work commencing rather than within 10 days of award.

ARTICLE 26 EXTRA WORK

The percentage paid for overhead for Extra Work pursuant to Section 26.1.11 is increased from 10% to 12% and the calculation of Worker's Compensation insurance costs reimbursed for Extra Work has been clarified.

ARTICLE 37 LABOR LAW REQUIREMENTS

ARTICLE 38 PAYROLL REPORTS

The provisions governing Labor Law provisions have been tightened, including requirements the employee identification cards include a photo (unless the requirement is waived), a prohibition on cash payments to employees and subcontractors, and clear enforcement authority requirements.

ARTICLE 70 ELECTRONIC FILING

A provision is added to make mandatory the electronic filing of certain alteration permits with the Department of Buildings.

Other significant changes include the following:

ARTICLE 7 INDEMNIFICATION

Changes have been made to the indemnification provisions.

ARTICLE14 FINAL ACCEPTANCE OF WORK
ARTICLE 44 SUBSTANTIAL COMPLETION PAYMENT

The Commissioner is no longer required to issue a substantial completion determination in addition to the already existing requirement that the Engineer issue a substantial completion determination and reach an agreement on a punch list of remaining work. Now, the Engineer, when issuing the punch list to the Contractor, must also include a proposed schedule for the completion of the punch list. The Contractor may propose an alternative schedule that is subject to the approval of the Engineer. If the Contractor fails to respond to the Engineer's proposed schedule, the Engineer's schedule is deemed accepted.

ARTICLE 15 LIQUIDATED DAMAGES

The contract is revised to match Schedule A to provide that liquidated damages are available only until substantial completion.

ARTICLE 17 SUBCONTRACTS

The requirements for prior approval of subcontractors, and for contractors to be responsible for the actions of their subcontractors, have been tightened. The requirement that the Contractor list subcontractors in the City's Payee Information Portal has been added; the provision was previously attached as a rider.

ARTICLE 19 SECURITY DEPOSIT

The provisions governing the return of bid deposits are clarified.

ARTICLE 20 PAYMENT GUARANTEE

The Payment Guaranty provisions, which apply when the City does not require the Contractor to obtain payment bonds, has been significantly revised to track the requirements of State Finance law 137.

ARTICLE 28 RECORDKEEPING FOR EXTRA OR DISPUTED WORK

The recordkeeping requirement that currently apply to payments for Time & Materials for extra work are expressly made applicable to regular work that is paid for on a T & M basis.

ARTICLE 35 EMPLOYEES

The whistleblower provisions of local law are added to the construction contract. They previously have been attached as a rider.

ARTICLE 38 PAYROLL REPORTS ARTICLE 77 RECORDS RETENTION

Requirements that records be maintained for six years and directions on how such records must be made available.

ARTICLE 42 PARTIAL PAYMENTS

Increased flexibility has been provided for when contractors may submit invoices.

ARTICLE 62 TAX EXEMPTION

The provisions identifying the State tax exemption for municipalities are revised to more clearly describe State law.

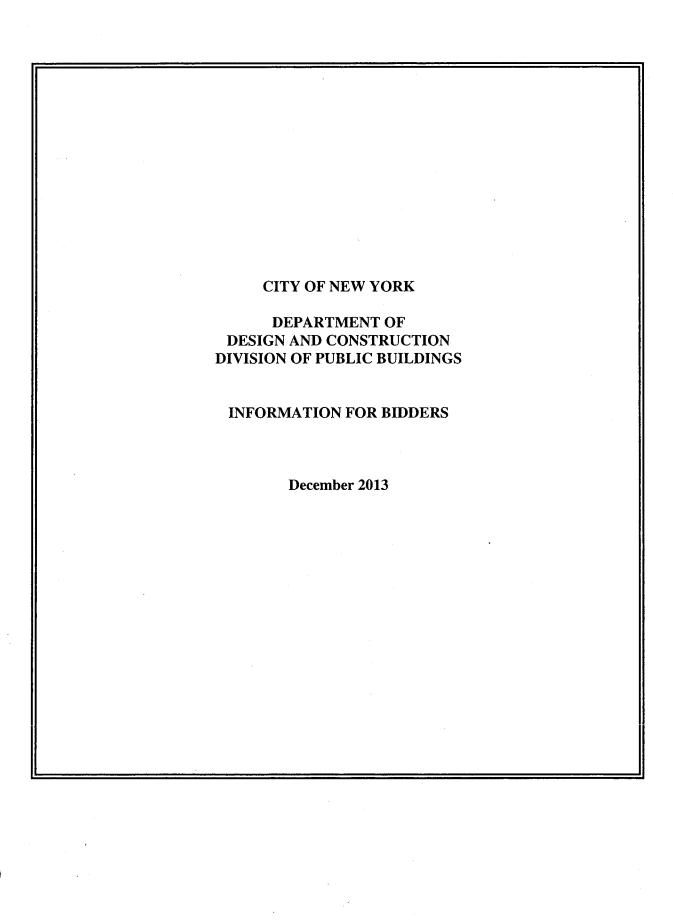
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NEW YORK CITY STANDARD CONSTRUCTION CONTRACT (DEC. 2013) INSURANCE RIDER

The following provisions supersede the corresponding provisions in the December 2013 version of the New York City Standard Construction Contract:

- 1. Section 22.1.1(c) provides as follows:
 - 22.1.1(c) If the **Work** requires a permit from the Department of Buildings pursuant to 1 RCNY Section 101-08, the **Contractor** shall provide Commercial General Liability Insurance with limits of at least those required by 1 RCNY section 101-08 or greater limits provided by the Agency in Schedule A. If the Work does not require such a permit, the minimum limits shall be those provided for in Schedule A.
- 2. Section 22.3.3 provides as follows:
 - For policies provided pursuant to all of Article 22.1 other than Article 22.1.2, the Contractor shall submit one or more Certificates of Insurance on forms acceptable to the Commissioner. All such Certificates of Insurance shall certify (a) the issuance and effectiveness of such policies of insurance, each with the specified minimum limits (b) for insurance secured pursuant to Article 22.1.1 that the City and any other entity specified in Schedule A is an Additional Insured thereunder; (c) in the event insurance is required pursuant to Article 22.1.6 and/or Article 22.1.7, that the City is an Additional Insured thereunder; and (d) the company code issued to the insurance company by the National Association of Insurance Commissioners (the NAIC number). All such Certificates of Insurance shall be accompanied by the required additional insured endorsements and either a duly executed "Certification by Insurance Broker or Agent" in the form contained in Part III of Schedule A or copies of all policies referenced in such Certificate of Insurance as certified by an authorized representative of the issuing insurance carrier. If any policy is not available at the time of submission, certified binders may be submitted until such time as the policy is available, at which time a certified copy of the policy shall be submitted.

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INFORMATION FOR BIDDERS

1. <u>Description and Location of Work</u>

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) <u>Deposit for Copy of Invitation For Bids Documents</u>: 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) <u>Return of Invitation For Bids Documents</u>: 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) <u>Additional Copies</u>: Additional copies of the Invitation For Bids Documents may be obtained, subject to the conditions set forth in the advertisement for bids.

5. <u>Pre-Bid Conference</u>

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. <u>Irrevocability of Bid</u>

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.

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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.

<u>Restriction</u>: 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) <u>Mistake Discovered Before Bid Opening</u>: 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) <u>Mistakes Discovered Before Award</u>

- (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
- In the judgment of the Agency Chief Contracting Officer, the bids were not independently arrived (2) at in open competition, were collusive, or were submitted in bad faith.
- 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:
 - prior notice of the intention to negotiate and a reasonable opportunity to negotiate have been given (1) by the contracting officer to each responsible bidder that submitted a bid in response to the Invitation for Bids;
 - the negotiated price is the lowest negotiated price offered by a responsible bidder; and (2)
 - the negotiated price is lower than the lowest rejected bid price of a responsible bidder that (3) submitted a bid in response to the Invitation for Bids.

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**

- Requirement: Pursuant to Administrative Code Section 6-116.2 and the PPB Rules, bidders may be (A) 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.
- Submission: Vendex Questionnaires must be submitted directly to the Mayor's Office of Contract Services, (B) 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.
- 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) <u>Bid Security</u>: 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) <u>Performance and Payment Security</u>: 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) <u>Acceptable Types of Security</u>: 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) <u>Power of Attorney</u>: 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. <u>Bidder Responsibilities and Qualifications</u>

- (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) <u>General</u>: 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. <u>Lump Sum Contracts</u>

- (A) <u>Comparison of Bids</u>: 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) <u>Variations from Engineer's Estimate</u>: 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) <u>Comparison of Bids</u>: 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) <u>Variations from Engineer's Estimate</u>: 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. <u>Locally Based Enterprise Requirements (LBE)</u>

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":
 - 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.
- Occumentation 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. <u>DDC Safety Requirements</u>

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

June 2015

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); 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 16 NYCRR Part 753
- ☐ Title 15 of the Rules of the City of New York, Chapter 13 Citywide Construction Dust Mitigation
- ☐ Manual on Uniform Traffic Control Devices (MUTCD)
- Title 15 of the Rules of the City of New York, Chapter 28 Citywide Construction Noise Mitigation

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 QA&CS 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 QA&CS within the Division of Program Management/ Safety & Site 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").

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Daily Safety Job Briefing: Daily jobsite safety meetings, giving to all jobsite personnel by contractor, with the purpose of discussing project specific safety procedures for the scheduled construction work.

Director - Quality Assurance and Construction Safety (QA&CS): Responsible for the operations of the QACS Construction Safety Unit and the DDC Site Safety management programs.

Job Hazard Analysis (JHA): A process of identifying the major job steps and any potential site-specific hazards that may be present during construction and establishing the means and methods to eliminate or control those hazards.

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.

. Project Site: Those areas indicated in the Contract Documents where the Work is to be performed.

Project Safety Representative: The designated project safety representative shall have completed an authorized 30 hour OSHA Construction Safety Course and other safety training applicable to Contractor's/subcontractor's project work. Except in instances where a dedicated Project Safety Manager is required, a Project Safety Representative may also function as a superintendent, foreman or crew leader on the Project, but must have sufficient experience and authority to undertake corrective actions and must qualify to be a competent person. No work is to be performed on site when a Project Safety Representative is not present.

Project Safety Manager: A dedicated, full-time project safety manager may be a contractual requirement on large projects or projects deemed by DDC to be particularly high risk. This would be in addition or in lieu of a Contractor's Project Safety Representative. This individual shall not have any other assigned duties. This individual shall have received, at a minimum an authorized 30 hour OSHA Construction Safety Course. Other examples of acceptable training are OSHA Safety and Health Standards for the Construction Industry training program (OSHA 510), Certified Safety Professional (CSP), Certified Industrial Hygienist (CIH) or a degree/certificate in a safety and health from a college-level curriculum.

A Project Safety Manager shall possess the additional training, years of experience, and skills necessary to thoroughly understand the health and safety hazards and controls for large construction projects, including the full scope of the specific Work.

QA&CS - Quality Assurance and Construction Safety of the New York City Department of Design and Construction.

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 Construction Management firm, 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 Manager: For certain projects, as defined in NYC Construction Codes – Title 28, the Contractor shall provide a Site Safety Manager with a Site Safety Manager License issued by the NYC Department of Building.

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 procedures and training appropriate and

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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.

Work: The construction required by the Contract Documents whether completed or partially completed, performed by the Contractor/ subcontractors. Work refers to the furnishing of labor, furnishing and incorporating materials and equipment into the construction and providing any service required by the Contract Documents to fulfill the Contractor's obligation to complete the Project.

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. DDC or CM Resident Engineer / Construction Project 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 meetings and daily safety job briefings.
- 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 and Accident Notification and Response Protocol.
- Gathers facts related to all accidents and prepares DDC Construction Accident Report.
- Notifies the Construction Safety Unit within two (2) hours of the start of an inspection by any outside regulatory agency personnel, including OSHA, NYC DOB or others and forwards a copy of the inspection report within three days of its receipt.
- Monitors the conditions at the site for conformance with the contractor's 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 contractor's Site Safety Plan, applicable federal, state or local codes or any condition that presents a
 potential risk of injury to the public or workers or possible damage to property.
- Notifies DDC of any unsafe or unhealthy condition and directs the contractor to provide such labor, materials, equipment and supervision to abate such conditions.
- Escort and assist QA&CS Construction Safety Auditors during the field and record inspections.
- Reports emergency conditions to the Construction Safety Unit immediately.

B. Contractors

- Submit a completed Safety Questionnaire and other safety performance related documentation with its bid or as part of a pre-qualification package.
- Complete a written Job Hazard Analysis (JHA) that identifies safety hazards for project specific work tasks and hazard control methods. A written JHA shall be available at the site for reference and included in the Site Safety Plan submitted by the contractor.
- Submit a Site Safety Plan and Safety Program within 30 days from the Award Date 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.

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- Develop project specific safety procedures to protect general public during all construction activities for the duration of the project.
- Ensure that all employees are aware of the hazards associated with the project through documented formal and
 informal training and/or other communications. Conduct and document weekly safety meetings and daily job
 briefing sessions for the duration of the project. Documentation to be provided to the RE/CPM on a monthly
 basis.
- Name the Project Safety Representative and Project Safety Manager, if required. The Contractor will be
 required to identify the Project Safety Representative and Project Safety Manager in the Site Safety Plan.
 Resumes, outlining the qualification and experience for the Project Safety Representative and Project Safety
 Manager, shall be available upon request. DDC reserves the right to request that the Contractor replace any
 Project Safety Representative or Project Safety Manager for any reason at any time during the project.
- Name a Competent Person(s), The Contractor will be required to identify a Competent Person(s) 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.
- Conduct applicable safety training prior to the commencement of work at the site. All training records (OSHA 10-hour, flagger, scaffold, fall protection, confined space entry, etc.) shall be provided to the RE/CPM prior to mobilization, included in the Site Safety Plan, kept current during the course of the project, and available for review. Prior to performing any work on DDC project all employees shall have successfully completed, within the previous five calendar years, a 10 Hour OSHA construction safety course.
- As part of the Site Safety Plan, prepare a site specific programs and plans, such as MPT plan, steel erection plan, confined space program, fall protection plan, demolition plan, etc. (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 Project Safety Representative and/or Project
 Safety Manager will conduct this training prior to mobilization and provide documentation to the RE/CPM.
- 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 or unhealthy conditions to the RE/CPM as soon as practical, but no more than 24 hours after discovery, and take prompt actions to remove or abate such conditions.
- Report any accidents involving injuries to workers or the general public, as well as property damage, to the RE/CPM within one (1) hour.
- Following an accident, the Contractor shall not remove or alter any equipment, structure, material, or evidence related to the accident. Exception: Immediate emergency procedures taken to secure structures, temporary construction, operations, or equipment that pose a continued imminent danger or facilitate assistance for persons who are trapped or who have sustained bodily injury.
- Notify the RE/CPM within one (1) hour of the start of an inspection by any outside regulatory agency personnel, including OSHA, NYC DOB or others.
- Maintain all records pertaining to all required compliance documents and accident and injury reports.
- Address 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 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 company workers' compensation experience modification rating and OSHA Incident Rates for the three (3) years prior to the date of the bid opening. DDC may request a Contractor to update its Questionnaire at any time or to provide more detailed information. The Contractor must provide the requested information within 15 days.

The following criteria will be used by DDC in reviewing the Contractor's responsibility, which will be based on the information provided on the questionnaire:

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Criteria 1: OSHA Injury and Illness Rates (I&IR) are no greater than the average for the industry (based on the most current Bureau of Labor Statistics data for the Contractors SIC code); and

Criteria 2: Insurance workers compensation Experience Modification Rate (EMR) equal to or less than 1.0; and

Criteria 3: Any willful violations issued by OSHA or NYC DOB within the last three (3) years; and

Criteria 4: A fatality (worker or member of public) and injuries, requiring OSHA notification, experienced on or near Contractor's worksite within the last three (3) years; and

Criteria 5: Past safety performance on DDC projects (accidents; status of safety program and site safety plan submittals; etc.)

Criteria 6: OSHA violation history for the last three (3) years;

Criteria 7: Contractor shall provide OSHA Injury and Illness Records (currently OSHA 300 and 300A Logs) for the last three (3) years.

If the Contractor fails to meet the basic criteria listed above, the Construction Safety Unit may request, through the ACCO, more details concerning the Contractor's safety experience. DDC may request the Contractor to provide copies of, among other things, accident investigation reports, OSHA records, OSHA and NYC DOB citations, EPA citations and written corrective action plan.

VI. SAFETY PROGRAM AND SITE SAFETY PLAN

Within thirty (30) days from the Award Date, 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 standards. The Site Safety Plan shall identify project work scope, safety hazards associated with the project tasks, and include specific safety procedures and training appropriate and necessary to complete the work. The 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.

<u>Safety Program:</u> Corporate Safety Program established by the Contractor that includes the Contractor's overall safety policy, regulatory compliance plan and basic safety procedures covering all aspects of construction operations, performed by the Contractor. The Safety Program shall be a written document with a separate section describing each element of the Safety Program. The Safety Program shall have at minimum the following elements applicable to the Contractor's operations:

- Responsibility and Organization Contractor's company organization chart, including titles, names, contact information, roles and responsibilities for key personnel, etc.
- Safety Training Program Contractor's corporate training program.
- Hazard Corrective Actions Criteria for safety inspections, identification of safety non-compliances, implementation and verification of corrective actions, forms to document safety inspections results, etc.
- Accident/Exposure Investigation
- Recordkeeping and Reporting Injuries Responsible staff; reporting and recording criteria; OSHA 300 and 300A form completion, etc.
- Fire Protection and Prevention Program
- Housekeeping
- Illumination
- Sanitation
- Personal Protective Equipment (PPE) Company policy for the use of head protection, foot protection, hearing protection, eye and face protection, protective clothing, and any additional protective equipment based on work tasks; PPE inspection and replacement policy.
- Hazard Communication Program
- Employee Emergency Action Plan
- Protection of Underground Facilities and Utilities
- Ionizing/Nonionizing Radiation
- Material Handling, Storage, Use and Disposal
- Tools Hand and Power
- Signs, Signals, and Barricades

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- Scaffold Local Law 52 requirements, installation, use, inspection, dismantling, training and general safety requirements.
- Welding and Cutting
- Electrical Safety
- Fall Protection
- Cranes, Derrick, Hoists, Elevators, Conveyors
- Excavation Safety
- Concrete and Masonry Construction
- Maintenance and Protection of Traffic
- Steel Erection
- Demolition
- Blasting and the Use of Explosives
- Stairways and Ladders
- Toxic and Hazardous Substances
- Alcohol and Drug Abuse Policy
- Rodents and Vermin
- Occupational Noise Exposure
- Confined Space Program General confined Space Program: training requirements, confined space hazard evaluation procedure, atmospheric testing procedure, confined space classification, permit-required procedure, communication procedure, rescue procedure, forms, etc.
- Construction Vehicles/Heavy Equipment
- Dust Control Procedures

Site Safety Plan: The Site Safety Plan shall be a written document and shall apply to all project specific Contractor and subcontractor operations, and shall have at a minimum, the following elements with each element described in a separate section (It may be necessary to modify the basic format for certain unique or high-risk projects, such as tunnels or high-rise construction):

- Project Work Scope Detailed information regarding work tasks that will be performed by contractor and subcontractors under the project.
- Responsibility and Organization Contractor's organization chart with responsible staff for the project, including titles, names, contact information, roles and responsibilities.
- Safety Training and Education OSHA 10 Hours training, requirements for daily safety briefings and weekly safety meetings, any work task specific training, responsible staff for implementation of training program for the project.
- Job Hazard Analysis (JHA) Project specific Job Hazard Analysis including work tasks, identified hazards, hazard control methods (administrative, engineering, PPE), contractor's name, project id, location, name and signature of a certifying person, hazard assessment date.
- Protection of Public
- Hazard Corrective Actions Responsible staff, forms, frequency of safety inspections and implementation of corrective actions.
- Accident/Exposure Investigation Accident/incident notification procedure of DDC project staff. Project specific procedures for accident investigation and implementation of corrective actions.
- First Aid and Medical Attention Responsible staff, location and inspection of First Aid kit, directions to local hospitals; emergency telephone numbers.
- Project Specific Fire Protection and Prevention Program.
- Project Specific Illumination Procedure.
- Project Specific Sanitation Procedure.
- Personal Protective Equipment (PPE)
- Hazard Communication Program Responsible staff; training; SDS records, project specific list of chemical; location of the program and SDS records.
- Means of Egress Information regarding free and unobstructed egress from all parts of the building or structure; exit marking; maintenance of means of egress, etc.
- Employee Emergency Action Plan Project specific: responsible staff, emergency alarm system, evacuation procedure, procedure to account for employees after evacuation, etc.
- Evacuation Plan Project specific evacuation plan (drawing/scheme) with exists and evacuation routes.

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- Protection of Underground Facilities and Utilities, including responsible staff.

- Ionizing/Nonionizing Radiation - Competent person, license and qualification requirements, type of radiation, employees exposure and protection, etc.

Material Handling, Storage, Use and Disposal - Project specific information regarding material storage and

disposal.

Signs, Signals, and Barricades – Use of danger/warning signs, sidewalk closure, safety instruction signs, pedestrian fencing and barricades, etc.

Scaffold – Project specific scaffold types, training, scaffold drawings, competent person, criteria for project specific scaffold, falling object protection.

- Welding and Cutting – project specific procedure for welding and cutting, including all necessary safety requirements such as fire prevention, personal protective equipment, hot work permits, FDNY certificate requirements.

Fall Protection - Project specific information regarding selected fall protection systems, fall protection plan.

 Cranes, Derrick, Hoists, Elevators, Conveyors – project specific equipment information including type, rated load capacity, manufacture specification requirements, competent person, exposure to falling load, inspection, recordkeeping, clearance requirements, communication procedure, ground lines, permits.

Excavation Safety - Competent person, project specific protective system.

- Maintenance and Protection of Traffic Plan - Project specific MPT plan, flagmen training.

- Steel Erection - Site specific erection plan, requirements for applicable written notifications, competent person.

- Demolition - Engineering survey, including written evidence, disconnection of all effected utilities, identification of all hazardous chemicals, materials, gases, etc., floor openings, chutes, inspection and maintenance of all stairs/passageways, removal of materials/debris/structural elements, lock out/tag out, competent person.

Blasting and the Use of Explosives – Project specific safety procedures, warning signs, training/qualification, transportation, storage and use of explosives, inspection.

Toxic and Hazardous Substances – Safety procedures for substances to be used on project.

- Noise Mitigation Plan - Completed project specific Noise Mitigation Plan.

- Confined Space Program - Project specific Confined Space Program, responsible staff, training records, equipment information, rescue procedure, list of project specific confined spaces, forms.

- Construction Vehicles/Heavy Equipment - Type of construction vehicles/heavy equipment to be used on site

- Dust Mitigation Plan - Completed project specific Dust Mitigation Plan.

The most critical component of the Site Safety Plan is the Job Hazard Analysis (JHA) section. The JHA form is a written document prepared by the contractor. The contractor must conduct a site and task assessment JHA to identify the major job steps and any potential safety or environmental hazards related to performance of the work, eliminate or implement controls for the potential hazards, and identify proper personal protective equipment for the task. The JHA shall be communicated to all contractor/subcontractor personnel on site.

The initial Job Hazard Assessment form shall be included in the contractor's Site Safety Plan and the current form shall be available at the construction site for reference.

Certain DDC programs, such as Job Order Contracting System (JOCS), may not necessarily require Site Safety Plans. The JOCS contractor shall submit a Safety Program. The Site Safety Plan requirement for the JOCS contractor will be determined by QA&CS based on a project work scope, construction activities and project location. In addition, certain DDC Operating Units may establish client-specific program or safety requirements. The contractor's Site Safety Plan must address such client-specific program or safety requirements.

VII. KICK-OFF MEETINGS/PRE-CONSTRUCTION AND SAFETY REVIEW

RE/CPM shall invite QA&CS Construction Safety Unit to the construction kick-off meeting. A QA&CS representative will participate in this meeting with the Contractor and RE/CPM prior to the start of the project for the purpose of:

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- 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 QA&CS 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 Project 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 have these records available upon request. Any critical deficiencies shall be immediately reported to QA&CS 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 QA&CS, or his/her designee will meet with the Contractor's Project Safety Representative and or Project Safety Manager, the DDC Project Manager, the RE/CPM, and the DDC Environmental Specialist (if environmental issues are involved). The purpose of this meeting is to 1) determine the level of non-compliance; 2) explain and clarify the safety/environmental provisions; 3) agree on a future course of action to correct the deficiencies.
- D. If the deficiencies continue to occur with inadequate attention by the contractor, this shall, among other remedies available, be grounds for default.
- E. The contractor shall within 1 hour inform the RE/CPM/CM of all accidents/incidents including all fatalities, any injuries to employees or members of the general public, and property damage (e.g., structural damage, equipment rollovers, utility damage, loads dropped from crane). The RE/CPM shall notify the Construction Safety Unit as per DDC's Construction Safety Emergency and Accident Notification and Response Protocol and shall maintain a record of all contractor accidents/incidents for the project.
- F. The Construction Safety Unit shall be notified within two (2) hours of the start of any NYS-DOL/ NYC-COSH/ OSHA/ EPA inspections.

IX. SAFETY PERFORMANCE EVALUATION

The contractor's safety record, including accident/incident history and DDC safety inspection results, will be considered as part of the Contractor's performance evaluation at the conclusion of the project. Poor safety performance during the course of the project shall be a reason to rate a Contractor unsatisfactory which may 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.

December 2013

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WITNESSETH:

The parties, in consideration of the mutual agreements contained herein, agree as follows:

CHAPTER I THE CONTRACT AND DEFINITIONS

ARTICLE 1. THE CONTRACT

- 1.1 Except for titles, subtitles, headings, running headlines, tables of contents and indices (all of which are printed herein merely for convenience), the following, except for such portions thereof as 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 All Addenda issued prior to the receipt of the bids; the Notice of Award; Performance and Payment Bonds, if required; and the Notice to Proceed or the Order to Work.
- 1.2 Should any conflict occur in or between the Drawings and Specifications, the Contractor shall be deemed to have estimated the most expensive way of doing the Work, unless the Contractor shall have asked for and obtained a decision in writing from the Commissioner of the Agency that is entering into this Contract, before the submission of its bid, as to what shall govern.

ARTICLE 2. DEFINITIONS

- 2.1 The following words and expressions, or pronouns used in their stead, shall, wherever they appear in this Contract, be construed as follows, unless a different meaning is clear from the context:
 - 2.1.1 "Addendum" or "Addenda" shall mean the additional Contract provisions and/or technical clarifications issued in writing by the Commissioner prior to the receipt of bids.
 - 2.1.2 "Agency" shall mean a city, county, borough or other office, position, department, division, bureau, board or commission, or a corporation, institution or agency of government, the expenses of which are paid in whole or in part from the City treasury.
 - 2.1.3 "Agency Chief Contracting Officer" (ACCO) shall mean a person delegated authority by the Commissioner to organize and supervise the procurement activity of subordinate Agency staff in conjunction with the CCPO, or his/her duly authorized representative.

- 2.1.4 "Allowance" shall mean a sum of money which the Agency may include in the total amount of the Contract for such specific contingencies as the Agency believes may be necessary to complete the Work, e.g., lead or asbestos remediation, and for which the Contractor will be paid on the basis of stipulated unit prices or a formula set forth in the Contract or negotiated between the parties provided, however, that if the Contractor is not directed to use the Allowance, the Contractor shall have no right to such money and it shall be deducted from the total amount of the Contract.
- 2.1.5 "City" shall mean the City of New York.
- 2.1.6 "City Chief Procurement Officer" (CCPO) shall mean a person delegated authority by the Mayor to coordinate and oversee the procurement activity of Mayoral agency staff, including the ACCO and any offices which have oversight responsibility for the procurement of construction, or his/her duly authorized representative.
- 2.1.7 "Commissioner" shall mean the head of the Agency that has entered into this Contract, or his/her duly authorized representative.
- 2.1.8 "Comptroller" shall mean the Comptroller of the City of New York.
- 2.1.9 "Contract" or "Contract Documents" shall mean each of the various parts of the contract referred to in Article 1 hereof, both as a whole and severally.
- 2.1.10 "Contract Drawings" shall mean only those drawings specifically entitled as such and listed in the Specifications or in any Addendum, or any drawings furnished by the Commissioner, pertaining or supplemental thereto.
- 2.1.11 "Contract Work" shall mean everything required to be furnished and done by the Contractor by any one or more of the parts of the Contract referred to in Article 1, except Extra Work as hereinafter defined.
- 2.1.12 "Contractor" shall mean the entity which executed this Contract, whether a corporation, firm, partnership, joint venture, individual, or any combination thereof, and its, their, his/her successors, personal representatives, executors, administrators, and assigns, and any person, firm, partnership, joint venture, individual, or corporation which shall at any time be substituted in the place of the Contractor under this Contract.
- 2.1.13 "Days" shall mean calendar days, except where otherwise specified.
- 2.1.14 "Engineer" or "Architect" or "Project Manager" shall mean the person so designated in writing by the Commissioner in the Notice to Proceed or the Order to Work to act as such in relation to this Contract, including a private Architect or Engineer or Project Manager, as the case may be. Subject to written approval by the Commissioner, the Engineer, Architect or Project Manager may designate an authorized representative.
- 2.1.15 "Engineering Audit Officer" (EAO) shall mean the person so designated by the Commissioner to perform responsible auditing functions hereunder.
- 2.1.16 "Extra Work" shall mean Work other than that required by the Contract at the time of award which is authorized by the Commissioner pursuant to Chapter VI of this Contract.
- 2.1.17 "Federal-Aid Contract" shall mean a contract in which the United States (federal) Government provides financial funding as so designated in the Information for Bidders.

- 2.1.18 "Final Acceptance" shall mean final written acceptance of all the Work by the Commissioner, a copy of which shall be sent to the Contractor.
- 2.1.19 "Final Approved Punch List" shall mean a list, approved pursuant to Article 14.2.2, specifying those items of Work to be completed by the Contractor after Substantial Completion and dates for the completion of each item of Work.
- 2.1.20 "Law" or "Laws" shall mean the Constitution of the State of New York, the New York City Charter, the New York City Administrative Code, a statute of the United States or of the State of New York, a local law of the City of New York, any ordinance, rule or regulation having the force of law, or common law.
- 2.1.21 "Materialman" shall mean any corporation, firm, partnership, joint venture, or individual, other than employees of the Contractor, who or which contracts with the Contractor or any Subcontractor, to fabricate or deliver, or who actually fabricates or delivers, plant, materials or equipment to be incorporated in the Work.
- 2.1.22 "Means and Methods of Construction" shall mean the labor, materials, temporary structures, tools, plant, and construction equipment, and the manner and time of their use, necessary to accomplish the result intended by this Contract.
- 2.1.23 "Notice to Proceed" or "Order to Work" shall mean the written notice issued by the Commissioner specifying the time for commencement of the Work and the Engineer, Architect or Project Manager.
- 2.1.24 "Other Contractor(s)" shall mean any contractor (other than the entity which executed this Contract or its Subcontractors) who or which has a contract with the City for work on or adjacent to the building or Site of the Work.
- 2.1.25 **"Payroll Taxes"** shall mean State Unemployment Insurance (SUI), Federal Unemployment Insurance (FUI), and payments pursuant to the Federal Insurance Contributions Act (FICA).
- 2.1.26 "Project" shall mean the public improvement to which this Contract relates.
- 2.1.27 "Procurement Policy Board" (PPB) shall mean the Agency of the City of New York whose function is to establish comprehensive and consistent procurement policies and rules which shall have broad application throughout the City.
- 2.1.28 "Required Quantity" in a unit price Contract shall mean the actual quantity of any item of Work or materials which is required to be performed or furnished in order to comply with the Contract.
- 2.1.29 "Resident Engineer" shall mean the representative of the Commissioner duly designated by the Commissioner to be his/her representative at the site of the Work.
- 2.1.30 "Site" shall mean the area upon or in which the Contractor's operations are carried on, and such other areas adjacent thereto as may be designated as such by the Engineer.
- 2.1.31 "Small Tools" shall mean items that are ordinarily required for a worker's job function, including but not limited to, equipment that ordinarily has no licensing, insurance

or substantive storage costs associated with it; such as circular and chain saws, impact drills, threaders, benders, wrenches, socket tools, etc.

- 2.1.32 "Specifications" shall mean all of the directions, requirements, and standards of performance applying to the Work as hereinafter detailed and designated under the Specifications.
- 2.1.33 "Subcontractor" shall mean any person, firm or corporation, other than employees of the Contractor, who or which contracts with the Contractor or with its subcontractors to furnish, or actually furnishes labor, or labor and materials, or labor and equipment, or superintendence, supervision and/or management at the Site. Wherever the word Subcontractor appears, it shall also mean sub-Subcontractor.
- 2.1.34 "Substantial Completion" shall mean the written determination by the Engineer that the Work required under this Contract is substantially, but not entirely, complete and the approval of the Final Approved Punch List.
- 2.1.35 "Work" shall mean all services required to complete the Project in accordance with the Contract Documents, including without limitation, labor, material, superintendence, management, administration, equipment, and incidentals, and obtaining any and all permits, certifications and licenses as may be necessary and required to complete the Work, and shall include both Contract Work and Extra Work.

CHAPTER II THE WORK AND ITS PERFORMANCE

ARTICLE 3. CHARACTER OF THE WORK

3.1 Unless otherwise expressly provided in the **Contract Drawings**, **Specifications**, and **Addenda**, the **Work** shall be performed in accordance with the best modern practice, utilizing, unless otherwise specified in writing, new and unused materials of standard first grade quality and workmanship and design of the highest quality, to the satisfaction of the **Commissioner**.

ARTICLE 4. MEANS AND METHODS OF CONSTRUCTION

- 4.1 Unless otherwise expressly provided in the Contract Drawings, Specifications, and Addenda, the Means and Methods of Construction shall be such as the Contractor may choose; subject, however, to the Engineer's right to reject the Means and Methods of Construction proposed by the Contractor which in the opinion of the Engineer:
 - 4.1.1 Will constitute or create a hazard to the Work, or to persons or property; or
 - 4.1.2 Will not produce finished Work in accordance with the terms of the Contract; or
 - 4.1.3 Will be detrimental to the overall progress of the **Project**.
- 4.2 The Engineer's approval of the Contractor's Means and Methods of Construction, or his/her failure to exercise his/her right to reject such means or methods, shall not relieve the Contractor of its obligation to complete the Work as provided in this Contract; nor shall the exercise of such right to reject create a cause of action for damages.

ARTICLE 5. COMPLIANCE WITH LAWS

- 5.1 The Contractor shall comply with all Laws applicable to this Contract and to the Work to be done hereunder.
- 5.2 Procurement Policy Board Rules: This Contract is subject to the Rules of the PPB ("PPB Rules") in effect at the time of the bid opening for this Contract. In the event of a conflict between the PPB Rules and a provision of this Contract, the PPB Rules shall take precedence.
 - 5.3 Noise Control Code provisions.
 - 5.3.1 In accordance with the provisions of Section 24-216(b) of the Administrative Code of the City ("Administrative Code"), Noise Abatement Contract Compliance, devices and activities which will be operated, conducted, constructed or manufactured pursuant to this Contract and which are subject to the provisions of the City Noise Control Code shall be operated, conducted, constructed, or manufactured without causing a violation of the Administrative Code. Such devices and activities shall incorporate advances in the art of noise control development for the kind and level of noise emitted or produced by such devices and activities, in accordance with regulations issued by the Commissioner of the City Department of Environmental Protection.
 - 5.3.2 The Contractor agrees to comply with Section 24-219 of the Administrative Code and implementing rules codified at 15 Rules of the City of New York ("RCNY") Section 28-100 et seq. In accordance with such provisions, the Contractor, if the Contractor is the responsible party under such regulations, shall prepare and post a Construction Noise Mitigation Plan at each Site, in which the Contractor shall certify that all construction tools and equipment have been maintained so that they operate at normal manufacturers operating specifications. If the Contractor cannot make this certification, it must have in place an Alternative Noise Mitigation Plan approved by the City Department of Environmental Protection. In addition, the Contractor's certified Construction Noise Mitigation Plan is subject inspection by the City Department of Environmental Protection in accordance with Section 28-101 of Title 15 of RCNY. No Contract Work may take place at a Site unless there is a Construction Noise Mitigation Plan or approved Alternative Noise Mitigation Plan in place. In addition, the Contractor shall create and implement a noise mitigation training program. Failure to comply with these requirements may result in fines and other penalties pursuant to the applicable provisions of the Administrative Code and RCNY.
- 5.4 Ultra Low Sulfur Diesel Fuel: In accordance with the provisions of Section 24-163.3 of the Administrative Code, the **Contractor** specifically agrees as follows:
 - 5.4.1 Definitions. For purposes of this Article 5.4, the following definitions apply:
 - 5.4.1(a) "Contractor" means any person or entity that enters into a Public Works Contract with a City Agency, or any person or entity that enters into an agreement with such person or entity, to perform work or provide labor or services related to such Public Works Contract.
 - 5.4.1(b) "Motor Vehicle" means any self-propelled vehicle designed for transporting persons or property on a street or highway.
 - 5.4.1(c) "Nonroad Engine" means an internal combustion engine (including the fuel system) that is not used in a Motor Vehicle or a vehicle used solely for competition, or that is not subject to standards promulgated under Section 7411 or Section 7521 of

Title 42 of the United States Code, except that this term shall apply to internal combustion engines used to power generators, compressors or similar equipment used in any construction program or project.

- 5.4.1(d) "Nonroad Vehicle" means a vehicle that is powered by a Nonroad Engine, fifty (50) horsepower and greater, and that is not a Motor Vehicle or a vehicle used solely for competition, which shall include, but not be limited to, excavators, backhoes, cranes, compressors, generators, bulldozers, and similar equipment, except that this term shall not apply to horticultural maintenance vehicles used for landscaping purposes that are powered by a Nonroad Engine of sixty-five (65) horsepower or less and that are not used in any construction program or project.
- 5.4.1(e) "Public Works Contract" means a contract with a City Agency for a construction program or project involving the construction, demolition, restoration, rehabilitation, repair, renovation, or abatement of any building, structure, tunnel, excavation, roadway, park or bridge; a contract with a City Agency for the preparation for any construction program or project involving the construction, demolition, restoration, rehabilitation, repair, renovation, or abatement of any building, structure, tunnel, excavation, roadway, park or bridge; or a contract with a City Agency for any final work involved in the completion of any construction program or project involving the construction, demolition, restoration, rehabilitation, repair, renovation, or abatement of any building, structure, tunnel, excavation, roadway, park or bridge.
- 5.4.1(f) "Ultra Low Sulfur Diesel Fuel" means diesel fuel that has a sulfur content of no more than fifteen parts per million (15 ppm).

5.4.2 Ultra Low Sulfur Diesel Fuel

- 5.4.2(a) All **Contractors** shall use Ultra Low Sulfur Diesel Fuel in diesel-powered Nonroad Vehicles in the performance of this **Contract**.
- 5.4.2(b) Notwithstanding the requirements of Article 5.4.2(a), Contractors may use diesel fuel that has a sulfur content of no more than thirty parts per million (30 ppm) to fulfill the requirements of this Article 5.4.2, where the Commissioner of the City Department of Environmental Protection ("DEP Commissioner") has issued a determination that a sufficient quantity of Ultra Low Sulfur Diesel Fuel is not available to meet the needs of Agencies and Contractors. Any such determination shall expire after six (6) months unless renewed.
- 5.4.2(c) Contractors shall not be required to comply with this Article 5.4.2 where the City Agency letting this Contract makes a written finding, which is approved, in writing, by the DEP Commissioner, that a sufficient quantity of Ultra Low Sulfur Diesel Fuel, or diesel fuel that has a sulfur content of no more than thirty parts per million (30 ppm) is not available to meet the requirements of Section 24-163.3 of the Administrative Code, provided that such Contractor in its fulfillment of the requirements of this Contract, to the extent practicable, shall use whatever quantity of Ultra Low Sulfur Diesel Fuel or diesel fuel that has a sulfur content of no more than thirty parts per million (30 ppm) is available. Any finding made pursuant to this Article 5.4.2(c) shall expire after sixty (60) Days, at which time the requirements of this Article 5.4.2 shall be in full force and effect unless the City Agency renews the finding in writing and such renewal is approved by the DEP Commissioner.

- 5.4.2(d) Contractors may check on determinations and approvals issued by the DEP Commissioner pursuant to Section 24-163.3 of the Administrative Code, if any, at www.dep.nyc.gov or by contacting the City Agency letting this Contract.
- 5.4.2(e) The requirements of this Article 5.4.2 do not apply where they are precluded by federal or State funding requirements or where the **Contract** is an emergency procurement.

5.4.3 Best Available Technology

- 5.4.3(a) All Contractors shall utilize the best available technology for reducing the emission of pollutants for diesel-powered Nonroad Vehicles in the performance of this Contract. For determinations of best available technology for each type of diesel-powered Nonroad Vehicle, Contractors shall comply with the regulations of the City Department of Environmental Protection, as and when adopted, Chapter 14 of Title 15 of the Rules of the City of New York (RCNY). The Contractor shall fully document all steps in the best available technology selection process and shall furnish such documentation to the City Agency or the DEP Commissioner upon request. The Contractor shall retain all documentation generated in the best available technology selection process for as long as the selected best available technology is in use.
- 5.4.3(b) No **Contractor** shall be required to replace best available technology for reducing the emission of pollutants or other authorized technology utilized for a diesel-powered Nonroad Vehicle in accordance with the provisions of this Article 5.4.3 within three (3) years of having first utilized such technology for such vehicle.
- 5.4.3(c) This Article 5.4.3 shall not apply to any vehicle used to satisfy the requirements of a specific Public Works Contract for fewer than twenty (20) **Days**.
- 5.4.3(d) The **Contractor** shall not be required to comply with this Article 5.4.3 with respect to a diesel-powered Nonroad Vehicle under the following circumstances:
 - 5.4.3(d)(i) Where the **City Agency** makes a written finding, which is approved, in writing, by the DEP Commissioner, that the best available technology for reducing the emission of pollutants as required by this Article 5.4.3 is unavailable for such vehicle, the **Contractor** shall use whatever technology for reducing the emission of pollutants, if any, is available and appropriate for such vehicle.
 - 5.4.3(d)(ii) Where the DEP Commissioner has issued a written waiver based upon the **Contractor** having demonstrated to the DEP Commissioner that the use of the best available technology for reducing the emission of pollutants might endanger the operator of such vehicle or those working near such vehicle, due to engine malfunction, the **Contractor** shall use whatever technology for reducing the emission of pollutants, if any, is available and appropriate for such vehicle, which would not endanger the operator of such vehicle or those working near such vehicle.
 - 5.4.3(d)(iii) In determining which technology to use for the purposes of Articles 5.4.3(d)(i) and 5.4.3(d)(ii) above, the **Contractor** shall primarily consider the reduction in emissions of particulate matter and secondarily consider the reduction in emissions of nitrogen oxides associated with the use of such

technology, which shall in no event result in an increase in the emissions of either such pollutant.

- 5.4.3(d)(iv) The **Contractor** shall submit requests for a finding or a waiver pursuant to this Article 5.4.3(d) in writing to the DEP Commissioner, with a copy to the **ACCO** of the **City Agency** letting this **Contract**. Any finding or waiver made or issued pursuant to Articles 5.4.3(d)(i) and 5.4.3(d)(ii) above shall expire after one hundred eighty (180) **Days**, at which time the requirements of Article 5.4.3(a) shall be in full force and effect unless the **City Agency** renews the finding, in writing, and the DEP Commissioner approves such finding, in writing, or the DEP Commissioner renews the waiver, in writing.
- 5.4.3(e) The requirements of this Article 5.4.3 do not apply where they are precluded by federal or State funding requirements or where the **Contract** is an emergency procurement.
- 5.4.4 Section 24-163 of the Administrative Code. The **Contractor** shall comply with Section 24-163 of the Administrative Code related to the idling of the engines of motor vehicles while parking.

5.4.5 Compliance

- 5.4.5(a) The **Contractor's** compliance with Article 5.4 may be independently monitored. If it is determined that the **Contractor** has failed to comply with any provision of Article 5.4, any costs associated with any independent monitoring incurred by the **City** shall be reimbursed by the **Contractor**.
- 5.4.5(b) Any **Contractor** who violates any provision of Article 5.4, except as provided in Article 5.4.5(c) below, shall be liable for a civil penalty between the amounts of one thousand (\$1,000) and ten thousand (\$10,000) dollars, in addition to twice the amount of money saved by such **Contractor** for failure to comply with Article 5.4.
- 5.4.5(c) No Contractor shall make a false claim with respect to the provisions of Article 5.4 to a City Agency. Where a Contractor has been found to have done so, such Contractor shall be liable for a civil penalty of twenty thousand (\$20,000) dollars, in addition to twice the amount of money saved by such Contractor in association with having made such false claim.

5.4.6 Reporting

- 5.4.6(a) For all Public Works Contracts covered by this Article 5.4, the Contractor shall report to the City Agency the following information:
 - 5.4.6(a)(i) The total number of diesel-powered Nonroad Vehicles used to fulfill the requirements of this Public Works Contract;
 - 5.4.6(a)(ii) The number of such Nonroad Vehicles that were powered by Ultra Low Sulfur Diesel Fuel;
 - 5.4.6(a)(iii) The number of such Nonroad Vehicles that utilized the best available technology for reducing the emission of pollutants, including a breakdown by vehicle model and the type of technology;

5.4.6(a)(iv) The number of such Nonroad Vehicles that utilized such other authorized technology in accordance with Article 5.4.3, including a breakdown by vehicle model and the type of technology used for each such vehicle;

5.4.6(a)(v) The locations where such Nonroad Vehicles were used; and

5.4.6(a)(vi) Where a determination is in effect pursuant to Article 5.4.2(b) or 5.4.2(c), detailed information concerning the Contractor's efforts to obtain Ultra Low Sulfur Diesel Fuel or diesel fuel that has a sulfur content of no more than thirty parts per million (30 ppm).

5.4.6(b) The **Contractor** shall submit the information required by Article 5.4.6(a) at the completion of **Work** under the Public Works Contract and on a yearly basis no later than August 1 throughout the term of the Public Works Contract. The yearly report shall cover **Work** performed during the preceding fiscal year (July 1 - June 30).

- 5.5 Ultra Low Sulfur Diesel Fuel. In accordance with the Coordinated Construction Act for Lower Manhattan, as amended:
 - 5.5.1 Definitions. For purposes of this Article 5.5, the following definitions apply:
 - 5.5.1(a) "Lower Manhattan" means the area to the south of and within the following lines: a line beginning at a point where the United States pierhead line in the Hudson River as it exists now or may be extended would intersect with the southerly line of West Houston Street in the Borough of Manhattan extended, thence easterly along the southerly side of West Houston Street to the southerly side of Houston Street, thence easterly along the southerly side of Houston Street to the southerly side of East Houston Street to the point where it would intersect with the United States pierhead line in the East River as it exists now or may be extended, including tax lots within or immediately adjacent thereto.
 - 5.5.1(b) "Lower Manhattan Redevelopment Project" means any project in Lower Manhattan that is funded in whole or in part with federal or State funding, or any project intended to improve transportation between Lower Manhattan and the two air terminals in the City known as LaGuardia Airport and John F. Kennedy International Airport, or between Lower Manhattan and the air terminal in Newark known as Newark Liberty International Airport, and that is funded in whole or in part with federal funding.
 - 5.5.1(c) "Nonroad Engine" means an internal combustion engine (including the fuel system) that is not used in a Motor Vehicle or a vehicle used solely for competition, or that is not subject to standards promulgated under Section 7411 or Section 7521 of Title 42 of the United States Code, except that this term shall apply to internal combustion engines used to power generators, compressors or similar equipment used in any construction program or project.
 - 5.5.1(d) "Nonroad Vehicle" means a vehicle that is powered by a Nonroad Engine, fifty (50) horsepower (HP) and greater, and that is not a Motor Vehicle or a vehicle used solely for competition, which shall include, but not be limited to, excavators, backhoes, cranes, compressors, generators, bulldozers, and similar equipment, except

that this terms shall not apply to horticultural maintenance vehicles used for landscaping purposes that are powered by a Nonroad Engine of sixty-five (65) HP or less and that are not used in any construction program or project.

- 5.5.1(e) "Ultra Low Sulfur Diesel Fuel" means diesel fuel that has a sulfur content of no more than fifteen parts per million (15 ppm).
- 5.5.2 Requirements. Contractors and Subcontractors are required to use only Ultra Low Sulfur Diesel Fuel to power the diesel-powered Nonroad Vehicles with engine HP rating of fifty (50) HP and above used on a Lower Manhattan Redevelopment Project and, where practicable, to reduce the emission of pollutants by retrofitting such Nonroad Vehicles with oxidation catalysts, particulate filters, or technology that achieves lowest particulate matter emissions.
- 5.6 Pesticides. In accordance with Section 17-1209 of the Administrative Code, to the extent that the **Contractor** or any **Subcontractor** applies pesticides to any property owned or leased by the **City**, the **Contractor**, and any **Subcontractor** shall comply with Chapter 12 of the Administrative Code.
- 5.7 Waste Treatment, Storage, and Disposal Facilities and Transporters. In connection with the **Work**, the **Contractor** and any **Subcontractor** shall use only those waste treatment, storage, and disposal facilities and waste transporters that possess the requisite license, permit or other governmental approval necessary to treat, store, dispose, or transport the waste, materials or hazardous substances.
- 5.8 Environmentally Preferable Purchasing. The Contractor shall ensure that products purchased or leased by the Contractor or any Subcontractor for the Work that are not specified by the City or are submitted as equivalents to a product specified by the City comply with the requirements of the New York City Environmentally Preferable Purchasing Program contained in Chapter 11 of Title 43 of the RCNY, pursuant to Chapter 3 of Title 6 of the Administrative Code.

ARTICLE 6. INSPECTION

- 6.1 During the progress of the **Work** and up to the date of **Final Acceptance**, the **Contractor** shall at all times afford the representatives of the **City** every reasonable, safe, and proper facility for inspecting all **Work** done or being done at the **Site** and also for inspecting the manufacture or preparation of materials and equipment at the place of such manufacture or preparation.
- 6.2 The Contractor's obligation hereunder shall include the uncovering or taking down of finished Work and its restoration thereafter; provided, however, that the order to uncover, take down and restore shall be in writing, and further provided that if Work thus exposed proves satisfactory, and if the Contractor has complied with Article 6.1, such uncovering or taking down and restoration shall be considered an item of Extra Work to be paid for in accordance with the provisions of Article 26. If the Work thus exposed proves unsatisfactory, the City has no obligation to compensate the Contractor for the uncovering, taking down or restoration.
- 6.3 Inspection and approval by the Commissioner, the Engineer, Project Manager, or Resident Engineer, of finished Work or of Work being performed, or of materials and equipment at the place of manufacture or preparation, shall not relieve the Contractor of its obligation to perform the Work in strict accordance with the Contract. Finished or unfinished Work not found to be in strict accordance with the Contract shall be replaced as directed by the Engineer, even though such Work may have been previously approved and paid for. Such corrective Work is Contract Work and shall not be deemed Extra Work.

6.4 Rejected **Work** and materials shall be promptly taken down and removed from the **Site**, which must at all times be kept in a reasonably clean and neat condition.

ARTICLE 7. PROTECTION OF WORK AND OF PERSONS AND PROPERTY; NOTICES AND INDEMNIFICATION

- 7.1 During the performance of the Work and up to the date of Final Acceptance, the Contractor shall be under an absolute obligation to protect the finished and unfinished Work against any damage, loss, injury, theft and/or vandalism and in the event of such damage, loss, injury, theft and/or vandalism, it shall promptly replace and/or repair such Work at the Contractor's sole cost and expense, as directed by the Resident Engineer. The obligation to deliver finished Work in strict accordance with the Contract prior to Final Acceptance shall be absolute and shall not be affected by the Resident Engineer's approval of, or failure to prohibit, the Means and Methods of Construction used by the Contractor.
- 7.2 During the performance of the Work and up to the date of Final Acceptance, the Contractor shall take all reasonable precautions to protect all persons and the property of the City and of others from damage, loss or injury resulting from the Contractor's, and/or its Subcontractors' operations under this Contract. The Contractor's obligation to protect shall include the duty to provide, place or replace, and adequately maintain at or about the Site suitable and sufficient protection such as lights, barricades, and enclosures.
- 7.3 The Contractor shall comply with the notification requirements set forth below in the event of any loss, damage or injury to Work, persons or property, or any accidents arising out of the operations of the Contractor and/or its Subcontractors under this Contract.
 - 7.3.1 The Contractor shall make a full and complete report in writing to the Resident Engineer within three (3) Days after the occurrence.
 - 7.3.2 The Contractor shall also send written notice of any such event to all insurance carriers that issued potentially responsive policies (including commercial general liability insurance carriers for events relating to the Contractor's own employees) no later than twenty (20) days after such event and again no later than twenty (20) days after the initiation of any claim and/or action resulting therefrom. Such notice shall contain the following information: the number of the insurance policy, the name of the Named Insured, the date and location of the incident, and the identity of the persons injured or property damaged. For any policy on which the City and/or the Engineer, Architect, or Project Manager are Additional Insureds, such notice shall expressly specify that "this notice is being given on behalf of the City of New York as Additional Insured, such other Additional Insureds, as well as the Named Insured."
 - 7.3.2(a) Whenever such notice is sent under a policy on which the City is an Additional Insured, the Contractor shall provide copies of the notice to the Comptroller, the Commissioner and the City Corporation Counsel. The copy to the Comptroller shall be sent to the Insurance Unit, NYC Comptroller's Office, I Centre Street Room 1222, New York, New York, 10007. The copy to the Commissioner shall be sent to the address set forth in Schedule A of the General Conditions. The copy to the City Corporation Counsel shall be sent to Insurance Claims Specialist, Affirmative Litigation Division, New York City Law Department, 100 Church Street, New York, New York 10007.

- 7.3.2(b) If the **Contractor** fails to provide any of the foregoing notices to any appropriate insurance carrier(s) in a timely and complete manner, the **Contractor** shall indemnify the **City** for all losses, judgments, settlements, and expenses, including reasonable attorneys' fees, arising from an insurer's disclaimer of coverage citing late notice by or on behalf of the **City**.
- 7.4 To the fullest extent permitted by law, the Contractor shall defend, indemnify, and hold the City, its employees, and officials (the "Indemnitees") harmless against any and all claims (including but not limited to claims asserted by any employee of the Contractor and/or its Subcontractors) and costs and expenses of whatever kind (including but not limited to payment or reimbursement of attorneys' fees and disbursements) allegedly arising out of or in any way related to the operations of the Contractor and/or its Subcontractors in the performance of this Contract or from the Contractor's and/or its Subcontractors' failure to comply with any of the provisions of this Contract or of the Law. Such costs and expenses shall include all those incurred in defending the underlying claim and those incurred in connection with the enforcement of this Article 7.4 by way of cross-claim, third-party claim, declaratory action or otherwise. The parties expressly agree that the indemnification obligation hereunder contemplates (1) full indemnity in the event of liability imposed against the Indemnitees without negligence and solely by reason of statute, operation of Law or otherwise; and (2) partial indemnity in the event of any actual negligence on the part of the Indemnitees either causing or contributing to the underlying claim (in which case, indemnification will be limited to any liability imposed over and above that percentage attributable to actual fault whether by statute, by operation of Law, or otherwise). Where partial indemnity is provided hereunder, all costs and expenses shall be indemnified on a pro rata basis.
 - 7.4.1 Indemnification under Article 7.4 or any other provision of the **Contract** shall operate whether or not **Contractor** or its **Subcontractors** have placed and maintained the insurance specified under Article 22.
- 7.5 The provisions of this Article 7 shall not be deemed to create any new right of action in favor of third parties against the **Contractor** or the **City**.

CHAPTER III TIME PROVISIONS

ARTICLE 8. COMMENCEMENT AND PROSECUTION OF THE WORK

8.1 The Contractor shall commence the Work on the date specified in the Notice to Proceed or the Order to Work. The time for performance of the Work under the Contract shall be computed from the date specified in the Notice to Proceed or the Order to Work. TIME BEING OF THE ESSENCE to the City, the Contractor shall thereafter prosecute the Work diligently, using such Means and Methods of Construction as are in accord with Article 4 herein and as will assure its completion not later than the date specified in this Contract, or on the date to which the time for completion may be extended.

ARTICLE 9. PROGRESS SCHEDULES

9.1 To enable the **Work** to be performed in an orderly and expeditious manner, the **Contractor**, within fifteen (15) **Days** after the **Notice to Proceed** or **Order to Work**, unless otherwise directed by the **Engineer**, shall submit to the **Engineer** a proposed progress schedule based on the Critical Path Method in the form of a bar graph or in such other form as specified by the **Engineer**, and monthly cash flow requirements, showing:

- 9.1.1 The anticipated time of commencement and completion of each of the various operations to be performed under this **Contract**; and
- 9.1.2 The sequence and interrelation of each of these operations with the others and with those of other related contracts; and
- 9.1.3 The estimated time required for fabrication or delivery, or both, of all materials and equipment required for the **Work**, including the anticipated time for obtaining required approvals pursuant to Article 10; and
- 9.1.4 The estimated amount in dollars the Contractor will claim on a monthly basis.
- 9.2 The proposed schedule shall be revised as directed by the **Engineer**, until finally approved by the **Engineer**, and after such approval, subject to the provisions of Article 11, shall be strictly adhered to by the **Contractor**.
- 9.3 If the Contractor shall fail to adhere to the approved progress schedule, or to the schedule as revised pursuant to Article 11, it shall promptly adopt such other or additional Means and Methods of Construction, at its sole cost and expense, as will make up for the time lost and will assure completion in accordance with the approved progress schedule. The approval by the City of a progress schedule which is shorter than the time allotted under the Contract shall not create any liability for the City if the approved progress schedule is not met.
- 9.4 The Contractor will not receive any payments until the proposed progress schedule is submitted.

ARTICLE 10. REQUESTS FOR INFORMATION OR APPROVAL

- 10.1 From time to time as the **Work** progresses and in the sequence indicated by the approved progress schedule, the **Contractor** shall submit to the **Engineer** a specific request in writing for each item of information or approval required by the **Contractor**. These requests shall state the latest date upon which the information or approval is actually required by the **Contractor**, and shall be submitted in a reasonable time in advance thereof to provide the **Engineer** a sufficient time to act upon such submissions, or any necessary re-submissions thereof.
- 10.2 The Contractor shall not have any right to an extension of time on account of delays due to the Contractor's failure to submit requests for the required information or the required approval in accordance with the above requirements.

ARTICLE 11. NOTICE OF CONDITIONS CAUSING DELAY AND DOCUMENTATION OF DAMAGES CAUSED BY DELAY

- 11.1 After the commencement of any condition which is causing or may cause a delay in completion of the **Work**, including conditions for which the **Contractor** may be entitled to an extension of time, the following notifications and submittals are required:
 - 11.1.1 Within 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 11, 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 Article 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 strictly 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.
- 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 provided, however, that the amount of compensation due to the Contractor will not be determined until the Commissioner determines that the Work is delayed after the date set for substantial completion.
- 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 Commissioner 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 the **Work** for a period exceeding thirty (30) **Days**, that was not brought about through any action or omission of the **Contractor**.
- 11.4.1.5 Differing site conditions that were neither known nor reasonably ascertainable on a pre-bid inspection of the **Site** or review of the bid documents or other publicly available sources, and that are not ordinarily encountered in the **Project's** geographical area or neighborhood or in the type of **Work** to be performed.
- 11.4.1.6 Delays caused by the City's bad faith or its willful, malicious, or grossly negligent conduct;
- 11.4.1.7 Delays not contemplated by the parties;
- 11.4.1.8 Delays so unreasonable that they constitute an intentional abandonment of the **Contract** by the **City**; and
- 11.4.1.9 Delays resulting from the City's breach of a fundamental obligation of the Contract.
- 11.4.2 No claim may be made for any alleged delay in Substantial Completion of the Work by a date earlier than the date of Substantial Completion provided for in Schedule A unless there is a provision in the Contract providing for additional compensation for early completion. No claim may be made for any alleged delay in Substantial Completion of the Work if the work is substantially completed by the date of Substantial Completion provided for in Schedule A unless acceleration has been directed by the Commissioner to meet the date of Substantial Completion set forth in Schedule A.
- 11.4.3 The provisions of this Article 11 apply only to claims for additional costs attributable to delay and do not preclude determinations by the **Commissioner** allowing reimbursements for additional costs for **Extra Work** pursuant to Articles 25 and 26 of this **Contract**. To the extent that any cost attributable to delay is reimbursed as part of a change order, no additional claim for compensation under this Article 11 shall be allowed.
- 11.5 Non-Compensable Delays. The **Contractor** agrees to make no claim for, and is deemed to have included in its bid prices for the various items of the **Contract**, the extra/additional costs attributable to any delays caused by or attributable to the items set forth below. For such items, the **Contractor** shall be compensated, if at all, solely by an extension of time to complete the performance of the **Work**, in accordance with the provisions of Article 13. Such extensions of time will be granted, if at all, pursuant to the grounds set forth in Article 13.3.
 - 11.5.1 The acts or omissions of any third parties, including but not limited to **Other Contractors**, public/ governmental bodies (other than **City Agencies**), utilities or private enterprises, who are disclosed in the **Contract Documents** or are ordinarily encountered or generally recognized as related to the **Work**;
 - 11.5.2 Any situation which was within the contemplation of the parties at the time of entering into the **Contract**, including any delay indicated or disclosed in the **Contract Documents** or 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, lockout or similar situation;
- 11.5.5 Any shortages of supplies or materials, or unavailability of equipment, required by the Contract Work;
- 11.5.6 Climatic conditions, storms, floods, droughts, tidal waves, fires, hurricanes, earthquakes, landslides or other catastrophes or acts of God, or acts of war or of the public enemy or terrorist acts, including the City's reasonable responses thereto; and
- 11.5.7 Extra Work which does not significantly affect the overall completion of the Contract, reasonable delays in the review or issuance of change orders or field orders and/or in shop drawing reviews or approvals.
- 11.6 Required Content of Submission of Statement of Delay Damages
 - 11.6.1 In the verified written statement of delay damages required by Article 11.1.2, the following information shall be provided by the **Contractor**:
 - 11.6.1.1 For each delay, the start and end dates of the claimed periods of delay and, in addition, a description of the operations that were delayed, an explanation of how they were delayed, and the reasons for the delay, including identifying the applicable act or omission of the City listed in Article 11.4.
 - 11.6.1.2 A detailed factual statement of the claim providing all necessary dates, locations and items of **Work** affected by the claim.
 - 11.6.1.3 The 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 Article 11.7.
 - 11.6.1.4 Any additional information requested by the Commissioner.

11.7 Recoverable Costs

- 11.7.1 Delay damages may be recoverable for the following costs actually and necessarily incurred in the performance of the **Work**:
 - 11.7.1.1 Direct labor, including payroll taxes (subject to statutory wage caps) and supplemental benefits, based on time and materials records;
 - 11.7.1.2 Necessary materials (including transportation to the **Site**), based on time and material records:
 - 11.7.1.3 Reasonable rental value of necessary plant and equipment other than small tools, plus fuel/energy costs according to the applicable formula set forth in Articles 26.2.4 and/or 26.2.8, based on time and material records;
 - 11.7.1.4 Insurance and bond costs:
 - 11.7.1.5 Extended field office costs:
 - 11.7.1.6 Extended Site overhead; and
 - 11.7.1.7 Extended home office overhead.
- 11.7.2 Recoverable Subcontractor Costs. When the Work is performed by a Subcontractor, the Contractor may be paid the actual and necessary costs of such subcontracted Work as outlined above in Articles 11.7.1.1 through 11.7.1.6, and an

additional overhead of five (5%) percent of the costs outlined in Articles 11.7.1.1 through 11.7.1.3.

- Non-Recoverable Costs. The parties agree that the City will have no liability for 11.7.3 the following items and the Contractor agrees it shall make no claim for the following items:
 - 11.7.3.1Profit, or loss of anticipated or unanticipated profit;
 - 11.7.3.2Consequential 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, pursuant to Article 11.1.3 above, that a compensable delay has occurred and agree on the amount of compensation, payment may be made pursuant to a written change order. Payment pursuant to such change order is subject to pre-audit by the Engineering Audit Officer, and may be post-audited by the Comptroller and/or the Agency.

ARTICLE 12. COORDINATION WITH OTHER CONTRACTORS

- 12.1 During the progress of the Work, Other Contractors may be engaged in performing other work or may be awarded other contracts for additional work on this Project. In that event, the Contractor shall coordinate the Work to be done hereunder with the work of such Other Contractors and the Contractor shall fully cooperate with such Other Contractors and carefully fit its own Work to that provided under other contracts as may be directed by the Engineer. The Contractor shall not commit or permit any act which will interfere with the performance of work by any Other Contractors.
- 12.2 If the Engineer determines that the Contractor is failing to coordinate its Work with the work of Other Contractors as the Engineer has directed, then the Commissioner shall have the right to withhold any payments otherwise due hereunder until the Contractor completely complies with the Engineer's directions.
- 12.3 The Contractor shall notify the Engineer in writing if any Other Contractor on this Project is failing to coordinate its work with the Work of this Contract. If the Engineer finds such charges to be true, the Engineer shall promptly issue such directions to the Other Contractor with respect thereto as the situation may require. The City shall not, however, be liable for any damages suffered by any Other Contractor's failure to coordinate its work with the Work of this Contract or by reason of the Other Contractor's failure to promptly comply with the directions so issued by the Engineer, or by reason of any Other Contractor's default in performance, it being understood that the City does not guarantee the responsibility or continued efficiency of any contractor. The Contractor agrees to make no claim against STANDARD CONSTRUCTION CONTRACT CITY OF NEW YORK 17

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the City for any damages relating to or arising out of any directions issued by the Engineer pursuant to this Article 12 (including but not limited to the failure of any Other Contractor to comply or promptly comply with such directions), or the failure of the Engineer to issue any directions, or the failure of any Other Contractor.

- 12.4 The Contractor shall indemnify and hold the City harmless from any and all claims or judgments for damages and from costs and expenses to which the City may be subjected or which it may suffer or incur by reason of the Contractor's failure to comply with the Engineer's directions promptly; and the Comptroller shall have the right to exercise the powers reserved in Article 23 with respect to any claims which may be made for damages due to the Contractor's failure to comply with the Engineer's directions promptly. Insofar as the facts and Law relating to any claim would preclude the City from being completely indemnified by the Contractor, the City shall be partially indemnified by the Contractor to the fullest extent provided by Law.
- 12.5 Should the Contractor sustain any damage through any act or omission of any Other Contractor having a contract with the City for the performance of work upon the Site or of work which may be necessary to be performed for the proper prosecution of the Work to be performed hereunder, or through any act or omission of a subcontractor of such Other Contractor, the Contractor shall have no claim against the City for such damage, but shall have a right to recover such damage from the Other Contractor under the provision similar to the following provisions which apply to this Contract and have been or will be inserted in the contracts with such Other Contractors:
 - 12.5.1 Should any Other Contractor having or who shall hereafter have a contract with the City for the performance of work upon the Site sustain any damage through any act or omission of the Contractor hereunder or through any act or omission of any Subcontractor of the Contractor, the Contractor agrees to reimburse such Other Contractor for all such damages and to defend at its own expense any action based upon such claim and if any judgment or claim (even if the allegations of the action are without merit) against the City shall be allowed the Contractor shall pay or satisfy such judgment or claim and pay all costs and expenses in connection therewith and agrees to indemnify and hold the City harmless from all such claims. Insofar as the facts and Law relating to any claim would preclude the City from being completely indemnified by the Contractor, the City shall be partially indemnified by the Contractor to the fullest extent provided by Law.
- 12.6 The City's right to indemnification hereunder shall in no way be diminished, waived or discharged by its recourse to assessment of liquidated damages as provided in Article 15, or by the exercise of any other remedy provided for by Contract or by Law.

ARTICLE 13. EXTENSION OF TIME FOR PERFORMANCE

- 13.1 If performance by the **Contractor** is delayed for a reason set forth in Article 13.3, the **Contractor** may be allowed a reasonable extension of time in conformance with this Article 13 and the **PPB** Rules.
- 13.2 Any extension of time may be granted only by the **ACCO** or by the Board for the Extension of Time (hereafter "Board") (as set forth below) upon written application by the **Contractor**.
- 13.3 Grounds for Extension: If such application is made, the **Contractor** shall be entitled to an extension of time for delay in completion of the **Work** caused solely:
 - 13.3.1 By the acts or omissions of the City, its officials, agents or employees; or

- 13.3.2 By the act or omissions of Other Contractors on this Project; or
- 13.3.3 By supervening conditions entirely beyond the control of either party hereto (such as, but not limited to, acts of God or the public enemy, excessive inclement weather, war or other national emergency making performance temporarily impossible or illegal, or strikes or labor disputes not brought about by any act or omission of the **Contractor**).
- 13.3.4 The Contractor shall, however, be entitled to an extension of time for such causes only for the number of **Days** of delay which the **ACCO** or the Board may determine to be due solely to such causes, and then only if the Contractor shall have strictly complied with all of the requirements of Articles 9 and 10.
- 13.4 The Contractor shall not be entitled to receive a separate extension of time for each of several causes of delay operating concurrently, but, if at all, only for the actual period of delay in completion of the Work as determined by the ACCO or the Board, irrespective of the number of causes contributing to produce such delay. If one of several causes of delay operating concurrently results from any act, fault or omission of the Contractor or of its Subcontractors or Materialmen, and would of itself (irrespective of the concurrent causes) have delayed the Work, no extension of time will be allowed for the period of delay resulting from such act, fault or omission.
- 13.5 The determination made by the **ACCO** or the Board on an application for an extension of time shall be binding and conclusive on the **Contractor**.
- 13.6 The ACCO or the Board acting entirely within their discretion may grant an application for an extension of time for causes of delay other than those herein referred.
- 13.7 Permitting the **Contractor** to continue with the **Work** after the time fixed for its completion has expired, or after the time to which such completion may have been extended has expired, or the making of any payment to the **Contractor** after such time, shall in no way operate as a waiver on the part of the **City** of any of its rights under this **Contract**.
 - 13.8 Application for Extension of Time:
 - 13.8.1 Before the **Contractor's** time extension request will be considered, the **Contractor** shall notify the **ACCO** of the condition which allegedly has caused or is causing the delay, and shall submit a written application to the **ACCO** identifying:
 - 13.8.1(a) The Contractor; the registration number; and Project description;
 - 13.8.1(b) Liquidated damage assessment rate, as specified in the Contract;
 - 13.8.1(c) Original total bid price;
 - 13.8.1(d) The original Contract start date and completion date;
 - 13.8.1(e) Any previous time extensions granted (number and duration); and
 - 13.8.1(f) The extension of time requested.
 - 13.8.2 In addition, the application for extension of time shall set forth in detail:
 - 13.8.2(a) The nature of each alleged cause of delay in completing the Work;

- 13.8.2(b) The date upon which each such cause of delay began and ended and the number of **Days** attributable to each such cause;
- 13.8.2(c) A statement that the **Contractor** waives all claims except for those delineated in the application, and the particulars of any claims which the **Contractor** does not agree to waive. For time extensions for **Substantial Completion** and final completion payments, the application shall include a detailed statement of the dollar amounts of each element of claim item reserved; and
- 13.8.2(d) A statement indicating the **Contractor's** understanding that the time extension is granted only for purposes of permitting continuation of **Contract** performance and payment for **Work** performed and that the **City** retains its right to conduct an investigation and assess liquidated damages as appropriate in the future.

13.9 Analysis and Approval of Time Extensions:

- 13.9.1 For time extensions for partial payments, a written determination shall be made by the **ACCO** who may, for good and sufficient cause, extend the time for the performance of the **Contract** as follows:
 - 13.9.1(a) If the **Work** is to be completed within six (6) months, the time for performance may be extended for sixty (60) **Days**;
 - 13.9.1(b) If the **Work** is to be completed within less than one (1) year but more than six (6) months, an extension of ninety (90) **Days** may be granted;
 - 13.9.1(c) If the **Contract** period exceeds one (1) year, besides the extension granted in Article 13.9.1(b), an additional thirty (30) **Days** may be granted for each multiple of six (6) months involved beyond the one (1) year period; or
 - 13.9.1(d) If exceptional circumstances exist, the ACCO may extend the time for performance beyond the extensions in Articles 13.9.1(a), 13.9.1(b), and 13.9.1(c). In that event, the ACCO shall file with the Mayor's Office of Contract Services a written explanation of the exceptional circumstances.
- 13.9.2 For extensions of time for **Substantial Completion** and final completion payments, the **Engineer**, in consultation with the **ACCO**, shall prepare a written analysis of the delay (including a preliminary determination of the causes of delay, the beginning and end dates for each such cause of delay, and whether the delays are excusable under the terms of this **Contract**). The report shall be subject to review by and approval of the Board, which shall have authority to question its analysis and determinations and request additional facts or documentation. The report as reviewed and made final by the Board shall be made a part of the **Agency** contract file. Neither the report itself nor anything contained therein shall operate as a waiver or release of any claim the **City** may have against the **Contractor** for either actual or liquidated damages.
- 13.9.3 Approval Mechanism for Time Extensions for **Substantial Completion** or Final Completion Payments: An extension shall be granted only with the approval of the Board which is comprised of the **ACCO** of the **Agency**, the **City** Corporation Counsel, and the **Comptroller**, or their authorized representatives.

- 13.9.4 Neither the granting of any application for an extension of time to the **Contractor** or any **Other Contractor** on this **Project** nor the papers, records or reports related to any application for or grant of an extension of time or determination related thereto shall be referred to or offered in evidence by the **Contractor** or its attorneys in any action or proceeding.
- 13.10 No Damage for Delay: The **Contractor** agrees to make no claim for damages for delay in the performance of this **Contract** occasioned by any act or omission to act of the **City** or any of its representatives, except as provided for in Article 11.

ARTICLE 14. COMPLETION AND FINAL ACCEPTANCE OF THE WORK

- 14.1 Date for Substantial Completion: The Contractor shall substantially complete the Work within the time fixed in Schedule A of the General Conditions, or within the time to which such Substantial Completion may be extended.
- 14.2 Determining the Date of **Substantial Completion**: The **Work** will be deemed to be substantially complete when the two conditions set forth below have been met.
 - 14.2.1 Inspection: The **Engineer** has inspected the **Work** and has made a written determination that it is substantially complete.
 - 14.2.2 Approval of Final Approved Punch List and Date for Final Acceptance: Following inspection of the Work, the Engineer shall furnish the Contractor with a final punch list, specifying all items of Work to be completed and proposing dates for the completion of each specified item of Work. The Contractor shall then submit in writing to the Engineer within ten (10) Days of the Engineer furnishing the final punch list either acceptance of the dates or proposed alternative dates for the completion of each specified item of Work. If the Contractor proposes alternative dates, then, 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, the Engineer shall establish dates for the completion of each item of Work. If the Contractor neither accepts the dates nor proposes alternative dates within ten (10) Days, the schedule proposed by the Engineer shall be deemed accepted. The latest completion date specified shall be the date for Final Acceptance of the Work.
- 14.3 Date of Substantial Completion. The date of approval of the Final Approved Punch List, shall be the date of Substantial Completion. The date of approval of the Final Approved Punch List shall be either (a) if the Contractor approves the final punch list and proposed dates for completion furnished by the Engineer, the date of the Contractor's approval; or (b) if the Contractor neither accepts the dates nor proposes alternative dates, ten (10) Days after the Engineer furnishes the Contractor with a final punch list and proposed dates for completion; or (c) if the Contractor proposes alternative dates, the date that the Engineer sends written notification to the Contractor either approving the Contractor's proposed alternative dates or establishing dates for the completion for each item of Work.
- 14.4 Determining the Date of **Final Acceptance**: The **Work** will be accepted as final and complete as of the date of the **Engineer's** 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**.

- 14.5 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.
- 14.6 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.
- 14.7 Initiation of Inspection by the Engineer: If the Contractor does not request inspection or reinspection 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 substantially complete the Work within the time fixed for such Substantial Completion in Schedule A of the General Conditions, plus authorized time extensions, or if the Contractor, in the sole determination of the Commissioner, has abandoned the Work, the Contractor shall pay to the City the sum fixed in Schedule A of the General Conditions, for each and every Day that the time consumed in substantially completing the Work exceeds the time allowed therefor; which said sum, in view of the difficulty of accurately ascertaining the loss which the City will suffer by reason of delay in the Substantial Completion of the Work hereunder, is hereby fixed and agreed as the liquidated damages that the City will suffer by reason of such delay, and not as a penalty. This Article 15 shall also apply to the Contractor whether or not the Contractor is defaulted pursuant to Chapter X of this Contract. Neither the failure to assess liquidated damages nor the granting of any time extension shall operate as a waiver or release of any claim the City may have against the Contractor for either actual or liquidated damages.
- 15.2 Liquidated damages received hereunder are not intended to be nor shall they be treated as either a partial or full waiver or discharge of the City's right to indemnification, or the Contractor's obligation to indemnify the City, or to any other remedy provided for in this Contract or by Law.
- 15.3 The **Commissioner** may deduct and retain out of the monies which may become due hereunder, the amount of any such liquidated damages; and in case the amount which may become due hereunder shall be less than the amount of liquidated damages suffered by the **City**, the **Contractor** shall be liable to pay the difference.

ARTICLE 16. OCCUPATION OR USE PRIOR TO COMPLETION

- 16.1 Unless otherwise provided for in the Specifications, the Commissioner may take over, use, occupy or operate any part of the Work at any time prior to Final Acceptance, upon written notification to the Contractor. The Engineer shall inspect the part of the Work to be taken over, used, occupied, or operated, and will furnish the Contractor with a written statement of the Work, if any, which remains to be performed on such part. The Contractor shall not object to, nor interfere with, the Commissioner's decision to exercise the rights granted by Article 16. In the event the Commissioner takes over, uses, occupies, or operates any part of the Work:
 - 16.1.1 the Engineer shall issue a written determination of Substantial Completion with respect to such part of the Work;

- 16.1.2 the **Contractor** shall be relieved of its absolute obligation to protect such part of the unfinished **Work** in accordance with Article 7;
- 16.1.3 the Contractor's guarantee on such part of the Work shall begin on the date of such use by the City; and;
- 16.1.4 the **Contractor** shall be entitled to a return of so much of the amount retained in accordance with Article 21 as it relates to such part of the **Work**, except so much thereof as may be retained under Articles 24 and 44.

CHAPTER IV SUBCONTRACTS AND ASSIGNMENTS

ARTICLE 17. SUBCONTRACTS

- 17.1 The Contractor shall not make subcontracts totaling an amount more than the percentage of the total Contract price fixed in Schedule A of the General Conditions, without prior written permission from the Commissioner. All subcontracts made by the Contractor shall be in writing. No Work may be performed by a Subcontractor prior to the Contractor entering into a written subcontract with the Subcontractor and complying with the provisions of this Article 17.
- 17.2 Before making any subcontracts, the Contractor shall submit a written statement to the Commissioner giving the name and address of the proposed Subcontractor; the portion of the Work and materials which it is to perform and furnish; the cost of the subcontract; the VENDEX questionnaire if required; the proposed subcontract if requested by the Commissioner; and any other information tending to prove that the proposed Subcontractor has the necessary facilities, skill, integrity, past experience, and financial resources to perform the Work in accordance with the terms and conditions of this Contract.
- 17.3 In addition to the requirements in Article 17.2, Contractor is required to list the Subcontractor in the web based Subcontractor Reporting System through the City's Payee Information Portal (PIP), available at www.nyc.gov/pip.. For each Subcontractor listed, Contractor is required to provide the following information: maximum contract value, description of Subcontractor's Work, start and end date of the subcontract and identification of the Subcontractor's industry. Thereafter, Contractor will be required to report in the system the payments made to each Subcontractor within 30 days of making the payment. If any of the required information changes throughout the Term of the Contract, Contractor will be required to revise the information in the system.

Failure of the Contractor to list a Subcontractor and/or to report Subcontractor payments in a timely fashion may result in the Commissioner declaring the Contractor in default of the Contract and will subject Contractor to liquidated damages in the amount of \$100 per day for each day that the Contractor fails to identify a Subcontractor along with the required information about the Subcontractor and/or fails to report payments to a Subcontractor, beyond the time frames set forth herein or in the notice from the City. Article 15 shall govern the issue of liquidated damages.

¹ In order to use the new system, a PIP account will be required. Detailed instructions on creating a PIP account and using the new system are also available at www.nyc.gov/pip. Additional assistance with PIP may be obtained by emailing the Financial Information Services Agency Help Desk at pip@fisa.nyc.gov.

- 17.4 If an approved **Subcontractor** elects to subcontract any portion of its subcontract, the proposed sub-subcontract shall be submitted in the same manner as directed above.
- 17.5 The Commissioner will notify the Contractor in writing whether the proposed Subcontractor is approved. If the proposed Subcontractor is not approved, the Contractor may submit another proposed Subcontractor unless the Contractor decides to do the Work. No Subcontractor shall be permitted to enter or perform any work on the Site unless approved.
- 17.6 Before entering into any subcontract hereunder, the Contractor shall provide the proposed Subcontractor with a complete copy of this document and inform the proposed Subcontractor fully and completely of all provisions and requirements of this Contract relating either directly or indirectly to the Work to be performed and the materials to be furnished under such subcontract, and every such Subcontractor shall expressly stipulate that all labor performed and materials furnished by the Subcontractor shall strictly comply with the requirements of this Contract.
- 17.7 Documents given to a prospective **Subcontractor** for the purpose of soliciting the **Subcontractor's** bid shall include either a copy of the bid cover or a separate information sheet setting forth the **Project** name, the **Contract** number (if available), the **Agency** (as noted in Article 2.1.6), and the **Project's** location.
- 17.8 The Commissioner's approval of a Subcontractor shall not relieve the Contractor of any of its responsibilities, duties, and liabilities hereunder. The Contractor shall be solely responsible to the City for the acts or defaults of its Subcontractor and of such Subcontractor's officers, agents, and employees, each of whom shall, for this purpose, be deemed to be the agent or employee of the Contractor to the extent of its subcontract.
- 17.9 If the **Subcontractor** fails to maintain the necessary facilities, skill, integrity, past experience, and financial resources (other than due to the **Contractor**'s failure to make payments where required) to perform the **Work** in accordance with the terms and conditions of this **Contract**, the **Contractor** shall promptly notify the **Commissioner** and replace such **Subcontractor** with a newly approved **Subcontractor** in accordance with this Article 17.
- 17.10 The Contractor shall be responsible for ensuring that all Subcontractors performing Work at the Site maintain all insurance required by Law.
- 17.11 The **Contractor** shall promptly, upon request, file with the **Engineer** a conformed copy of the subcontract and its cost. The subcontract shall provide the following:
 - 17.11.1 Payment to Subcontractors: The agreement between the Contractor and its Subcontractor shall contain the same terms and conditions as to method of payment for Work, labor, and materials, and as to retained percentages, as are contained in this Contract.
 - 17.11.2 Prevailing Rate of Wages: The agreement between the **Contractor** and its **Subcontractor** shall include the prevailing wage rates and supplemental benefits to be paid in accordance with Labor Law Section 220.
 - 17.11.3 Section 6-123 of the Administrative Code: Pursuant to the requirements of Section 6-123 of the Administrative Code, every agreement between the **Contractor** and a **Subcontractor** in excess of fifty thousand (\$50,000) dollars shall include a provision that the **Subcontractor** shall not engage in any unlawful discriminatory practice as defined in Title VIII of the Administrative Code (Section 8-101 et seq.).

- 17.11.4 All requirements required pursuant to federal and/or state grant agreement(s), if applicable to the Work.
- 17.12 The Commissioner may deduct from the amounts certified under this Contract to be due to the Contractor, the sum or sums due and owing from the Contractor to the Subcontractors according to the terms of the said subcontracts, and in case of dispute between the Contractor and its Subcontractor, or Subcontractors, as to the amount due and owing, the Commissioner may deduct and withhold from the amounts certified under this Contract to be due to the Contractor such sum or sums as may be claimed by such Subcontractor, or Subcontractors, in a sworn affidavit, to be due and owing until such time as such claim or claims shall have been finally resolved.
- 17.13 On contracts where performance bonds and payment bonds are executed, the Contractor shall include on each requisition for payment the following data: Subcontractor's name, value of the subcontract, total amount previously paid to Subcontractor for Work previously requisitioned, and the amount, including retainage, to be paid to the Subcontractor for Work included in the requisition.
- 17.14 On Contracts where performance bonds and payment bonds are not executed, the Contractor shall include with each requisition for payment submitted hereunder, a signed statement from each and every Subcontractor and/or Materialman for whom payment is requested in such requisition. Such signed statement shall be on the letterhead of the Subcontractor and/or Materialman for whom payment is requested and shall (i) verify that such Subcontractor and/or Materialman has been paid in full for all Work performed and/or material supplied to date, exclusive of any amount retained and any amount included on the current requisition, and (ii) state the total amount of retainage to date, exclusive of any amount retained on the current requisition.

ARTICLE 18. ASSIGNMENTS

- 18.1 The **Contractor** shall not assign, transfer, convey or otherwise dispose of this **Contract**, or the right to execute it, or the right, title or interest in or to it or any part thereof, or assign, by power of attorney or otherwise any of the monies due or to become due under this **Contract**, unless the previous written consent of the **Commissioner** shall first be obtained thereto, and the giving of any such consent to a particular assignment shall not dispense with the necessity of such consent to any further or other assignments.
- 18.2 Such assignment, transfer, conveyance or other disposition of this Contract shall not be valid until filed in the office of the Commissioner and the Comptroller, with the written consent of the Commissioner endorsed thereon or attached thereto.
- 18.3 Failure to obtain the previous written consent of the Commissioner to such an assignment, transfer, conveyance or other disposition, may result in the revocation and annulment of this Contract. The City shall thereupon be relieved and discharged from any further liability to the Contractor, its assignees, transferees or sublessees, who shall forfeit and lose all monies therefor earned under the Contract, except so much as may be required to pay the Contractor's employees.
- 18.4 The provisions of this clause shall not hinder, prevent, or affect an assignment by the **Contractor** for the benefit of its creditors made pursuant to the **Laws** of the State of New York.
- 18.5 This **Contract** may be assigned by the **City** to any corporation, agency or instrumentality having authority to accept such assignment.

CHAPTER V CONTRACTOR'S SECURITY AND GUARANTEE

ARTICLE 19. SECURITY DEPOSIT

- 19.1 If performance and payment bonds are required, the City shall retain the bid security to ensure that the successful bidder executes the Contract and furnishes the required payment and performance security within ten (10) Days after notice of the award of the Contract. If the successful bidder fails to execute the Contract and furnish the required payment and performance security, the City shall retain such bid security as set forth in the Information for Bidders. If the successful bidder executes the Contract and furnishes the required payment and performance security, the City shall return the bid security within a reasonable time after the furnishing of such bonds and execution of the Contract by the City.
- 19.2 If performance and payment bonds are not required, the bid security shall be retained by the **City** as security for the **Contractor**'s faithful performance of the **Contract**. If partial payments are provided, the bid security will be returned to the **Contractor** after the sum retained under Article 21 equals the amount of the bid security, subject to other provisions of this **Contract**. If partial payments are not provided, the bid security will be released when final payment is certified by the **City** for payment.
- 19.3 If the **Contractor** is declared in default under Article 48 prior to the return of the deposit, or if any claim is made such as referred to in Article 23, the amount of such deposit, or so much thereof as the **Comptroller** may deem necessary, may be retained and then applied by the **Comptroller**:
 - 19.3.1 To compensate the City for any expense, loss or damage suffered or incurred by reason of or resulting from such default, including the cost of re-letting and liquidated damages; or
 - 19.3.2 To indemnify the City against any and all claims.

ARTICLE 20. PAYMENT GUARANTEE

- 20.1 On **Contracts** where one hundred (100%) percent performance bonds and payment bonds are executed, this Article 20 does not apply.
- 20.2 In the event the terms of this **Contract** do not require the **Contractor** to provide a payment bond or where the **Contract** does not requite a payment bond for one hundred (100%) percent of the **Contract** price, the **City** shall, in accordance with the terms of this Article 20, guarantee payment of all lawful claims for:
 - 20.2.1 Wages and compensation for labor performed and/or services rendered; and
 - 20.2.2 Materials, equipment, and supplies provided, whether incorporated into the **Work** or not, when demands have been filed with the **City** as provided hereinafter by any person, firm, or corporation which furnished labor, material, equipment, supplies, or any combination thereof, in connection with the **Work** performed hereunder (hereinafter referred to as the "beneficiary") at the direction of the **City** or the **Contractor**.
 - 20.3 The provisions of Article 20.2 are subject to the following limitations and conditions:

- 20.3.1 If the Contractor provides a payment bond for a value that is less than one hundred (100%) percent of the value of the Contract Work, the payment bond provided by the Contractor shall be primary (and non-contributing) to the payment guarantee provided under this Article 20.
- 20.3.2 The guarantee is made for the benefit of all beneficiaries as defined in Article 20.2 provided that those beneficiaries strictly adhere to the terms and conditions of Article 20.3.4 and 20.3.5.
- 20.3.3 Nothing in this Article 20 shall prevent a beneficiary providing labor, services or material for the Work from suing the Contractor for any amounts due and owing the beneficiary by the Contractor.
- 20.3.4 Every person who has furnished labor or material, to the Contractor or to a Subcontractor of the Contractor, in the prosecution of the Work and who has not been paid in full therefor before the expiration of a period of ninety (90) Days after the date on which the last of the labor was performed or material was furnished by him/her for which the claim is made, shall have the right to sue on this payment guarantee in his/her own name for the amount, or the balance thereof, unpaid at the time of commencement of the action; provided, however, that a person having a direct contractual relationship with a Subcontractor of the Contractor but no contractual relationship express or implied with the Contractor shall not have a right of action upon the guarantee unless he/she shall have given written notice to the Contractor within one hundred twenty (120) Days from the date on which the last of the labor was performed or the last of the material was furnished, for which his/her claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the material was furnished or for whom the labor was performed. The notice shall be served by delivering the same personally to the Contractor or by mailing the same by registered mail, postage prepaid, in an envelope addressed to the Contractor at any place where it maintains an office or conducts its business; provided, however, that where such notice is actually received by the Contractor by other means, such notice shall be deemed sufficient.
- 20.3.5 Except as provided in Labor Law Section 220-g, no action on this payment guarantee shall be commenced after the expiration of the one-year limitations period set forth in Section 137(4)(b) of the State Finance Law.
- 20.3.6 The Contractor shall promptly forward to the City any notice or demand received pursuant to Article 20.3.4. The Contractor shall inform the City of any defenses to the notice or demand and shall forward to the City any documents the City requests concerning the notice or demand.
- 20.3.7 All demands made against the City by a beneficiary of this payment guarantee shall be presented to the Engineer along with all written documentation concerning the demand which the Engineer deems reasonably appropriate or necessary, which may include, but shall not be limited to: the subcontract; any invoices presented to the Contractor for payment; the notarized statement of the beneficiary that the demand is due and payable, that a request for payment has been made of the Contractor and that the demand has not been paid by the Contractor within the time allowed for such payment by the subcontract; and copies of any correspondence between the beneficiary and the Contractor concerning such demand. The City shall notify the Contractor that a demand has been made. The Contractor shall inform the City of any defenses to the demand and shall forward to the City any documents the City requests concerning the demand.

- 20.3.8 The City shall make payment only if, after considering all defenses presented by the Contractor, it determines that the payment is due and owing to the beneficiary making the demand.
- 20.3.9 No beneficiary shall be entitled to interest from the City, or to any other costs, including, but not limited to, attorneys' fees, except to the extent required by State Finance Law Section 137.
- 20.4 Upon the receipt by the **City** of a demand pursuant to this Article 20, the **City** may withhold from any payment otherwise due and owing to the **Contractor** under this **Contract** an amount sufficient to satisfy the demand.
 - 20.4.1 In the event the City determines that the demand is valid, the City shall notify the Contractor of such determination and the amount thereof and direct the Contractor to immediately pay such amount to the beneficiary. In the event the Contractor, within seven (7) Days of receipt of such notification from the City, fails to pay the beneficiary, such failure shall constitute an automatic and irrevocable assignment of payment by the Contractor to the beneficiary for the amount of the demand determined by the City to be valid. The Contractor, without further notification or other process, hereby gives its unconditional consent to such assignment of payment to the beneficiary and authorizes the City, on its behalf, to take all necessary actions to implement such assignment of payment, including without limitation the execution of any instrument or documentation necessary to effectuate such assignment.
 - 20.4.2In the event that the amount otherwise due and owing to the Contractor by the City is insufficient to satisfy such demand, the City may, at its option, require payment from the Contractor of an amount sufficient to cover such demand and exercise any other right to require or recover payment which the City may have under Law or Contract.
 - 20.4.3 In the event the City determines that the demand is invalid, any amount withheld pending the City's review of such demand shall be paid to the Contractor; provided, however, no lien has been filed. In the event a claim or an action has been filed, the terms and conditions set forth in Article 23 shall apply. In the event a lien has been filed, the parties will be governed by the provisions of the Lien Law of the State of New York.
- 20.5 The provisions of this Article 20 shall not prevent the City and the Contractor from resolving disputes in accordance with the PPB Rules, where applicable.
- 20.6 In the event the City determines that the beneficiary is entitled to payment pursuant to this Article 20, such determination and any defenses and counterclaims raised by the Contractor shall be taken into account in evaluating the Contractor's performance.
- 20.7 Nothing in this Article 20 shall relieve the **Contractor** of the obligation to pay the claims of all persons with valid and lawful claims against the **Contractor** relating to the **Work**.
- 20.8 The Contractor shall not require any performance, payment or other bonds of any Subcontractor if this Contract does not require such bonds of the Contractor.
- 20.9 The payment guarantee made pursuant to this Article 20 shall be construed in a manner consistent with Section 137 of the State Finance Law and shall afford to persons furnishing labor or materials to the Contractor or its Subcontractors in the prosecution of the Work under this Contract all of the rights and remedies afforded to such persons by such section, including but not limited to, the right CITY OF NEW YORK

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to commence an action against the City on the payment guarantee provided by this Article 20 within the one-year limitations period set forth in Section 137(4)(b).

ARTICLE 21. RETAINED PERCENTAGE

- 21.1 If this Contract requires one hundred (100%) percent performance and payment security, then as further security for the faithful performance of this Contract, the Commissioner shall deduct, and retain until the substantial completion of the Work, five (5%) percent of the value of Work certified for payment in each partial payment voucher.
- 21.2 If this **Contract** does not require one hundred (100%) percent performance and payment security and if the price for which this **Contract** was awarded does not exceed one million (\$1,000,000) dollars, then as further security for the faithful performance of this **Contract**, the **Commissioner** shall deduct, and retain until the substantial completion of the **Work**, five (5%) percent of the value of **Work** certified for payment in each partial payment voucher.
- 21.3 If this **Contract** does not require one hundred (100%) percent performance and payment security and if the price for which this **Contract** was awarded exceeds one million (\$1,000,000) dollars, then as further security for the faithful performance of this **Contract**, the **Commissioner** shall deduct, and retain until the substantial completion of the **Work**, up to ten (10%) percent of the value of **Work** certified for payment in each partial payment voucher. The percentage to be retained is set forth in Schedule A of the General Conditions.

ARTICLE 22. INSURANCE

- 22.1 Types of Insurance: The Contractor shall procure and maintain the following types of insurance if, and as indicated, in Schedule A of the General Conditions (with the minimum limits and special conditions specified in Schedule A). Such insurance shall be maintained from the date the Contractor is required to provide Proof of Insurance pursuant to Article 22.3.1 through the date of completion of all required Work (including punch list work as certified in writing by the Resident Engineer), except for insurance required pursuant to Article 22.1.4, which may terminate upon Substantial Completion of the Contract. All insurance shall meet the requirements set forth in this Article 22. Wherever this Article requires that insurance coverage be "at least as broad" as a specified form (including all ISO forms), there is no obligation that the form itself be used, provided that the Contractor can demonstrate that the alternative form or endorsement contained in its policy provides coverage at least as broad as the specified form.
 - 22.1.1Commercial General Liability Insurance: The Contractor shall provide Commercial General Liability Insurance covering claims for property damage and/or bodily injury, including death, which may arise from any of the operations under this Contract. Coverage under this insurance shall be at least as broad as that provided by the latest edition of Insurance Services Office ("ISO") Form CG 0001. Such insurance shall be "occurrence" based rather than "claims-made" and include, without limitation, the following types of coverage: premises operations; products and completed operations; contractual liability (including the tort liability of another assumed in a contract); broad form property damage; independent contractors; explosion, collapse and underground (XCU); construction means and methods; and incidental malpractice. Such insurance shall contain a "per project" aggregate limit, as specified in Schedule A, that applies separately to operations under this Contract.

- 22.1.1(a) Such Commercial General Liability Insurance shall name the City as an Additional Insured. Coverage for the City shall specifically include the City's officials and employees, be at least as broad as the latest edition of ISO Form CG 20 10 and provide completed operations coverage at least as broad as the latest edition of ISO Form CG 20 37.
- 22.1.1(b) Such Commercial General Liability Insurance shall name all other entities designated as additional insureds in Schedule A but only for claims arising from the **Contractor's** operations under this **Contract**, with coverage at least as broad as the latest edition of ISO Form CG 20 26.
- 22.1.1(c) If the **Work** requires a permit from the Department of Buildings pursuant to 1 RCNY Section 101-08, at http://www.nyc.gov/html/dob/downloads/rules/1_RCNY_101-08.pdf, the **Contractor** shall provide Commercial General Liability Insurance with limits of at least those required by 1 RCNY section 101-08. If the **Work** does not require such a permit, the minimum limits shall be those provided for in Schedule A.
- 22.1.1(d) If any of the **Work** includes repair of a waterborne vessel owned by or to be delivered to the **City**, such Commercial General Liability shall include, or be endorsed to include, Ship Repairer's Legal Liability Coverage to protect against, without limitation, liability arising from navigation of such vessels prior to delivery to and acceptance by the **City**.
- 22.1.2 Workers' Compensation Insurance, Employers' Liability Insurance, and Disability Benefits Insurance: The **Contractor** shall provide, and shall cause its **Subcontractors** to provide, Workers Compensation Insurance, Employers' Liability Insurance, and Disability Benefits Insurance in accordance with the **Laws** of the State of New York on behalf of all employees providing services under this **Contract** (except for those employees, if any, for which the **Laws** require insurance only pursuant to Article 22.1.3).
- 22.1.3 United States Longshoremen's and Harbor Workers Act and/or Jones Act Insurance: If specified in Schedule A of the General Conditions or if required by **Law**, the **Contractor** shall provide insurance in accordance with the United States Longshoremen's and Harbor Workers Act and/or the Jones Act, on behalf of all qualifying employees providing services under this **Contract**.
- 22.1.4 Builders Risk Insurance: If specified in Schedule A of the General Conditions, the Contractor shall provide Builders Risk Insurance on a completed value form for the total value of the Work through Substantial Completion of the Work in its entirety. Such insurance shall be provided on an All Risk basis and include coverage, without limitation, for windstorm (including named windstorm), storm surge, flood and earth movement. Unless waived by the Commissioner, it shall include coverage for ordinance and law, demolition and increased costs of construction, debris removal, pollutant clean up and removal, and expediting costs. Such insurance shall cover, without limitation, (a) all buildings and/or structures involved in the Work, as well as temporary structures at the Site, and (b) any property that is intended to become a permanent part of such building or structure, whether such property is on the Site, in transit or in temporary storage. Policies shall name the Contractor as Named Insured and list the City as both an Additional Insured and a Loss Payee as its interest may appear.
 - 22.1.4(a) Policies of such insurance shall specify that, in the event a loss occurs at an occupied facility, occupancy of such facility is permitted without the consent of the issuing insurance company.

- 22.1.4(b) Such insurance may be provided through an Installation Floater, at the **Contractor's** option, if it otherwise conforms with the requirements of this Article 22.1.4.
- 22.1.5 Commercial Automobile Liability Insurance: The **Contractor** shall provide Commercial Automobile Liability Insurance for liability arising out of ownership, maintenance or use of any owned (if any), non-owned and hired vehicles to be used in connection with this **Contract**. Coverage shall be at least as broad as the latest edition of ISO Form CA0001. If vehicles are used for transporting hazardous materials, the Automobile Liability Insurance shall be endorsed to provide pollution liability broadened coverage for covered vehicles (endorsement CA 99 48) as well as proof of MCS 90.
- 22.1.6 Contractors Pollution Liability Insurance: If specified in Schedule A of the General Conditions, the Contractor shall maintain, or cause the Subcontractor doing such Work to maintain, Contractors Pollution Liability Insurance covering bodily injury and property damage. Such insurance shall provide coverage for actual, alleged or threatened emission, discharge, dispersal, seepage, release or escape of pollutants (including asbestos), including any loss, cost or expense incurred as a result of any cleanup of pollutants (including asbestos) or in the investigation, settlement or defense of any claim, action, or proceedings arising from the operations under this Contract. Such insurance shall be in the Contractor's name and list the City as an Additional Insured and any other entity specified in Schedule A. Coverage shall include, without limitation, (a) loss of use of damaged property or of property that has not been physically injured, (b) transportation, and (c) non-owned disposal sites.
 - 22.1.6(a) Coverage for the City as Additional Insured shall specifically include the City's officials and employees and be at least as broad as provided to the Contractor for this Project.
 - 22.1.6(b) If such insurance is written on a claims-made policy, such policy shall have a retroactive date on or before the effective date of this **Contract**, and continuous coverage shall be maintained, or an extended discovery period exercised, for a period of not less than three (3) years from the time the **Work** under this **Contract** is completed.

22.1.7 Marine Insurance:

22.1.7(a) Marine Protection and Indemnity Insurance: If specified in Schedule A of the General Conditions or if the Contractor engages in marine operations in the execution of any part of the Work, the Contractor shall maintain, or cause the Subcontractor doing such Work to maintain, Marine Protection and Indemnity Insurance with coverage at least as broad as Form SP-23. The insurance shall provide coverage for the Contractor or Subcontractor (whichever is doing this Work) and for the City (together with its officials and employees) and any other entity specified in Schedule A as an Additional Insured for bodily injury and property damage arising from marine operations under this Contract. Coverage shall include, without limitation, injury or death of crew members (if not fully provided through other insurance), removal of wreck, damage to piers, wharves and other fixed or floating objects and loss of or damage to any other vessel or craft, or to property on such other vessel or craft.

- 22.1.7(b) Hull and Machinery Insurance: If specified in Schedule A of the General Conditions or if the Contractor engages in marine operations in the execution of any part of the Work, the Contractor shall maintain, or cause the Subcontractor doing such Work to maintain, Hull and Machinery Insurance with coverage for the Contractor or Subcontractor (whichever is doing this Work) and for the City (together with its officials and employees) as Additional Insured at least as broad as the latest edition of American Institute Tug Form for all tugs used under this Contract and Collision Liability at least as broad as the latest edition of American Institute Hull Clauses.
- 22.1.7(c) Marine Pollution Liability Insurance: If specified in Schedule A of the General Conditions or if the Contractor engages in marine operations in the execution of any part of the Work, the Contractor shall maintain, or cause the Subcontractor doing such Work to maintain, Marine Pollution Liability Insurance covering itself (or the Subcontractor doing such Work) as Named Insured and the City (together with its officials and employees) and any other entity specified in Schedule A as an Additional Insured. Coverage shall be at least as broad as that provided by the latest edition of Water Quality Insurance Syndicate Form and include, without limitation, liability arising from the discharge or substantial threat of a discharge of oil, or from the release or threatened release of a hazardous substance including injury to, or economic losses resulting from, the destruction of or damage to real property, personal property or natural resources.
- 22.1.8 The **Contractor** shall provide such other types of insurance, at such minimum limits and with such conditions, as are specified in Schedule A of the General Conditions.
- 22.2 General Requirements for Insurance Coverage and Policies:
 - 22.2.1 All required insurance policies shall be maintained with companies that may lawfully issue the required policy and have an A.M. Best rating of at least A-/VII or a Standard and Poor's rating of at least A, unless prior written approval is obtained from the City Corporation Counsel.
 - 22.2.2 The **Contractor** shall be solely responsible for the payment of all premiums for all required policies and all deductibles and self-insured retentions to which such policies are subject, whether or not the **City** is an insured under the policy.
 - 22.2.3 In his/her sole discretion, the **Commissioner** may, subject to the approval of the **Comptroller** and the **City** Corporation Counsel, accept Letters of Credit and/or custodial accounts in lieu of required insurance.
 - 22.2.4 The City's limits of coverage for all types of insurance required pursuant to Schedule A of the General Conditions shall be the greater of (i) the minimum limits set forth in Schedule A or (ii) the limits provided to the Contractor as Named Insured under all primary, excess, and umbrella policies of that type of coverage.
 - 22.2.5 The **Contractor** may satisfy its insurance obligations under this Article 22 through primary policies or a combination of primary and excess/umbrella policies, so long as all policies provide the scope of coverage required herein.
 - 22.2.6 Policies of insurance provided pursuant to this Article 22 shall be primary and non-contributing to any insurance or self-insurance maintained by the City.

22.3 Proof of Insurance:

- 22.3.1 For all types of insurance required by Article 22.1 and Schedule A, except for insurance required by Articles 22.1.4 and 22.1.7, the **Contractor** shall file proof of insurance in accordance with this Article 22.3 within ten (10) **Days** of award. For insurance provided pursuant to Articles 22.1.4 and 22.1.7, proof shall be filed by a date specified by the **Commissioner** or ten (10) **Days** prior to the commencement of the portion of the **Work** covered by such policy, whichever is earlier.
- 22.3.2 For Workers' Compensation Insurance provided pursuant to Article 22.1.2, the Contractor shall submit one of the following forms: C-105.2 Certificate of Workers' Compensation Insurance; U-26.3 State Insurance Fund Certificate of Workers' Compensation Insurance; Request for WC/DB Exemption (Form CE-200); equivalent or successor forms used by the New York State Workers' Compensation Board; or other proof of insurance in a form acceptable to the Commissioner. For Disability Benefits Insurance provided pursuant to Article 22.1.2, the Contractor shall submit DB-120.1 Certificate Of Insurance Coverage Under The NYS Disability Benefits Law, Request for WC/DB Exemption (Form CE-200); equivalent or successor forms used by the New York State Workers' Compensation Board; or other proof of insurance in a form acceptable to the Commissioner. ACORD forms are not acceptable.
- 22.3.3 For policies provided pursuant to all of Article 22.1 other than Article 22.1.2, the Contractor shall submit one or more Certificates of Insurance on forms acceptable to the Commissioner. All such Certificates of Insurance shall certify (a) the issuance and effectiveness of such policies of insurance, each with the specified minimum limits (b) for insurance secured pursuant to Article 22.1.1 that the City and any other entity specified in Schedule A is an Additional Insured with coverage at least as broad as the most recent edition of ISO Forms CG 20 10, CG 20 37, and CG 20 26, as applicable; (c) in the event insurance is required pursuant to Article 22.1.6 and/or Article 22.1.7, that the City is an Additional Insured thereunder; (d) the company code issued to the insurance company by the National Association of Insurance Commissioners (the NAIC number); and (e) the number assigned to the Contract by the City. All such Certificates of Insurance shall be accompanied by either a duly executed "Certification by Broker" in the form contained in Part III of Schedule A or copies of all policies referenced in such Certificate of Insurance as certified by an authorized representative of the issuing insurance carrier. If any policy is not available at the time of submission, certified binders may be submitted until such time as the policy is available, at which time a certified copy of the policy shall be submitted.
- 22.3.4 Documentation confirming renewals of insurance shall be submitted to the **Commissioner** prior to the expiration date of coverage of policies required under this **Contract**. Such proofs of insurance shall comply with the requirements of Articles 22.3.2 and 22.3.3.
- 22.3.5 The **Contractor** shall be obligated to provide the **City** with a copy of any policy of insurance provided pursuant to this Article 22 upon the demand for such policy by the **Commissioner** or the **City** Corporation Counsel.

22.4 Operations of the Contractor:

22.4.1 The Contractor shall not commence the Work unless and until all required certificates have been submitted to and accepted by the Commissioner. Acceptance by the Commissioner of a certificate does not excuse the Contractor from securing insurance

consistent with all provisions of this Article 22 or of any liability arising from its failure to do so.

- 22.4.2 The Contractor shall be responsible for providing continuous insurance coverage in the manner, form, and limits required by this Contract and shall be authorized to perform Work only during the effective period of all required coverage.
- 22.4.3 In the event that any of the required insurance policies lapse, are revoked, suspended or otherwise terminated, for whatever cause, the Contractor shall immediately stop all Work, and shall not recommence Work until authorized in writing to do so by the Commissioner. Upon quitting the Site, except as otherwise directed by the Commissioner, the Contractor shall leave all plant, materials, equipment, tools, and supplies on the Site. Contract time shall continue to run during such periods and no extensions of time will be granted. The Commissioner may also declare the Contractor in default for failure to maintain required insurance.
- 22.4.4 In the event the Contractor receives notice, from an insurance company or other person, that any insurance policy required under this Article 22 shall be cancelled or terminated (or has been cancelled or terminated) for any reason, the Contractor shall immediately forward a copy of such notice to both the Commissioner and the New York City Comptroller, attn: Office of Contract Administration, Municipal Building, One Centre Street, room 1005, New York, New York 10007. Notwithstanding the foregoing, the Contractor shall ensure that there is no interruption in any of the insurance coverage required under this Article 22.
- 22.4.5 Where notice of loss, damage, occurrence, accident, claim or suit is required under an insurance policy maintained in accordance with this Article 22, the Contractor shall notify in writing all insurance carriers that issued potentially responsive policies of any such event relating to any operations under this Contract (including notice to Commercial General Liability insurance carriers for events relating to the Contractor's own employees) no later than 20 days after such event. For any policy where the City is an Additional Insured, such notice shall expressly specify that "this notice is being given on behalf of the City of New York as Insured as well as the Named Insured." Such notice shall also contain the following information: the number of the insurance policy, the name of the named insured, the date and location of the damage, occurrence, or accident, and the identity of the persons or things injured, damaged or lost. The Contractor shall simultaneously send a copy of such notice to the City of New York c/o Insurance Claims Specialist, Affirmative Litigation Division, New York City Law Department, 100 Church Street, New York, New York 10007.
- 22.4.6 In the event of any loss, accident, claim, action, or other event that does or can give rise to a claim under any insurance policy required under this Article 22, the **Contractor** shall at all times fully cooperate with the **City** with regard to such potential or actual claim.
- 22.5 Subcontractor Insurance: In the event the Contractor requires any Subcontractor to procure insurance with regard to any operations under this Contract and requires such Subcontractor to name the Contractor as an Additional Insured thereunder, the Contractor shall ensure that the Subcontractor name the City, including its officials and employees, as an Additional Insured with coverage at least as broad as the most recent edition of ISO Form CG 20 26.
- 22.6 Wherever reference is made in Article 7 or this Article 22 to documents to be sent to the **Commissioner** (e.g., notices, filings, or submissions), such documents shall be sent to the address set forth in Schedule A of the General Conditions. In the event no address is set forth in Schedule A, such documents are to be sent to the **Commissioner's** address as provided elsewhere in this **Contract**.

- 22.7 Apart from damages or losses covered by insurance provided pursuant to Articles 22.1.2, 22.1.3, or 22.1.5, the **Contractor** waives all rights against the **City**, including its officials and employees, for any damages or losses that are covered under any insurance required under this Article 22 (whether or not such insurance is actually procured or claims are paid thereunder) or any other insurance applicable to the operations of the **Contractor** and/or its employees, agents, or **Subcontractors**.
- 22.8 In the event the **Contractor** utilizes a self-insurance program to satisfy any of the requirements of this Article 22, the **Contractor** shall ensure that any such self-insurance program provides the **City** with all rights that would be provided by traditional insurance under this Article 22, including but not limited to the defense and indemnification obligations that insurers are required to undertake in liability policies.
- 22.9 Materiality/Non-Waiver: The **Contractor's** failure to secure policies in complete conformity with this Article 22, or to give an insurance company timely notice of any sort required in this **Contract** or to do anything else required by this Article 22 shall constitute a material breach of this **Contract**. Such breach shall not be waived or otherwise excused by any action or inaction by the **City** at any time.
- 22.10 Pursuant to General Municipal Law Section 108, this Contract shall be void and of no effect unless Contractor maintains Workers' Compensation Insurance for the term of this Contract to the extent required and in compliance with the New York State Workers' Compensation Law.
- 22.11 Other Remedies: Insurance coverage provided pursuant to this Article 22 or otherwise shall not relieve the **Contractor** of any liability under this **Contract**, nor shall it preclude the **City** from exercising any rights or taking such other actions available to it under any other provisions of this **Contract** or **Law**.

ARTICLE 23. MONEY RETAINED AGAINST CLAIMS

- 23.1 If any claim shall be made by any person or entity (including Other Contractors with the City on this Project) against the City or against the Contractor and the City for any of the following:
 - (a) An alleged loss, damage, injury, theft or vandalism of any of the kinds referred to in Articles 7 and 12, plus the reasonable costs of defending the City, which in the opinion of the Comptroller may not be paid by an insurance company (for any reason whatsoever); or
 - (b) An infringement of copyrights, patents or use of patented articles, tools, etc., as referred to in Article 57; or
 - (c) Damage claimed to have been caused directly or indirectly by the failure of the Contractor to perform the Work in strict accordance with this Contract,

the amount of such claim, or so much thereof as the Comptroller may deem necessary, may be withheld by the Comptroller, as security against such claim, from any money due hereunder. The Comptroller, in his/her discretion, may permit the Contractor to substitute other satisfactory security in lieu of the monies so withheld.

23.2 If an action on such claim is timely commenced and the liability of the City, or the Contractor, or both, shall have been established therein by a final judgment of a court of competent jurisdiction, or if such claim shall have been admitted by the Contractor to be valid, the Comptroller

shall pay such judgment or admitted claim out of the monies retained by the Comptroller under the provisions of this Article 23, and return the balance, if any, without interest, to the Contractor.

ARTICLE 24. MAINTENANCE AND GUARANTY

- 24.1 The **Contractor** shall promptly repair, replace, restore or rebuild, as the **Commissioner** may determine, any finished **Work** in which defects of materials or workmanship may appear or to which damage may occur because of such defects, during the one (1) year period subsequent to the date of **Substantial Completion** (or use and occupancy in accordance with Article 16), except where other periods of maintenance and guaranty are provided for in Schedule A.
- 24.2 As security for the faithful performance of its obligations hereunder, the Contractor, upon filing its requisition for payment on Substantial Completion, shall deposit with the Commissioner a sum equal to one (1%) percent of the price (or the amount fixed in Schedule A of the General Conditions) in cash or certified check upon a state or national bank and trust company or a check of such bank and trust company signed by a duly authorized officer thereof and drawn to the order of the Comptroller, or obligations of the City, which the Comptroller may approve as of equal value with the sum so required.
- 24.3 In lieu of the above, the Contractor may make such security payment to the City by authorizing the Commissioner in writing to deduct the amount from the Substantial Completion payment which shall be deemed the deposit required above.
- 24.4 If the Contractor has faithfully performed all of its obligations hereunder the Commissioner shall so certify to the Comptroller within five (5) Days after the expiration of one (1) year from the date of Substantial Completion and acceptance of the Work or within thirty (30) Days after the expiration of the guarantee period fixed in the Specifications. The security payment shall be repaid to the Contractor without interest within thirty (30) Days after certification by the Commissioner to the Comptroller that the Contractor has faithfully performed all of its obligations hereunder.
- 24.5 Notice by the Commissioner to the Contractor to repair, replace, rebuild or restore such defective or damaged Work shall be timely, pursuant to this article, if given not later than ten (10) Days subsequent to the expiration of the one (1) year period or other periods provided for herein.
- 24.6 If the Contractor shall fail to repair, replace, rebuild or restore such defective or damaged Work promptly after receiving such notice, the Commissioner shall have the right to have the Work done by others in the same manner as provided for in the completion of a defaulted Contract, under Article 51.
- 24.7 If the security payment so deposited is insufficient to cover the cost of such Work, the Contractor shall be liable to pay such deficiency on demand by the Commissioner.
- 24.8 The **Engineer's** certificate setting forth the fair and reasonable cost of repairing, replacing, rebuilding or restoring any damaged or defective **Work** when performed by one other than the **Contractor**, shall be binding and conclusive upon the **Contractor** as to the amount thereof.
- 24.9 The Contractor shall obtain all manufacturers' warranties and guaranties of all equipment and materials required by this Contract in the name of the City and shall deliver same to the Commissioner. All of the City's rights and title and interest in and to said manufacturers' warranties and guaranties may be assigned by the City to any subsequent purchasers of such equipment and materials or lessees of the premises into which the equipment and materials have been installed.

CHAPTER VI CHANGES, EXTRA WORK, AND DOCUMENTATION OF CLAIM

ARTICLE 25. CHANGES

- 25.1 Changes may be made to this Contract only as duly authorized in writing by the Commissioner in accordance with the Law and this Contract. All such changes, modifications, and amendments will become a part of the Contract. Work so ordered shall be performed by the Contractor.
- 25.2 Contract changes will be made only for Work necessary to complete the Work included in the original scope of the Contract and/or for non-material changes to the scope of the Contract. Changes are not permitted for any material alteration in the scope of Work in the Contract.
- 25.3 The **Contractor** shall be entitled to a price adjustment for **Extra Work** performed pursuant to a written change order. Adjustments to price shall be computed in one or more of the following ways:
 - 25.3.1 By applicable unit prices specified in the Contract; and/or
 - 25.3.2 By agreement of a fixed price; and/or
 - 25.3.3 By time and material records; and/or
 - 25.3.4 In any other manner approved by the CCPO.
- 25.4 All payments for change orders are subject to pre-audit by the Engineering Audit Officer and may be post-audited by the Comptroller and/or the Agency.

ARTICLE 26. METHODS OF PAYMENT FOR OVERRUNS AND EXTRA WORK

- 26.1 Overrun of Unit Price Item: An overrun is any quantity of a unit price item which the **Contractor** is directed to provide which is in excess of one hundred twenty-five (125%) percent of the estimated quantity for that item set forth in the bid schedule.
 - 26.1.1For 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.
 - 26.1.2If the actual quantity of any unit price item necessary to complete the **Work** will exceed one hundred twenty five (125%) percent of the estimated quantity for that item set forth in the bid schedule, the **City** reserves the right and the **Contractor** agrees to negotiate a new unit price for such item. In no event shall such negotiated new unit price exceed the unit bid price. If the **City** and **Contractor** cannot agree on a new unit price, then the **City** shall order the **Contractor** and the **Contractor** agrees to provide additional quantities of the

item on the basis of time and material records for the actual and reasonable cost as determined under Article 26.2, but in no event at a unit price exceeding the unit price bid.

- 26.2 Extra Work: For Extra Work where payment is by agreement on a fixed price in accordance with Article 25.3.2, the price to be paid for such Extra Work shall be based on the fair and reasonable estimated cost of the items set forth below. For Extra Work where payment is based on time and material records in accordance with Article 25.3.3, the price to be paid for such Extra Work shall be the actual and reasonable cost of the items set forth below, calculated in accordance with the formula specified therein, if any.
 - 26.2.1 Necessary materials (including transportation to the Site); plus
 - 26.2.2 Necessary direct labor, including payroll taxes (subject to statutory wage caps) and supplemental benefits; plus
 - 26.2.3 Sales and personal property taxes, if any, required to be paid on materials not incorporated into such Extra Work; plus
 - 26.2.4 Reasonable rental value of Contractor-owned (or Subcontractor-owned, as applicable), necessary plant and equipment other than Small Tools, plus fuel/energy costs. Except for fuel costs for pick-up trucks which shall be reimbursed based on a consumption of five (5) gallons per shift, fuel costs shall be reimbursed based on actual costs or, in the absence of auditable documentation, the following fuel consumption formula per operating hour: (.035) x (HP rating) x (Fuel cost/gallon). Reasonable rental value is defined as the lower of either seventy-five percent of the monthly prorated rental rates established in "The AED Green Book, Rental Rates and Specifications for Construction Equipment" published by Equipment Watch (the "Green Book"), or seventy-five percent of the monthly prorated rental rates established in the "Rental Rate Blue Book for Construction Equipment" published by Equipment Watch (the "Blue Book") (the applicable Blue Book rate being for rental only without the addition of any operational costs listed in the Blue Book). The reasonable rental value is deemed to be inclusive of all operating costs except for fuel/energy consumption and equipment operator's wages/costs. For multiple shift utilization, reimbursement shall be calculated as follows: first shift shall be seventy-five (75%) percent of such rental rates; second shift shall be sixty (60%) percent of the first shift rate; and third shift shall be forty (40%) percent of the first shift rate. Equipment on standby shall be reimbursed at one-third (1/3) the prorated monthly rental rate. Contractor-owned (or Subcontractor-owned, as applicable) equipment includes equipment from rental companies affiliated with or controlled by the Contractor (or Subcontractor, as applicable), as determined by the Commissioner. In establishing cost reimbursement for non-operating Contractor-owned (or Subcontractor-owned, as applicable) equipment (scaffolding, sheeting systems, road plates, etc.), the City may restrict reimbursement to a purchase-salvage/life cycle basis if less than the computed rental costs; plus
 - 26.2.5 Necessary installation and dismantling of such plant and equipment, including transportation to and from the **Site**, if any, provided that, in the case of non-**Contractor**-owned (or non-**Subcontractor**-owned, as applicable) equipment rented from a third party, the cost of installation and dismantling are not allowable if such costs are included in the rental rate; plus
 - 26.2.6 Necessary fees charged by governmental entities; plus

- 26.2.7 Necessary construction-related service fees charged by non-governmental entities, such as landfill tipping fees; plus
- 26.2.8 Reasonable rental costs of non-Contractor-owned (or non-Subcontractor-owned, as applicable) necessary plant and equipment other than Small Tools, plus fuel/energy costs. Except for fuel costs for pick-up trucks which shall be reimbursed based on a consumption of five (5) gallons per shift, fuel costs shall be reimbursed based on actual costs or, in the absence of auditable documentation, the following fuel consumption formula per hour of operation: (.035) x (HP rating) x (Fuel cost/gallon). In lieu of renting, the City reserves the right to direct the purchase of non-operating equipment (scaffolding, sheeting systems, road plates, etc.), with payment on a purchase-salvage/life cycle basis, if less than the projected rental costs; plus
- Workers' Compensation Insurance, and any insurance coverage expressly 26.2.9 required by the City for the performance of the Extra Work which is different than the types of insurance required by Article 22 and Schedule A of the General Conditions. The cost of Workers' Compensation Insurance is subject to applicable payroll limitation caps and shall be based upon the carrier's Manual Rate for such insurance derived from the applicable class Loss Cost ("LC") and carrier's Lost Cost Multiplier ("LCM") approved by the New York State Department of Financial Services, and with the exception of experience rating, rate modifiers as promulgated by the New York Compensation Insurance Rating Board ("NYCIRB"); plus
- Additional costs incurred as a result of the Extra Work for performance and 26.2.10 payment bonds; plus
- 26.2.11 Twelve percent (12%) percent of the total of items in Articles 26.2.1 through 26.2.5 as compensation for overhead, except that no percentage for overhead will be allowed on Payroll Taxes or on the premium portion of overtime pay or on sales and personal property taxes. Overhead shall include without limitation, all costs and expenses in connection with administration, management superintendence, small tools, and insurance required by Schedule A of the General Conditions other than Workers' Compensation Insurance; plus
- 26.2.12 Ten (10%) percent of the total of items in Articles 26.2.1 through 26.2.5, plus the items in Article 26.2.11, as compensation for profit, except that no percentage for profit will be allowed on Payroll Taxes or on the premium portion of overtime pay or on sales and personal property taxes; plus
- 26.2.13 Five (5%) percent of the total of items in Articles 26.2.6 through 26.2.10 as compensation for overhead and profit.
- 26.3 Where the Extra Work is performed in whole or in part by other than the Contractor's own forces pursuant to Article 26.2, the Contractor shall be paid, subject to pre-audit by the Engineering Audit Officer, the cost of such Work computed in accordance with Article 26.2 above, plus an additional allowance of five (5%) percent to cover the Contractor's overhead and profit.
- 26.4 Where a change is ordered, involving both Extra Work and omitted or reduced Contract Work, the Contract price shall be adjusted, subject to pre-audit by the EAO, in an amount based on the difference between the cost of such Extra Work and of the omitted or reduced Work.
- 26.5 Where the Contractor and the Commissioner can agree upon a fixed price for Extra Work in accordance with Article 25.3.2 or another method of payment for Extra Work in accordance with Article STANDARD CONSTRUCTION CONTRACT CITY OF NEW YORK 39 December 2013

25.3.4, or for Extra Work ordered in connection with omitted Work, such method, subject to pre-audit by the EAO, may, at the option of the Commissioner, be substituted for the cost plus a percentage method provided in Article 26.2; provided, however, that if the Extra Work is performed by a Subcontractor, the Contractor shall not be entitled to receive more than an additional allowance of five (5%) percent for overhead and profit over the cost of such Subcontractor's Work as computed in accordance with Article 26.2.

ARTICLE 27. RESOLUTION OF DISPUTES

- 27.1 All disputes between the **City** and the **Contractor** of the kind delineated in this Article 27.1 that arise under, or by virtue of, this **Contract** shall be finally resolved in accordance with the provisions of this Article 27 and the **PPB** Rules. This procedure for resolving all disputes of the kind delineated herein shall be the exclusive means of resolving any such disputes.
 - 27.1.1 This Article 27 shall not apply to disputes concerning matters dealt with in other sections of the **PPB** Rules, or to disputes involving patents, copyrights, trademarks, or trade secrets (as interpreted by the courts of New York State) relating to proprietary rights in computer software.
 - 27.1.2 This Article 27 shall apply only to disputes about the scope of Work delineated by the Contract, the interpretation of Contract documents, the amount to be paid for Extra Work or disputed work performed in connection with the Contract, the conformity of the Contractor's Work to the Contract, and the acceptability and quality of the Contractor's Work; such disputes arise when the Engineer, Resident Engineer, Engineering Audit Officer, or other designee of the Commissioner makes a determination with which the Contractor disagrees.
- 27.2 All determinations required by this Article 27 shall be made in writing clearly stated, with a reasoned explanation for the determination based on the information and evidence presented to the party making the determination. Failure to make such determination within the time required by this Article 27 shall be deemed a non-determination without prejudice that will allow application to the next level.
- 27.3 During such time as any dispute is being presented, heard, and considered pursuant to this Article 27, the Contract terms shall remain in force and the Contractor shall continue to perform Work as directed by the ACCO or the Engineer. Failure of the Contractor to continue Work as directed shall constitute a waiver by the Contractor of its claim.
 - 27.4 Presentation of Disputes to Commissioner.

Notice of Dispute and Agency Response. The Contractor shall present its dispute in writing ("Notice of Dispute") to the Commissioner within thirty (30) Days of receiving written notice of the determination or action that is the subject of the dispute. This notice requirement shall not be read to replace any other notice requirements contained in the Contract. The Notice of Dispute shall include all the facts, evidence, documents, or other basis upon which the Contractor relies in support of its position, as well as a detailed computation demonstrating how any amount of money claimed by the Contractor in the dispute was arrived at. Within thirty (30) Days after receipt of the detailed written submission comprising the complete Notice of Dispute, the Engineer, Resident Engineer, Engineering Audit Officer, or other designee of the Commissioner shall submit to the Commissioner all materials he or she deems pertinent to the dispute. Following initial submissions to the Commissioner, either party may demand of the other the production of any document or other material the demanding party believes may be relevant to the dispute. The requested party shall produce all relevant materials that are not otherwise

protected by a legal privilege recognized by the courts of New York State. Any question of relevancy shall be determined by the **Commissioner** whose decision shall be final. Willful failure of the **Contractor** to produce any requested material whose relevancy the **Contractor** has not disputed, or whose relevancy has been affirmatively determined, shall constitute a waiver by the **Contractor** of its claim.

- 27.4.1 Commissioner Inquiry. The Commissioner shall examine the material and may, in his or her discretion, convene an informal conference with the Contractor, the ACCO, and the Engineer, Resident Engineer, Engineering Audit Officer, or other designee of the Commissioner to resolve the issue by mutual consent prior to reaching a determination. The Commissioner may seek such technical or other expertise as he or she shall deem appropriate, including the use of neutral mediators, and require any such additional material from either or both parties as he or she deems fit. The Commissioner's ability to render, and the effect of, a decision hereunder shall not be impaired by any negotiations in connection with the dispute presented, whether or not the Commissioner participated therein. The Commissioner may or, at the request of any party to the dispute, shall compel the participation of any Other Contractor with a contract related to the Work of this Contract, and that Contractor shall be bound by the decision of the Commissioner. Any Other Contractor thus brought into the dispute resolution proceeding shall have the same rights and obligations under this Article 27 as the Contractor initiating the dispute.
- 27.4.2 Commissioner Determination. Within thirty (30) Days after the receipt of all materials and information, or such longer time as may be agreed to by the parties, the Commissioner shall make his or her determination and shall deliver or send a copy of such determination to the Contractor, the ACCO, and Engineer, Resident Engineer, Engineering Audit Officer, or other designee of the Commissioner, as applicable, together with a statement concerning how the decision may be appealed.
- 27.4.3 Finality of Commissioner's Decision. The Commissioner's decision shall be final and binding on all parties, unless presented to the Contract Dispute Resolution Board pursuant to this Article 27. The City may not take a petition to the Contract Dispute Resolution Board. However, should the Contractor take such a petition, the City may seek, and the Contract Dispute Resolution Board may render, a determination less favorable to the Contractor and more favorable to the City than the decision of the Commissioner.
- 27.5 Presentation of Dispute to the **Comptroller**. Before any dispute may be brought by the **Contractor** to the Contract Dispute Resolution Board, the **Contractor** must first present its claim to the **Comptroller** for his or her review, investigation, and possible adjustment.
 - 27.5.1 Time, Form, and Content of Notice. Within thirty (30) Days of its receipt of a decision by the Commissioner, the Contractor shall submit to the Comptroller and to the Commissioner a Notice of Claim regarding its dispute with the Agency. The Notice of Claim shall consist of (i) a brief written statement of the substance of the dispute, the amount of money, if any, claimed and the reason(s) the Contractor contends the dispute was wrongly decided by the Commissioner; (ii) a copy of the written decision of the Commissioner; and (iii) a copy of all materials submitted by the Contractor to the Agency, including the Notice of Dispute. The Contractor may not present to the Comptroller any material not presented to the Commissioner, except at the request of the Comptroller.
 - 27.5.2 Response. Within thirty (30) **Days** of receipt of the Notice of Claim, the **Agency** shall make available to the **Comptroller** a copy of all material submitted by the **Agency** to the **Commissioner** in connection with the dispute. The **Agency** may not present to the

Comptroller any material not presented to the Commissioner except at the request of the Comptroller.

- 27.5.3 Comptroller Investigation. The Comptroller may investigate the claim in dispute and, in the course of such investigation, may exercise all powers provided in Sections 7-201 and 7-203 of the Administrative Code. In addition, the Comptroller may demand of either party, and such party shall provide, whatever additional material the Comptroller deems pertinent to the claim, including original business records of the Contractor. Willful failure of the Contractor to produce within fifteen (15) Days any material requested by the Comptroller shall constitute a waiver by the Contractor of its claim. The Comptroller may also schedule an informal conference to be attended by the Contractor, Agency representatives, and any other personnel desired by the Comptroller.
- 27.5.4 Opportunity of Comptroller to Compromise or Adjust Claim. The Comptroller shall have forty-five (45) Days from his or her receipt of all materials referred to in Article 27.5.3 to investigate the disputed claim. The period for investigation and compromise may be further extended by agreement between the Contractor and the Comptroller, to a maximum of ninety (90) Days from the Comptroller's receipt of all materials. The Contractor may not present its petition to the Contract Dispute Resolution Board until the period for investigation and compromise delineated in this Article 27.5.4 has expired. In compromising or adjusting any claim hereunder, the Comptroller may not revise or disregard the terms of the Contract between the parties.
- 27.6 Contract Dispute Resolution Board. There shall be a Contract Dispute Resolution Board composed of:
 - 27.6.1 The chief administrative law judge of the Office of Administrative Trials and Hearings (OATH) or his/her designated OATH administrative law judge, who shall act as chairperson, and may adopt operational procedures and issue such orders consistent with this Article 27 as may be necessary in the execution of the Contract Dispute Resolution Board's functions, including, but not limited to, granting extensions of time to present or respond to submissions;
 - 27.6.2 The CCPO or his/her designee; any designee shall have the requisite background to consider and resolve the merits of the dispute and shall not have participated personally and substantially in the particular matter that is the subject of the dispute or report to anyone who so participated; and
 - 27.6.3 A person with appropriate expertise who is not an employee of the City. This person shall be selected by the presiding administrative law judge from a prequalified panel of individuals, established and administered by OATH with appropriate background to act as decision-makers in a dispute. Such individual may not have a contract or dispute with the City or be an officer or employee of any company or organization that does, or regularly represents persons, companies, or organizations having disputes with the City.
- 27.7 Petition to the Contract Dispute Resolution Board. In the event the claim has not been settled or adjusted by the **Comptroller** within the period provided in this Article 27, the **Contractor**, within thirty (30) **Days** thereafter, may petition the Contract Dispute Resolution Board to review the **Commissioner's** determination.
- 27.7.1 Form and Content of Petition by Contractor. The Contractor shall present its dispute to the Contract Dispute Resolution Board in the form of a petition, which shall CITY OF NEW YORK
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include (i) a brief written statement of the substance of the dispute, the amount of money, if any, claimed, and the reason(s) the **Contractor** contends the dispute was wrongly decided by the **Commissioner**; (ii) a copy of the written Decision of the **Commissioner**, (iii) copies of all materials submitted by the **Contractor** to the Agency; (iv) a copy of the written decision of the **Comptroller**, if any, and (v) copies of all correspondence with, or written material submitted by the **Contractor**, to the **Comptroller**. The **Contractor** shall concurrently submit four (4) complete sets of the Petition: one set to the **City** Corporation Counsel (Attn: Commercial and Real Estate Litigation Division) and three (3) sets to the Contract Dispute Resolution Board at OATH's offices with proof of service on the **City** Corporation Counsel. In addition, the **Contractor** shall submit a copy of the written statement of the substance of the dispute, cited in (i) above, to both the **Commissioner** and the **Comptroller**.

- 27.7.2 Agency Response. Within thirty (30) Days of its receipt of the Petition by the City Corporation Counsel, the Agency shall respond to the brief written statement of the Contractor and make available to the Contract Dispute Resolution Board all material it submitted to the Commissioner and Comptroller. Three (3) complete copies of the Agency response shall be provided to the Contract Dispute Resolution Board and one to the Contractor. Extensions of time for submittal of the Agency response shall be given as necessary upon a showing of good cause or, upon consent of the parties, for an initial period of up to thirty (30) Days.
- 27.7.3 Further Proceedings. The Contract Dispute Resolution Board shall permit the Contractor to present its case by submission of memoranda, briefs, and oral argument. The Contract Dispute Resolution Board shall also permit the Agency to present its case in response to the Contractor by submission of memoranda, briefs, and oral argument. If requested by the City Corporation Counsel, the Comptroller shall provide reasonable assistance in the preparation of the Agency's case. Neither the Contractor nor the Agency may support its case with any documentation or other material that was not considered by the Comptroller, unless requested by the Contract Dispute Resolution Board. The Contract Dispute Resolution Board, in its discretion, may seek such technical or other expert advice as it shall deem appropriate and may seek, on its own or upon application of a party, any such additional material from any party as it deems fit. The Contract Dispute Resolution Board, in its discretion, may combine more than one dispute between the parties for concurrent resolution.
- 27.7.4 Contract Dispute Resolution Board Determination. Within forty-five (45) **Days** of the conclusion of all written submissions and oral arguments, the Contract Dispute Resolution Board shall render a written decision resolving the dispute. In an unusually complex case, the Contract Dispute Resolution Board may render its decision in a longer period, not to exceed ninety (90) **Days**, and shall so advise the parties at the commencement of this period. The Contract Dispute Resolution Board's decision must be consistent with the terms of the **Contract**. Decisions of the Contract Dispute Resolution Board shall only resolve matters before the Contract Dispute Resolution Board and shall not have precedential effect with respect to matters not before the Contract Dispute Resolution Board.
- 27.7.5 Notification of Contract Dispute Resolution Board Decision. The Contract Dispute Resolution Board shall send a copy of its decision to the **Contractor**, the **ACCO**, the Engineer, the **Comptroller**, the **City** Corporation Counsel, the CCPO, and the **PPB**. A decision in favor of the **Contractor** shall be subject to the prompt payment provisions of the **PPB** Rules. The Required Payment Date shall be thirty (30) Days after the date the parties are formally notified of the Contract Dispute Resolution Board's decision.

27.7.6 Finality of Contract Dispute Resolution Board Decision. The Contract Dispute Resolution

Board's decision shall be final and binding on all parties. Any party may seek review of the Contract Dispute Resolution Board's decision solely in the form of a challenge, filed within four (4) months of the date of the Contract Dispute Resolution Board's decision, in a court of competent jurisdiction of the State of New York, County of New York pursuant to Article 78 of the Civil Practice Law and Rules. Such review by the court shall be limited to the question of whether or not the Contract Dispute Resolution Board's decision was made in violation of lawful procedure, was affected by an error of Law, or was arbitrary and capricious or an abuse of discretion. No evidence or information shall be introduced or relied upon in such proceeding that was not presented to the Contract Dispute Resolution Board in accordance with this Article 27.

Any termination, cancellation, or alleged breach of the **Contract** prior to or during the pendency of any proceedings pursuant to this Article 27 shall not affect or impair the ability of the **Commissioner** or Contract Dispute Resolution Board to make a binding and final decision pursuant to this Article 27.

ARTICLE 28. RECORD KEEPING FOR EXTRA OR DISPUTED WORK OR WORK ON A TIME & MATERIALS BASIS

- 28.1 While the Contractor or any of its Subcontractors is performing Work on a time and material basis or Extra Work on a time and material basis ordered by the Commissioner under Article 25, or where the Contractor believes that it or any of its Subcontractors is performing Extra Work but a final determination by Agency has not been made, or the Contractor or any of its Subcontractors is performing disputed Work (whether on or off the Site), or complying with a determination or order under protest in accordance with Articles 11, 27, and 30, in each such case the Contractor shall furnish the Resident Engineer daily with three (3) copies of written statements signed by the Contractor's representative at the Site showing:
 - 28.1.1 The name, trade, and number of each worker employed on such **Work** or engaged in complying with such determination or order, the number of hours employed, and the character of the **Work** each is doing; and
 - 28.1.2 The nature and quantity of any materials, plant and equipment furnished or used in connection with the performance of such **Work** or compliance with such determination or order, and from whom purchased or rented.
- 28.2 A copy of such statement will be countersigned by the **Resident Engineer**, noting thereon any items not agreed to or questioned, and will be returned to the **Contractor** within two (2) **Days** after submission.
- 28.3 The Contractor and its Subcontractors, when required by the Commissioner, or the Comptroller, shall also produce for inspection, at the office of the Contractor or Subcontractor, any and all of its books, bid documents, financial statements, vouchers, records, daily job diaries and reports, and cancelled checks, and any other documents relating to showing the nature and quantity of the labor, materials, plant and equipment actually used in the performance of such Work, or in complying with such determination or order, and the amounts expended therefor, and shall permit the Commissioner and the Comptroller to make such extracts therefrom, or copies thereof, as they or either of them may desire.
- 28.4 In connection with the examination provided for herein, the Commissioner, upon demand therefor, will produce for inspection by the Contractor such records as the Agency may have with CITY OF NEW YORK

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respect to such Extra Work or disputed Work performed under protest pursuant to order of the Commissioner, except those records and reports which may have been prepared for the purpose of determining the accuracy and validity of the Contractor's claim.

28.5 Failure to comply strictly with these requirements shall constitute a waiver of any claim for extra compensation or damages on account of the performance of such **Work** or compliance with such determination or order.

ARTICLE 29. OMITTED WORK

- 29.1 If any Contract Work in a lump sum Contract, or if any part of a lump sum item in a unit price, lump sum, or percentage-bid Contract is omitted by the Commissioner pursuant to Article 33, the Contract price, subject to audit by the EAO, shall be reduced by a pro rata portion of the lump sum bid amount based upon the percent of Work omitted subject to Article 29.4. For the purpose of determining the pro rata portion of the lump sum bid amount, the bid breakdown submitted in accordance with Article 41 shall be considered, but shall not be the determining factor.
- 29.2 If the whole of a lump sum item or units of any other item is so omitted by the **Commissioner** in a unit price, lump sum, or percentage-bid **Contract**, then no payment will be made therefor except as provided in Article 29.4.
- 29.3 For units that have been ordered but are only partially completed, the unit price shall be reduced by a pro rata portion of the unit price bid based upon the percentage of **Work** omitted subject to Article 29.4.
- 29.4 In the event the **Contractor**, with respect to any omitted **Work**, has purchased any non-cancelable material and/or equipment that is not capable of use except in the performance of this **Contract** and has been specifically fabricated for the sole purpose of this **Contract**, but not yet incorporated into the **Work**, the **Contractor** shall be paid for such material and/or equipment in accordance with Article 64.2.1(b); provided, however, such payment is contingent upon the **Contractor's** delivery of such material and/or equipment in acceptable condition to a location designated by the **City**.
- 29.5 The Contractor agrees to make no claim for damages or for loss of overhead and profit with regard to any omitted Work.

ARTICLE 30. NOTICE AND DOCUMENTATION OF COSTS AND DAMAGES; PRODUCTION OF FINANCIAL RECORDS

30.1 If the Contractor shall claim to be sustaining damages by reason of any act or omission of the City or its agents, it shall submit to the Commissioner within forty-five (45) Days from the time such damages are first incurred, and every thirty (30) Days thereafter 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 strictly comply with the foregoing provisions, such claims shall be deemed waived and no right to recover on such claims shall exist. Damages that the Contractor may claim in any action or dispute resolution procedure arising under or by reason of this Contract shall not be different from or in excess of the statements and documentation made pursuant to this Article 30.

- 30.2 In addition to the foregoing statements, the Contractor shall, upon notice from the Commissioner, produce for examination at the Contractor's office, by the Engineer, Architect or Project Manager, all of its books of account, bills, invoices, payrolls, subcontracts, time books, daily reports, bank deposit books, bank statements, check books, and cancelled checks, showing all of its acts and transactions in connection with or relating to or arising by reason of this Contract, and submit itself and persons in its employment, for examination under oath by any person designated by the Commissioner or Comptroller to investigate claims made or disputes against the City under this Contract. At such examination, a duly authorized representative of the Contractor may be present.
- 30.3 In addition to the statements required under Article 28 and this Article 30, the Contractor and/or its Subcontractor shall, within thirty (30) Days upon notice from the Commissioner or Comptroller, produce for examination at the Contractor's and/or Subcontractor's office, by a representative of either the Commissioner or Comptroller, all of its books of account, bid documents, financial statements, accountant workpapers, bills, invoices, payrolls, subcontracts, time books, daily reports, bank deposit books, bank statements, check books, and cancelled checks, showing all of its acts and transactions in connection with or relating to or arising by reason of this Contract. Further, the Contractor and/or its Subcontractor shall submit any person in its employment, for examination under oath by any person designated by the Commissioner or Comptroller to investigate claims made or disputes against the City under this Contract. At such examination, a duly authorized representative of the Contractor may be present.
- 30.4 Unless the information and examination required under Article 30.3 is provided by the Contractor and/or its Subcontractor upon thirty (30) Days' notice from the Commissioner or Comptroller, or upon the Commissioner's or Comptroller's written authorization to extend the time to comply, the City shall be released from all claims arising under, relating to or by reason of this Contract, except for sums certified by the Commissioner to be due under the provisions of this Contract. It is further stipulated and agreed that no person has the power to waive any of the foregoing provisions and that in any action or dispute resolution procedure against the City to recover any sum in excess of the sums certified by the Commissioner to be due under or by reason of this Contract, the Contractor must allege in its complaint and prove, at trial or during such dispute resolution procedure, compliance with the provisions of this Article 30.
- 30.5 In addition, after the commencement of any action or dispute resolution procedure by the Contractor arising under or by reason of this Contract, the City shall have the right to require the Contractor to produce for examination under oath, up until the trial of the action or hearing before the Contract Dispute Resolution Board, the books and documents described in Article 30.3 and submit itself and all persons in its employ for examination under oath. If this Article 30 is not complied with as required, then the Contractor hereby consents to the dismissal of the action or dispute resolution procedure.

CHAPTER VII POWERS OF THE RESIDENT ENGINEER; THE ENGINEER OR ARCHITECT AND THE COMMISSIONER

ARTICLE 31. THE RESIDENT ENGINEER

31.1 The **Resident Engineer** shall have the power to inspect, supervise, and control the performance of the **Work**, subject to review by the **Commissioner**. The **Resident Engineer** shall not, however, have the power to issue an **Extra Work** order, except as specifically designated in writing by the **Commissioner**.

ARTICLE 32. THE ENGINEER OR ARCHITECT OR PROJECT MANAGER

- 32.1 The Engineer or Architect or Project Manager, in addition to those matters elsewhere herein delegated to the Engineer and expressly made subject to his/her determination, direction or approval, shall have the power, subject to review by the Commissioner:
 - 32.1.1 To determine the amount, quality, and location of the Work to be paid for hereunder; and
 - 32.1.2 To determine all questions in relation to the Work, to interpret the Contract Drawings, Specifications, and Addenda, and to resolve all patent inconsistencies or ambiguities therein; and
 - 32.1.3 To determine how the Work of this Contract shall be coordinated with Work of Other Contractors engaged simultaneously on this Project, including the power to suspend any part of the Work, but not the whole thereof; and
 - 32.1.4 To make minor changes in the **Work** as he/she deems necessary, provided such changes do not result in a net change in the cost to the **City** or to the **Contractor** of the **Work** to be done under the **Contract**; and
 - 32.1.5 To amplify the Contract Drawings, add explanatory information and furnish additional Specifications and drawings, consistent with this Contract.
- 32.2 The foregoing enumeration shall not imply any limitation upon the power of the Engineer or Architect or Project Manager, for it is the intent of this Contract that all of the Work shall generally be subject to his/her determination, direction, and approval, except where the determination, direction or approval of someone other than the Engineer or Architect or Project Manager is expressly called for herein.
- 32.3 The Engineer or Architect or Project Manager shall not, however, have the power to issue an Extra Work order, except as specifically designated in writing by the Commissioner.

ARTICLE 33. THE COMMISSIONER

- 33.1 The **Commissioner**, in addition to those matters elsewhere herein expressly made subject to his/her determination, direction or approval, shall have the power:
 - 33.1.1 To review and make determinations on any and all questions in relation to this **Contract** and its performance; and
 - 33.1.2 To modify or change this **Contract** so as to require the performance of **Extra Work** (subject, however, to the limitations specified in Article 25) or the omission of **Contract Work**; and
 - 33.1.3 To suspend the whole or any part of the **Work** whenever in his/her judgment such suspension is required:
 - 33.1.3(a) In the interest of the City generally; or

- 33.1.3(b) To coordinate the **Work** of the various contractors engaged on this **Project** pursuant to the provisions of Article 12; or
- 33.1.3(c) To expedite the completion of the entire **Project** even though the completion of this particular **Contract** may thereby be delayed.

ARTICLE 34. NO ESTOPPEL

- 34.1 Neither the City nor any Agency, official, agent or employee thereof, shall be bound, precluded or estopped by any determination, decision, approval, order, letter, payment or certificate made or given under or in connection with this Contract by the City, the Commissioner, the Engineer, the Resident Engineer, or any other official, agent or employee of the City, either before or after the final completion and acceptance of the Work and payment therefor:
 - 34.1.1 From showing the true and correct classification, amount, quality or character of the **Work** actually done; or that any such determination, decision, order, letter, payment or certificate was untrue, incorrect or improperly made in any particular, or that the **Work**, or any part thereof, does not in fact conform to the requirements of this **Contract**; and
 - 34.1.2 From demanding and recovering from the Contractor any overpayment made to it, or such damages as the City may sustain by reason of the Contractor's failure to perform each and every part of its Contract.

CHAPTER VIII LABOR PROVISIONS

ARTICLE 35. EMPLOYEES

- 35.1 The Contractor and its Subcontractors shall not employ on the Work:
 - 35.1.1 Anyone who is not competent, faithful and skilled in the **Work** for which he/she shall be employed; and whenever the **Commissioner** shall inform the **Contractor**, in writing, that any employee is, in his/her opinion, incompetent, unfaithful or disobedient, that employee shall be discharged from the **Work** forthwith, and shall not again be employed upon it; or
 - 35.1.2 Any labor, materials or means whose employment, or utilization during the course of this Contract, may tend to or in any way cause or result in strikes, work stoppages, delays, suspension of Work or similar troubles by workers employed by the Contractor or its Subcontractors, or by any of the trades working in or about the buildings and premises where Work is being performed under this Contract, or by Other Contractors or their Subcontractors pursuant to other contracts, or on any other building or premises owned or operated by the City, its Agencies, departments, boards or authorities. Any violation by the Contractor of this requirement may, upon certification of the Commissioner, be considered as proper and sufficient cause for declaring the Contractor to be in default, and for the City to take action against it as set forth in Chapter X of this Contract, or such other article of this Contract as the Commissioner may deem proper; or
- 35.1.3 In accordance with Section 220.3-e of the Labor Law of the State of New York (hereinafter "Labor Law"), the Contractor and its Subcontractors shall not employ on the Work any apprentice, unless he/she is a registered individual, under a bona fide program CITY OF NEW YORK

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registered with the New York State Department of Labor. The allowable ratio of apprentices to journey-level workers in any craft classification shall not be greater than the ratio permitted to the **Contractor** as to its work force on any job under the registered program. Any employee listed on a payroll at an apprentice wage rate, who is not registered as above, shall be paid the wage rate determined by the **Comptroller** of the **City** for the classification of **Work** actually performed. The **Contractor** or **Subcontractor** will be required to furnish written evidence of the registration of its program and apprentices as well as all the appropriate ratios and wage rates, for the area of the construction prior to using any apprentices on the **Contract Work**.

- 35.2 If the total cost of the **Work** under this **Contract** is at least two hundred fifty thousand (\$250,000) dollars, all laborers, workers, and mechanics employed in the performance of the **Contract** on the public work site, either by the **Contractor**, **Subcontractor** or other person doing or contracting to do the whole or a part of the **Work** contemplated by the **Contract**, shall be certified prior to performing any **Work** as having successfully completed a course in construction safety and health approved by the United States Department of Labor's Occupational Safety and Health Administration that is at least ten (10) hours in duration.
- 35.3 In accordance with Local Law Nos. 30-2012 and 33-2012, codified at sections 6-132 and 12-113 of the Administrative Code, respectively,
 - 35.3.1 The Contractor shall not take an adverse personnel action with respect to an officer or employee in retaliation for such officer or employee making a report of information concerning conduct which such officer or employee knows or reasonably believes to involve corruption, criminal activity, conflict of interest, gross mismanagement or abuse of authority by any officer or employee relating to this Contract to (a) the Commissioner of the Department of Investigation, (b) a member of the New York City Council, the Public Advocate, or the Comptroller, or (c) the CCPO, ACCO, Agency head, or Commissioner.
 - 35.3.2 If any of the **Contractor**'s officers or employees believes that he or she has been the subject of an adverse personnel action in violation of Article 35.3.1, he or she shall be entitled to bring a cause of action against the **Contractor** to recover all relief necessary to make him or her whole. Such relief may include but is not limited to: (a) an injunction to restrain continued retaliation, (b) reinstatement to the position such employee would have had but for the retaliation or to an equivalent position, (c) reinstatement of full fringe benefits and seniority rights, (d) payment of two times back pay, plus interest, and (e) compensation for any special damages sustained as a result of the retaliation, including litigation costs and reasonable attorney's fees.
 - 35.3.3 The **Contractor** shall post a notice provided by the **City** in a prominent and accessible place on any site where work pursuant to the **Contract** is performed that contains information about:
 - 35.3.3(a) how its employees can report to the New York City Department of Investigation allegations of fraud, false claims, criminality or corruption arising out of or in connection with the **Contract**; and
 - 35.3.3(b) the rights and remedies afforded to its employees under Administrative Code sections 7-805 (the New York City False Claims Act) and 12-113 (the Whistleblower Protection Expansion Act) for lawful acts taken in connection with the reporting of allegations of fraud, false claims, criminality or corruption in connection with the Contract.

- 35.3.4 For the purposes of this Article 35.3, "adverse personnel action" includes dismissal, demotion, suspension, disciplinary action, negative performance evaluation, any action resulting in loss of staff, office space, equipment or other benefit, failure to appoint, failure to promote, or any transfer or assignment or failure to transfer or assign against the wishes of the affected officer or employee.
- 35.3.5 This Article 35.3 is applicable to all of the **Contractor**'s **Subcontractors** having subcontracts with a value in excess of \$100,000; accordingly, the **Contractor** shall include this rider in all subcontracts with a value a value in excess of \$100,000.
- 35.4 Article 35.3 is not applicable to this **Contract** if it is valued at \$100,000 or less. Articles 35.3.1, 35.3.2, 35.3.4, and 35.3.5 are not applicable to this **Contract** if it was solicited pursuant to a finding of an emergency.

ARTICLE 36. NO DISCRIMINATION

- 36.1 The Contractor specifically agrees, as required by Labor Law Section 220-e, as amended, that:
 - 36.1.1 In the hiring of employees for the performance of Work under this Contract or any subcontract hereunder, neither the Contractor, Subcontractor, nor any person acting on behalf of such Contractor or Subcontractor, shall by reason of race, creed, color or national origin discriminate against any citizen of the State of New York who is qualified and available to perform the Work to which the employment relates;
 - 36.1.2 Neither the Contractor, Subcontractor, nor any person on its behalf shall, in any manner, discriminate against or intimidate any employee hired for the performance of Work under this Contract on account of race, creed, color or national origin;
 - 36.1.3 There may be deducted from the amount payable to the Contractor by the City under this Contract a penalty of fifty (\$50.00) dollars for each person for each Day during which such person was discriminated against or intimidated in violation of the provisions of this Contract; and
 - 36.1.4 This Contract may be cancelled or terminated by the City and all moneys due or to become due hereunder may be forfeited, for a second or any subsequent violation of the terms or conditions of this Article 36.
 - 36.1.5 This Article 36 covers all construction, alteration and repair of any public building or public work occurring in the State of New York and the manufacture, sale, and distribution of materials, equipment, and supplies to the extent that such operations are performed within the State of New York pursuant to this **Contract**.
- 36.2 The Contractor specifically agrees, as required by Section 6-108 of the Administrative Code, as amended, that:
 - 36.2.1 It shall be unlawful for any person engaged in the construction, alteration or repair of buildings or engaged in the construction or repair of streets or highways pursuant to a **Contract** with the **City** or engaged in the manufacture, sale or distribution of materials, equipment or supplies pursuant to a **Contract** with the **City** to refuse to employ or to refuse to continue in any employment any person on account of the race, color or creed of such person.

- 36.2.2 It shall be unlawful for any person or any servant, agent or employee of any person, described in Article 36.1.2, to ask, indicate or transmit, orally or in writing, directly or indirectly, the race, color or creed or religious affiliation of any person employed or seeking employment from such person, firm or corporation.
- 36.2.3 Breach of the foregoing provisions shall be deemed a violation of a material provision of this **Contract**.
- 36.2.4 Any person, or the employee, manager or owner of or officer of such firm or corporation who shall violate any of the provisions of this Article 36.2 shall, upon conviction thereof, be punished by a fine of not more than one hundred (\$100.00) dollars or by imprisonment for not more than thirty (30) **Days**, or both.
- 36.3 This Contract is subject to the requirements of Executive Order No. 50 (1980) ("E.O. 50"), as revised, and the rules and regulations promulgated thereunder. No contract will be awarded unless and until these requirements have been complied with in their entirety. By signing this Contract, the Contractor agrees that it:
 - 36.3.1 Will not engage in any unlawful discrimination against any employee or applicant for employment because of race, creed, color, national origin, sex, age, disability, marital status or sexual orientation with respect to all employment decisions including, but not limited to, recruitment, hiring, upgrading, demotion, downgrading, transfer, training, rates of pay or other forms of compensation, layoff, termination, and all other terms and conditions of employment; and
 - 36.3.2 Will not engage in any unlawful discrimination in the selection of **Subcontractors** on the basis of the owner's race, color, creed, national origin, sex, age, disability, marital status or sexual orientation; and
 - 36.3.3 Will state in all solicitations or advertisements for employees placed by or on behalf of the **Contractor** that all qualified applicants will receive consideration for employment without unlawful discrimination based on race, creed, color, national origin, sex, age, citizens status, disability, marital status, sexual orientation, or that it is an equal employment opportunity employer; and
 - 36.3.4 Will send to each labor organization or representative of workers with which it has a collective bargaining agreement or other contract or memorandum of understanding, written notification of its equal employment opportunity commitments under E.O. 50 and the rules and regulations promulgated thereunder; and
 - 36.3.5 Will furnish, before the award of the Contract, all information and reports, including an employment report, that are required by E.O. 50, the rules and regulations promulgated thereunder, and orders of the City Department of Business Services, Division of Labor Services (DLS) and will permit access to its books, records, and accounts by the DLS for the purposes of investigation to ascertain compliance with such rules, regulations, and orders.
- 36.4 The Contractor understands that in the event of its noncompliance with the nondiscrimination clauses of this Contract or with any of such rules, regulations, or orders, such noncompliance shall constitute a material breach of this Contract and noncompliance with E.O. 50 and the rules and regulations promulgated thereunder. After a hearing held pursuant to the rules of the DLS, the Director of the DLS may direct the Commissioner to impose any or all of the following sanctions:

- 36.4.1 Disapproval of the Contractor; and/or
- 36.4.2 Suspension or termination of the Contract; and/or
- 36.4.3 Declaring the Contractor in default; and/or
- 36.4.4 In lieu of any of the foregoing sanctions, the Director of the **DLS** may impose an employment program.

In addition to any actions taken under this **Contract**, failure to comply with E.O. 50 and the rules and regulations promulgated thereunder, in one or more instances, may result in a **City Agency** declaring the **Contractor** to be non-responsible in future procurements. The **Contractor** further agrees that it will refrain from entering into any **Contract** or **Contract** modification subject to E.O. 50 and the rules and regulations promulgated thereunder with a **Subcontractor** who is not in compliance with the requirements of E.O. 50 and the rules and regulations promulgated thereunder.

- 36.5 The Contractor specifically agrees, as required by Section 6-123 of the Administrative Code, that:
 - 36.5.1 The **Contractor** will not engage in any unlawful discriminatory practice in violation of Title 8 of the Administrative Code; and
 - 36.5.2 Any failure to comply with this Article 36.5 may subject the **Contractor** to the remedies set forth in Section 6-123 of the Administrative Code, including, where appropriate, sanctions such as withholding of payment, imposition of an employment program, finding the **Contractor** to be in default, cancellation of the **Contract**, or any other sanction or remedy provided by **Law** or **Contract**.

ARTICLE 37. LABOR LAW REQUIREMENTS

- 37.1 The **Contractor** shall strictly comply with all applicable provisions of the Labor Law, as amended. Such compliance is a material term of this **Contract**.
- 37.2 The Contractor specifically agrees, as required by Labor Law Sections 220 and 220-d, as amended, that:
 - 37.2.1 Hours of Work: No laborer, worker, or mechanic in the employ of the Contractor, Subcontractor or other person doing or contracting to do the whole or a part of the Work contemplated by this Contract shall be permitted or required to work more than eight (8) hours in any one (1) Day, or more than five (5) Days in any one (1) week, except as provided in the Labor Law and in cases of extraordinary emergency including fire, flood, or danger to life or property, or in the case of national emergency when so proclaimed by the President of the United States of America.
 - 37.2.2 In situations in which there are not sufficient laborers, workers, and mechanics who may be employed to carry on expeditiously the **Work** contemplated by this **Contract** as a result of such restrictions upon the number of hours and **Days** of labor, and the immediate commencement or prosecution or completion without undue delay of the **Work** is necessary for the preservation of the **Site** and/or for the protection of the life and limb of the persons using the same, such laborers, workers, and mechanics shall be permitted or required to

work more than eight (8) hours in any one (1) **Day**; or five (5) **Days** in any one (1) week; provided, however, that upon application of any **Contractor**, the **Commissioner** shall have first certified to the Commissioner of Labor of the State of New York (hereinafter "Commissioner of Labor") that such public **Work** is of an important nature and that a delay in carrying it to completion would result in serious disadvantage to the public; and provided, further, that such Commissioner of Labor shall have determined that such an emergency does in fact exist as provided in Labor Law Section 220.2.

- 37.2.3 Failure of the **Commissioner** to make such a certification to the Commissioner of Labor shall not entitle the **Contractor** to damages for delay or for any cause whatsoever.
- 37.2.4 Prevailing Rate of Wages: The wages to be paid for a legal day's **Work** to laborers, workers, or mechanics employed upon the **Work** contemplated by this **Contract** or upon any materials to be used thereon shall not be less than the "prevailing rate of wage" as defined in Labor Law Section 220, and as fixed by the **Comptroller** in the attached Schedule of Wage Rates and in updated schedules thereof. The prevailing wage rates and supplemental benefits to be paid are those in effect at the time the **Work** is being performed.
- 37.2.5 Requests for interpretation or correction in the Information for Bidders includes all requests for clarification of the classification of trades to be employed in the performance of the Work under this Contract. In the event that a trade not listed in the Contract is in fact employed during the performance of this Contract, the Contractor shall be required to obtain from the Agency the prevailing wage rates and supplementary benefits for the trades used and to complete the performance of this Contract at the price at which the Contract was awarded.
- 37.2.6 Minimum Wages: Except for employees whose wage is required to be fixed pursuant to Labor Law Section 220, all persons employed by the **Contractor** and any **Subcontractor** in the manufacture or furnishing of the supplies, materials, or equipment, or the furnishing of work, labor, or services, used in the performance of this **Contract**, shall be paid, without subsequent deduction or rebate unless expressly authorized by **Law**, not less than the sum mandated by **Law**.
- 37.3 Working Conditions: No part of the **Work**, labor or services shall be performed or rendered by the **Contractor** in any plants, factories, buildings or surroundings or under working conditions which are unsanitary or hazardous or dangerous to the health and safety of employees engaged in the performance of this **Contract**. Compliance with the safety, sanitary, and factory inspection **Laws** of the state in which the **Work** is to be performed shall be prima facie evidence of compliance with this Article 37.3.
- 37.4 Prevailing Wage Enforcement: The Contractor agrees to pay for all costs incurred by the City in enforcing prevailing wage requirements, including the cost of any investigation conducted by or on behalf of the Agency or the Comptroller, where the City discovers a failure to comply with any of the requirements of this Article 37 by the Contractor or its Subcontractor(s). The Contractor also agrees that, should it fail or refuse to pay for any such investigation, the Agency is hereby authorized to deduct from a Contractor's account an amount equal to the cost of such investigation.
 - 37.4.1 The Labor Law Section 220 and Section 220-d, as amended, provide that this **Contract** shall be forfeited and no sum paid for any **Work** done hereunder on a second conviction for willfully paying less than:
 - 37.4.1(a) The stipulated prevailing wage scale as provided in Labor Law section 220, as amended, or

- 37.4.1(b) The stipulated minimum hourly wage scale as provided in Labor Law section 220-d, as amended.
- 37.4.2 For any breach or violation of either working conditions (Article 37.3) or minimum wages (Article 37.2.6) provisions, the party responsible therefor shall be liable to the City for liquidated damages, which may be withheld from any amounts due on any contracts with the City of such party responsible, or may be recovered in actions brought by the City Corporation Counsel in the name of the City, in addition to damages for any other breach of this Contract, for a sum equal to the amount of any underpayment of wages due to any employee engaged in the performance of this Contract. In addition, the Commissioner shall have the right to cancel contracts and enter into other contracts for the completion of the original contract, with or without public letting, and the original Contractor shall be liable for any additional cost. All sums withheld or recovered as deductions, rebates, refunds, or underpayment of wages hereunder, shall be held in a special deposit account and shall be paid without interest, on order of the Comptroller, directly to the employees who have been paid less than minimum rates of pay as set forth herein and on whose account such sums were withheld or recovered, provided that no claims by employees for such payments shall be entertained unless made within two (2) years from the date of actual notice to the Contractor of the withholding or recovery of such sums by the City.
- 37.4.3 A determination by the **Comptroller** that a **Contractor** and/or its **Subcontractor** willfully violated Labor Law Section 220 will be forwarded to the **City's** five District Attorneys for review.
- 37.4.4 The Contractor's or Subcontractor's noncompliance with this Article 37.4 and Labor Law Section 220 may result in an unsatisfactory performance evaluation and the Comptroller may also find and determine that the Contractor or Subcontractor willfully violated the New York Labor Law.
 - 37.4.4(a) An unsatisfactory performance evaluation for noncompliance with this Article 37.4 may result in a determination that the **Contractor** is a non-responsible bidder on subsequent procurements with the **City** and thus a rejection of a future award of a contract with the **City**, as well as any other sanctions provided for by **Law**.
 - 37.4.4(b) Labor Law Section 220-b, as amended, provides that when two (2) final determinations have been rendered against a Contractor or Subcontractor within any consecutive six (6) year period determining that such Contractor or Subcontractor has willfully failed to pay the prevailing rate of wages or to provide supplements in accordance with the Labor Law and this Article 37.4, whether such failures were concurrent or consecutive and whether or not such final determinations concerning separate public works projects are rendered simultaneously, such Contractor or Subcontractor shall be ineligible to submit a bid on or be awarded any public works contract with the City for a period of five (5) years from the second final determination. If the final determination involves the falsification of payroll records or the kickback of wages or supplements, the Contractor or Subcontractor shall be ineligible to submit a bid on or be awarded any public works contract with the City for a period of five (5) years from the first final determination.
 - 37.4.4(c) Labor Law Section 220, as amended, provides that the **Contractor** or **Subcontractor** found to have violated this Article 37.4 may be directed to make payment of wages or supplements including interest found to be due, and the **Contractor** or **Subcontractor** may be directed to make payment of a further sum as

a civil penalty in an amount not exceeding twenty-five (25%) percent of the total amount found to be due.

37.5 The Contractor and its Subcontractors shall within ten (10) Days after mailing of a Notice of Award or written order, post in prominent and conspicuous places in each and every plant, factory, building, and structure where employees of the Contractor and its Subcontractors engaged in the performance of this Contract are employed, notices furnished by the City, in relation to prevailing wages and supplements, minimum wages, and other stipulations contained in Sections 220 and 220-h of the Labor Law, and the Contractor and its Subcontractors shall continue to keep such notices posted in such prominent and conspicuous places until Final Acceptance of the supplies, materials, equipment, or Work, labor, or services required to be furnished or rendered under this Contract.

37.6 The **Contractor** shall strictly comply with all of the provisions of Articles 37.6.1 through 37.6.5, and provide for all workers, laborers or mechanics in its employ, the following:

37.6.1 Notices Posted At Site: Post, in a location designated by the City, schedules of prevailing wages and supplements for this **Project**, a copy of all re-determinations of such schedules for the **Project**, the Workers' Compensation **Law** Section 51 notice, all other notices required by **Law** to be posted at the **Site**, the City notice that this **Project** is a public works project on which each worker is entitled to receive the prevailing wages and supplements for the occupation at which he or she is working, and all other notices which the City directs the Contractor to post. The Contractor shall provide a surface for such notices which is satisfactory to the City. The Contractor shall maintain and keep current such notices in a legible manner and shall replace any notice or schedule which is damaged, defaced, illegible or removed for any reason. The Contractor shall post such notices before commencing any **Work** on the **Site** and shall maintain such notices until all **Work** on the **Site** is complete; and

37.6.2 Daily Site Sign-in Sheets: Maintain daily Site sign-in sheets, and require that Subcontractors maintain daily Site sign-in sheets for its employees, which include blank spaces for an employee's name to be both printed and signed, job title, date started and Social Security number, the time the employee began work and the time the employee left work, until Final Acceptance of the supplies, materials, equipment, or Work, labor, or services to be furnished or rendered under this Contract unless exception is granted by the Comptroller upon application by the Agency. In the alternative, subject to the approval of the CCPO, the Contractor and Subcontractor may maintain an electronic or biometric sign-in system, which provides the information required by this Article 37.6.2; and

37.6.3 Individual Employee Information Notices: Distribute a notice to each worker, laborer or mechanic employed under this Contract, in a form provided by the Agency, that this Project is a public works project on which each worker, laborer or mechanic is entitled to receive the prevailing rate of wages and supplements for the occupation at which he or she is working. If the total cost of the Work under this Contract is at least two hundred fifty thousand (\$250,000) dollars, such notice shall also include a statement that each worker, laborer or mechanic must be certified prior to performing any Work as having successfully completed a course in construction safety and health approved by the United States Department of Labor's Occupational Safety and Health Administration that is at least ten (10) hours in duration. Such notice shall be distributed to each worker before he or she starts performing any Work of this Contract and with the first paycheck after July first of each year. "Worker, laborer or mechanic" includes employees of the Contractor and all Subcontractors and all employees of suppliers entering the Site. At the time of distribution, the Contractor shall have each worker, laborer or mechanic sign a statement, in a form provided by the Agency, certifying that the worker has received the notice required by this

Article 37.6.3, which signed statement shall be maintained with the payroll records required by this **Contract**; and

- 37.6.3(a) The **Contractor** and each **Subcontractor** shall notify each worker, laborer or mechanic employed under this **Contract** in writing of the prevailing rate of wages for their particular job classification. Such notification shall be given to every worker, laborer, and mechanic on their first pay stub and with every pay stub thereafter; and
- 37.6.4 Site Laminated Identification Badges: The Contractor shall provide laminated identification badges which include a photograph of the worker's, laborer's or mechanic's face and indicate the worker's, laborer's or mechanic's name, trade, employer's name, and employment starting date (month/day/year). Further, the Contractor shall require as a condition of employment on the Site, that each and every worker, laborer or mechanic wear the laminated identification badge at all times and that it may be seen by any representative of the City. The Commissioner may grant a written waiver from the requirement that the laminated identification badge include a photograph if the Contractor demonstrates that the identity of an individual wearing a laminated identification badge can be easily verified by another method; and
- 37.6.5 Language Other Than English Used On Site: Provide the ACCO notice when three (3) or more employees (worker and/or laborer and/or mechanic) on the Site, at any time, speak a language other than English. The ACCO will then provide the Contractor the notices described in Article 37.6.1 in that language or languages as may be required. The Contractor is responsible for all distributions under this Article 37; and
- 37.6.6 Provision of Records: The Contractor and Subcontractor(s) shall produce within five (5) Days on the Site of the Work and upon a written order of the Engineer, the Commissioner, the ACCO, the Agency EAO, or the Comptroller, such records as are required to be kept by this Article 37.6; and
- 37.6.7 The **Contractor** and **Subcontractor(s)** shall pay employees by check or direct deposit. If this **Contract** is for an amount greater than one million (\$1,000,000) dollars, checks issued by the **Contractor** to covered employees shall be generated by a payroll service or automated payroll system (an in-house system may be used if approved by the **Agency**). For any subcontract for an amount greater than seven hundred fifty thousand (\$750,000) dollars, checks issued by a **Subcontractor** to covered employees shall be generated by a payroll service or automated payroll system (an in-house system may be used if approved by the **Agency**); and
- 37.6.8 The failure of the **Contractor** or **Subcontractor**(s) to comply with the provisions of Articles 37.6.1 through 37.6.7 may result in the **Commissioner** declaring the **Contractor** in default and/or the withholding of payments otherwise due under the **Contract**.
- 37.7 The Contractor and its Subcontractors shall keep such employment and payroll records as are required by Section 220 of the Labor Law. The failure of the Contractor or Subcontractor(s) to comply with the provisions of this Article 37.7 may result in the Commissioner declaring the Contractor in default and/or the withholding of payments otherwise due under the Contract.
- 37.8 At the time the **Contractor** makes application for each partial payment and for final payment, the **Contractor** shall submit to the **Commissioner** a written payroll certification, in the form provided by this **Contract**, of compliance with the prevailing wage, minimum wage, and other provisions and stipulations required by Labor Law Section 220 and of compliance with the training requirements of CITY OF NEW YORK

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Labor Law Section 220-h set forth in Article 35.2. This certification of compliance shall be a condition precedent to payment and no payment shall be made to the **Contractor** unless and until each such certification shall have been submitted to and received by the **Commissioner**.

- 37.9 This Contract is executed by the Contractor with the express warranty and representation that the Contractor is not disqualified under the provisions of Section 220 of the Labor Law from the award of the Contract.
- 37.10 Any breach or violation of any of the foregoing shall be deemed a breach or violation of a material provision of this **Contract**, and grounds for cancellation thereof by the **City**.

ARTICLE 38. PAYROLL REPORTS

- 38.1 The Contractor and its Subcontractor(s) shall maintain on the Site during the performance of the Work the original payrolls or transcripts thereof which the Contractor and its Subcontractor(s) are required to maintain and shall submit such original payrolls or transcripts, subscribed and affirmed by it as true, within thirty (30) Days after issuance of its first payroll, and every thirty (30) Days thereafter, pursuant to Labor Law Section 220(3-a)(a)(iii). The Contractor and Subcontractor(s) shall submit such original payrolls or transcripts along with each and every payment requisition. If payment requisitions are not submitted at least once a month, the Contractor and its Subcontractor(s) shall submit original payrolls and transcripts both along with its payment requisitions and independently of its payment requisitions.
- 38.2 The Contractor shall maintain payrolls or transcripts thereof for six (6) years from the date of completion of the Work on this Contract. If such payrolls and transcripts are maintained outside of New York City after the completion of the Work and their production is required pursuant to this Article 38, the Contractor shall produce such records in New York City upon request by the City.
- 38.3 The Contractor and Subcontractor(s) shall comply with any written order, direction, or request made by the Engineer, the Commissioner, the ACCO, the Agency EAO, the Agency Labor Law Investigator(s), or the Comptroller, to provide to the requesting party any of the following information and/or records within five (5) Days of such written order, direction, or request:
 - 38.3.1 Such original payrolls or transcripts thereof subscribed and affirmed by it as true and the statements signed by each worker pursuant to this Chapter VIII; and/or
 - 38.3.2 Attendance sheets for each **Day** on which any employee of the **Contractor** and/or any of the **Subcontractor(s)** performed **Work** on the **Site**, which attendance sheet shall be in a form acceptable to the **Agency** and shall provide information acceptable to the **Agency** to identify each such employee; and/or
 - 38.3.3 Any other information to satisfy the Engineer, the Commissioner, the ACCO, the Agency EAO, the Agency Labor Law Investigator(s) or the Comptroller, that this Chapter VIII and the Labor Law, as to the hours of employment and prevailing rates of wages and/or supplemental benefits, are being observed.
- 38.4 The failure of the **Contractor** or **Subcontractor(s)** to comply with the provisions of Articles 38.1 and/or 38.2 may result in the **Commissioner** declaring the **Contractor** in default and/or the withholding of payments otherwise due under the **Contract**.

ARTICLE 39. DUST HAZARDS

39.1 Should a harmful dust hazard be created in performing the **Work** of this **Contract**, for the elimination of which appliances or methods have been approved by the Board of Standards and Appeals of the City of New York, such appliances and methods shall be installed, maintained, and effectively operated during the continuance of such harmful dust hazard. Failure to comply with this provision after notice shall make this **Contract** voidable at the sole discretion of the **City**.

CHAPTER IX PARTIAL AND FINAL PAYMENTS

ARTICLE 40. CONTRACT PRICE

40.1 The City shall pay, and the Contractor agrees to accept, in full consideration for the Contractor's performance of the Work subject to the terms and conditions hereof, the lump sum price or unit prices for which this Contract was awarded, plus the amount required to be paid for any Extra Work ordered by the Commissioner under Article 25, less credit for any Work omitted pursuant to Article 29.

ARTICLE 41. BID BREAKDOWN ON LUMP SUM

- 41.1 Within fifteen (15) Days after the commencement date specified in the Notice to Proceed or Order to Work, unless otherwise directed by the Resident Engineer, the Contractor shall submit to the Resident Engineer a breakdown of its bid price, or of lump sums bid for items of the Contract, showing the various operations to be performed under the Contract, as directed in the progress schedule required under Article 9, and the value of each of such operations, the total of such items to equal the lump sum price bid. Said breakdown must be approved in writing by the Resident Engineer.
- 41.2 No partial payment will be approved until the **Contractor** submits a bid breakdown that is acceptable to the **Resident Engineer**.
- 41.3 The Contractor shall also submit such other information relating to the bid breakdown as directed by the Resident Engineer. Thereafter, the breakdown may be used only for checking the Contractor's applications for partial payments hereunder, but shall not be binding upon the City, the Commissioner, or the Engineer for any purpose whatsoever.

ARTICLE 42. PARTIAL PAYMENTS

- 42.1 From time to time as the **Work** progresses satisfactorily, but not more often than once each calendar month (except where the **Commissioner** approves in writing the submission of invoices on a more frequent basis and for invoices relating to **Work** performed pursuant to a change order), the **Contractor** may submit to the **Engineer** a requisition for a partial payment in the prescribed form, which shall contain an estimate of the quantity and the fair value of the **Work** done during the payment period.
- 42.2 Partial payments may be made for materials, fixtures, and equipment in advance of their actual incorporation in the **Work**, as the **Commissioner** may approve, and upon the terms and conditions set forth in the General Conditions.

- 42.3 The **Contractor** shall also submit to the **Commissioner** in connection with every application for partial payment a verified statement in the form prescribed by the **Comptroller** setting forth the information required under Labor Law Section 220-a.
- 42.4 Within thirty (30) **Days** after receipt of a satisfactory payment application, and within sixty (60) **Days** after receipt of a satisfactory payment application in relation to **Work** performed pursuant to a change order, the **Engineer** will prepare and certify, and the **Commissioner** will approve, a voucher for a partial payment in the amount of such approved estimate, less any and all deductions authorized to be made by the **Commissioner** under the terms of this **Contract** or by **Law**.

ARTICLE 43. PROMPT PAYMENT

- 43.1 The Prompt Payment provisions of the **PPB** Rules in effect at the time of the bid will be applicable to payments made under this **Contract**. The provisions require the payment to the **Contractor** of interest on payments made after the required payment date, except as set forth in the **PPB** Rules.
- 43.2 The **Contractor** shall submit a proper invoice to receive payment, except where the **Contract** provides that the **Contractor** will be paid at predetermined intervals without having to submit an invoice for each scheduled payment.
 - 43.3 Determination of interest due will be made in accordance with the PPB Rules.
- 43.4 If the **Contractor** is paid interest, the proportionate share(s) of that interest shall be forwarded by the **Contractor** to its **Subcontractor**(s).
- 43.5 The Contractor shall pay each Subcontractor or Materialman not later than seven (7) Days after receipt of payment out of amounts paid to the Contractor by the City for Work performed by the Subcontractor or Materialman under this Contract.
 - 43.5.1 If Contractor fails to make any payment to any Subcontractor or Materialman within seven (7) Days after receipt of payment by the City pursuant to this Article 43.5, then the Contractor shall pay interest on amounts due to such Subcontractor or Materialman at the rate of interest in effect on the date such payment is made by the Contractor computed in accordance with Section 756-b (1)(b) of the New York General Business Law. Accrual of interest shall commence on the Day immediately following the expiration of the seventh Day following receipt of payment by the Contractor from the City and shall end on the date on which payment is made.
- 43.6 The Contractor shall include in each of its subcontracts a provision requiring each Subcontractor to make payment to each of its Subcontractors or Materialmen for Work performed under this Contract in the same manner and within the same time period set forth above.

ARTICLE 44. SUBSTANTIAL COMPLETION PAYMENT

- 44.1 The Contractor shall submit with the Substantial Completion requisition:
 - 44.1.1 A final verified statement of any pending Article 27 disputes in accordance with the **PPB** Rules and this **Contract** and any and all alleged claims against the **City**, in any way connected with or arising out of this **Contract** (including those as to which details may have been furnished pursuant to Articles 11, 27, 28, and 30) setting forth with respect to each

such claim the total amount thereof, the various items of labor and materials included therein, and the alleged value of each item; and if the alleged claim be one for delay, the alleged cause of each such delay, the period or periods of time, giving the dates when the **Contractor** claims the performance of the **Work** or a particular part thereof was delayed, and an itemized statement and breakdown of the amount claimed for each such delay.

44.1.1(a) With respect to each such claim, the Commissioner, the Comptroller and, in the event of litigation, the City Corporation Counsel shall have the same right to inspect, and to make extracts or copies of, the Contractor's books, vouchers, records, etc., as is referred to in Articles 11, 27, 28, and 30. Nothing contained in this Article 44.1.1(a) is intended to or shall relieve the Contractor from the obligation of complying strictly with Articles 11, 27, 28, and 30. The Contractor is warned that unless such claims are completely set forth as herein required, the Contractor upon acceptance of the Substantial Completion payment pursuant to this Article 44, will have waived any such claims.

44.1.2 A Final Approved Punch List.

- 44.1.3 Where required, a request for an extension of time to achieve **Substantial** Completion or final extension of time.
- 44.2 The Commissioner shall issue a voucher calling for payment of any part or all of the balance due for Work performed under the Contract, including monies retained under Article 21, less any and all deductions authorized to be made by the Commissioner, under this Contract or by Law, and less twice the amount the Commissioner considers necessary to ensure the completion of the balance of the Work by the Contractor. Such a payment shall be considered a partial and not a final payment. No Substantial Completion payment shall be made under this Article 44 where the Contractor failed to complete the Work within the time fixed for such completion in the Schedule A of the General Conditions, or within the time to which completion may have been extended, until an extension or extensions of time for the completion of Work have been acted upon pursuant to Article 13.
- 44.3 No further partial payments shall be made to the Contractor after Substantial Completion, except the Substantial Completion payment and payment pursuant to any Contractor's requisition that were properly filed with the Commissioner prior to the date of Substantial Completion; however, the Commissioner may grant a waiver for further partial payments after the date of Substantial Completion to permit payments for change order Work and/or release of retainage and deposits pursuant to Articles 21 and 24. Such waiver shall be in writing.
- 44.4 The **Contractor** acknowledges that nothing contained in this Article 44 is intended to or shall in any way diminish the force and effect of Article 13.

ARTICLE 45. FINAL PAYMENT

45.1 After completion and **Final Acceptance** of the **Work**, the **Contractor** shall submit all required certificates and documents, together with a requisition for the balance claimed to be due under the **Contract**, less the amount authorized to be retained for maintenance under Article 24. Such submission shall be within 90 days of the date of the **Commissioner's** written determination of **Final Acceptance**, or within such additional time as may be granted by the **Commissioner** in writing. If the **Contractor** fails to submit all required certificates and documents within the time allowed, no payment of the balance claimed shall be made to the **Contractor** and the **Contractor** shall be deemed to have forfeited its right to

payment of any balance claimed. A verified statement similar to that required in connection with applications for partial payments shall also be submitted to the Commissioner.

- 45.2 Amended Verified Statement of Claims: The Contractor shall also submit with the final requisition any amendments to the final verified statement of any pending dispute resolution procedures in accordance with the PPB Rules and this Contract and any and all alleged claims against the City, in any way connected with or arising out of this Contract (including those as to which details may have been furnished pursuant to Articles 11, 27, 28, and 30) that have occurred subsequent to Substantial Completion, setting forth with respect to each such claim the total amount thereof, the various items of labor and materials included therein, and the alleged value of each such item; and if the alleged claim be one for delay, the alleged cause of each such delay, the period or periods of time, giving the dates when the Contractor claims the performance of the Work or a particular part thereof was delayed, and an itemized statement and breakdown of the amount claimed for each such delay. With reference to each such claim, the Commissioner, the Comptroller and, in the event of litigation, the City Corporation Counsel shall have the same right to inspect, and to make extracts or copies of, the Contractor's books, vouchers, records, etc., as is referred to in Articles 11, 27, 28, and 30. Nothing contained in this Article 45.2, is intended to or shall relieve the Contractor from the obligation of complying strictly with Articles 11, 27, 28, and 30. The Contractor is warned that unless such claims are completely set forth as herein required, the Contractor, upon acceptance of the Final Payment pursuant to Article 46, will have waived any such claims.
- 45.3 Preparation of Final Voucher: Upon determining the balance due hereunder other than on account of claims, the **Engineer** will prepare and certify, for the Commissioner's approval, a voucher for final payment in that amount less any and all deductions authorized to be made by the **Commissioner** under this **Contract** or by **Law**. In the case of a lump sum **Contract**, the **Commissioner** shall certify the voucher for final payment within thirty (30) **Days** from the date of completion and acceptance of the **Work**, provided all requests for extensions of time have been acted upon.
 - 45.3.1 All prior certificates and vouchers upon which partial payments were made, being merely estimates made to enable the **Contractor** to prosecute the **Work** more advantageously, shall be subject to correction in the final voucher, and the certification of the **Engineer** thereon and the approval of the **Commissioner** thereof, shall be conditions precedent to the right of the **Contractor** to receive any money hereunder. Such final voucher shall be binding and conclusive upon the **Contractor**.
 - 45.3.2 Payment pursuant to such final voucher, less any deductions authorized to be made by the **Commissioner** under this **Contract** or by **Law**, shall constitute the final payment, and shall be made by the **Comptroller** within thirty (30) **Days** after the filing of such voucher in his/her office.
- 45.4 The **Contractor** acknowledges that nothing contained in this Article 45 is intended to or shall in any way diminish the force and effect of Article 13.

ARTICLE 46. ACCEPTANCE OF FINAL PAYMENT

46.1 The acceptance by the **Contractor**, or by anyone claiming by or through it, of the final payment, whether such payment be made pursuant to any judgment of any court, or otherwise, shall constitute and operate as a release of the **City** from any and all claims of and liability to the **Contractor** for anything heretofore done or furnished for the **Contractor** relating to or arising out of this **Contract** and the **Work** done hereunder, and for any prior act, neglect or default on the part of the **City** or any of its officials, agents or employees, excepting only a claim against the **City** for the amounts deducted or retained in accordance with the terms and provisions of this **Contract** or by **Law**, and excepting any CITY OF NEW YORK

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claims, not otherwise waived, or any pending dispute resolution procedures which are contained in the verified statement filed with the **Contractor's** substantial and final requisitions pursuant to Articles 44 and 45.

- 46.2 The Contractor is warned that the execution by it of a release, in connection with the acceptance of the final payment, containing language purporting to reserve claims other than those herein specifically excepted from the operation of this Article 46, or those for amounts deducted by the Commissioner from the final requisition or from the final payment as certified by the Engineer and approved by the Commissioner, shall not be effective to reserve such claims, anything stated to the Contractor orally or in writing by any official, agent or employee of the City to the contrary notwithstanding.
- 46.3 Should the Contractor refuse to accept the final payment as tendered by the Comptroller, it shall constitute a waiver of any right to interest thereon.
- 46.4 The Contractor, however, shall not be barred by this Article 46 from commencing an action for breach of Contract to the extent permitted by Law and by the terms of the Contract for any claims that are contained in the verified statement filed with the Contractor's substantial and final requisitions pursuant to Articles 44 and 45 or that arose after submission of the final payment requisition, provided that a detailed and verified statement of claim is served upon the contracting Agency and Comptroller not later than forty (40) Days after the making of such final payment by electronic funds transfer (EFT) or the mailing of such final payment. The statement shall specify the items upon which the claim will be based and any such claim shall be limited to such items.

ARTICLE 47. APPROVAL BY PUBLIC DESIGN COMMISSION

47.1 All works of art, including paintings, mural decorations, stained glass, statues, bas-reliefs, and other sculptures, monuments, fountains, arches, and other structures of a permanent character intended for ornament or commemoration, and every design of the same to be used in the performance of this **Contract**, and the design of all bridges, approaches, buildings, gates, fences, lamps, or structures to be erected, pursuant to the terms of this **Contract**, shall be submitted to the Art Commission, d/b/a the Public Design Commission of the City of New York, and shall be approved by the Public Design Commission prior to the erection or placing in position of the same. The final payment shall not become due or payable under this **Contract** unless and until the Public Design Commission shall certify that the design for the **Work** herein contracted for has been approved by the said Public Design Commission, and that the same has been executed in substantial accordance with the design so approved, pursuant to the provisions of Chapter 37, Section 854 of the **City** Charter, as amended.

CHAPTER X CONTRACTOR'S DEFAULT

ARTICLE 48. COMMISSIONER'S RIGHT TO DECLARE CONTRACTOR IN DEFAULT

- 48.1 In addition to those instances specifically referred to in other Articles herein, the Commissioner shall have the right to declare the Contractor in default of this Contract if:
 - 48.1.1 The Contractor fails to commence Work when notified to do so by the Commissioner; or if
 - 48.1.2 The Contractor shall abandon the Work; or if

- 48.1.3 The Contractor shall refuse to proceed with the Work when and as directed by the Commissioner; or if
- 48.1.4 The Contractor shall, without just cause, reduce its working force to a number which, if maintained, would be insufficient, in the opinion of the Commissioner, to complete the Work in accordance with the progress schedule; or if
- 48.1.5 The Contractor shall fail or refuse to increase sufficiently such working force when ordered to do so by the Commissioner; or if
- 48.1.6 The Contractor shall sublet, assign, transfer, convert or otherwise dispose of this Contract other than as herein specified; or sell or assign a majority interest in the Contractor; or if
- 48.1.7 The Contractor fails to secure and maintain all required insurance; or if
- 48.1.8 A receiver or receivers are appointed to take charge of the Contractor's property or affairs; or if
- 48.1.9 The Commissioner shall be of the opinion that the Contractor is or has been unnecessarily or unreasonably or willfully delaying the performance and completion of the Work, or the award of necessary subcontracts, or the placing of necessary material and equipment orders; or if
- 48.1.10 The Commissioner shall be of the opinion that the Contractor is or has been willfully or in bad faith violating any of the provisions of this Contract; or if
- 48.1.11 The **Commissioner** shall be of the opinion that the **Work** cannot be completed within the time herein provided therefor or within the time to which such completion may have been extended; provided, however, that the impossibility of timely completion is, in the **Commissioner's** opinion, attributable to conditions within the **Contractor's** control; or if
- 48.1.12 The Work is not completed within the time herein provided therefor or within the time to which the Contractor may be entitled to have such completion extended; or if
- 48.1.13 Any statement or representation of the Contractor in the Contract or in any document submitted by the Contractor with respect to the Work, the Project, or the Contract (or for purposes of securing the Contract) was untrue or incorrect when made; or if
- 48.1.14 The **Contractor** or any of its officers, directors, partners, five (5%) percent shareholders, principals, or other persons substantially involved in its activities, commits any of the acts or omissions specified as the grounds for debarment in the **PPB** Rules.
- 48.2 Before the **Commissioner** shall exercise his/her right to declare the **Contractor** in default, the **Commissioner** shall give the **Contractor** an opportunity to be heard, upon not less than two (2) **Days** notice.

ARTICLE 49. EXERCISE OF THE RIGHT TO DECLARE DEFAULT

- 49.1 The right to declare the **Contractor** in default for any of the grounds specified or referred to in Article 48 shall be exercised by sending the **Contractor** a notice, signed by the **Commissioner**, setting forth the ground or grounds upon which such default is declared (hereinafter referred to as a "Notice of Default").
- 49.2 The Commissioner's determination that the Contractor is in default shall be conclusive, final, and binding on the parties and such a finding shall preclude the Contractor from commencing a plenary action for any damages relating to the Contract. If the Contractor protests the determination of the Commissioner, the Contractor may commence an action in a court of competent jurisdiction of the State of New York under Article 78 of the New York Civil Practice Law and Rules.

ARTICLE 50. QUITTING THE SITE

50.1 Upon receipt of such notice the **Contractor** shall immediately discontinue all further operations under this **Contract** and shall immediately quit the **Site**, leaving untouched all plant, materials, equipment, tools, and supplies then on the **Site**.

ARTICLE 51. COMPLETION OF THE WORK

- 51.1 The Commissioner, after declaring the Contractor in default, may then have the Work completed by such means and in such manner, by contract with or without public letting, or otherwise, as he/she may deem advisable, utilizing for such purpose such of the Contractor's plant, materials, equipment, tools, and supplies remaining on the Site, and also such Subcontractors, as he/she may deem advisable.
- 51.2 After such completion, the **Commissioner** shall make a certificate stating the expense incurred in such completion, which shall include the cost of re-letting and also the total amount of liquidated damages (at the rate provided for in the **Contract**) from the date when the **Work** should have been completed by the **Contractor** in accordance with the terms hereof to the date of actual completion of the **Work**. Such certificate shall be binding and conclusive upon the **Contractor**, its sureties, and any person claiming under the **Contractor**, as to the amount thereof.
- 51.3 The expense of such completion, including any and all related and incidental costs, as so certified by the **Commissioner**, and any liquidated damages assessed against the **Contractor**, shall be charged against and deducted out of monies which are earned by the **Contractor** prior to the date of default. Should the expense of such completion, as certified by the **Commissioner**, exceed the total sum which would have been payable under the **Contract** if it had been completed by the **Contractor**, any excess shall be paid by the **Contractor**.

ARTICLE 52. PARTIAL DEFAULT

52.1 In case the **Commissioner** shall declare the **Contractor** in default as to a part of the **Work** only, the **Contractor** shall discontinue such part, shall continue performing the remainder of the **Work** in strict conformity with the terms of this **Contract**, and shall in no way hinder or interfere with any **Other**

Contractor(s) or persons whom the Commissioner may engage to complete the Work as to which the Contractor was declared in default.

52.2 The provisions of this Chapter relating to declaring the Contractor in default as to the entire Work shall be equally applicable to a declaration of partial default, except that the Commissioner shall be entitled to utilize for completion of the part of the Work as to which the Contractor was declared in default only such plant, materials, equipment, tools, and supplies as had been previously used by the Contractor on such part.

ARTICLE 53. PERFORMANCE OF UNCOMPLETED WORK

53.1 In completing the whole or any part of the **Work** under the provisions of this Chapter X, the **Commissioner** shall have the power to depart from or change or vary the terms and provisions of this **Contract**, provided, however, that such departure, change or variation is made for the purpose of reducing the time or expense of such completion. Such departure, change or variation, even to the extent of accepting a lesser or different performance, shall not affect the conclusiveness of the **Commissioner's** certificate of the cost of completion referred to in Article 51, nor shall it constitute a defense to an action to recover the amount by which such certificate exceeds the amount which would have been payable to the **Contractor** hereunder but for its default.

ARTICLE 54. OTHER REMEDIES

- 54.1 In addition to the right to declare the **Contractor** in default pursuant to this Chapter X, the **Commissioner** shall have the absolute right, in his/her sole discretion and without a hearing, to complete or cause to be completed in the same manner as described in Articles 51 and 53, any or all unsatisfactory or uncompleted punch list **Work** that remains after the completion date specified in the **Final Approved Punch List**. A written notice of the exercise of this right shall be sent to the **Contractor** who shall immediately quit the **Site** in accordance with the provisions of Article 50.
- 54.2 The expense of completion permitted under Article 54.1, including any and all related and incidental costs, as so certified by the **Commissioner**, shall be charged against and deducted out of monies which have been earned by the **Contractor** prior to the date of the exercise of the right set forth in Article 54.1; the balance of such monies, if any, subject to the other provisions of this **Contract**, to be paid to the **Contractor** without interest after such completion. Should the expense of such completion, as certified by the **Commissioner**, exceed the total sum which would have been payable under the **Contract** if it had been completed by the **Contractor**, any excess shall be paid by the **Contractor**.
- 54.3 The previous provisions of this Chapter X shall be in addition to any and all other remedies available under Law or in equity.
- 54.4 The exercise by the City of any remedy set forth herein shall not be deemed a waiver by the City of any other legal or equitable remedy contained in this Contract or provided under Law.

CHAPTER XI MISCELLANEOUS PROVISIONS

ARTICLE 55. CONTRACTOR'S WARRANTIES

- 55.1 In consideration of, and to induce, the award of this Contract to the Contractor, the Contractor represents and warrants:
 - 55.1.1 That it is financially solvent, sufficiently experienced and competent to perform the **Work**; and
 - 55.1.2 That the facts stated in its bid and the information given by it pursuant to the Information for Bidders is true and correct in all respects; and
 - 55.1.3 That it has read and complied with all requirements set forth in the Contract.

ARTICLE 56. CLAIMS AND ACTIONS THEREON

- 56.1 Any claim, that is not subject to dispute resolution under the **PPB** Rules or this **Contract**, against the **City** for damages for breach of **Contract** shall not be made or asserted in any action, unless the **Contractor** shall have strictly complied with all requirements relating to the giving of notice and of information with respect to such claims, as herein before provided.
- 56.2 Nor shall any action be instituted or maintained on any such claims unless such action is commenced within six (6) months after **Substantial Completion**; except that:
 - 56.2.1 Any claims arising out of events occurring after Substantial Completion and before Final Acceptance of the Work shall be asserted within six (6) months of Final Acceptance of the Work;
 - 56.2.2 Any claims for monies deducted, retained or withheld under the provisions of this **Contract** shall be asserted within six (6) months after the date when such monies otherwise become due and payable hereunder; and
 - 56.2.3 If the Commissioner exercises his/her right to terminate the Contract pursuant to Article 64, any such action shall be commenced within six (6) months of the date the Commissioner exercises said right.

ARTICLE 57. INFRINGEMENT

57.1 The Contractor shall be solely responsible for and shall defend, indemnify, and hold the City harmless from any and all claims (even if the allegations of the lawsuit are without merit) and judgments for damages and from costs and expenses to which the City may be subject to or which it may suffer or incur allegedly arising out of or in connection with any infringement by the Contractor of any copyright, trade secrets, trademark or patent rights or any other property or personal right of any third party by the Contractor and/or its Subcontractors in the performance or completion of the Work. Insofar as the facts or Law relating to any claim would preclude the City from being completely indemnified by the Contractor, the City shall be partially indemnified by the Contractor to the fullest extent permitted by Law.

ARTICLE 58. NO CLAIM AGAINST OFFICIALS, AGENTS OR EMPLOYEES

58.1 No claim whatsoever shall be made by the **Contractor** against any official, agent or employee of the **City** for, or on account of, anything done or omitted to be done in connection with this **Contract**.

ARTICLE 59. SERVICE OF NOTICES

- 59.1 The Contractor hereby designates the business address, fax number, and email address specified in its bid, as the place where all notices, directions or other communications to the Contractor may be delivered, or to which they may be mailed. Any notice, direction, or communication from either party to the other shall be in writing and shall be deemed to have been given when (i) delivered personally; (ii) sent by certified mail, return receipt requested; (iii) delivered by overnight or same day courier service in a properly addressed envelope with confirmation; or (iv) sent by fax or email and, unless receipt of the fax or e-mail is acknowledged by the recipient by fax or e-mail, deposited in a post office box regularly maintained by the United States Postal Service in a properly addressed, postage prepaid envelope.
- 59.2 Contractor's notice address, email address, or fax number may be changed at any time by an instrument in writing, executed and acknowledged by the Contractor, and delivered to the Commissioner.
- 59.3 Nothing herein contained shall, however, be deemed to preclude or render inoperative the service of any notice, direction or other communication upon the **Contractor** personally, or, if the **Contractor** is a corporation, upon any officer thereof.

ARTICLE 60. UNLAWFUL PROVISIONS DEEMED STRICKEN FROM CONTRACT

60.1 If this **Contract** contains any unlawful provision not an essential part of the **Contract** and which shall not appear to have been a controlling or material inducement to the making thereof, the same shall be deemed of no effect and shall, upon notice by either party, be deemed stricken from the **Contract** without affecting the binding force of the remainder.

ARTICLE 61. ALL LEGAL PROVISIONS DEEMED INCLUDED

61.1 It is the intent and understanding of the parties to this **Contract** that each and every provision of **Law** required to be inserted in this **Contract** shall be and is inserted herein. Furthermore, it is hereby stipulated that every such provision is to be deemed to be inserted herein, and if, through mistake or otherwise, any such provision is not inserted, or is not inserted in correct form, then this **Contract** shall forthwith upon the application of either party be amended by such insertion so as to comply strictly with the **Law** and without prejudice to the rights of either party hereunder.

ARTICLE 62. TAX EXEMPTION

62.1 The City is exempt from payment of Federal, State, and local taxes, including sales and compensating use taxes of the State of New York and its cities and counties on all tangible personal property sold to the City pursuant to the provisions of this Contract. These taxes are not to be included in bids. However, this exemption does not apply to tools, machinery, equipment or other property leased by or to the Contractor, Subcontractor or Materialman or to tangible personal property which, even CITY OF NEW YORK

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though it is consumed, is not incorporated into the completed **Work** (consumable supplies) and tangible personal property that the **Contractor** is required to remove from the **Site** during or upon completion of the **Work**. The **Contractor** and its **Subcontractors** and **Materialmen** shall be responsible for and pay any and all applicable taxes, including sales and compensating use taxes, on such leased tools, machinery, equipment or other property and upon all such consumable supplies and tangible personal property that the **Contractor** is required to remove from the **Site** during or upon completion of the **Work**.

- 62.2 The Contractor agrees to sell and the City agrees to purchase all tangible personal property, other than consumable supplies and other tangible personal property that the Contractor is required to remove from the Site during or upon completion of the Work, that is required, necessary or proper for or incidental to the construction of the Project covered by this Contract. The sum paid under this Contract for such tangible personal property shall be in full payment and consideration for the sale of such tangible personal property.
 - 62.2.1 The Contractor agrees to construct the Project and to perform all Work, labor and services rendered, necessary, proper or incidental thereto for the sum shown in the bid for the performance of such Work, labor, and services, and the sum so paid pursuant to this Contract for such Work, labor, and services, shall be in full consideration for the performance by the Contractor of all its duties and obligations under this Contract in connection with said Work, labor, and services.
- 62.3 20 NYCRR Section 541.3(d) provides that a **Contractor**'s purchases of tangible personal property that is either incorporated into real property owned by a governmental entity or purchased for and sold to a governmental entity are exempt from sales and use tax. The **City** shall not pay sales tax for any such tangible personal property that it purchases from the **Contractor** pursuant to the **Contract**. With respect to such tangible personal property, the **Contractor**, at the request of the **City**, shall furnish to the **City** such bills of sale and other instruments as may be required by the **City**, properly executed, acknowledged and delivered assuring to the **City** title to such tangible personal property, free of liens and/or encumbrances, and the **Contractor** shall mark or otherwise identify all such tangible personal property as the property of the **City**.
- 62.4 Title to all tangible personal property to be sold by the Contractor to the City pursuant to the provisions of the Contract shall immediately vest in and become the sole property of the City upon delivery of such tangible personal property to the Site. Notwithstanding such transfer of title, the Contractor shall have the full and continuing responsibility to install such tangible personal property in accordance with the provisions of this Contract, protect it, maintain it in a proper condition and forthwith repair, replace and make good any damage thereto, theft or disappearance thereof, and furnish additional tangible personal property in place of any that may be lost, stolen or rendered unusable, without cost to the City, until such time as the Work covered by the Contract is fully accepted by the City. Such transfer of title shall in no way affect any of the Contractor's obligations hereunder. In the event that, after title has passed to the City, any of the tangible personal property is rejected as being defective or otherwise unsatisfactory, title to all such tangible personal property shall be deemed to have been transferred back to the Contractor.
- 62.5 The purchase by **Subcontractors** or **Materialmen** of tangible personal property to be sold hereunder shall be a purchase or procurement for resale to the **Contractor** (either directly or through other **Subcontractors**) and therefore not subject to the aforesaid sales and compensating use taxes, provided that the subcontracts and purchase agreements provide for the resale of such tangible personal property and that such subcontracts and purchase agreements are in a form similar to this **Contract** with respect to the separation of the sale of consumable supplies and tangible personal property that the **Contractor** is required to remove from the **Site** during or upon completion of the **Work** from the **Work** and labor, services, and any other matters to be provided, and provided further that the subcontracts and

purchase agreements provide separate prices for tangible personal property and all other services and matters. Such separation shall actually be followed in practice, including the separation of payments for tangible personal property from the payments for other Work and labor and other things to be provided.

- 62.6 The Contractor and its Subcontractors and Materialmen shall furnish a Contractor Exempt Purchase Certificate to all persons, firms or corporations from which they purchase tangible personal property for the performance of the Work covered by this Contract.
- 62.7 In the event any of the provisions of this Article 62 shall be deemed to be in conflict with any other provisions of this Contract or create any ambiguity, then the provisions of this Article 62 shall control.

ARTICLE 63. INVESTIGATION(S) CLAUSE

- 63.1 The parties to this Contract agree to cooperate fully and faithfully with any investigation, audit or inquiry conducted by a United States, a State of New York (State) or a City governmental agency or authority that is empowered directly or by designation to compel the attendance of witnesses and to examine witnesses under oath, or conducted by the Inspector General of a governmental agency that is a party in interest to the transaction, submitted bid, submitted proposal, contract, lease, permit or license that is the subject of the investigation, audit or inquiry.
- 63.2 If any person who has been advised that his/her statement, and any information from such statement, will not be used against him/her in any subsequent criminal proceeding refuses to testify before a grand jury or other governmental agency or authority empowered directly or by designation to compel the attendance of witnesses and to examine witnesses under oath concerning the award of or performance under any transaction, agreement, lease, permit, contract, or license entered into with the City, the State, or any political subdivision or public authority thereof, or the Port Authority of New York and New Jersey, or any local development corporation within the City, or any public benefit corporation organized under the Laws of the State of New York, or;
- 63.3 If any person refuses to testify for a reason other than the assertion of his/her privilege against self incrimination in an investigation, audit or inquiry conducted by a City or State governmental agency or authority empowered directly or by designation to compel the attendance of witnesses and to take testimony under oath, or by the Inspector General of the governmental agency that is a party in interest in, and is seeking testimony concerning the award of, or performance under any transaction, agreement, lease, permit, contract, or license entered into with the City, the State, or any political subdivision thereof or any local development corporation within the City, then;
- 63.4 The Commissioner whose Agency is a party in interest to the transaction, submitted bid, submitted proposal, contract, lease, permit, or license shall convene a hearing, upon not less than five (5) Days' written notice to the parties involved to determine if any penalties should attach for the failure of a person to testify.
- 63.5 If any non-governmental party to the hearing requests an adjournment, the Commissioner who convened the hearing may, upon granting the adjournment, suspend any contract, lease, permit, or license, pending the final determination pursuant to Article 63.7 without the City incurring any penalty or damages for delay or otherwise.
- 63.6 The penalties which may attach after a final determination by the Commissioner may include but shall not exceed:

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- 63.6.1 The disqualification for a period not to exceed five (5) years from the date of an adverse determination for any person, or any entity of which such person was a member at the time the testimony was sought, from submitting bids for, or transacting business with, or entering into or obtaining any contract, lease, permit or license with or from the City; and/or
- 63.6.2 The cancellation or termination of any and all such existing City contracts, leases, permits or licenses that the refusal to testify concerns and that have not been assigned as permitted under this Contract, nor the proceeds of which pledged, to an unaffiliated and unrelated institutional lender for fair value prior to the issuance of the notice scheduling the hearing, without the City incurring any penalty or damages on account of such cancellation or termination; monies lawfully due for goods delivered, work done, rentals, or fees accrued prior to the cancellation or termination shall be paid by the City.
- 63.7 The **Commissioner** shall consider and address in reaching his/her determination and in assessing an appropriate penalty the factors in Articles 63.7.1 and 63.7.2. The **Commissioner** may also consider, if relevant and appropriate, the criteria established in Articles 63.7.3 and 63.7.4, in addition to any other information which may be relevant and appropriate:
 - 63.7.1 The party's good faith endeavors or lack thereof to cooperate fully and faithfully with any governmental investigation or audit, including but not limited to the discipline, discharge, or disassociation of any person failing to testify, the production of accurate and complete books and records, and the forthcoming testimony of all other members, agents, assignees or fiduciaries whose testimony is sought.
 - 63.7.2 The relationship of the person who refused to testify to any entity that is a party to the hearing, including but not limited to, whether the person whose testimony is sought has an ownership interest in the entity and/or the degree of authority and responsibility the person has within the entity.
 - 63.7.3 The nexus of the testimony sought to the subject entity and its contracts, leases, permits or licenses with the City.
 - 63.7.4 The effect a penalty may have on an unaffiliated and unrelated party or entity that has a significant interest in an entity subject to penalties under Article 63.6, provided that the party or entity has given actual notice to the **Commissioner** upon the acquisition of the interest, or at the hearing called for in Article 63.4, gives notice and proves that such interest was previously acquired. Under either circumstance the party or entity shall present evidence at the hearing demonstrating the potential adverse impact a penalty will have on such person or entity.

63.8 Definitions:

- 63.8.1 The term "license" or "permit" as used in this Article 63 shall be defined as a license, permit, franchise or concession not granted as a matter of right.
- 63.8.2 The term "person" as used in this Article 63 shall be defined as any natural person doing business alone or associated with another person or entity as a partner, director, officer, principal or employee.
- 63.8.3 The term "entity" as used in this Article 63 shall be defined as any firm, partnership, corporation, association, joint venture, or person that receives monies, benefits, licenses, leases, or permits from or through the **City** or otherwise transacts business with the **City**.

- 63.8.4 The term "member" as used in this Article 63 shall be defined as any person associated with another person or entity as a partner, director, officer, principal or employee.
- 63.9 In addition to and notwithstanding any other provision of this **Contract**, the **Commissioner** may in his/her sole discretion terminate this **Contract** upon not less than three (3) **Days'** written notice in the event the **Contractor** fails to promptly report in writing to the **Commissioner** of the Department of Investigations ("DOI") of the **City** any solicitation of money, goods, requests for future employment or other benefit or thing of value, by or on behalf of any employee of the **City** or other person, firm, corporation or entity for any purpose which may be related to the procurement or obtaining of this **Contract** by the **Contractor**, or affecting the performance of this **Contract**.

ARTICLE 64. TERMINATION BY THE CITY

- 64.1 In addition to termination pursuant to any other article of this Contract, the Commissioner may, at any time, terminate this Contract by written notice to the Contractor. In the event of termination, the Contractor shall, upon receipt of such notice, unless otherwise directed by the Commissioner:
 - 64.1.1 Stop Work on the date specified in the notice;
 - 64.1.2 Take such action as may be necessary for the protection and preservation of the City's materials and property;
 - 64.1.3 Cancel all cancelable orders for material and equipment;
 - 64.1.4 Assign to the City and deliver to the Site or another location designated by the Commissioner, any non-cancelable orders for material and equipment that is not capable of use except in the performance of this Contract and has been specifically fabricated for the sole purpose of this Contract and not incorporated in the Work;
 - 64.1.5 Take no action which will increase the amounts payable by the City under this Contract.
- 64.2 In the event of termination by the **City** pursuant to this Article 64, payment to the **Contractor** shall be in accordance with Articles 64.2.1, 64.2.2 or 64.2.3, to the extent that each respective article applies.
 - 64.2.1 Lump Sum Contracts or Items: On all lump sum Contracts, or on lump sum items in a Contract, the City will pay the Contractor the sum of the amounts described in Articles 64.2.1(a) and 64.2.1(b), less all payments previously made pursuant to this Contract. On lump sum Contracts only, the City will also pay the Contractor an additional sum as provided in Article 64.2.1(c).
 - 64.2.1(a) For Work completed prior to the notice of termination, the Contractor shall be paid a pro rata portion of the lump sum bid amount, plus approved change orders, based upon the percent completion of the Work, as determined by the Commissioner. For the purpose of determining the pro rata portion of the lump sum bid amount to which the Contractor is entitled, the bid breakdown submitted in accordance with Article 41 shall be considered, but shall not be dispositive. The Commissioner's determination hereunder shall be final, binding, and conclusive.

- 64.2.1(b) For non-cancelable material and equipment that is not capable of use except in the performance of this **Contract** and has been specifically fabricated for the sole purpose of this **Contract**, but not yet incorporated in the **Work**, the **Contractor** shall be paid the lesser of the following, less salvage value:
 - 64.2.1(b)(i) The Direct Cost, as defined in Article 64.2.4; or
 - 64.2.1(b)(ii) The fair and reasonable value, if less than Direct Cost, of such material and equipment, plus necessary and reasonable delivery costs.
 - 64.2.1(b)(iii) In addition, the **Contractor** shall be paid five (5%) percent of the amount described in Article 64.2.1(b)(i) or Article 64.2.1(b)(ii), whichever applies.
- 64.2.1(c) Except as otherwise provided in Article 64.2.1(d), on all lump sum **Contracts**, the **Contractor** shall be paid the percentage indicated below applied to the difference between the total lump sum bid amount and the total of all payments made prior to the notice of termination plus all payments allowed pursuant to Articles 64.2.1(a) and 64.2.1(b):
 - 64.2.1(c)(i) Five (5%) percent of the first five million (\$5,000,000) dollars; and
 - 64.2.1(c)(ii) Three (3%) percent of any amount between five million (\$5,000,000) dollars and fifteen million (\$15,000,000) dollars; plus
 - 64.2.1(c)(iii) One (1%) percent of any amount over fifteen million (\$15,000,000) dollars.
- 64.2.1(d) In the event the City terminates a lump sum Contract pursuant to this Article 64 within ninety (90) Days after registration of the Contract with the Comptroller, the Contractor shall be paid one (1%) percent of the difference between the lump sum bid amount and the total of all payments made pursuant to this Article 64.2.
- 64.2.2 Unit Price Contracts or Items: On all unit price Contracts, or on unit price items in a Contract, the City will pay the Contractor the sum of the amounts described in Articles 64.2.2(a) and 64.2.2(b), less all payments previously made pursuant to this Contract:
 - 64.2.2(a) For all completed units, the unit price stated in the Contract, and
 - 64.2.2(b) For units that have been ordered but are only partially completed, the **Contractor** will be paid:
 - 64.2.2(b)(i) A pro rata portion of the unit price stated in the **Contract** based upon the percent completion of the unit and
 - 64.2.2(b)(ii) For non-cancelable material and equipment, payment will be made pursuant to Article 64.2.1(b).
- 64.2.3 Time and Materials Contracts or Items Based on Time and Material Records: On all Contracts or items in a Contract where payment for the Work is based on time and

material records, the **Contractor** shall be paid in accordance with Article 26, less all payments previously made pursuant to this **Contract**.

- 64.2.4 Direct Costs: Direct Costs as used in this Article 64.2 shall mean:
 - 64.2.4(a) The actual purchase price of material and equipment, plus necessary and reasonable delivery costs,
 - 64.2.4(b) The actual cost of labor involved in construction and installation at the Site, and
 - 64.2.4(c) The actual cost of necessary bonds and insurance purchased pursuant to requirements of this **Contract** less any amounts that have been or should be refunded by the **Contractor's** sureties or insurance carriers.
 - 64.2.4(d) Direct Costs shall not include overhead.
- 64.3 In no event shall any payments under this Article 64 exceed the Contract price for such items.
- 64.4 All payments pursuant to Article 64 shall be in the nature of liquidated damages and shall be accepted by the **Contractor** in full satisfaction of all claims against the **City**.
- 64.5 The City may deduct or set off against any sums due and payable pursuant to this Article 64, any deductions authorized by this Contract or by Law (including but not limited to liquidated damages) and any claims it may have against the Contractor. The City's exercise of the right to terminate the Contract pursuant to this Article 64 shall not impair or otherwise effect the City's right to assert any claims it may have against the Contractor in a plenary action.
- 64.6 Where the **Work** covered by the **Contract** has been substantially completed, as determined in writing by the **Commissioner**, termination of the **Work** shall be handled as an omission of **Work** pursuant to Articles 29 and 33, in which case a change order will be issued to reflect an appropriate reduction in the **Contract** sum, or if the amount is determined after final payment, such amount shall be paid by the **Contractor**.

ARTICLE 65. CHOICE OF LAW, CONSENT TO JURISDICTION AND VENUE

- 65.1 This Contract shall be deemed to be executed in the City regardless of the domicile of the Contractor, and shall be governed by and construed in accordance with the Laws of the State of New York and the Laws of the United States, where applicable.
- 65.2 The parties agree that any and all claims asserted against the City arising under this Contract or related thereto shall be heard and determined in the courts of the State of New York ("New York State Courts") located in the City and County of New York. To effect this Contract and intent, the Contractor agrees:
 - 65.2.1 If the City initiates any action against the Contractor in Federal court or in a New York State Court, service of process may be made on the Contractor either in person, wherever such Contractor may be found, or by registered mail addressed to the Contractor at its address as set forth in this Contract, or to such other address as the Contractor may provide to the City in writing; and

- 65.2.2 With respect to any action between the **City** and the **Contractor** in a New York State Court, the **Contractor** hereby expressly waives and relinquishes any rights it might otherwise have:
 - 65.2.2(a) To move to dismiss on grounds of forum non conveniens;
 - 65.2.2(b) To remove to Federal Court; and
 - 65.2.2(c) To move for a change of venue to a New York State Court outside New York County.
- 65.2.3 With respect to any action brought by the **City** against the **Contractor** in a Federal Court located in the **City**, the **Contractor** expressly waives and relinquishes any right it might otherwise have to move to transfer the action to a Federal Court outside the **City**.
- 65.2.4 If the Contractor commences any action against the City in a court located other than in the City and County of New York, upon request of the City, the Contractor shall either consent to a transfer of the action to a New York State Court of competent jurisdiction located in the City and County of New York or, if the Court where the action is initially brought will not or cannot transfer the action, the Contractor shall consent to dismiss such action without prejudice and may thereafter reinstate the action in a New York State Court of competent jurisdiction in New York County.
- 65.3 If any provision(s) of this Article 65 is held unenforceable for any reason, each and all other provision(s) shall nevertheless remain in full force and effect.

ARTICLE 66. PARTICIPATION IN AN INTERNATIONAL BOYCOTT

- 66.1 The **Contractor** agrees that neither the **Contractor** nor any substantially owned affiliated company is participating or shall participate in an international boycott in violation of the provisions of the Federal Export Administration Act of 1979, as amended, or the regulations of the United States Department of Commerce (Commerce Department) promulgated thereunder.
- 66.2 Upon the final determination by the Commerce Department or any other agency of the United States as to, or conviction of the Contractor or a substantially-owned affiliated company thereof for participation in an international boycott in violation of the provisions of the Export Administration Act of 1979, as amended, or the regulations promulgated thereunder, the Comptroller may, at his/her option, render forfeit and void this Contract.
- 66.3 The **Contractor** shall comply in all respects, with the provisions of Section 6-114 of the Administrative Code and the rules and regulations issued by the **Comptroller** thereunder.

ARTICLE 67. LOCALLY BASED ENTERPRISE PROGRAM

67.1 This **Contract** is subject to the requirements of Section 6-108.1 of the Administrative Code and regulations promulgated thereunder. No construction contract shall be awarded unless and until these requirements have been complied with in their entirety; however, compliance with this Article 67 is not required if the Agency sets Subcontractor Participation Goals for Minority- and Women-Owned Business Enterprises (M/WBEs).

- 67.2 Unless specifically waived by the **Commissioner** with the approval of the Division of Economic and Financial Opportunity of the **City** Department of Business Services, if any portion of the **Contract** is subcontracted, not less than ten (10%) percent of the total dollar amount of the **Contract** shall be awarded to locally based enterprises (LBEs); except that where less than ten (10%) percent of the total dollar amount of the **Contract** is subcontracted, such lesser percentage shall be so awarded.
 - 67.3 The Contractor shall not require performance and payment bonds from LBE Subcontractors.
- 67.4 If the Contractor has indicated prior to award that no Work will be subcontracted, no Work shall be subcontracted without the prior approval of the Commissioner, which shall be granted only if the Contractor makes a good faith effort beginning at least six (6) weeks before the Work is to be performed to obtain LBE Subcontractors to perform the Work.
- 67.5 If the Contractor has not identified sufficient LBE Subcontractors prior to award, it shall sign a letter of compliance stating that it complies with Section 6-108.1 of the Administrative Code, recognizes that achieving the LBE requirement is a condition of its Contract, and shall submit documentation demonstrating its good faith efforts to obtain LBEs. After award, the Contractor shall begin to solicit LBE's to perform subcontracted Work at least six (6) weeks before the date such Work is to be performed and shall demonstrate that a good faith effort has been made to obtain LBEs on each subcontract until it meets the required percentage.
- 67.6 Failure of the Contractor to comply with the requirements of Section 6-108.1 of the Administrative Code and the regulations promulgated thereunder shall constitute a material breach of this Contract. Remedy for such breach may include the imposition of any or all of the following sanctions:
 - 67.6.1 Reducing the **Contractor's** compensation by an amount equal to the dollar value of the percentage of the LBE subcontracting requirement not complied with;
 - 67.6.2 Declaring the Contractor in default;
 - 67.6.3 If the **Contractor** is an LBE, de-certifying and declaring the **Contractor** ineligible to participate in the LBE program for a period of up to three (3) years.

ARTICLE 68. ANTITRUST

68.1 The Contractor hereby assigns, sells, and transfers to the City all right, title, and interest in and to any claims and causes of action arising under the antitrust Laws of New York State or of the United States relating to the particular goods or services purchased or procured by the City under this Contract.

ARTICLE 69. MacBRIDE PRINCIPLES PROVISIONS

- 69.1 Notice To All Prospective Contractors:
 - 69.1.1 Local Law No. 34 of 1991 became effective on September 10, 1991 and added Section 6-115.1 of the Administrative Code. The local **Law** provides for certain restrictions on **City Contracts** to express the opposition of the people of the **City** to employment discrimination practices in Northern Ireland to promote freedom of work-place opportunity.
- 69.1.2 Pursuant to Section 6-115.1, prospective Contractors for Contracts to provide goods or services involving an expenditure of an amount greater than ten thousand CITY OF NEW YORK DDC 75 STANDARD CONSTRUCTION CONTRACT December 2013

- (\$10,000.) dollars, or for construction involving an amount greater than fifteen thousand (\$15,000.) dollars, are asked to sign a rider in which they covenant and represent, as a material condition of their **Contract**, that any business operations in Northern Ireland conducted by the **Contractor** and any individual or legal entity in which the **Contractor** holds a ten (10%) percent or greater ownership interest in the **Contractor** will be conducted in accordance with the MacBride Principles of nondiscrimination in employment.
- 69.1.3 Prospective Contractors are not required to agree to these conditions. However, in the case of Contracts let by competitive sealed bidding, whenever the lowest responsible bidder has not agreed to stipulate to the conditions set forth in this notice and another bidder who has agreed to stipulate to such conditions has submitted a bid within five (5%) percent of the lowest responsible bid for a Contract to supply goods, services or contraction of comparable quality, the Agency shall refer such bids to the Mayor, the Speaker or other officials, as appropriate, who may determine, in accordance with applicable Law, that it is in the best interest of the City that the Contract be awarded to other than the lowest responsible pursuant to Section 313(b)(2) of the City Charter.
- 69.1.4 In the case of **Contracts** let by other than competitive sealed bidding, if a prospective **Contractor** does not agree to these conditions, no **Agency**, elected official or the **City** Council shall award the **Contract** to that bidder unless the **Agency** seeking to use the goods, services or construction certifies in writing that the **Contract** is necessary for the **Agency** to perform its functions and there is no other responsible **Contractor** who will supply goods, services or construction of comparable quality at a comparable price.
- 69.2 In accordance with Section 6-115.1 of the Administrative Code, the **Contractor** stipulates that such **Contractor** and any individual or legal entity in which the **Contractor** holds a ten (10%) percent or greater ownership interest in the **Contractor** either:
 - 69.2.1 Have no business operations in Northern Ireland, or
 - 69.2.2 Shall take lawful steps in good faith to conduct any business operations they have in Northern Ireland in accordance with the MacBride Principles, and shall permit independent monitoring of their compliance with such principles.
 - 69.3 For purposes of this Article, the following terms shall have the following meanings:
 - 69.3.1 "MacBride Principles" shall mean those principles relating to nondiscrimination in employment and freedom of work-place opportunity which require employers doing business in Northern Ireland to:
 - 69.3.1(a) increase the representation of individuals from under-represented religious groups in the workforce, including managerial, supervisory, administrative, clerical and technical jobs;
 - 69.3.1(b) take steps to promote adequate security for the protection of employees from under-represented religious groups both at the work-place and while traveling 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 69 is in violation thereof, the Agency shall review such information and give the Contractor an opportunity to respond. If the Agency finds that a violation has occurred, the Agency shall have the right to declare the Contractor in default in default and/or terminate this Contract for cause and procure supplies, services or Work from another source in the manner the Agency deems proper. In the event of such termination, the Contractor shall pay to the Agency, or the Agency in its sole discretion may withhold from any amounts otherwise payable to the Contractor, the difference between the Contract price for the uncompleted portion of this Contract and the cost to the Agency of completing performance of this Contract either itself or by engaging another Contractor or Contractors. In the case of a requirement Contract, the Contractor shall be liable for such difference in price for the entire amount of supplies required by the Agency for the uncompleted term of Contractor's Contract. In the case of a construction Contract, the Agency shall also have the right to hold the Contractor in partial or total default in accordance with the default provisions of this Contract, and/or may seek debarment or suspension of the Contractor. The rights and remedies of the Agency hereunder shall be in addition to, and not in lieu of, any rights and remedies the Agency has pursuant to this Contract or by operation of Law.

ARTICLE 70. ELECTRONIC FILING/NYC DEVELOPMENT HUB

70.1 The **Contractor** shall electronically file all alteration type-2 and alteration type-3 applications via the New York City Development Hub Web site, except applications for the following types of minor alterations: enlargements, curb cuts, legalizations, fire alarms, builders pavement plans, and jobs filed on Landmark Preservation Commission calendared properties. All such filings must be professionally certified. Information about electronic filing via the New York City Development Hub is available on the **City** Department of Buildings Web site at www.nyc.gov/buildings.

ARTICLE 71. PROHIBITION OF TROPICAL HARDWOODS

71.1 Tropical hardwoods, as defined in Section 165 of the New York State Finance Law (Finance Law), shall not be utilized in the performance of this **Contract** except as expressly permitted by Section 165 of the Finance Law.

ARTICLE 72. CONFLICTS OF INTEREST

72.1 Section 2604 of the City Charter and other related provisions of the City Charter, the Administrative Code, and the Penal Law are applicable under the terms of this Contract in relation to conflicts of interest and shall be extended to Subcontractors authorized to perform Work, labor and services pursuant to this Contract and further, it shall be the duty and responsibility of the Contractor to so inform its respective Subcontractors. Notice is hereby given that, under certain circumstances, penalties may be invoked against the donor as well as the recipient of any form of valuable gift.

ARTICLE 73. MERGER CLAUSE

73.1 The written **Contract** herein, contains all the terms and conditions agreed upon by the parties hereto, and no other agreement, oral or otherwise, regarding the subject matter of this **Contract** shall be deemed to exist or to bind any of the parties hereto, or to vary any of the terms contained herein.

ARTICLE 74. STATEMENT OF WORK

74.1 The Contractor shall furnish all labor and materials and perform all Work in strict accordance with the Specifications and Addenda thereto, numbered ______.

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:

Six multion, Northwest fifty and Dollars, (\$ (2,954,871.79)), this said sum being the amount at which the Contract was awarded to the Contractor at a public letting thereof, based upon the Contractor's bid for the Contract.

ARTICLE 76. ELECTRONIC FUNDS TRANSFER

- 76.1 In accordance with Section 6-107.1 of the Administrative Code, the Contractor agrees to accept payments under this Contract from the City by electronic funds transfer (EFT). An EFT is any transfer of funds, other than a transaction originated by check, draft or similar paper instrument, which is initiated through an electronic terminal, telephonic instrument or computer or magnetic tape so as to order, instruct or authorize a financial institution to debit or credit an account. Prior to the first payment made under this Contract, the Contractor shall designate one financial institution or other authorized payment agent and shall complete the attached "EFT Vendor Payment Enrollment Form" in order to provide the Commissioner of the City Department of Finance with information necessary for the Contractor to receive electronic funds transfer payments through a designated financial institution or authorized payment agent. The crediting of the amount of a payment to the appropriate account on the books of a financial institution or other authorized payment agent designated by the Contractor shall constitute full satisfaction by the City for the amount of the payment under this Contract. The account information supplied by the Contractor to facilitate the electronic funds transfer shall remain confidential to the fullest extent provided by Law.
- 76.2 The Commissioner may waive the application of the requirements of this Article 76 to payments on contracts entered into pursuant to Section 315 of the City Charter. In addition, the Commissioner of the Department of Finance and the Comptroller may jointly issue standards pursuant to CITY OF NEW YORK

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which the **Agency** may waive the requirements of this Article 76 for payments in the following circumstances: (i) for individuals or classes of individuals for whom compliance imposes a hardship; (ii) for classifications of types of checks; or (iii) in other circumstances as may be necessary in the interest of the **City**.

ARTICLE 77. RECORDS RETENTION

77.1 The **Contractor** agrees to retain all books, records, and other documents relevant to this **Contract** for six years after the final payment or termination of this **Contract**, whichever is later. **City**, state, and federal auditors and any other persons duly authorized by the **City** shall have full access to and the right to examine any such books, records, and other documents during the retention period.

ARTICLE 78. 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 and Local Law 1 of 2013 amended Section 6-129 of the Administrative Code of the City of New York (hereinafter "Section 6-129"). Section 6-129 establishes the program for participation in City procurement ("M/WBE Program") by minority- owned business enterprises ("MBEs") and women-owned business enterprises ("WBEs"), certified in accordance with Section 1304 of the New York City Charter. As stated in Section 6-129, the intent of the program is to address the impact of discrimination on the City's procurement process, and to promote the public interest in avoiding fraud and favoritism in the procurement process, increasing competition for City business, and lowering contract costs. The contract provisions contained herein are pursuant to Section 6-129, and the rules of the Department of Small Business Services ("DSBS") promulgated thereunder.

If this Contract is subject to the M/WBE Program established by Section 6-129, the specific requirements of MBE and/or WBE participation for this Contract are set forth in Schedule B of the Contract (entitled the "M/WBE Utilization Plan"), and are detailed below. The Contractor must comply with all applicable MBE and WBE requirements for this Contract.

All provisions of Section 6-129 are hereby incorporated in the Contract by reference and all terms used herein that are not defined herein shall have the meanings given such terms in Section 6-129. Article I, Part A, below, sets forth provisions related to the participation goals for construction, standard and professional services contracts. Article I, Part B, below, sets forth miscellaneous provisions related to the M/WBE Program.

PART A

<u>PARTICIPATION GOALS FOR CONSTRUCTION, STANDARD</u> <u>AND PROFESSIONAL SERVICES CONTRACTS OR TASK ORDERS</u>

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

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

2. If **Participation Goals** have been established for this Contract or Task Orders issued pursuant to this Contract, Contractor agrees or shall agree as a material term of the Contract that Contractor shall be subject to the **Participation**

Goals, unless the goals are waived or modified by Agency in accordance with Section 6-129 and Part A, Sections 10 and 11 below, respectively.

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

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

- 4. A. If Participation Goals have been established for this Contract, a prospective contractor shall be required to submit with its bid or proposal, as applicable, a completed Schedule B, M/WBE Utilization Plan, Part II (see Pages 2-4) indicating: (a) whether the contractor is an MBE or WBE, or qualified joint venture; (b) the percentage of work it intends to award to direct subcontractors; and (c) in cases where the contractor intends to award direct subcontracts, a description of the type and dollar value of work designated for participation by MBEs and/or WBEs, and the time frames in which such work is scheduled to begin and end. In the event that this M/WBE Utilization Plan indicates that the bidder or proposer, as applicable, does not intend to meet the Participation Goals, the bid or proposal, as applicable, shall be deemed non-responsive, unless Agency has granted the bidder or proposer, as applicable, a pre-award waiver of the Participation Goals in accordance with Section 6-129 and Part A, Section 10 below.
- B. (i) If this Contract is for a master services agreement or other requirements type contract that will result in the issuance of Task Orders that will be individually registered ("Master Services Agreement") and is subject to M/WBE Participation Goals, a prospective contractor shall be required to submit with its bid or proposal, as applicable, a completed Schedule B, M/WBE Participation Requirements for Master Services Agreements That Will Require Individually Registered Task Orders, Part II (page 2) indicating the prospective contractor's certification and required affirmations to make all reasonable good faith efforts to meet participation goals established on each individual Task Order issued pursuant to this Contract, or if a partial waiver is obtained or such goals are modified by the Agency, to meet the modified Participation Goals by soliciting and obtaining the participation of certified MBE and/or WBE firms. In the event that the Schedule B indicates that the bidder or proposer, as applicable, does not intend to meet the Participation Goals that may be established on Task Orders issued pursuant to this Contract, the bid or proposal, as applicable, shall be deemed nonresponsive.
- (ii) Participation Goals on a Master Services Agreement will be established for individual Task Orders issued after the Master Services Agreement is awarded. If Participation Goals have been established on a Task Order, a contractor shall be required to submit a Schedule B M/WBE Utilization Plan For Independently Registered Task Orders That Are Issued Pursuant to Master Services Agreements, Part II (see Pages 2-4) indicating: (a) whether the contractor is an MBE or WBE, or qualified joint venture; (b) the percentage of work it intends to award to direct subcontractors; and (c) in cases where the contractor intends to award direct subcontracts, a description of the type and dollar value of work designated for participation by MBEs and/or WBEs, and the time frames in which such work is scheduled to begin and end. The contractor must engage in good faith efforts to meet the Participation Goals in accordance with Section 6-129 and Part A, Section 10 below.
- C. THE BIDDER/PROPOSER MUST COMPLETE THE SCHEDULE B INCLUDED HEREIN (SCHEDULE B, PART II). A SCHEDULE B SUBMITTED BY THE BIDDER/PROPOSER WHICH DOES NOT INCLUDE THE VENDOR CERTIFICATION AND REQUIRED AFFIRMATIONS (SEE SECTION V OF PART II) WILL BE DEEMED TO BE NON-RESPONSIVE, UNLESS A FULL WAIVER OF THE PARTICIPATION GOALS IS GRANTED (SCHEDULE B, PART III). IN THE EVENT THAT THE CITY DETERMINES THAT THE BIDDER/PROPOSER HAS SUBMITTED A SCHEDULE B WHERE THE VENDOR CERTIFICATION AND REQUIRED AFFIRMATIONS ARE COMPLETED BUT OTHER

- ASPECTS OF THE SCHEDULE B ARE NOT COMPLETE, OR CONTAIN A COPY OR COMPUTATION ERROR THAT IS AT ODDS WITH THE VENDOR CERTIFICATION AND AFFIRMATIONS, THE BIDDER/PROPOSER WILL BE NOTIFIED BY THE AGENCY AND WILL BE GIVEN FOUR (4) CALENDAR DAYS FROM RECEIPT OF NOTIFICATION TO CURE THE SPECIFIED DEFICIENCIES AND RETURN A COMPLETED SCHEDULE B TO THE AGENCY. FAILURE TO DO SO WILL RESULT IN A DETERMINATION THAT THE BID/PROPOSAL IS NON-RESPONSIVE. RECEIPT OF NOTIFICATION IS DEFINED AS THE DATE NOTICE IS E-MAILED OR FAXED (IF THE BIDDER/PROPOSER HAS PROVIDED AN E-MAIL ADDRESS OR FAX NUMBER), OR NO LATER THAN FIVE (5) CALENDAR DAYS FROM THE DATE OF MAILING OR UPON DELIVERY, IF DELIVERED.
- 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 multiyear contracts, such list shall also be submitted every year thereafter. The Agency may also require the Contractor to report periodically about the contracts awarded by its direct subcontractors to indirect subcontractors (as defined in Section 6-129(c)(22)). PLEASE NOTE: If this Contract is a public works project subject to GML §101(5) (i.e., a contract valued at or below \$3M for projects in New York City) or if the Contract is subject to a project labor agreement in accordance with Labor Law §222, and the bidder is required to identify at the time of bid submission its intended subcontractors for the Wicks trades (plumbing and gas fitting; steam heating, hot water heating, ventilating and air conditioning (HVAC); and electric wiring), the Contractor must identify all those to which it intends to award construction subcontracts for any portion of the Wicks trade work at the time of bid submission, regardless of what point in the life of the contract such subcontracts will occur. In identifying intended subcontractors in the bid submission, bidders may satisfy any Participation Goals established for this Contract by proposing one or more subcontractors that are MBEs and/or WBEs for any portion of the Wicks trade work. In the event that the Contractor's selection of a subcontractor is disapproved, the Contractor shall have a reasonable time to propose alternate subcontractors.
- MBE and WBE firms must be certified by DSBS in order for the Contractor to credit such firms' participation toward the attainment of the **Participation Goals**. Such certification must occur prior to the firms' commencement of work. A list of MBE and WBE firms may be obtained from the DSBS website at www.nyc.gov/buycertified, by emailing DSBS at buyer@sbs.nyc.gov, by calling (212) 513-6356, or by visiting or writing DSBS at 110 William St., New York, New York, 10038, 7th floor. Eligible firms that have not yet been certified may contact DSBS in order to seek certification by visiting www.nyc.gov/getcertified, emailing MWBE@sbs.nyc.gov, or calling the DSBS certification helpline at (212) 513-6311. A firm that is certified as both an MBE and a WBE may be counted either toward the goal for MBEs or the goal for WBEs, but not both. No credit shall be given for participation by a graduate MBE or graduate WBE, as defined in Section 6-129(c)(20).
- Where an M/WBE Utilization Plan has been submitted, the Contractor shall, with each voucher for payment, and/or periodically as Agency may require, submit statements, certified under penalty of perjury, which shall include, but not be limited to; the total amount the Contractor paid to its direct subcontractors, and, where applicable pursuant to Section 6-129(j), the total amount direct subcontractors paid to indirect subcontractors; the names, addresses and contact numbers of each MBE or WBE hired as a subcontractor by the Contractor, and, where applicable, hired by any of the Contractor's direct subcontractors; and the dates and amounts paid to each MBE or WBE. The Contractor shall also submit, along with its voucher for final payment: the total amount it paid to subcontractors, and, where applicable pursuant to Section 6-129(j), the total amount its direct subcontractors paid directly to their indirect subcontractors; and a final list, certified under penalty of perjury, which shall include the name, address and contact information of each subcontractor that is an MBE or WBE, the work performed by, and the dates and amounts paid to each.
- 8. If payments made to, or work performed by, MBEs or WBEs are less than the amount specified in the Contractor's M/WBE Utilization Plan, Agency shall take appropriate action, in accordance with Section 6-129 and Article II below, unless the Contractor has obtained a modification of its M/WBE Utilization Plan in accordance with Section 6-129 and Part A, Section 11 below.
- 9. Where an M/WBE Utilization Plan has been submitted, and the Contractor requests a change order the value of which exceeds the greater of 10 percent of the Contract or Task Order, as applicable, or \$500,000, Agency shall review the scope of work for the Contract or Task Order, as applicable, and the scale and types of work involved in the change order, and determine whether the **Participation Goals** should be modified.
- 10. Pre-award waiver of the **Participation Goals**. (a) A bidder or proposer, or contractor with respect to a Task Order, may seek a pre-award full or partial waiver of the **Participation Goals** in accordance with Section 6-129, which

requests that Agency change one or more Participation Goals on the grounds that the Participation Goals are unreasonable in light of the availability of certified firms to perform the services required, or by demonstrating that it has legitimate business reasons for proposing a lower level of subcontracting in its M/WBE Utilization Plan.

- (b) To apply for a full or partial waiver of the Participation Goals, a bidder, proposer, or contractor, as applicable, must complete Part III (Page 5) of Schedule B and submit such request no later than seven (7) calendar days prior to the date and time the bids, proposals, or Task Orders are due, in writing to the Agency by email at poped@ddc.nyc.gov or via facsimile at (718) 391-1886. Bidders, proposers, or contractors, as applicable, who have submitted requests will receive an Agency response by no later than two (2) calendar days prior to the due date for bids, proposals, or Task Orders; provided, however, that if that date would fall on a weekend or holiday, an Agency response will be provided by close-of-business on the business day before such weekend or holiday date.
- (c) If the Agency determines that the Participation Goals are unreasonable in light of the availability of certified firms to perform the services required, it shall revise the solicitation and extend the deadline for bids and proposals, or revise the Task Order, as applicable.
- (d) Agency may grant a full or partial waiver of the Participation Goals to a bidder, proposer or contractor, as applicable, who demonstrates—before submission of the bid, proposal or Task Order, as applicable—that it has legitimate business reasons for proposing the level of subcontracting in its M/WBE Utilization Plan. In making its determination, Agency shall consider factors that shall include, but not be limited to, whether the bidder, proposer or contractor, as applicable, has the capacity and the bona fide intention to perform the Contract without any subcontracting, or to perform the Contract without awarding the amount of subcontracts represented by the Participation Goals. In making such determination, Agency may consider whether the M/WBE Utilization Plan is consistent with past subcontracting practices of the bidder, proposer or contractor, as applicable, has made efforts to form a joint venture with a certified firm, and whether the bidder, proposer, or contractor, as applicable, has made good faith efforts to identify other portions of the Contract that it intends to subcontract.
- 11. Modification of M/WBE Utilization Plan. (a) A Contractor may request a modification of its M/WBE Utilization Plan after award of this Contract. PLEASE NOTE: If this Contract is a public works project subject to GML §101(5) (i.e., a contract valued at or below \$3M for projects in New York City) or if the Contract is subject to a project labor agreement in accordance with Labor Law §222, and the bidder is required to identify at the time of bid submission its intended subcontractors for the Wicks trades (plumbing and gas fitting; steam heating, hot water heating, ventilating and air conditioning (HVAC); and electric wiring), the Contractor may request a Modification of its M/WBE Utilization Plan as part of its bid submission. The Agency may grant a request for Modification of a Contractor's M/WBE Utilization Plan if it determines that the Contractor has established, with appropriate documentary and other evidence, that it made reasonable, good faith efforts to meet the Participation Goals. In making such determination, Agency shall consider evidence of the following efforts, as applicable, along with any other relevant factors:
- (i) The Contractor advertised opportunities to participate in the Contract, where appropriate, in general circulation media, trade and professional association publications and small business media, and publications of minority and women's business organizations;
- (ii) The Contractor provided notice of specific opportunities to participate in the Contract, in a timely manner, to minority and women's business organizations:
- (iii) The Contractor sent written notices, by certified mail or facsimile, in a timely manner, to advise MBEs or WBEs that their interest in the Contract was solicited;
- (iv) The Contractor made efforts to identify portions of the work that could be substituted for portions originally designated for participation by MBEs and/or WBEs in the M/WBE Utilization Plan, and for which the Contractor claims an inability to retain MBEs or WBEs;
- (v) The Contractor held meetings with MBEs and/or WBEs prior to the date their bids or proposals were due, for the purpose of explaining in detail the scope and requirements of the work for which their bids or proposals were solicited;
- (vi) The Contractor made efforts to negotiate with MBEs and/or WBEs as relevant to perform specific subcontracts, or act as suppliers or service providers;
- (vii) Timely written requests for assistance made by the Contractor to Agency's M/WBE liaison officer and to DSBS;

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

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

- (b) The Agency may modify the **Participation Goals** when the scope of the work has been changed by the Agency in a manner that affects the scale and types of work that the Contractor indicated in its **M/WBE** Utilization Plan would be awarded to subcontractors.
- 12. If this Contract is for an indefinite quantity of construction, standard or professional services or is a requirements type contract and the Contractor has submitted an M/WBE Utilization Plan and has committed to subcontract work to MBEs and/or WBEs in order to meet the Participation Goals, the Contractor will not be deemed in violation of the M/WBE Program requirements for this Contract with regard to any work which was intended to be subcontracted to an MBE and/or WBE to the extent that the Agency has determined that such work is not needed.
- 13. If Participation Goals have been established for this Contract or a Task Order issued pursuant to this Contract, at least once annually during the term of the Contract or Task Order, as applicable, Agency shall review the Contractor's progress toward attainment of its M/WBE Utilization Plan, including but not limited to, by reviewing the percentage of work the Contractor has actually awarded to MBE and/or WBE subcontractors and the payments the Contractor made to such subcontractors.
- 14. If **Participation Goals** have been established for this Contract or a Task Order issued pursuant to this Contract, Agency shall evaluate and assess the Contractor's performance in meeting those goals, and such evaluation and assessment shall become part of the Contractor's overall contract performance evaluation.

PART B: MISCELLANEOUS

- 1. The Contractor shall take notice that, if this solicitation requires the establishment of an M/WBE Utilization Plan, the resulting contract may be audited by DSBS to determine compliance with Section 6-129. See §6-129(e)(10). Furthermore, such resulting contract may also be examined by the City's Comptroller to assess compliance with the M/WBE Utilization Plan.
- 2. Pursuant to DSBS rules, construction contracts that include a requirement for an M/WBE Utilization Plan shall not be subject to the law governing Locally Based Enterprises set forth in Section 6-108.1 of the Administrative Code of the City of New York.
- 3. DSBS is available to assist contractors and potential contractors in determining the availability of MBEs and/or WBEs to participate as subcontractors, and in identifying opportunities that are appropriate for participation by MBEs and/or WBEs in contracts.
- 4. Prospective contractors are encouraged to enter into qualified joint venture agreements with MBEs and/or WBEs as defined by Section 6-129(c)(30).
- 5. By submitting a bid or proposal the Contractor hereby acknowledges its understanding of the M/WBE Program requirements set forth herein and the pertinent provisions of Section 6-129, and any rules promulgated thereunder, and if awarded this Contract, the Contractor hereby agrees to comply with the M/WBE Program requirements of this Contract and pertinent provisions of Section 6-129, and any rules promulgated thereunder, all of which shall be deemed to be material terms of this Contract. The Contractor hereby agrees to make all reasonable, good faith efforts to solicit and obtain the participation of MBEs and/or WBEs to meet the required Participation Goals.

ARTICLE II. ENFORCEMENT

1. If Agency determines that a bidder or proposer, as applicable, has, in relation to this procurement, violated Section 6-129 or the DSBS rules promulgated pursuant to Section 6-129, Agency may disqualify such bidder or proposer, as applicable, from competing for this Contract and the Agency may revoke such bidder's or proposer's prequalification status, if applicable.

- 2. Whenever Agency believes that the Contractor or a subcontractor is not in compliance with Section 6-129 or the DSBS rules promulgated pursuant to Section 6-129, or any provision of this Contract that implements Section 6-129, including, but not limited to any M/WBE Utilization Plan, Agency shall send a written notice to the Contractor describing the alleged noncompliance and offering the Contractor an opportunity to be heard. Agency shall then conduct an investigation to determine whether such Contractor or subcontractor is in compliance.
- 3. In the event that the Contractor has been found to have violated Section 6-129, the DSBS rules promulgated pursuant to Section 6-129, or any provision of this Contract that implements Section 6-129, including, but not limited to, any M/WBE Utilization Plan, Agency may determine that one of the following actions should be taken:
- (a) entering into an agreement with the Contractor allowing the Contractor to cure the violation;
- (b) revoking the Contractor's pre-qualification to bid or make proposals for future contracts;
- (c) making a finding that the Contractor is in default of the Contract;
- (d) terminating the Contract;
- (e) declaring the Contractor to be in breach of Contract;
- (f) withholding payment or reimbursement;
- (g) determining not to renew the Contract;
- (h) assessing actual and consequential damages;
- assessing liquidated damages or reducing fees, provided that liquidated damages may be based on amounts representing costs of delays in carrying out the purposes of the M/WBE Program, or in meeting the purposes of the Contract, the costs of meeting utilization goals through additional procurements, the administrative costs of investigation and enforcement, or other factors set forth in the Contract;
- (j) exercising rights under the Contract to procure goods, services or construction from another contractor and charge the cost of such contract to the Contractor that has been found to be in noncompliance; or
- (k) taking any other appropriate remedy.
- 4. If an M/WBE Utilization Plan has been submitted, and pursuant to this Article II, Section 3, the Contractor has been found to have failed to fulfill its Participation Goals contained in its M/WBE Utilization Plan or the Participation Goals as modified by Agency pursuant to Article I, Part A, Section 11, Agency may assess liquidated damages in the amount of ten percent (10%) of the difference between the dollar amount of work required to be awarded to MBE and/or WBE firms to meet the Participation Goals and the dollar amount the Contractor actually awarded and paid, and/or credited, to MBE and/or WBE firms. In view of the difficulty of accurately ascertaining the loss which the City will suffer by reason of Contractor's failure to meet the Participation Goals, the foregoing amount is hereby fixed and agreed as the liquidated damages that the City will suffer by reason of such failure, and not as a penalty. Agency may deduct and retain out of any monies which may become due under this Contract the amount of any such liquidated damages; and in case the amount which may become due under this Contract shall be less than the amount of liquidated damages suffered by the City, the Contractor shall be liable to pay the difference.
- 5. Whenever Agency has reason to believe that an MBE and/or WBE is not qualified for certification, or is participating in a contract in a manner that does not serve a commercially useful function (as defined in Section 6-129(c)(8)), or has violated any provision of Section 6-129, Agency shall notify the Commissioner of DSBS who shall determine whether the certification of such business enterprise should be revoked.
- 6. Statements made in any instrument submitted to Agency pursuant to Section 6-129 shall be submitted under penalty of perjury and any false or misleading statement or omission shall be grounds for the application of any applicable criminal and/or civil penalties for perjury. The making of a false or fraudulent statement by an MBE and/or WBE in any instrument submitted pursuant to Section 6-129 shall, in addition, be grounds for revocation of its certification.
- 7. The Contractor's record in implementing its M/WBE Utilization Plan shall be a factor in the evaluation of its performance. Whenever Agency determines that a Contractor's compliance with an M/WBE Utilization Plan has been unsatisfactory, Agency shall, after consultation with the City Chief Procurement Officer, file an advice of caution form for inclusion in VENDEX as caution data.

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 Carlala Commissioner

CONTRACTOR:

Title: // post lit

(Where Contractor is a Corporation, add): Attest:

In lava

(Seal)

ACKNOWLEDGMENT OF PRINCIPAL, IF A CORPORATION County of Occas ss: 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. 101 Ocopue Abe. SI., W.Y 10312 VICTORIA AYO-VAUGHAN Notary Public of C ommissioner of Deeds Notary Public, State of New York Registration #01AY5014042 Registration #UTAY 30 140-12 Qualified in Queens County Qualified in Queens County ACKNOWLEDGMENT OF PRINCIPAL, IF A PARTNERSHIP Commission Expires July 15, __ 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, the person described as such in and who as such executed the foregoing and he acknowledged to me that he executed the same as Deputy Commissioner for the purpos			
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,

AUTHORITY

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

DATED DATED

APPROPRIATION COMMISSIONER'S CERTIFICATE

In conformity with the provisions of Section 6-101of 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

Dix million nine hundred fifty four
Thousand, eight hooks I sout on chiers or]
Dollars (\$ 6,954,871,79)
is chargeable to the fund of the Department of Design and Construction entitled Code
TVI75 AQUA
Department of Design and Construction
I hereby certify that the specifications contained herein comply with the terms and conditions of the BUDGET.
Depty Commissioner
Sept. 13 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

BOND NUMBER: PB03008300025

Performance Bond #2 (Pages 94 to 97): Use if the total contract price is more than \$5 Million.

PERFORMANCE BOND #2 (Page 1)

PERFORMANCE BOND #2

KNOW ALL PE	RSONS BY THESE PRESENTS, That we,
SIGNATURE CONSTRU	ICTION GROUP, INC
160 7TH STREET	
BROOKLYN, NY 11215	
ereinafter referred to as t	he "Principal", and
PHILADELPHIA INDEM	NITY INSURANCE COMPANY
ONE BALA PLAZA, SUI	TE 100
BALA CYNWYD, PA 19	004
ereinafter referred to as the ereinafter referred to as the	the "Surety" ("Sureties") are held and firmly bound to THE CITY OF NEW YORK, he "City" or to its successors and assigns, in the penal sum of
SIX MILLION NINE HUNI	DRED FIFTY FOUR THOUSAND EIGHT HUNDRED SEVENTY ONE AND
79/100 DOLLARS	,
f money well and truly to uccessors and assigns, joi WHEREAS, the I	Dollars, lawful money of the United States, for the payment of which said sum to be made, we, and each of us, bind ourselves, our heirs, executors, administrators, ntly and severally, firmly by these presents. Principal is about to enter, or has entered, into a Contract in writing with the City for A STATEN ISLAND ZOO AQUARIUM RECONSTRUCTION, 614 BROADWAY,
STATEN ISLAND, NY 10	0310 E-PIN: 85015B0174001 DDC PIN: 8502015PV0020C
copy of which Contract is	s annexed to and hereby made a part of this bond as though herein set forth in full;

Performance Bond #2 (Pages 94 to 97): Use if the total contract price is more than \$5 Million.

PERFORMANCE BOND #2 (Page2)

NOW, THEREFORE, the conditions of this obligation are such that if the Principal, his or its representatives or assigns, shall well and faithfully perform the said Contract and all modifications, amendments, additions and alterations thereto that may hereafter be made, according to its terms and its true intent and meaning, including repair and or replacement of defective work and guarantees of maintenance for the periods stated in the Contract, and shall fully indemnify and save harmless the City from all cost and damage which it may suffer by reason of the Principal's default of the Contract, and shall fully reimburse and repay the City for all outlay and expense which the City may incur in making good any such default and shall protect the said City of New York against, and pay any and all amounts, damages, cost and judgments which may or shall be recovered against said City or its officers or agents or which the said City of New York may be called upon to pay any person or corporation by reason of any damages arising or growing out of the Principal's default of the Contract, then this obligation shall be null and void, otherwise to remain in full force and effect.

The Surety (Sureties), for value received, hereby stipulates and agrees, upon written notice from the City that the City has determined that the Principal is in default of the Contract, to either (1) pay the full amount of the above penal sum in complete discharge and exoneration of this bond and of all the liabilities of the Surety relating to this bond, or (2) fully perform and complete the Work to be performed under the Contract, pursuant to the terms, conditions, and covenants thereof. The Surety (Sureties) further agrees, at its option, either to tender the penal sum or to commence and diligently perform the Work specified in the Contract, including physical site work, within twenty-five (25) business days after written notice thereof from the City and to complete all Work within the time set forth in the Contract or such other time as agreed to between the City and Surety in accordance with the Contract. The Surety and the City reserve all rights and defenses each may have against the other; provided, however, that the Surety expressly agrees that its reservation of rights shall not provide a basis for non-performance of its obligation to commence and to complete all Work as provided herein.

The Surety (Sureties), for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of said Surety (Sureties) and its bond shall be in no way impaired or affected by any extension of time, modification, omission, addition, or change in or to the said Contract or the Work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or by any assignment, subletting or other transfer thereof or of any Work to be performed or any moneys due or to become due thereunder; and said Surety (Sureties) does hereby waive notice of any and all of such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts and transfers, and hereby expressly stipulates and agrees that any and all things done and omitted to be done by and in relation to assignees, subcontractors, and other transferees shall have the same effect as to said Surety (Sureties) as though done or omitted to be done by or in relation to said Principal.

Performance Bond #2 (Pages 94 to 97): Use if the total contract price is more than \$5 Million.

PERFORMANCE BOND #2 (Page 3)

IN WITNESS WHEREOF, the Principal and the Surety (Sureties) have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereunto affixed and these presents to be signed by their proper officers, this 15th day of APRIL 2016

(Seal) SIGNATURE CONSTRUCTION GROUP, INC.				
		AND THE SHAPE OF T	Principal	_(L.S.)
		Ву:	Jon Tan	raj
(Seat)		PHILADELPHIA	Surety	RANCE COMPANY
(Seal)		DAVID A. (GOLDSTEIN, ATTO	RNEY - IN - FACT
(OCA)		Ву:	Surety	
(Seal)				THE CONTINUE
		All the second s	Surety	Makes of Systems or
		Ву:		No. of the last of
(Seal)				
			Surety	
		Ву:		- Add Tomation
(Seal)				
			Surety	
Bond Premium Rate	SLIDING SCALE			
Bond Premium Cost	\$60,934			
If the Contractor (Princi	pal) is a partnership, the bon	d should be signed I	y each of the indivi	duale who are normal
If the Contractor (Princ authorized officer, agent	cipal) is a corporation, the b	oond should be sign	ned in its correct co	orporate name by a duly
There should be execu counterparts of the Cont	ted an appropriate number ract,	of counterparts of	the bond correspon	nding to the number of
			•	
CITY OF NEW YORK DDC		96	STANDARD CON	STRUCTION CONTRACT

Performance Bond #2 (Pages 94 to 97): Use if the total contract price is more than \$5 Million.

PERFORMANCE BOND #2 (Page 4)

CITY OF NEW YORK DDC	97	STANDARD CONSTRUC	TION CONTRACT
Affix	Acknowledgments and Justific	cation of Sureties.	
(b) appropriate duly certified copy of agent, officer or other representative of Surety under which Power of Atto issued, and (d) certified copy of latest	of Principal or Surety; (c) a d	bly certified extract from By-L	ond is executed by aws or resolutions
Notary Public or Commissioner of D	eeds		
the instrument.	o the met of mother sign	nature on the instrument, said i	ndividual executed
the within instrument and acknowled			me is subscribed to
On this day of 20 to me known, who, being by me duly	awuiii wiu ucdose and sav ihat h	e/che recidec at	
State of			
	VLEDGMENT OF PRINCIPA		
Notary Public or Commissioner of I	Deeds		
	y	шим эшр.	
the partnership described in and whice foregoing instrument as the duly auth	ii executed the foregoing inclui	ment and that hatche comme to be	her name to the
a limited/g	eneral partnership existing under	e is part er the laws of the State of	
to me known, who, being by me dul	y sworn and depose and say that	he/she resides at	
On this day of	_, 20 before me perso	nally came	
State of	County of	\$\$.	
	WLEDGMENT OF PRINCIPA		
Notary Public or Commissioner of	Deeds		Qualified in Westchester County Commission Expires March 26, 2020
			No. 01W A6258487
instrument by order of the directors	of said corporation as the duly a	nuthorized and binding act therec	MARK T. WAI TED
Staten (slaw) My 10312	that he she is ab	hat he/she resides at 101 6	clanic Ave
On this & day of A Occ	1 20 11	sonally came Daniel	Times
State of New York Co	unty of Wetchesters:		
ACKNO	WLEDGMENT OF PRINCIP	AL, IF A CORPORATION	

REPLACE TENTED

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THE COLORS OF THE SELECTED

DIGG AS ASSAULT BASES OF THE

ACKNOWLEDGEMENT OF SURETY

State of NEW YORK)
	:ss:
County of SUFFOLK)

On the 15th day of APRIL, 20 16, before me personally came DAVID A. GOLDSTEIN to me known, who, being by me duly sworn, did depose and say the (s)he resides at MERRICK, NEW YORK that (s)he is the Attorney-In-Fact of PHILADELPHIA INDEMNITY INSURANCE COMPANY the Corporation described in and which executed the above instrument; that (s)he knows the seal of said Corporation; that one of the seals affixed by order of the Board of Directors of said Corporation; and that (s)he signed his/her name thereto by like order.

JENNIFER SPADARO
Notary Public State of New York
No. 01SP5017514
Qualified in Suffolk County
Commission Expires Sept. 7

Notary Public

ennifer Spada

BOND NO: PB03008300025

PHILADELPHIA INDEMNITY INSURANCE COMPANY

One Bala Plaza, Suite 100 Bala Cynwyd, PA 19004 Power of Attorney

KNOW ALL PERSONS BY THESE PRESENTS: that PHILADELPHIA INDEMNITY INSURANCE COMPANY (the Company), a corporation organized and existing under the laws of the Commonwealth of Pennsylvania, does hereby constitute and appoint: David A. Goldstein & Glenn Glubiak of Omni Risk Management A Division of Assured SKCG, Inc.

Its true and lawful Attorney(s) in fact with full authority to execute on its behalf bonds, undertakings, recognizances and other contracts of indemnity and writings obligatory in the nature thereof, issued in the course of its business and to bind the Company thereby, in an amount not to exceed \$25,000,000.00

This Power of Attorney is granted and is signed and sealed by facsimile under and by the authority of the following Resolution adopted by the Board of Directors of PHILADELPHIA INDEMNITY INSURANCE COMPANY at a meeting duly called the 1st day of July, 2011.

RESOLVED:

That the Board of Directors hereby authorizes the President or any Vice President of the Company to: (1) Appoint Attorney(s) in Fact and authorize the Attorney(s) in Fact to execute on behalf of the Company bonds and undertakings, contracts of indemnity and other writings obligatory in the nature thereof and to attach the seal of the Company thereto; and (2) to remove, at any time, any such Attorney-in-Fact and revoke the authority given. And, be it

FURTHER RESOLVED:

That the signatures of such officers and the seal of the Company may be affixed to any such Power of Attorney or certificate relating thereto by facsimile, and any such Power of Attorney so executed and certified by facsimile signatures and facsimile seal shall be valid and biding upon the Company in the future with the respect to any bond or undertaking to which it is attached.

IN TESTIMONY WHEREOF, PHILADELPHIA INDEMNITY INSURANCE COMPANY HAS CAUSED THIS INSTRUMENT TO BE SIGNED AND ITS CORPORATE SEALTO BE AFFIXED BY ITS AUTHORIZED OFFICE THIS 7^{TH} DAY OF FEBRUARY 2013.



(Seal)

Rownery

Robert D. O'Leary Jr., President & CEO Philadelphia Indemnity Insurance Company

On this 7th day of February 2013, before me came the individual who executed the preceding instrument, to me personally known, and being by me duly sworn said that he is the therein described and authorized officer of the **PHILADELPHIA INDEMNITY INSURANCE COMPANY**; that the seal affixed to said instrument is the Corporate seal of said Company; that the said Corporate Seal and his signature were duly affixed.

COMMONWEALTH OF PENNSYLVANIA

NOTARIAL SEAL

DANIELLE PORATH, Notary Public

Lower Merion Twp., Montgomery County
My Commission Expires Merch 22, 2016

Notary Public:

700

(Notary Seal)

residing at:

Bala Cynwyd, PA

My commission expires:

March 22, 2016

I, Craig P. Keller, Executive Vice President, Chief Financial Officer and Secretary of PHILADELPHIA INDEMNITY INSURANCE COMPANY, do herby certify that the foregoing resolution of the Board of Directors and this Power of Attorney issued pursuant thereto are true and correct and are still in full force and effect. I do further certify that Robert D. O'Leary Jr., who executed the Power of Attorney as President, was on the date of execution of the attached Power of Attorney the duly elected President of PHILADELPHIA INDEMNITY INSURANCE COMPANY.

In Testimony Whereof I have subscribed my name and affixed the facsimile seal of each Company this

his 15th day of

1922

Craig P. Keller, Executive Vice President, Chief Financial Officer & Secretary PHILADELPHIA INDEMNITY INSURANCE COMPANY

PHILADELPHIA INDEMNITY INSURANCE COMPANY

Statutory Statements of Admitted Assets, Liabilities and Capital and Surplus (in thousands, except par value and share amounts)

Admitted Assets	As of December 31,		
	2014		
Bonds (fair value \$6,153,215 and \$5,687,336)	\$ 5,869,602	2013 \$ 5.603.006	
Preferred stocks (fair value \$59,525 and \$-)	59.413	\$ 5,603,006	
Common stocks (cost \$110,951 and \$3,594)	97,616	3.604	
Mortgage loans	21,402	3,594	
Other invested assets (cost \$156,141 and \$26,678)		26.670	
Cash and short-term investments	154,549	26,678	
Cash and invested assets	45,054	2,441	
	6,247,636	5,635,719	
Premiums receivable, agents' balances and other receivables	C72 500		
Reinsurance receivable on paid losses	673,590	626,337	
Accrued investment income	27,162	26,176	
Receivable from affiliates	65,074	61,467	
Net deferred tax asset	4,104	2,948	
Federal income taxes receivable	164,545	162,476	
Guaranty funds receivable	•	10,909	
Total admitted assets	<u> </u>	29	
. 5011 401111110 455015	\$ 7,182,217	\$ 6.526,061	
Liabilities and Capital and Surplus			
Liabilities:			
Net unpaid losses and loss adjustment expenses	\$ 3,169,910	Φ 0.00 ± 00 ±	
Net unearned premiums		\$ 2,895,803	
Reinsurance payable on paid loss and loss adjustment expenses	1,260,065	1,164,576	
Ceded reinsurance premiums payable	3,747	3,621	
Commissions payable, contingent commissions and other similar charges	63,104	63,156	
Federal income taxes payable	226,034	204,448	
Accrued expenses and other liabilities	13,990	•	
Payable to affiliates	50,060	31,505	
Provision for reinsurance	9,877	4,695	
Payable for policyholders' dividends	1,000	1,323	
Payable for purchased securities	221	220	
Total liabilities	46,833		
rota naomitics	4,844,841	4,369,347	
Capital;			
Common stock, par value of \$10 per share; 1,000,000 shares			
authorized, 359,995 shares issued and outstanding			
Surplus:	3,600	3,600	
Gross paid-in and contributed surplus			
Unassigned surplus	386,970	386,970	
Total surplus	1.946,806	1,766,144	
Total capital and cumber	<u>2,333,776</u>	2,153,114	
Total capital and surplus	2,337,376	2.156,714	
Total liabilities and capital and surplus	\$ 7,182,217	\$ 6,526.061	
		~	

The undersigned, being duly sworn, says: That she is the Executive Vice President and Chief Financial Officer of Philadelphia Indemnity Insurance Company; that said Company is a corporation duly organized in the state of Pennsylvania, and licensed and engaged in the State of Pennsylvania and has duly complied with all the requirements of the laws of the said State applicable of the said Company and is duly qualified to act as Surety under such laws; that said Company has also complied with and is duly qualified to act as Surety under the Act of Congress. And that to the best of her knowledge and belief the above statement is a full, true and correct statement of

Attest:

Notarial Seal
Kimberly A. Kessleski, Notary Public
Lower Merion Twp., Montgomery County
My Commission Expires Dec. 18, 2016
MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES

Sworn to before me this 8th day of June 2015.

Karen Gilmer-Pauciello, EVP & CFO

Kimberly Kessleski, Notary

BOND NUMBER: PB03008300025

Payment Bond (Pages 98 to 101): Use for any contract for which a Payment Bond is required. PAYMENT BOND (Page 1) PAYMENT BOND KNOW ALL PERSONS BY THESE PRESENTS, That we, ___ SIGNATURE CONSTRUCTION GROUP, INC. 160 7TH STREET **BROOKLYN, NY 11215** hereinafter referred to as the "Principal", and ______ PHILADELPHIA INDEMNITY INSURANCE COMPANY ONE BALA PLAZA, SUITE 100 BALA CYNWYD, PA 19004 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 SIX MILLION NINE HUNDRED FIFTY FOUR THOUSAND EIGHT HUNDRED SEVENTY ONE AND **79/100 DOLLARS** (\$6,954,871.79) 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 PROJECT ID: PV175AQUA STATEN ISLAND ZOO AQUARIUM RECONSTRUCTION, 614 BROADWAY, STATEN ISLAND, NY 10310 E-PIN: 85015B0174001 DDC PIN: 8502015PV0020C 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 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

DDC

Payment Bond (Pages 98 to 101): Use for any contract for which a Payment Bond is required.

PAYMENT BOND (Page 2)

engaged who perform the work of laborers or mechanics at or in the vicinity of the site of the Project regardless of any contractual relationship between the Principal or such Subcontractors, or his or their successors or assigns, on the one hand and such laborers or mechanics on the other, but not including office employees not regularly stationed at the site of the project; and

(b) Materials and supplies (whether incorporated in the permanent structure or not), as well as teams, fuels, oils, implements or machinery furnished, used or consumed by said Principal or any subcontractor at or in the vicinity of the site of the Project in the prosecution of the Work under said Contract and any amendment or extension thereof or addition thereto; then this obligation shall be void, otherwise to remain in full force and effect.

This bond is subject to the following additional conditions, limitations and agreements:

- (a) The Principal and Surety (Sureties) agree that this bond shall be for the benefit of any materialmen or laborer having a just claim, as well as the City itself.
- (b) All persons who have performed labor, rendered services or furnished materials and supplies, as aforesaid, shall have a direct right of action against the Principal and his, its or their successors and assigns, and the Surety (Sureties) herein, or against either or both or any of them and their successors and assigns. Such persons may sue in their own name, and may prosecute the suit to judgment and execution without the necessity of joining with any other persons as party plaintiff.
- (c) The Principal and Surety (Sureties) agree that neither of them will hold the City liable for any judgment for costs of otherwise, obtained by either or both of them against a laborer or materialman in a suit brought by either a laborer or materialman under this bond for moneys allegedly due for performing work or furnishing material.
- (d) The Surety (Sureties) or its successors and assigns shall not be liable for any compensation recoverable by an employee or laborer under the Workmen's Compensation Law.
- (e) In no event shall the Surety (Sureties), or its successors or assigns, be liable for a greater sum than the penalty of this bond or be subject to any suit, action or proceeding hereon that is instituted by any person, firm, or corporation hereunder later than two years after the complete performance of said Contract and final settlement thereof.

The Principal, for himself and his successors and assigns, and the Surety (Sureties), for itself and its successors and assigns, do hereby expressly waive any objection that might be interposed as to the right of the City to require a bond containing the foregoing provisions, and they do hereby further expressly waive any defense which they or either of them might interpose to an action brought hereon by any person, firm or corporation, including subcontractors, materialmen and third persons, for work, labor, services, supplies or material performed rendered, or furnished as aforesaid upon the ground that there is no law authorizing the City to require the foregoing provisions to be placed in this bond.

And the Surety (Sureties), for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of said Surety (Sureties), and its bonds shall be in no way impaired or affected by any extension of time, modification, omission, addition, or change in or of the said Contract or the work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or by any assignment, subletting or other transfer thereof or of any part thereof, or of any Work to be performed, or any moneys due to become due thereunder and said Surety (Sureties) does hereby waive notice of any and all of such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts and transfers, and hereby expressly stipulates and agrees that any and all things done and omitted to be done by and in relation to assignees, Subcontractors, and other transferees shall have the same effect as to said Surety (Sureties) as though done or omitted to be done or in relation to said Principal.

Payment Bond (Pages 98 to 101): Use for any contract for which a Payment Bond is required.

PAYMENT BOND (Page 3)

ITY OF NEW YORK DDC	100	STANDARD C	ONSTRUCTION CONTRACT
	THE Administration of the American September 1990 and the Amer		
		;	
counterparts of the Contract.	married of counterpa	arts of the bond co	rresponding to the number of
There should be executed an appropriate	•	orte of the band on	
If the Contractor (Principal) is a corporat authorized officer, agent, or attorney-in-fac	ion, the bond should	be signed in its con	rect corporate name by a duly
If the Contractor (Principal) is a partnershi			
If the Contractor (British 1)			
	Ву:		
		Surety	tan-hali penan tengganan
(Seal)			
	Ву:		Philosophic paper autor and company.
		Surety	
(Seal)			
	Ву:	Paramondo y B. Advinous for the state paramondo de la principal de mandata a securado.	- decrease and the second seco
		Surety	
(Seal)	***		
	By:	A. GOLDSTEIN, ATT	ORNEY - IN - FACT
	(Surety	•
(Seal)	PHILADELPHIA	INDEMNITY INSURA	NCE COMPANY
	Ву:	Van /an	
	, <u>'</u>	Principal	p
(Seal)	SIGNATURE CONSTR	RUCTION GROUP, IN	<u>C. (L.S.)</u>
proper ornicers, uns	day of	AI ME	2016
and such of them as are corporations have signed by their proper officers, this	ve caused men comor	ale ceals to he heren	nto affixed and these presents to
IN WITNESS HEREOF, the Pr	rincipal and the Suret	V (Sureties) have he	reunto set their hands and seals,

Payment Bond (Pages 98 to 101): Use for any contract for which a Payment Bond is required.

PAYMENT BOND (Page 4)

ACKNOWLEDGMENT OF PRINCIPAL, IF A CORPORATION State of New York County of Whitchester ss:

On this 18th day of Capil, 2016 before me personally came Daniel Tong; to me known, who, being by me duly sworn did depose and say that he resides at State Islam we 10312 that he is the Procedure 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

MARK T. WALTER
Notary Public, State of New York
No. 01W A6258487
Qualified in Westchester County
Commission Expires March 26, 2020

ACKNOWLEDGMENT OF PRINCIPAL, IF A PARTNERSHIP

Stat	te of _			Coun	y of	······································		***************************************	SS:							
On	this	Belleville and Constitution of the Constitutio	da	y of	*******	***************************************		۰	· · · · · · · · · · · · · · · · · · ·		befo	ore me	person	nally	appe	ared
to	me	known,	and	known	to	me	to	be	one	of	the	members	of	the	firm	of
me t	that he	executed	the same	descrit as and f	bed in	n and a	who e	xecu d of	ted the said fin	foreg m.	oing i	nstrument;	and he	ackno	wledge	d to
			A C I	ZNOWI					Commi							
			ACI	CHOWL	EDG	MENI	OF P	'RIN	<u>CIPAL</u>	<u>, IF A</u>	N IND	IVIDUAL				
State	of			_ County	y of _		······································	{	SS:							
On	this			day (of	- Constitution of the Cons	~~~~		**************************************		before	me	persona	ally	appea	red
to m	e knov owledg	vn, and ki	nown to	me to b	e the	perso	n desc	cribe	d in an	d who	o exec	uted the for	eg oing	instr	iment;	and
					7	lotary	Public	or C	Commis	sione	r of De	eds				

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

CITY OF NEW YORK

101

STANDARD CONSTRUCTION CONTRACT
December 2013

Bi the company of the

ACKNOWLEDGEMENT OF SURETY

State of NEW YORK)
	SS
County of SUFFOLK)

On the 15th day of APRIL, 20 16, before me personally came DAVID A. GOLDSTEIN to me known, who, being by me duly sworn, did depose and say the (s)he resides at MERRICK, NEW YORK that (s)he is the Attorney-In-Fact of PHILADELPHIA INDEMNITY INSURANCE COMPANY the Corporation described in and which executed the above instrument; that (s)he knows the seal of said Corporation; that one of the seals affixed by order of the Board of Directors of said Corporation; and that (s)he signed his/her name thereto by like order.

JENNIFER SPADARO
Notary Public State of New York
No. 01SP5017514
Qualified in Suffolk County
Commission Expires Sept. 7

Notary Public

Jennifer Spadar

BOND NO: PB03008300025

PHILADELPHIA INDEMNITY INSURANCE COMPANY

One Bala Plaza, Suite 100 Bala Cynwyd, PA 19004 Power of Attorney

KNOW ALL PERSONS BY THESE PRESENTS: that PHILADELPHIA INDEMNITY INSURANCE COMPANY (the Company), a corporation organized and existing under the laws of the Commonwealth of Pennsylvania, does hereby constitute and appoint: <u>David A. Goldstein & Glenn Glubiak of Omni Risk</u>

<u>Management A Division of Assured SKCG, Inc.</u>

Its true and lawful Attorney(s) in fact with full authority to execute on its behalf bonds, undertakings, recognizances and other contracts of indemnity and writings obligatory in the nature thereof, issued in the course of its business and to bind the Company thereby, in an amount not to exceed \$25,000,000.00

This Power of Attorney is granted and is signed and sealed by facsimile under and by the authority of the following Resolution adopted by the Board of Directors of PHILADELPHIA INDEMNITY INSURANCE COMPANY at a meeting duly called the 1st day of July, 2011.

RESOLVED:

That the Board of Directors hereby authorizes the President or any Vice President of the Company to: (1) Appoint Attorney(s) in Fact and authorize the Attorney(s) in Fact to execute on behalf of the Company bonds and undertakings, contracts of indemnity and other writings obligatory in the nature thereof and to attach the seal of the Company thereto; and (2) to remove, at any time, any such Attorney-in-Fact and revoke the authority given. And, be it

FURTHER RESOLVED:

That the signatures of such officers and the seal of the Company may be affixed to any such Power of Attorney or certificate relating thereto by facsimile, and any such Power of Attorney so executed and certified by facsimile signatures and facsimile seal shall be valid and biding upon the Company in the future with the respect to any bond or undertaking to which it is attached.

IN TESTIMONY WHEREOF, PHILADELPHIA INDEMNITY INSURANCE COMPANY HAS CAUSED THIS INSTRUMENT TO BE SIGNED AND ITS CORPORATE SEALTO BE AFFIXED BY ITS AUTHORIZED OFFICE THIS 7^{TI} DAY OF FEBRUARY 2013.



Robert D. O'Leary Jr., President & CEO

Philadelphia Indemnity Insurance Company in this 7th day of February 2013, before me came the individual who executed the preceding instrument of the preceding instrument.

On this 7th day of February 2013, before me came the individual who executed the preceding instrument, to me personally known, and being by me duly sworn said that he is the therein described and authorized officer of the **PHILADELPHIA INDEMNITY INSURANCE COMPANY**; that the seal affixed to said instrument is the Corporate seal of said Company; that the said Corporate Seal and his signature were duly affixed.

COMMONWEALTH OF PENNSYLVANIA

NOTARIAL SEAL

DANIELLE PORATH, Notary Public
Lower Merion Twp., Montgornery County
My Commission Expires Merch 22, 2016

Notary Public

residing at:

Bala Cynwyd, PA

(Notary Seal)

(Seal)

My commission expires:

March 22, 2016

I, Craig P. Keller, Executive Vice President, Chief Financial Officer and Secretary of PHILADELPHIA INDEMNITY INSURANCE COMPANY, do herby certify that the foregoing resolution of the Board of Directors and this Power of Attorney issued pursuant thereto are true and correct and are still in full force and effect. I do further certify that Robert D. O'Leary Jr., who executed the Power of Attorney as President, was on the date of execution of the attached Power of Attorney the duly elected President of PHILADELPHIA INDEMNITY INSURANCE COMPANY.

In Testimony Whereof I have subscribed my name and affixed the facsimile seal of each Company this

<u> 15th</u> day of _

1 20 16

A CONTRACTOR OF THE PARTY OF TH

Craig P. Keller, Executive Vice President, Chief Financial Officer & Secretary PHILADELPHIA INDEMNITY INSURANCE COMPANY

PHILADELPHIA INDEMNITY INSURANCE COMPANY

Statutory Statements of Admitted Assets, Liabilities and Capital and Surplus (in thousands, except par value and share amounts)

Admitted Assets		cember 31,
Don da (frie males #6 152 015 and #5 605 006)	<u>2014</u>	<u>2013</u>
Bonds (fair value \$6,153,215 and \$5,687,336)	\$ 5,869,602	\$ 5,603,006
Preferred stocks (fair value \$59,525 and \$-)	59,413	
Common stocks (cost \$110,951 and \$3,594) Mortgage loans	97,616	3,594
Other invested assets (cost \$156,141 and \$26,678)	21,402	
Cash and short-term investments	154,549	26,678
Cash and invested assets	45,054	2,441
Cash and myested assets	6,247,636	5,635,719
Premiums receivable, agents' balances and other receivables	673,590	626,337
Reinsurance receivable on paid losses	27,162	26,176
Accrued investment income	65,074	61,467
Receivable from affiliates	4,104	2,948
Net deferred tax asset	164,545	162,476
Federal income taxes receivable	, ·	10,909
Guaranty funds receivable	106	29
Total admitted assets	\$ 7,182,217	\$ 6,526,061
Liabilities and Capital and Surplus		
Liabilities:		
Net unpaid losses and loss adjustment expenses	\$ 3,169,910	\$ 2,895,803
Net unearned premiums	1,260,065	1,164,576
Reinsurance payable on paid loss and loss adjustment expenses	3,747	3,621
Ceded reinsurance premiums payable	63,104	63,156
Commissions payable, contingent commissions and other similar charges	226,034	204,448
Federal income taxes payable	13,990	201,110
Accrued expenses and other liabilities	50,060	31,505
Payable to affiliates	9,877	4,695
Provision for reinsurance	1,000	1,323
Payable for policyholders' dividends	221	220
Payable for purchased securities	46,833	
Total liabilities	4,844,841	4,369,347
Capital:		
Common stock, par value of \$10 per share; 1,000,000 shares		
authorized, 359,995 shares issued and outstanding	3.600	3,600
Surplus:	5,000	3,000
Gross paid-in and contributed surplus	386,970	386,970
Unassigned surplus	1.946,806	1,7 <u>66,144</u>
Total surplus	2,333,776	2,153,114
Total capital and surplus	2,337,376	2.156,714
Total liabilities and capital and surplus	\$ 7.182.217	\$ 6.526.061
• • • •	102020411	<u>₩ . ₩,240,001</u>

The undersigned, being duly sworn, says: That she is the Executive Vice President and Chief Financial Officer of Philadelphia Indemnity Insurance Company; that said Company is a corporation duly organized in the state of Pennsylvania, and licensed and engaged in the State of Pennsylvania and has duly complied with all the requirements of the laws of the said State applicable of the said Company and is duly qualified to act as Surety under such laws; that said Company has also complied with and is duly qualified to act as Surety under the Act of Congress. And that to the best of her knowledge and belief the above statement is a full, true and correct statement of

Attest:

COMMONWEALTH OF PENNSYLVANIA Notarial Seal Kimberly A. Kessleski, Notary Public Lower Merion Twp., Montgomery County My Commission Expires Dec. 18, 2016 MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES

Sworn to before me this 8th day of June 2015.

Karen Gilmer-Pauciello, EVP & CFO

Kimberly Kessleski, Notary

ACORD.

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

1856 Cook Maran & Associates 40 Marcus Drive, 3rd Floor	CONTACT COOK Maran & Associates PHONE (A/C, No, Ext): 631-390-9700 E-MAIL ADDRESS: Certificates@cookmaran.com	631-390-9790
Melville, NY 11747	INSURER(S) AFFORDING COVERAGE INSURER A : Travelers Indemnity Company	NAIC #
Signature Construction Group, Inc.	INSURER B: Travelers Indemnity Company	25658 25658
160 7th Street Brooklyn, NY 11215	INSURER C: Travelers Casualty Ins Co of Am INSURER D: Philadelphia Indemnity Ins Comp	19046 18058
COVERAGES CERTIFICATE NUMBER	INSURER E : Columbia Casualty Company INSURER F :	

	THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD CERTIFICATE MAY BE ISSUED ON A REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT.							
Į.	EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.							
17	ATTE OF INSURANCE	INSF	WVC	POLICY NUMBER	POLICY EFF (MM/DD/YYY	POLICY EXP	LIMI	TS
	X COMMERCIAL GENERAL LIABILITY	Y		DTCO0F608387PHX15	09/19/201	5 09/19/201	6 EACH OCCURRENCE	\$2,000,000
	CLAIMS-MADE X OCCUR				1		DAMAGE TO RENTED PREMISES (Ea occurrence)	\$300,000
	X PD Ded:5,000						MED EXP (Any one person)	s10,000
l		-					PERSONAL & ADV INJURY	\$2,000,000
l	GEN'L AGGREGATE LIMIT APPLIES PER:	-			1		GENERAL AGGREGATE	s4,000,000
Ŀ	POLICY X PRO-				1		PRODUCTS - COMP/OP AGG	s4,000,000
E	AUTOMOBILE LIABILITY			BA0F56802315CNS	09/19/2014	09/19/2016	COMBINED SINGLE LIMIT (Ea accident)	\$
	ALLOWNED SCHEDINED	-			10,2010	03/13/2016	(La accident)	\$1,000,000
	AUTOS AUTOS				}		BODILY INJURY (Per person) BODILY INJURY (Per accident)	\$
	X HIRED AUTOS X NON-OWNED AUTOS						PROPERTY DAMAGE	
В	 	ļ					(Per accident)	\$
•	X UMBRELLA LIAB X OCCUR			DTSMCUP0F608387IND	09/19/2015	09/19/2016	EACH OCCURRENCE	\$
	CLAIMS-MADI					00,10,2010	AGGREGATE	\$5,000,000
С	DED X RETENTION \$10,000 WORKERS COMPENSATION	+						\$5,000,000
Ŭ	AND EMPLOYERS' LIARILITY	1	1	DTAUB0G43362215	06/02/2015	06/02/2016	X WC STATU- TORY LIMITS OTH-	\$
	ANY PROPRIETOR/PARTNER/EXECUTIVE N/N OFFICER/MEMBER EXCLUDED? (Mandatory in NH)	N/A				1 1		\$1,000,000
	If yes, describe under DESCRIPTION OF OPERATIONS below					, ,	E.L. DISEASE - EA EMPLOYEE	
D	Excess Liability	\vdash		DIMIDOLOGI			E.L. DISEASE - POLICY LIMIT	\$1,000,000 \$1,000,000
E	Professional						\$5,000,000	
				CPB6020570991	01/25/2016	01/25/2017	\$2,000,000 per Claim	ŀ
ŒS	CRIPTION OF OPERATIONS / LOCATIONS / VEHIC	I FS (A	tach A	CORD 101 1 1 1				
The	e certificate holder and the following are included as Additional Remarks Schedule, if more space is required)							

The certificate holder and the following are included as Additional Insureds with respects to General Liability as required by a written contract: The City of New York, including its officials and employees.

CERTIFICATE HOLDER	CANCELLATION
City of New York Department of Design and Construction 30-30 Thomson Avenue	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.
Long Island City, NY 11101	AUTHORIZED REPRESENTATIVE
	Leonard Drivscia

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WORKERS' COMPENSATION BOARD

CERTIFICATE OF NYS WORKERS' COMPENSATION INSURANCE COVERAGE

1a. Legal Name & Address of Insured (Use street address Signature Construction Group, Inc.	
160 7th Street Brooklyn, NY 11215 Work Location of Insured (Only required if covers specifically limited to certain locations in New York State, Wrap-Up Policy)	1c. NYS Unemployment Insurance Employer Registration Number of Insured 1d. Federal Employer Identification Number of Insured or Social Security Number
	133572304
2. Name and Address of the Entity Requesting Proof of Coverage (Entity Being Listed as the Certificate Holder) ACCO's Office Insurance Unit 30-30 Thomson Avenue, 4 th Floor Long Island City, New York 11101	3a. Name of Insurance Carrier Travelers Casualty Ins Co of Amer 3b. Policy Number of entity listed in box "1a" DTAUB0G43362215 3c. Policy effective period 06/02/2015 to 06/02/2016
	3d. The Proprietor, Partners or Executive Officers are
	included. (Only check box if all partners/officers included)
	all excluded or certain partners/officers excluded.
the Insurance Carrier will also notify the above certificate h	solder within 10 days IF and
rom the coverage indicated on this Certificate. (These notices	nolder within 10 days IF a policy is canceled due to nonpayment of impayment of premiums that cancel the policy or eliminate the insured may be sent by regular mail.) Otherwise, this Certificate is valid for or its licensed agent, or until the policy expiration date listed in box
rom the coverage indicated on this Certificate. (These notices one year after this form is approved by the insurance carrier of 3c", whichever is earlier. Please Note: Upon the cancellation of the workers' compensamed on a permit, license or contract issued by a certificate ew Certificate of Workers' Compensation Coverage or chandatory coverage requirements of the New York State Wonder penalty of perjury. I certify that I am an outborized we	may be sent by regular mail.) Otherwise, this Certificate is valid for or its licensed agent, or until the policy expiration date listed in box ation policy indicated on this form, if the business continues to be the holder, the business must provide that certificate holder with a other authorized proof that the business is complying with the orkers' Compensation Law.
rom the coverage indicated on this Certificate. (These notices one year after this form is approved by the insurance carrier of 3c", whichever is earlier. Please Note: Upon the cancellation of the workers' compensamed on a permit, license or contract issued by a certificate ew Certificate of Workers' Compensation Coverage or chandatory coverage requirements of the New York State Wonder penalty of perjury, I certify that I am an authorized rebove and that the named insured has the coverage as depicted.	may be sent by regular mail.) Otherwise, this Certificate is valid for or its licensed agent, or until the policy expiration date listed in box ation policy indicated on this form, if the business continues to be the holder, the business must provide that certificate holder with a other authorized proof that the business is complying with the orkers' Compensation Law.
rom the coverage indicated on this Certificate. (These notices one year after this form is approved by the insurance carrier of 3c", whichever is earlier. Please Note: Upon the cancellation of the workers' compens amed on a permit, license or contract issued by a certificate ew Certificate of Workers' Compensation Coverage or contract issued by a certificate ew Certificate of Workers' Compensation Coverage or contract issued by a certificate ew Certificate of Workers' Compensation Coverage or contract issued by a certificate workers' compensation Coverage or contract issued by a certificate when the coverage is depicted by the coverage as depicted by the coverage as depicted approved by: Approved by: Leonard Scio	may be sent by regular mail.) Otherwise, this Certificate is valid for or its licensed agent, or until the policy expiration date listed in box ation policy indicated on this form, if the business continues to be the holder, the business must provide that certificate holder with a other authorized proof that the business is complying with the orkers' Compensation Law. Expresentative or licensed agent of the insurance carrier referenced ed on this form.
rom the coverage indicated on this Certificate. (These notices one year after this form is approved by the insurance carrier of 3c", whichever is earlier. Please Note: Upon the cancellation of the workers' compens amed on a permit, license or contract issued by a certificate ew Certificate of Workers' Compensation Coverage or contract issued by a certificate ew Certificate of Workers' Compensation Coverage or contract issued by a certificate ew Certificate of Workers' Compensation Coverage or contract issued by a certificate workers' compensation Coverage or contract issued by a certificate when the coverage is depicted by the coverage as depicted by the coverage as depicted approved by: Approved by: Leonard Scio	may be sent by regular mail.) Otherwise, this Certificate is valid for or its licensed agent, or until the policy expiration date listed in box ation policy indicated on this form, if the business continues to be the holder, the business must provide that certificate holder with a other authorized proof that the business is complying with the orkers' Compensation Law. Expresentative or licensed agent of the insurance carrier referenced ed on this form. Descia Section 14/18/16
rom the coverage indicated on this Certificate. (These notices one year after this form is approved by the insurance carrier of 3c", whichever is earlier. Please Note: Upon the cancellation of the workers' compensamed on a permit, license or contract issued by a certificate ew Certificate of Workers' Compensation Coverage or chandatory coverage requirements of the New York State Worker penalty of perjury, I certify that I am an authorized rebove and that the named insured has the coverage as depicted Approved by: Leonard Scio (Print name of authorized repressarily)	ation policy indicated on this form, if the business continues to be the holder, the business must provide that certificate holder with a other authorized proof that the business is complying with the orkers' Compensation Law. epresentative or licensed agent of the insurance carrier referenced ed on this form. 1. Socia rentative or licensed agent of insurance carrier referenced entative or licensed agent of insurance carrier)

Please Note: Only insurance carriers and their licensed agents are authorized to issue Form C-105.2. Insurance brokers are NOT C-105.2 (9-07)

Workers' Compensation Law

Section 57. Restriction on issue of permits and the entering into contracts unless compensation is secured.

- 1. The head of a state or municipal department, board, commission or office authorized or required by law to issue any permit for or in connection with any work involving the employment of employees in a hazardous employment defined by this chapter, and notwithstanding any general or special statute requiring or authorizing the issue of such permits, shall not issue such permit unless proof duly subscribed by an insurance carrier is produced in a form satisfactory to the chair, that compensation for all employees has been secured as provided by this chapter. Nothing herein, however, shall be construed as creating any liability on the part of such state or municipal department, board, commission or office to pay any compensation to any such employee if so employed.
- 2. The head of a state or municipal department, board, commission or office authorized or required by law to enter into any contract for or in connection with any work involving the employment of employees in a hazardous employment defined by this chapter, notwithstanding any general or special statute requiring or authorizing any such contract, shall not enter into any such contract unless proof duly subscribed by an insurance carrier is produced in a form satisfactory to the chair, that compensation for all employees has been secured as provided by this chapter.

C-105.2 (9-07) Reverse

			SIG	NCON2			
ACORD. INS	URANCE BINDER						ATE
PRODUCER PH	ARY INSURANCE CONTRACT, SUBJECT	T TO THE CONDITIO	ONS SHOW	N ON THE	REVERSE	SIDE OF TH	IIS FOF
IA FA	/C, No, Ext): 031-324-1440	COMPANY			BIND		
Commercial Lines	Č, No);	Hartford Insurance (Company CTIVE		12M	SBJ2156	
Cook Maran & Associates		DATE		IME	D/	EXPIRATION ATE	TIMI
161 Pantigo Road		04/21/16	12:01	X AM	04/21/17	7	X 12:0
East Hampton, NY 11937				PM			NO
ODE:	SUB CODE:	THIS BINDER IS PER EXPIRING	ISSUED TO EX POLICY #:	TEND COVERAG	E IN THE ABO	VE NAMED CO	MPANY
GENCY USTOMER ID: 60806		DESCRIPTION OF OPER					
	struction Group,	Loc#1: Staten Is				,	
Inc.		island, NY					
160 7th Street							
Brooklyn, NY 1	1215						
OVERAGES							
TYPE OF INSURANCE					LIM	ITS	
ROPERTY CAUSES OF LOSS	Builders Risk	RMS		DEDUCTIBLE	COINS %	AMC	DUNT
BASIC BROAD X SPEC			I	2500		7,000,00	0
				2500	1	7,000,00	0
]				
NERAL LIABILITY				F1011000100		 	
COMMERCIAL GENERAL LIABILITY			Γ.	DAMAGE TO		\$	
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4				PERSONAL & AD		\$	
	_		Г	GENERAL AGGR		\$	
FOMOBILE LIABILITY	RETRO DATE FOR CLAIMS MADE:		F	PRODUCTS - CO		s	
7				COMBINED SING		s	
ALL OWNED AUTOS			יַ	BODILY INJURY (Per person)	s	
SCHEDULED AUTOS			<u>_</u> I	BODILY INJURY (Per accident)	\$	
HIRED AUTOS			<u> [</u>	PROPERTY DAM	AGE	\$	
NON-OWNED AUTOS			<u> </u>	MEDICAL PAYME		\$	
				PERSONAL INJUI		\$	
			1	JNINSURED MOT	ORIST	\$	
O PHYSICAL DAMAGE DEDUCTIBLE	ALL VEHICLES SCHEDULED VEH	HICLES		4071111 01		\$	
COLLISION:			-	STATED AN			
OTHER THAN COL:			<u></u>	OTHER	IOUNI	3	
AGE LIABILITY		· · · · · · · · · · · · · · · · · · ·	A	UTO ONLY - EA	ACCIDENT	s	
ANY AUTO				THER THAN AUT			
					CCIDENT	\$	
SS LIABILITY				AGG	GREGATE	\$	
UMBRELLA FORM			E/	ACH OCCURREN	ICE	\$	
OTHER THAN UMBRELLA FORM	RETRO DATE FOR CLAIMS MADE:		A	GGREGATE		\$	
	THE THE BATE FOR CLAIMS MADE:		SE	ELF-INSURED RE	TENTION	\$	
WORKER'S COMPENSATION			<u> </u>	WC STATUT			
AND EMPLOYER'S LIABILITY				L. EACH ACCIDE		\$	
•				L. DISEASE - EA		\$	
* Continued from Projitions/	operty Section *		1	L. DISEASE - POI ES		\$	
K				XES		\$ \$	
(See attached Speci	Conditions/Other Covs page.)			TIMATED TOTAL		ss	
E & ADDRESS			, 20	TOTAL	UNIOW	<u> </u>	
		MORTGAGEE	ADDITIO	VAL INSURED			
		LOSS PAYEE					
	L	OAN#					
	_						
	[^	Leonard ()	LIVE				
t ·		oxonora ()(rocia				

SPECIAL CONDITIONS/OTHER COVERAGES (Cont. from page 1)

Cause of Loss: Special Deductible: \$2,500

Location Limit: \$7,000,000 Temp Loc Limit: \$100,000

Transit Limit: \$100,000

Completed Value:

Location #: 1 Bldg #: 1 Job Site Limit: \$7,000,000

Desc: Boiler Limit: \$7,000,000 Ded: \$2,500

AMS 75.4 (2001/01) 3 of 3 #52046

CONDITIONS

This Company binds the kind(s) of insurance stipulated on the reverse side. The Insurance is subject to the terms, conditions and limitations of the policy(ies) in current use by the Company.

This binder may be cancelled by the Insured by surrender of this binder or by written notice to the Company stating when cancellation will be effective. This binder may be cancelled by the Company by notice to the Insured in accordance with the policy conditions. This binder is cancelled when replaced by a policy. If this binder is not replaced by a policy, the Company is entitled to charge a premium for the binder according to the Rules and Rates in use by the Company.

Applicable in California

When this form is used to provide insurance in the amount of one million dollars (\$1,000,000) or more, the title of the form is changed from "Insurance Binder" to "Cover Note".

Applicable in Delaware

The mortgagee or Obligee of any mortgage or other instrument given for the purpose of creating a lien on real property shall accept as evidence of insurance a written binder issued by an authorized insurer or its agent if the binder includes or is accompanied by: the name and address of the borrower; the name and address of the lender as loss payee; a description of the insured real property; a provision that the binder may not be canceled within the term of the binder unless the lender and the insured borrower receive written notice of the cancellation at least ten (10) days prior to the cancellation; except in the case of a renewal of a policy subsequent to the closing of the loan, a paid receipt of the full amount of the applicable premium, and the amount of insurance coverage.

Chapter 21 Title 25 Paragraph 2119

Applicable in Florida

Except for Auto Insurance coverage, no notice of cancellation or nonrenewal of a binder is required unless the duration of the binder exceeds 60 days. For auto insurance, the insurer must give 5 days prior notice, unless the binder is replaced by a policy or another binder in the same company.

Applicable in Nevada

Any person who refuses to accept a binder which provides coverage of less than \$1,000,000.00 when proof is required: (A) Shall be fined not more than \$500.00, and (B) is liable to the party presenting the binder as proof of insurance for actual damages sustained therefrom.

SCHEDULE A (FOR PUBLICLY BID PROJECTS)

Relating to Article 22 - Insurance

PART III. Certification by Insurance Broker or Agent

The undersigned insurance broker or agent represents to the City of New York that the attached Certificate of Insurance is accurate in all material respects.

[Name of broker or agent (typewritten)]
40 Marcus Drive, Melville, NY 11747
[Address of broker or agent (typewritten)]
drosato@cookmaran.com
[Email address of broker or agent (typewritten)]
631-390-9722 / 631-390-9790
[Phone number/Fax number of broker or agent (typewritten)]
[Signature of authorized official or broker or agent]
Donna Rosato Senior Account Manager
[Name and title of authorized official, broker or agent (typewritte

RYAN T CONWELL.

Notary Public - State of New York

NO. 01C06321935

Qualified in Suffolk County

My Commission Expires Mar 30, 2019

State of New York) ss:
County of Suttork)

Sworn to before me this

18 day of April 2016

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SCHEDULE A (FOR PUBLICLY BID PROJECTS)

Relating to Article 22 - Insurance

PART III. Certification by Insurance Broker or Agent

The undersigned insurance broker or agent represents to the City of New York that the attached Certificate of Insurance is accurate in all material respects.

Cook Maran & Associates
[Name of broker or agent (typewritten)]
40 Marcus Drive, Melville, NY 11747
[Address of broker or agent (typewritten)]
drosato@cookmaran.com
[Email address of broker or agent (typewritten)]
631-390-9722 / 631-390-9790
[Phone number/Fax number of broker or agent (typewritten)]
Nona Cosato
[Signature of authorized official or broker or agent]
Donna Rosato Senior Account Manager
[Name and title of authorized official, broker or agent (typewritten

RYAN T CORWELL

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NO. 01GO6321935

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NOTARY PUBLIC FOR THE STATE OF New York

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Section 1995

LABOR LAW §220 PREVAILING WAGE SCHEDULE

Workers, Laborers and Mechanics employed on a public work project must receive not less than the prevailing rate of wage and benefits for the classification of work performed by each upon such public work. Pursuant to Labor Law §220 the Comptroller of the City of New York has promulgated this schedule solely for Workers, Laborers and Mechanics engaged by private contractors on New York City public work contracts.

This schedule is a compilation of separate determinations of the prevailing rate of wage and supplements made by the Comptroller for each trade classification listed herein pursuant to New York State Labor Law section 220 (5). The source of the wage and supplement rates, whether a collective bargaining agreement, survey data or other, is listed at the end of each classification.

Agency Chief Contracting Officers should contact the Bureau of Labor Law's Classification Unit with any questions concerning trade classifications, prevailing rates or prevailing practices with respect to procurement on New York City public works contracts. Contractors are advised to review the Comptroller's Prevailing Wage Schedule before bidding on public works contracts. Contractors with questions concerning trade classifications, prevailing rates or prevailing practices with respect to public works contracts in the procurement stage must contact the contracting agency responsible for the procurement.

Any error as to compensation under the prevailing wage law or other information as to trade classification, made by the contracting agency in the contract documents or in any other communication, will not preclude a finding against the contractor of prevailing wage violation.

Any questions concerning trade classifications, prevailing rates or prevailing practices on New York City public works contracts that have already been awarded may be directed to the Bureau of Labor Law's Classification Unit by calling (212) 669-7974. All callers must have the agency name and contract registration number available when calling with questions on public works contracts. 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.

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 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 worker, laborer, mechanic performs the work. Preliminary schedules for future one-year periods appear in the City Record on or about June 1 each succeeding year. Final schedules appear on or about July 1 in the City Record and on our web site 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.

PUBLISH DATE: 7/1/2015 EFFECTIVE PERIOD: JULY 1, 2015 THROUGH JUNE 30, 2016 Page 1 of 86

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.

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.

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 <u>EACH HOUR WORKED</u> unless otherwise noted.

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

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ASBESTOS HANDLER

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

Asbestos Handler

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$36.00

Supplemental Benefit Rate per Hour: \$15.95

Overtime

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

Time and one half the regular rate for Sunday.

Time and one half the regular hourly rate after 40 hours in any work week.

Overtime Holidays

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

Thanksgiving Day Christmas Day

Easter

Paid Holidays

None

(Local #78 and Local #12A)

BLASTER

Blaster

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$46.89

Supplemental Benefit Rate per Hour: \$41.19

Blaster (Hydraulic)

Effective Period: 7/1/2015 - 6/30/2016

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Wage Rate per Hour: \$47.71

Supplemental Benefit Rate per Hour: \$41.19

Blaster - Trac Drill Hydraulic

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$42.25

Supplemental Benefit Rate per Hour: \$41.19

Blaster - Wagon: Air Trac: Quarry Bar: Drillrunners

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$41.46

Supplemental Benefit Rate per Hour: \$41.19

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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$40.42

Supplemental Benefit Rate per Hour: \$41.19

Blaster - Powder Carriers

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$36.53

Supplemental Benefit Rate per Hour: \$41.19

Blaster - Hydraulic Trac Drill Chuck Tender

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$35.25

Supplemental Benefit Rate per Hour: \$41.19

Blaster - Chuck Tender & Nipper

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$34.50

Supplemental Benefit Rate per Hour: \$41.19

Blaster - Magazine Keepers: (Watch Person)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$20.68

Supplemental Benefit Rate per Hour: \$41.19

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Overtime Description

Magazine Keepers:

Time and one half for work performed in excess of forty (40) hours per week and for work performed on Saturdays, Sundays and Holidays.

All Other Employees:

Time and one-half for the first eight hours of work on Saturday and for Make-up Time. Double time for all hours over eight Monday through Friday (except make-up hours) and for all hours worked on Sunday and Holidays.

Overtime

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

Overtime Holidays

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

Paid Holidays

None

Shift Rates

A single shift shall be 8 hours plus an unpaid lunch, starting at 8:00 A.M (or between 6:00 A.M. and 10:00 A.M. on weekdays). When two (2) shifts are employed, each shift shall be 8 hours plus ½ hour unpaid lunch. When three (3) shifts are employed, each shift will work seven and one-half (7½) 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

<u>Boilermaker</u>

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$51.56

Supplemental Benefit Rate per Hour: \$41.69

Supplemental Note: For time and one half overtime - \$61.94 For double overtime - \$82.18

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

<u>Bricklayer</u>

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$48.91

PUBLISH DATE: 7/1/2015 EFFECTIVE PERIOD: JULY 1, 2015 THROUGH JUNE 30, 2016 Page 8 of 86

Supplemental Benefit Rate per Hour: \$28.03

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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$50.50

Supplemental Benefit Rate per Hour: \$45.88

Overtime

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

Double time the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays

Double time the regular rate for work on the following holiday(s). New Year's Day 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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$50.50

Supplemental Benefit Rate per Hour: \$46.65

Overtime

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

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays

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



Shift Rates

Off shift work commencing between 5:00 P.M. and 11:00 P.M. shall work eight and one half hours allowing for one half hour for lunch. The wage rate shall be 113% of the straight time hourly wage rate.

(Carpenters District Council)

CARPENTER - SIDEWALK SHED, SCAFFOLD AND HOIST

Carpenter - Hod Hoist

(Assisted by Mason Tender)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$49.60

Supplemental Benefit Rate per Hour: \$43.00

Overtime

ime and one half the regular rate after an 8 hour day.

ime and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Presidential Election Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

Paid Holidays

None

Shift Rates

The second shift will receive one hour at the double time rate of pay for the last hour of the shift; eight hours pay for seven hours of work, nine hours pay for eight hours of work. There must be a first shift in order to work a

PUBLISH DATE: 7/1/2015 EFFECTIVE PERIOD: JULY 1, 2015 THROUGH JUNE 30, 2016 Page 11 of 86

(Carpenters District Council)

CEMENT & CONCRETE WORKER

Cement & Concrete Worker

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$42.48

Supplemental Benefit Rate per Hour: \$26.57

Supplemental Note: \$29.32 on Saturdays; \$32.07 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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$38.88

Supplemental Benefit Rate per Hour: \$39.80

Supplemental Note: For time and one half overtime - \$49.05; For double overtime - \$58.30

Overtime Description

Time and one-half the regular rate after an 8 hour day, double time the regular rate after 10 hours. Time and one-half the regular rate on Saturday, double time the regular rate after 10 hours. Double time the regular rate on Sunday.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day
President's Day
Good Friday
Memorial Day
Independence Day
Labor Day
Columbus Day
Presidential Election Day
Thanksgiving Day
Christmas Day

Paid Holidays

Any worker who reports to work on Christmas Eve or New Year's Eve pursuant to his employer's instruction shall be entitled to three (3) hours afternoon pay without working.

Shift Rates

For an off shift day, (work at times other than the regular 7:00 A.M. to 3:30 P.M. work day) a cement mason shall be paid at the regular hourly rate plus a 25% per hour differential. Four Days a week at Ten (10)hour day.

(Local #780)

CORE DRILLER

Core Driller

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$36.82

Supplemental Benefit Rate per Hour: \$22.69

Core Driller Helper

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$29.44

Supplemental Benefit Rate per Hour: \$22.69

Core Driller Helper(Third year in the industry)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$26.50

Supplemental Benefit Rate per Hour: \$22.69

Core Driller Helper (Second year in the industry)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$23.55

Supplemental Benefit Rate per Hour: \$22.69

Core Driller Helper (First year in the industry)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$20.61

Supplemental Benefit Rate per Hour: \$22.69

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 (1/2) hour for mealtime.

Page 14 of 86 EFFECTIVE PERIOD: JULY 1, 2015 THROUGH JUNE 30, 2016 **PUBLISH DATE: 7/1/2015**

(Carpenters District Council)

DERRICKPERSON AND RIGGER

Derrick Person & Rigger

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$44.84

Supplemental Benefit Rate per Hour: \$49.28

Supplemental Note: The above supplemental rate applies for work performed in Manhattan, Bronx, Brooklyn and

Queens. \$50.70 - For work performed in Staten Island.

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

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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$63.82

PUBLISH DATE: 7/1/2015 EFFECTIVE PERIOD: JULY 1, 2015 THROUGH JUNE 30, 2016 Page 15 of 86

Supplemental Benefit Rate per Hour: \$46.65

Diver Tender (Marine)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$45.47

Supplemental Benefit Rate per Hour: \$46.65

Overtime

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

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Presidential Election Day

Thanksgiving Day

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

<u> Dockbuilder - Pile Driver</u>

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$50.50

Supplemental Benefit Rate per Hour: \$46.65

Overtime

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

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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

Paid Holidays

Christmas Day

None

Shift Rates

Off shift work commencing between 5:00 P.M. and 11:00 P.M. shall work eight and one half hours allowing for one half hour for lunch. The wage rate shall be 113% of the straight time hourly wage rate.

(Carpenters District Council)

DRIVER: TRUCK (TEAMSTER)

Driver - Dump Truck

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$39.53

Supplemental Benefit Rate per Hour: \$41.59

Supplemental Note: Over 40 hours worked: time and one half rate \$16.94, double time rate \$22.58

Driver - Tractor Trailer

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$39.50

Supplemental Benefit Rate per Hour: \$43.35

Supplemental Note: For over 40 hours worked: at time and one half - \$16.65; at double time - \$22.20

Driver - Euclid & Turnapull Operator

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$40.06

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Supplemental Benefit Rate per Hour: \$43.35

Supplemental Note: Over 40 hours worked: time and one half rate \$16.65 double time rate \$22.20

Overtime Description

For Paid Holidays: Holiday pay for all holidays shall be prorated based two hours per day for each day worked in the holiday week, not to exceed 8 hours of holiday pay. For Thanksgiving week, the prorated share shall be 5 1/3 hours of holiday pay for each day worked in Thanksgiving week.

Overtime

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

Overtime Holidays

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

Paid Holidays

New Year's Day President's Day Memorial Day Independence Day **Labor Day** Columbus Day Veteran's Day Thanksgiving Day Day after Thanksgiving **Christmas Day**

Shift Rates

Off single shift work commencing between 6:00 P.M. and 5:00 A.M. shall work eight and one half hours allowing for one half hour for lunch and receive 9 hours pay for 8 hours of work.

Driver Redi-Mix (Sand & Gravel)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$36.30

Supplemental Benefit Rate per Hour: \$40.02

Supplemental Note: Over 40 hours worked: time and one half rate \$13.90, double time rate \$18.53

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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
ndependence Day
Labor Day
Columbus Day
Election Day
Thanksgiving Day
Christmas Day

(Local #282)

ELECTRICIAN

(Including all low voltage cabling carrying data; video; and voice in combination with data and or video.)

Electrician "A" (Regular Day)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$54.00

Supplemental Benefit Rate per Hour: \$50.03

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Electrician "A" (Regular Day Overtime)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$81.00

Supplemental Benefit Rate per Hour: \$53.41

Electrician "A" (Day Shift)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$54.00

Supplemental Benefit Rate per Hour: \$50.03

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

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$81.00

Supplemental Benefit Rate per Hour: \$53.41

Electrician "A" (Swing Shift)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$63.36

Supplemental Benefit Rate per Hour: \$56.94

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

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$95.04

Supplemental Benefit Rate per Hour: \$60.91

Electrician "A" (Graveyard Shift)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$70.97

Supplemental Benefit Rate per Hour: \$62.78

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

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$106.46

Supplemental Benefit Rate per Hour: \$67.23

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. For three or less workers performing 8 hours temporary light and/or power the supplemental benefit rate is \$24.39.

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: 7/1/2015 - 6/30/2016

Wage Rate per Hour; \$27.50

Supplemental Benefit Rate per Hour: \$20.82

First and Second Year "M" Wage Rate Per Hour: \$23.00 First and Second Year "M" Supplemental Rate: \$18.56

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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$41.25

Supplemental Benefit Rate per Hour: \$22.54

First and Second Year "M" Wage Rate Per Hour: \$34.50

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First and Second Year "M" Supplemental Rate: \$20.00

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: 7/1/2015 - 3/9/2016 Wage Rate per Hour: \$31.40

Supplemental Benefit Rate per Hour: \$14.76

Supplemental Note: \$13.26 only after 8 hours worked in a day

Effective Period: 3/10/2016 - 6/30/2016

Wage Rate per Hour: \$32.00

Supplemental Benefit Rate per Hour: \$15.47

Supplemental Note: \$13.97 only after 8 hours worked in a day

Overtime Description

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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. Up to 4 vacation days may be used as sick days.

(Local #3)

ELECTRICIAN-STREET LIGHTING WORKER

Electrician - Electro Pole Electrician

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$54.00

Supplemental Benefit Rate per Hour: \$51.86

Electrician - Electro Pole Foundation Installer

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Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$40.93

Supplemental Benefit Rate per Hour: \$39.46

Electrician - Electro Pole Maintainer

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$35.05

Supplemental Benefit Rate per Hour: \$35.51

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

Paid Holidays

Christmas Day

None

(Local #3)

ELEVATOR CONSTRUCTOR

Elevator Constructor

Effective Period: 7/1/2015 - 3/16/2016

Wage Rate per Hour: \$59.55

Supplemental Benefit Rate per Hour: \$31.07

EFFECTIVE PERIOD: JULY 1, 2015 THROUGH JUNE 30, 2016 Page 24 of 86 PUBLISH DATE: 7/1/2015

Effective Period: 3/17/2016 - 6/30/2016

Vage Rate per Hour: \$60.96

Supplemental Benefit Rate per Hour: \$32.67

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: 7/1/2015 - 3/16/2016

Wage Rate per Hour: \$46.92

Supplemental Benefit Rate per Hour: \$30.91

Effective Period: 3/17/2016 - 6/30/2016

Wage Rate per Hour: \$47.91

Supplemental Benefit Rate per Hour: \$32.51

Overtime Description

For Scheduled Service Work: Double time - work scheduled in advance by two or more workers performed on Sundays, Holidays, and between midnight and 7:00am.

Overtime

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

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

Time and one half the regular rate for work on a holiday plus the day's pay.

Paid Holidays

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

Shift Rates

Afternoon shift - regularly hourly rate plus a (15%) fifteen percent differential. Graveyard shift - time and one half the regular rate.

Vacation

Employer contributes 8% of regular basic hourly rate as vacation pay for employees with more than 15 years of service, and 6% for employees with 5 to 15 years of service, and 4% for employees with less than 5 years of service.

(Local #1)

ENGINEER

Engineer - Heavy Construction Operating Engineer I

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

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$64.31

Supplemental Benefit Rate per Hour: \$34.25

Supplemental Note: \$61.60 on overtime

Shift Wage Rate: \$102.90

Engineer - Heavy Construction Operating Engineer II

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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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$62.40

Supplemental Benefit Rate per Hour: \$34.25

Supplemental Note: \$61.60 on overtime

Shift Wage Rate: \$99.84

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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$59.20

Supplemental Benefit Rate per Hour: \$34.25 supplemental Note: \$61.60 on overtime

Shift Wage Rate: \$94.72

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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$62.11

Supplemental Benefit Rate per Hour: \$34.25 Supplemental Note: \$61.60 on overtime

Shift Wage Rate: \$99.38

Engineer - Heavy Construction Maintenance Engineer II

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On Base Mounted Tower Cranes

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$81.54

Supplemental Benefit Rate per Hour: \$34.25 Supplemental Note: \$61.60 on overtime

Shift Wage Rate: \$130.46

Engineer - Heavy Construction Maintenance Engineer III

On Generators, Light Towers

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$41.04

Supplemental Benefit Rate per Hour: \$34.25 Supplemental Note: \$61.60 on overtime

Shift Wage Rate: \$65.66

Engineer - Heavy Construction Maintenance Engineer IV

On Pumps and Mixers including mud sucking

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$42.11

Supplemental Benefit Rate per Hour: \$34.25 Supplemental Note: \$61.60 on overtime

Shift Wage Rate: \$67.38

Engineer - Heavy Construction Oilers I

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

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$56.02

Supplemental Benefit Rate per Hour: \$34.25 Supplemental Note: \$61.60 on overtime

Shift Wage Rate: \$89.63

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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$38.79

Supplemental Benefit Rate per Hour: \$34.25 Supplemental Note: \$61.60 on overtime

Shift Wage Rate: \$62.06

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Engineer - Steel Erection Maintenance Engineers

Derrick, Travelers, Tower, Crawler Tower and Climbing Cranes

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$59.77

Supplemental Benefit Rate per Hour: \$34.25 Supplemental Note: \$61.60 on overtime

Shift Wage Rate: \$95.63

Engineer - Steel Erection Oiler I

On a Truck Crane

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$55.95

Supplemental Benefit Rate per Hour: \$34.25

Supplemental Note: \$61.60 on overtime

Shift Wage Rate: \$89.52

Engineer - Steel Erection Oiler II

On a Crawler Crane

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$42.64

Supplemental Benefit Rate per Hour: \$34.25

Supplemental Note: \$61.60 on overtime

Shift Wage Rate: \$68.22

Overtime Description

On jobs of more than one shift, if the next shift employee fails to report for work through any cause over which the employer has no control, the employee on duty who works the next shift continues to work at the single time rate.

Overtime

Double time the regular rate after an 8 hour day.

Double time the regular time rate for Saturday.

Double time the regular rate for Sunday.

Double time the regular rate for work on the following holiday(s).

Paid Holidays

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

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

Engineer - Building Work Maintenance Engineers I

Installing, repairing, maintaining, dismantling (of all equipment including: Steel Cutting and Bending Machines, Mechanical Heaters, Mine Hoists, Climbing Cranes, Tower Cranes, Linden Peine, Lorain, Liebherr, Mannes, or machines of a similar nature, Well Point Systems, Deep Well Pumps, Concrete Mixers with loading Device, Concrete Plants, Motor Generators when used for temporary power and lights), skid steer machines of a similar nature including bobcat.

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$56.88

Supplemental Benefit Rate per Hour: \$34.25 Supplemental Note: \$61.60 on overtime

Engineer - Building Work Maintenance Engineers II

On Pumps, Generators, Mixers and Heaters

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$44.22

Supplemental Benefit Rate per Hour: \$34.25 Supplemental Note: \$61.60 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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$54.08

Supplemental Benefit Rate per Hour: \$34.25 Supplemental Note: \$61.60 on overtime

Engineer - Building Work Oilers II

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

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$40.21

Supplemental Benefit Rate per Hour: \$34.25 Supplemental Note: \$61.60 on overtime

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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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$37.04

Supplemental Benefit Rate per Hour: \$18.60

Supplemental Note: Overtime Benefit Rate - \$25.45 per hour (time & one half) \$32.30 per hour (double time).

Instrument Person

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$30.59

Supplemental Benefit Rate per Hour: \$18.60

Supplemental Note: Overtime Benefit Rate - \$25.45 per hour (time & one half) \$32.30 per hour (double time).

Rodperson

PUBLISH DATE: 7/1/2015 EFFECTIVE PERIOD: JULY 1, 2015 THROUGH JUNE 30, 2016 Page 31 of 86

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$26.52

Supplemental Benefit Rate per Hour: \$18.60

Supplemental Note: Overtime Benefit Rate - \$25.45 per hour (time & one half) \$32.30 per hour (double time).

Overtime Description

Time and one half the regular rate after an 8 hour day, Time and one half the regular rate for Saturday for the first eight hours worked, Double time the regular time rate for Saturday for work performed in excess of eight hours, Double time the regular rate for Sunday and Double time the regular rate for work on a holiday.

Paid Holidays

New Year's Day Lincoln's Birthday President's Day **Memorial Day** Independence Day Labor Day Columbus Day Veteran's Day Thanksgiving Day Day after Thanksgiving **Christmas Day**

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

(Operating Engineer Local #15-D)

ENGINEER - FIELD (BUILDING CONSTRUCTION)

(Construction of Building Projects, Concrete Superstructures, etc.)

Field Engineer - BC Party Chief

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$60.77

Supplemental Benefit Rate per Hour: \$32.40

Supplemental Note: Overtime Benefit Rate - \$45.28 per hour (time & one half) \$58.15 per hour (double time).

Field Engineer - BC Instrument Person

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$47.20

Supplemental Benefit Rate per Hour: \$32.40

Supplemental Note: Overtime Benefit Rate - \$45.28 per hour (time & one half) \$58.15 per hour (double time).

Field Engineer - BC Rodperson

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Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$30.49

Supplemental Benefit Rate per Hour: \$32.40

Supplemental Note: Overtime Benefit Rate - \$45.28 per hour (time & one half) \$58.15 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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$66.43

Supplemental Benefit Rate per Hour: \$32.40

Supplemental Note: Overtime benefit rate - \$45.28 per hour (time & one half), \$58.15 per hour (double time).

Field Engineer - HC Instrument Person

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$48.82

Supplemental Benefit Rate per Hour: \$32.40

Supplemental Note: Overtime benefit rate - \$45.28 per hour (time & one half), \$58.15 per hour (double time).

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Field Engineer - HC Rodperson

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$40.99

Supplemental Benefit Rate per Hour: \$32.40

Supplemental Note: Overtime benefit rate - \$45.28 per hour (time & one half), \$58.15 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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$62.26

Supplemental Benefit Rate per Hour: \$32.40

Supplemental Note: Overtime benefit rate - \$45.28 per hour (time & one half), \$58.15 per hour (double time).

Field Engineer - Steel Erection Instrument Person

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$48.57

Supplemental Benefit Rate per Hour: \$32.40

Supplemental Note: Overtime benefit rate - \$45.28 per hour (time & one half), \$58.15 per hour (double time).

Field Engineer - Steel Erection Rodperson

Effective Period: 7/1/2015 - 6/30/2016

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Wage Rate per Hour: \$32.61

Supplemental Benefit Rate per Hour: \$32.40

Supplemental Note: Overtime benefit rate - \$45.28 per hour (time & one half), \$58.15 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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$71.75

Supplemental Benefit Rate per Hour: \$30.40 Supplemental Note: \$55.10 overtime hours

Shift Wage Rate: \$114.80

Operating Engineer - Road & Heavy Construction II

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

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$74.29

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Supplemental Benefit Rate per Hour: \$30.40 Supplemental Note: \$55.10 overtime hours

Shift Wage Rate: \$118.86

Operating Engineer - Road & Heavy Construction III

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

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$76.67

Supplemental Benefit Rate per Hour: \$30.40 Supplemental Note: \$55.10 overtime hours

Shift Wage Rate: \$122.67

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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$74.84

Supplemental Benefit Rate per Hour: \$30.40 Supplemental Note: \$55.10 overtime hours

Shift Wage Rate: \$119.74

Operating Engineer - Road & Heavy Construction V

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

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$73.36

Supplemental Benefit Rate per Hour: \$30.40 Supplemental Note: \$55.10 overtime hours

Shift Wage Rate: \$117.38

Operating Engineer - Road & Heavy Construction VI

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

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$69.69

Supplemental Benefit Rate per Hour: \$30.40 Supplemental Note: \$55.10 overtime hours

Shift Wage Rate: \$111.50

Operating Engineer - Road & Heavy Construction VII

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

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$56.25

Supplemental Benefit Rate per Hour: \$30.40 Supplemental Note: \$55.10 overtime hours

Shift Wage Rate: \$90.00

Operating Engineer - Road & Heavy Construction VIII

Utility Compressors

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$43.63

Supplemental Benefit Rate per Hour: \$30.40 Supplemental Note: \$55.10 overtime hours

Shift Wage Rate: \$55.03

Operating Engineer - Road & Heavy Construction IX

Horizontal Boring Rig

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$66.26

Supplemental Benefit Rate per Hour: \$30.40 Supplemental Note: \$55.10 overtime hours

Shift Wage Rate: \$106.02

Operating Engineer - Road & Heavy Construction X

Elevators (manually operated as personnel hoist).

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$60.89

Supplemental Benefit Rate per Hour: \$30.40 Supplemental Note: \$55.10 overtime hours

Shift Wage Rate: \$97.42

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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$47.28

Supplemental Benefit Rate per Hour: \$30.40 Supplemental Note: \$55.10 overtime hours

Shift Wage Rate: \$75.65

Operating Engineer - Road & Heavy Construction XII

All Drills and Machines of a similar nature.

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$70.42

Supplemental Benefit Rate per Hour: \$30.40 Supplemental Note: \$55.10 overtime hours

Shift Wage Rate: \$112.67

Operating Engineer - Road & Heavy Construction XIII

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

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$68.19

Supplemental Benefit Rate per Hour: \$30.40 Supplemental Note: \$55.10 overtime hours

Shift Wage Rate: \$109.10

Operating Engineer - Road & Heavy Construction XIV

Concrete Mixer

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$65.20

Supplemental Benefit Rate per Hour: \$30.40 Supplemental Note: \$55.10 overtime hours

Shift Wage Rate: \$104.32

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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$43.91

Supplemental Benefit Rate per Hour: \$30.40 Supplemental Note: \$55.10 overtime hours

Shift Wage Rate: \$70.26

Operating Engineer - Road & Heavy Construction XVI

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

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$62.25

Supplemental Benefit Rate per Hour: \$30.40 Supplemental Note: \$55.10 overtime hours

Shift Wage Rate: \$99.60

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Operating Engineer - Road & Heavy Construction XVII

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

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$62.74

Supplemental Benefit Rate per Hour: \$30.40 Supplemental Note: \$55.10 overtime hours

Shift Wage Rate: \$100.38

Operating Engineer - Road & Heavy Construction XVIII

Tower Crane

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$90.09

Supplemental Benefit Rate per Hour: \$30.40 Supplemental Note: \$55.10 overtime hours

Shift Wage Rate: \$144.14

<u> Operating Engineer - Paving I</u>

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

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$69.69

Supplemental Benefit Rate per Hour: \$30.40 Supplemental Note: \$55.10 overtime hours

Shift Wage Rate: \$111.50

Operating Engineer - Paving II

Asphalt Roller

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$67.87

Supplemental Benefit Rate per Hour: \$30.40 Supplemental Note: \$55.10 overtime hours

Shift Wage Rate: \$108.59

Operating Engineer - Paving III

Asphalt Plants

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$57.40

Supplemental Benefit Rate per Hour: \$30.40 Supplemental Note: \$55.10 overtime hours

Shift Wage Rate: \$91.84

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Operating Engineer - Concrete I

Cranes

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$74.51

Supplemental Benefit Rate per Hour: \$30.40 Supplemental Note: \$55.10 overtime hours

<u>Operating Engineer - Concrete II</u>

Compressors

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$44.25

Supplemental Benefit Rate per Hour: \$30.40 Supplemental Note: \$55.10 overtime hours

Operating Engineer - Concrete III

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

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$59.51

Supplemental Benefit Rate per Hour: \$30.40 Supplemental Note: \$55.10 overtime hours

Operating Engineer - Steel Erection I

Three Drum Derricks

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$77.40

Supplemental Benefit Rate per Hour: \$30.40 Supplemental Note: \$55.10 overtime hours

Shift Wage Rate: \$123.84

Operating Engineer - Steel Erection II

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

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$74.37

Supplemental Benefit Rate per Hour: \$30.40 Supplemental Note: \$55.10 overtime hours

Shift Wage Rate: \$118.99

Operating Engineer - Steel Erection III

compressors, Welding Machines.

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$44.09

Supplemental Benefit Rate per Hour: \$30.40 Supplemental Note: \$55.10 overtime hours

Shift Wage Rate: \$70.54

Operating Engineer - Steel Erection IV

Compressors - Not Combined with Welding Machine.

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$41.98

Supplemental Benefit Rate per Hour: \$30.40 Supplemental Note: \$55.10 overtime hours

Shift Wage Rate: \$67.17

Operating Engineer - Building Work I

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

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$61.27

Supplemental Benefit Rate per Hour: \$30.40 Supplemental Note: \$55.10 overtime hours

Operating Engineer - Building Work II

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

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$45.85

Supplemental Benefit Rate per Hour: \$30.40 Supplemental Note: \$55.10 overtime hours

Operating Engineer - Building Work III

Double Drum

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$69.76

Supplemental Benefit Rate per Hour: \$30.40 Supplemental Note: \$55.10 overtime hours

Operating Engineer - Building Work IV

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Stone Derrick, Cranes, Hydraulic Cranes Boom Trucks.

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$73.91

Supplemental Benefit Rate per Hour: \$30.40 Supplemental Note: \$55.10 overtime hours

Operating Engineer - Building Work V

Dismantling and Erection of Cranes, Relief Engineer.

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$68.09

Supplemental Benefit Rate per Hour: \$30.40 Supplemental Note: \$55.10 overtime hours

Operating Engineer - Building Work VI

4 Pole Hoist, Single Drum Hoists.

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$67.37

Supplemental Benefit Rate per Hour: \$30.40 Supplemental Note: \$55.10 overtime hours

Operating Engineer - Building Work VII

Rack & Pinion and House Cars

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$53.54

Supplemental Benefit Rate per Hour: \$30.40 Supplemental Note: \$55.10 overtime hours

For New House Car projects Wage Rate per Hour \$42.70

Overtime Description

On jobs of more than one shift, if an Employee fails to report for work through any cause over which the Employer has no control, the Employee on duty will continue to work at the rate of single time.

For House Cars and Rack & Pinion only: Overtime paid at time and one-half for all hours in excess of eight hours in a day, Saturday, Sunday and Holidays worked.

Overtime

Double time the regular rate after an 8 hour day.

Double time the regular time rate for Saturday.

Double time the regular rate for Sunday.

Double time the regular rate for work on the following holiday(s).

Paid Holidays

New Year's Day

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Lincoln's Birthday
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

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

Shift Rates

For Steel Erection Only: Shifts may be worked at the single time rate at other than the regular working hours (8:00 A.M. to 4:30 P.M.) on the following work ONLY: Heavy construction jobs on work below the street level, over railroad tracks and on building jobs.

(Operating Engineer Local #14)

FLOOR COVERER

(Interior vinyl composition tile, sheath vinyl linoleum and wood parquet tile including site preparation and synthetic turf not including site preparation)

Floor Coverer

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$50.50

Supplemental Benefit Rate per Hour: \$45.88

Overtime

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

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: 7/1/2015 - 10/31/2015

Wage Rate per Hour: \$43.35

Supplemental Benefit Rate per Hour: \$36.59

Supplemental Note: Supplemental Benefit Overtime Rate: \$45.34

Effective Period: 11/1/2015 - 6/30/2016

Wage Rate per Hour: \$43.95

Supplemental Benefit Rate per Hour: \$36.84

Supplemental Note: Supplemental Benefit Overtime Rate: \$45.59

Overtime Description

An optional 8th hour can be worked at straight time rate. If 9th hour is worked, then both hours or more (8th & 9th or more) will be at the double time rate of pay.

Overtime

Double time the regular rate after a 7 hour day. Double time the regular time rate for Saturday. Double time the regular rate for Sunday.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$23.68

Supplemental Benefit Rate per Hour: \$19.54

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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$57.38

Supplemental Benefit Rate per Hour: \$37.41

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 will be Tier A House Wreckers (i.e. 1st, 2nd, 11th, 14th etc). Other House Wreckers may be Tier B House Wreckers.

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$35.52

Supplemental Benefit Rate per Hour: \$26.86

House Wrecker - Tier B

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$24.90

Supplemental Benefit Rate per Hour: \$19.88

Overtime

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

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Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$43.20

Supplemental Benefit Rate per Hour: \$47.67

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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$48.75

Supplemental Benefit Rate per Hour: \$67.34

Supplemental Note: Supplemental benefits are to be paid at the applicable overtime rate when overtime is in

effect.

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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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$40.50

Supplemental Benefit Rate per Hour: \$36.53

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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$27.00

Supplemental Benefit Rate per Hour: \$14.55

Landscaper (3 - 6 years experience)

Effective Period: 7/1/2015 - 6/30/2016

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Wage Rate per Hour: \$26.00

Supplemental Benefit Rate per Hour: \$14.55

Landscaper (up to 3 years experience)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$23.50

Supplemental Benefit Rate per Hour: \$14.55

Groundperson

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$23.50

Supplemental Benefit Rate per Hour: \$14.55

Tree Remover / Pruner

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$32.00

Supplemental Benefit Rate per Hour: \$14.55

Landscaper Sprayer (Pesticide Applicator)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$22.00

Supplemental Benefit Rate per Hour: \$14.55

Watering - Plant Maintainer

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$17.00

Supplemental Benefit Rate per Hour: \$14.55

Overtime Description

For all overtime work performed, supplemental benefits shall include an additional seventy-five (\$0.75) cents per hour.

Overtime

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

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Time and one half the regular rate for work on a holiday plus the day's pay.

Paid Holidays

New Year's Day Memorial Day Independence Day Labor Day Thanksgiving Day

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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: 7/1/2015 - 12/31/2015

Wage Rate per Hour: \$51.53

Supplemental Benefit Rate per Hour: \$35.73

Effective Period: 1/1/2016 - 6/30/2016

Wage Rate per Hour: \$51.89

Supplemental Benefit Rate per Hour: \$36.62

Marble Finisher

Effective Period: 7/1/2015 - 12/31/2015

Wage Rate per Hour: \$40.53

Supplemental Benefit Rate per Hour: \$34.52

Effective Period: 1/1/2016 - 6/30/2016

Wage Rate per Hour: \$40.80

Supplemental Benefit Rate per Hour: \$35.15

Marble Polisher

Effective Period: 7/1/2015 - 12/31/2015

Wage Rate per Hour: \$36.65

Supplemental Benefit Rate per Hour: \$26.63

Effective Period: 1/1/2016 - 6/30/2016

Wage Rate per Hour: \$37.02

Supplemental Benefit Rate per Hour: \$27.01

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

Paid Holidays

Christmas Day

Day after Thanksgiving

None

(Local #7)

MASON TENDER

Mason Tender

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$36.67

Supplemental Benefit Rate per Hour: \$28.02

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

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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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$35.46

Supplemental Benefit Rate per Hour: \$22.13

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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$24.65

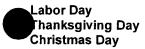
Supplemental Benefit Rate per Hour: \$16.45

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



Paid Holidays

None

(Local #79)

METALLIC LATHER

Metallic Lather

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$43.63

Supplemental Benefit Rate per Hour: \$41.57

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

<u>Millwright</u>

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$49.50

Supplemental Benefit Rate per Hour: \$52.01

Overtime

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

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$45.91

Supplemental Benefit Rate per Hour: \$38.15

Supplemental Note: Supplemental benefits for overtime to be paid at the rate of \$48.92 per hour.

Mosaic Mechanic - Mosaic & Terrazzo Finisher

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$44.30

Supplemental Benefit Rate per Hour: \$38.14

Supplemental Note: Supplemental benefits for overtime to be paid at the rate of \$48.91

per hour.

Mosaic Mechanic - Machine Operator Grinder

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$44.30

Supplemental Benefit Rate per Hour: \$38.14

Supplemental Note: Supplemental benefits for overtime to be paid at the rate of \$48.91 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)

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PAINTER

Painter - Brush & Roller

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$41.00

Supplemental Benefit Rate per Hour: \$26.37 Supplemental Note: \$31.00 on overtime

Spray & Scaffold / Decorative / Sandblast

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$44.00

Supplemental Benefit Rate per Hour: \$26.37 Supplemental Note: \$31.00 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

<u>Designer</u>

PUBLISH DATE: 7/1/2015 EFFECTIVE PERIOD: JULY 1, 2015 THROUGH JUNE 30, 2016 Page 58 of 86

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$40.30

Supplemental Benefit Rate per Hour: \$7.22

Journeyperson

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$37.48

Supplemental Benefit Rate per Hour: \$7.22

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
Martin Luther King Jr. Day
Memorial Day
Independence Day
Labor Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day
Two (2) additional holidays as floating holidays

(Local #8A-28A)

PAINTER - STRIPER

Striper (paint)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$35.00

Supplemental Benefit Rate per Hour: \$12.27

Supplemental Note: Overtime Supplemental Benefit rate - \$8.02 New Hire Rate (0-3 months) - \$0.00

<u>Lineperson (thermoplastic)</u>

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$39.00

Supplemental Benefit Rate per Hour: \$12.27

Supplemental Note: Overtime Supplemental Benefit rate - \$8.02; New Hire Rate (0-3 months) - \$0.00

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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: 7/1/2015 - 9/30/2015

Wage Rate per Hour: \$48.00

Supplemental Benefit Rate per Hour: \$34.58

Effective Period: 10/1/2015 - 6/30/2016

Wage Rate per Hour: \$49.00

Supplemental Benefit Rate per Hour: \$36.08

Painter - Power Tool

PUBLISH DATE: 7/1/2015 EFFECTIVE PERIOD: JULY 1, 2015 THROUGH JUNE 30, 2016 Page 60 of 86

Effective Period: 7/1/2015 - 9/30/2015

Wage Rate per Hour: \$54.00

Supplemental Benefit Rate per Hour: \$34.58

Effective Period: 10/1/2015 - 6/30/2016

Wage Rate per Hour: \$55.00

Supplemental Benefit Rate per Hour: \$36.08

Overtime Description

Supplemental Benefits shall be paid for each hour worked, up to forty (40) hours per week for the period of May 1st to November 15th or up to fifty (50) hours per week for the period of November 16th to April 30th.

Overtime

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

Overtime Holidays

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

Paid Holidays

None

Shift Rates

Regular hourly rates plus a ten per cent (10%) differential

(Local #806)

PAPERHANGER

<u>Paperhanger</u>

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$41.08

Supplemental Benefit Rate per Hour: \$29.23

Supplemental Note: Supplemental benefits are to be paid at the appropriate straight time and overtime rate.

Overtime

Time and one half the regular rate after a 7 hour day.

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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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$44.85

Supplemental Benefit Rate per Hour: \$36.92

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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$40.98

Supplemental Benefit Rate per Hour: \$36.92

<u>Production Paver & Roadbuilder - Screed Person</u>

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(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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$45.45

Supplemental Benefit Rate per Hour: \$36.92

Production Paver & Roadbuilder - Raker

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$44.85

Supplemental Benefit Rate per Hour: \$36.92

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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$41.56

Supplemental Benefit Rate per Hour: \$36.92

Overtime Description

Veteran's Day is a Paid Holiday for employees working on production paving.

If an employee works New Year's Day or Christmas Day, they receive the single time rate plus 25%.

Employees who work on a holiday listed below receive the straight time rate plus one day's pay for the holiday.

Overtime

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

Paid Holidays

Memorial Day Independence Day Labor Day Presidential Election Day Thanksgiving Day

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 $\frac{1}{2}$) hours but will be paid for eight (8) hours since only one half (1/2) hour is allowed for meal time.

When two or more shifts are employed, single time will be paid for each shift.

Night Work - On night work, the first eight (8) hours of work will be paid for at the single time rate, except that production paving work shall be paid at 15% over the single time rate for the screed person, rakers and

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shovelers directly involved only. All other workers will be exempt. Hours worked over eight (8) hours during said shift shall be paid for at the time and one-half rate.

(Local #1010)

PLASTERER

<u>Plasterer</u>

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$43.43

Supplemental Benefit Rate per Hour: \$27.95

Overtime

Time and one half the regular rate after a 7 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

Martin Luther King Jr. Day

President's Day

Good Friday

Memorial Day

Independence Day

Labor Day

Columbus Day

Presidential Election Day

Thanksgiving Day

Christmas Day

Paid Holidays

None

Shift Rates

When it is not possible to conduct alteration work during regular work hours, in a building occupied by tenants, said work shall proceed on a shift basis: however work over seven (7) hours in any twenty four (24) hour period, the time after seven (7) hours shall be considered overtime.

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 $(\frac{1}{2})$ hour to eat with this time being included in the seven (7) hours of work.

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PLASTERER - TENDER

Plasterer - Tender

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$36.67

Supplemental Benefit Rate per Hour: \$28.02

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

ndependence 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

<u>Plumber</u>

Effective Period: 7/1/2015 - 6/30/2016

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Wage Rate per Hour: \$65.27

Supplemental Benefit Rate per Hour: \$28.38

Supplemental Note: Overtime supplemental benefit rate per hour: \$56.48

<u>Plumber - Temporary Services</u>

Temporary Services - When there are no Plumbers on the job site, there may be three shifts designed to cover the entire twenty-four hour period, including weekends if necessary, at the following rate straight time.

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$52.24

Supplemental Benefit Rate per Hour: \$22.28

Overtime Description

Double time the regular rate after a 7 hour day - unless for new construction site work where the plumbing contract price is \$1.5 million or less, the hours of labor can be 8 hours per day at the employers option. On Alteration jobs when other mechanical trades at the site are working an eighth hour at straight time, then the plumber shall also work an eighth hour at straight time.

Overtime

Double time the regular time rate for Saturday. Double time the regular rate for Sunday.

Overtime Holidays

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

Shift Rates

Shift work, when directly specified in public agency or authority documents where plumbing contract is \$8 million or less, will be permitted. 30% shift premium shall be paid for wages and fringe benefits for 4:00 pm and midnight shifts Monday to Friday. 50% shift premium shall be paid for wages and fringe benefits for 4:00 pm and midnight shift work performed on weekends. For shift work on holidays, double time wages and fringe benefits shall be paid.

(Plumbers Local #1)	
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PLUMBER (MECHNICAL EQUIPMENT AND SERVICE)

(Mechanical Equipment and Service work shall include any repair and/or replacement of the present plumbing system.)

Plumber

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$39.27

Supplemental Benefit Rate per Hour: \$13.34

Overtime

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

Overtime Holidays

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

Paid Holidays

None

(Plumbers Local # 1)

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

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$45.19

Supplemental Benefit Rate per Hour: \$20.62

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

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Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

Paid Holidays

None

Shift Rates

30% shift premium shall be paid for wages and fringe benefits for 4:00 pm and midnight shifts Monday to Friday. 50% shift premium shall be paid for wages and fringe benefits for 4:00 pm and midnight shift work performed on weekends. For shift work on holidays, double time wages and fringe benefits shall be paid.

(Plumbers Local #1)

PLUMBER: PUMP & TANK

Oil Trades (Installation and Maintenance)

Plumber - Pump & Tank

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$62.83

Supplemental Benefit Rate per Hour: \$21.37

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

Columbus Day

Veteran's Day

Thanksgiving Day

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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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$47.41

Supplemental Benefit Rate per Hour: \$24.40

Overtime

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

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays

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

New Year's Day

Martin Luther King Jr. Day

President's Day

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

Paid Holidays

None

Shift Rates

All work outside the regular work day (an eight hour workday between the hours of 6:00 A.M. and 4:30 P.M.) is to be paid at time and one half the regular rate.

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(Bricklayer District Council)

ROOFER

Roofer

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$40.70

Supplemental Benefit Rate per Hour: \$30.17

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: 7/1/2015 - 6/30/2016

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Wage Rate per Hour: \$47.41

Supplemental Benefit Rate per Hour: \$24.40

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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$46.96

Supplemental Benefit Rate per Hour: \$45.19

Supplemental Note: Supplemental benefit contributions are to be made at the applicable overtime rates.

<u> Sheet Metal Worker - Fan Maintenance</u>

(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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$37.57

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Supplemental Benefit Rate per Hour: \$45.19

Sheet Metal Worker - Duct Cleaner

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$12.90

Supplemental Benefit Rate per Hour: \$8.07

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.

(Local #28)

SHEET METAL WORKER - SPECIALTY

(Decking & Siding)

Sheet Metal Specialty Worker

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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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$42.64

Supplemental Benefit Rate per Hour: \$23.62

Supplemental Note: Supplemental benefit contributions are to be made at the applicable overtime rates.

Overtime

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

Overtime Holidays

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

Paid Holidays

None

(Local #28)

SHIPYARD WORKER

Shipyard Mechanic - First Class

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$27.54

Supplemental Benefit Rate per Hour: \$3.01

Shipyard Mechanic - Second Class

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$20.22

Supplemental Benefit Rate per Hour: \$2.73

Shipyard Laborer - First Class

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$20.90

Supplemental Benefit Rate per Hour: \$2.75

Shipyard Laborer - Second Class

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$13.86

Supplemental Benefit Rate per Hour: \$2.48

Shipyard Dockhand - First Class

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$23.61

Supplemental Benefit Rate per Hour: \$2.86

Shipyard Dockhand - Second Class

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$15.94

Supplemental Benefit Rate per Hour: \$2.56

Overtime Description

Work performed on holiday is paid double time the regular hourly wage rate plus holiday pay.

Overtime

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

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Time and one half the regular hourly rate after 40 hours in any work week.

Paid Holidays

New Year's Day
Martin Luther King Jr. Day
President's Day
Good Friday
Memorial Day
Independence Day
Labor Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Based on Survey Data

SIGN ERECTOR

(Sheet Metal, Plastic, Electric, and Neon)

Sign Erector

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$45.60

Supplemental Benefit Rate per Hour: \$46.28

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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$55.00

Supplemental Benefit Rate per Hour: \$52.79

Supplemental Note: Overtime supplemental benefit rate: \$104.84

Steamfitter -Temporary Services

PUBLISH DATE: 7/1/2015 EFFECTIVE PERIOD: JULY 1, 2015 THROUGH JUNE 30, 2016 Page 75 of 86

The steamfitters shall not do any other work and shall not be permitted to work more than one shift in a twentyfour hour day. When steamfitters are present during the regular working day, no temporary services steamfitter will be required

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$41.80

Supplemental Benefit Rate per Hour: \$42.76

Supplemental Note: .

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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$55.00

Supplemental Benefit Rate per Hour: \$52.79

Supplemental Note: Overtime supplemental benefit rate: \$104.84

Steamfitter -Temporary Services

PUBLISH DATE: 7/1/2015 EFFECTIVE PERIOD: JULY 1, 2015 THROUGH JUNE 30, 2016 Page 76 of 86

The steamfitters shall not do any other work and shall not be permitted to work more than one shift in a twentyfour hour day. When steamfitters are present during the regular working day, no temporary services steamfitter will be required.

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$41.80

Supplemental Benefit Rate per Hour: \$42.76

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

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

PUBLISH DATE: 7/1/2015 EFFECTIVE PERIOD: JULY 1, 2015 THROUGH JUNE 30, 2016 Page 77 of 86

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$39.25

Supplemental Benefit Rate per Hour: \$13.81

Refrigeration and Air Conditioner Service Person V

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$32.25

Supplemental Benefit Rate per Hour: \$12.44

Refrigeration and Air Conditioner Service Person IV

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$26.72

Supplemental Benefit Rate per Hour: \$11.30

Refrigeration and Air Conditioner Service Person III

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

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$22.93

Supplemental Benefit Rate per Hour: \$10.45

Refrigeration and Air Conditioner Service Person II

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

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$19.02

Supplemental Benefit Rate per Hour: \$9.67

Refrigeration and Air Conditioner Service Person I

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

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$13.91

Supplemental Benefit Rate per Hour: \$8.78

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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$47.20

Supplemental Benefit Rate per Hour: \$37.15

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: 7/1/2015 - 12/29/2015

Wage Rate per Hour: \$46.32

Supplemental Benefit Rate per Hour: \$22.66

Effective Period: 12/30/2015 - 6/30/2016

Wage Rate per Hour: \$46.82

Supplemental Benefit Rate per Hour: \$22.66

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

Paid Holidays

Christmas Day

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.



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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$40.35

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

Paid Holidays

Christmas Day

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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$40.03

Supplemental Benefit Rate per Hour: \$29.71

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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$51.61

Supplemental Benefit Rate per Hour: \$33.46

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 (1½) times the regular straight time rate of pay for the seven hours of actual off-shift work.

(Local #7)

TIMBERPERSON

PUBLISH DATE: 7/1/2015 EFFECTIVE PERIOD: JULY 1, 2015 THROUGH JUNE 30, 2016 Page 83 of 86

Timberperson.

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$45.60

Supplemental Benefit Rate per Hour: \$46.67

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.

Time and one half the regular hourly rate after 40 hours in any work week.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Presidential Election Day
Thanksgiving Day
Christmas Day

Paid Holidays

None

Shift Rates

Off shift work commencing between 5:00 P.M. and 11:00 P.M. shall work eight and one half hours allowing for one half hour for lunch. The wage rate shall be 113% of the straight time hourly wage rate.

(Local #1536)

TUNNEL WORKER

Blasters, Mucking Machine Operators (Compressed Air Rates)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$59.17

Supplemental Benefit Rate per Hour: \$49.45

Tunnel Workers (Compressed Air Rates)

Effective Period: 7/1/2015 - 6/30/2016

PUBLISH DATE: 7/1/2015 EFFECTIVE PERIOD: JULY 1, 2015 THROUGH JUNE 30, 2016 Page 84 of 86

Wage Rate per Hour: \$57.12

Supplemental Benefit Rate per Hour: \$47.80

Top Nipper (Compressed Air Rates)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$56.07

Supplemental Benefit Rate per Hour: \$46.96

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

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$55.06

Supplemental Benefit Rate per Hour: \$46.07

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

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$55.06

Supplemental Benefit Rate per Hour: \$46.07

Changehouse Attendant: Powder Watchperson (Compressed Air Rates)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$48.16

Supplemental Benefit Rate per Hour: \$43.62

Blasters (Free Air Rates)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$56.47

Supplemental Benefit Rate per Hour: \$47.47

Tunnel Workers (Free Air Rates)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$54.04

Supplemental Benefit Rate per Hour: \$45.45

All Others (Free Air Rates)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$49.93

Supplemental Benefit Rate per Hour: \$42.06

Microtunneling (Free Air Rates)

PUBLISH DATE: 7/1/2015 EFFECTIVE PERIOD: JULY 1, 2015 THROUGH JUNE 30, 2016 Page 85 of 86

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$43.23

Supplemental Benefit Rate per Hour: \$36.36

Overtime Description

For Repair-Maintenance Work on Existing Equipment and Facilities - Time and one half the regular rate after a 7 hour day, or for Saturday, or for Sunday. Double time the regular rate for work on a holiday. For Small-Bore Micro Tunneling Machines - Time and one-half the regular rate shall be paid for all overtime.

Overtime

Double time the regular rate after an 8 hour day.

Double time the regular time rate for Saturday.

Double time the regular rate for Sunday.

Double time the regular rate for work on the following holiday(s).

Paid Holidays

New Year's Day Lincoln's Birthday President's Day Memorial Day Independence Day Labor Day Columbus Day Election Day Veteran's Day Thanksgiving Day Christmas Day

(Local #147)

WELDER

TO BE PAID AT THE RATE OF THE JOURNEYPERSON IN THE TRADE PERFORMING THE WORK.

OFFICE OF THE COMPTROLLER

CITY OF NEW YORK

220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

APPENDIX

Pursuant to Labor Law §220 (3-e), only apprentices who are individually registered in a bona fide program to which the employer contractor is a participant and registered with the New York State Department of Labor, may be employed on a public work project.

Any employee listed on a payroll at an apprentice wage rate, who is not registered as above, shall be paid the journey person wage rate for the classification of work he actually performed.

Apprentice ratios are established to ensure the proper safety, training and supervision of apprentices. A ratio establishes the number of journey workers required for each apprentice in a program and on a job site. Ratios are interpreted as follows: in the case of a 1:1, 1:4 ratio, there must be one journey worker for the first apprentice, and four additional journey workers for each subsequent apprentice.

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ASBESTOS HANDLER

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

<u>Asbestos Handler (First 1000 Hours)</u>

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 78% of Journeyperson's rate Supplemental Benefit Rate Per Hour: \$15.95

Asbestos Handler (Second 1000 Hours)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 80% of Journeyperson's rate Supplemental Benefit Rate Per Hour: \$15.95

Asbestos Handler (Third 1000 Hours)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 83% of Journeyperson's rate Supplemental Benefit Rate Per Hour: \$15.95

Asbestos Handler (Fourth 1000 Hours)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 89% of Journeyperson's rate Supplemental Benefit Rate Per Hour: \$15.95

(Local #78)

BOILERMAKER

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

Boilermaker (First Year)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 65% of Journeyperson's rate Supplemental Benefit Rate Per Hour: \$30.00

Boilermaker (Second Year: 1st Six Months)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 70% of Journeyperson's rate

Supplemental Benefit Rate Per Hour: \$31.66

Boilermaker (Second Year: 2nd Six Months)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 75% of Journeyperson's rate Supplemental Benefit Rate Per Hour: \$33.32

Boilermaker (Third Year: 1st Six Months)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 80% of Journeyperson's rate Supplemental Benefit Rate Per Hour: \$35.00

Boilermaker (Third Year: 2nd Six Months)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 85% of Journeyperson's rate Supplemental Benefit Rate Per Hour: \$36.67

Boilermaker (Fourth Year: 1st Six Months)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 90% of Journeyperson's rate Supplemental Benefit Rate Per Hour: \$38.34

Boilermaker (Fourth Year: 2nd Six Months)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 95% of Journeyperson's rate Supplemental Benefit Rate Per Hour: \$40.01

(Local #5)

BRICKLAYER

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

Bricklayer (First 750 Hours)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 50% of Journeyperson's rate Supplemental Benefit Rate Per Hour: \$17.10

Bricklayer (Second 750 Hours)

PUBLISH DATE: 7/1/2015 EFFECTIVE PERIOD: JULY 1, 2015 THROUGH JUNE 30, 2016 Page 4 of 34

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 60% of Journeyperson's rate Supplemental Benefit Rate Per Hour: \$17.10

Bricklayer (Third 750 Hours)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 70% of Journeyperson's rate Supplemental Benefit Rate Per Hour: \$17.10

Bricklayer (Fourth 750 Hours)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 80% of Journeyperson's rate Supplemental Benefit Rate Per Hour: \$17.10

Bricklayer (Fifth 750 Hours)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 90% of Journeyperson's rate Supplemental Benefit Rate Per Hour: \$17.10

Bricklayer (Sixth 750 Hours)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 95% of Journeyperson's rate

Supplemental Benefit Rate Per Hour: \$17.10

(Bricklayer District Council)

CARPENTER

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

Carpenter (First Year)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 40% of Journeyperson's rate Supplemental Benefit Rate Per Hour: \$31.14

Carpenter (Second Year)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 50% of Journeyperson's rate Supplemental Benefit Rate Per Hour: \$31.14

Carpenter (Third Year)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 65% of Journeyperson's rate Supplemental Benefit Rate Per Hour: \$31.14

Carpenter (Fourth Year)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 80% of Journeyperson's rate Supplemental Benefit Rate Per Hour: \$31.14

(Carpenters District Council)

CEMENT MASON

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

Cement Mason (First Year)

Effective Period: 7/1/2015 - 6/30/2016

Wage and Supplemental Rate Per Hour: 50% of Journeyperson's Rate

Cement Mason (Second Year)

Effective Period: 7/1/2015 - 6/30/2016

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

<u> Cement Mason (Third Year)</u>

Effective Period: 7/1/2015 - 6/30/2016

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 (First 1333 hours)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 50% of Journeyperson's rate Supplemental Benefit Rate Per Hour: \$18.84

Cement & Concrete Worker (Second 1333 hours)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 65% of Journeyperson's rate Supplemental Benefit Rate Per Hour: \$24.65

Cement & Concrete Worker (Last 1334 hours)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 80% of Journeyperson's rate Supplemental Benefit Rate Per Hour: \$25.47

(Cement Concrete Workers District Council)

DERRICKPERSON & RIGGER (STONE)

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

Derrickperson & Rigger (stone) - First Year

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 50% of Journeyperson's rate

Supplemental Benefit Rate Per Hour: 50% of Journeyperson's rate

<u>Derrickperson & Rigger (stone) - Second Year: 1st Six Months</u>

Effective Period: 7/1/2015 - 6/30/2016

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: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 80% of Journeyperson's rate

Supplemental Benefit Rate Per Hour: 75% of Journeyperson's rate

<u>Derrickperson & Rigger (stone) - Third Year</u>

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 90% of Journeyperson's rate

Supplemental Benefit Rate Per Hour: 75% of Journeyperson's rate

PUBLISH DATE: 7/1/2015 EFFECTIVE PERIOD: JULY 1, 2015 THROUGH JUNE 30, 2016 Page 7 of 34

(Local #197)

DOCKBUILDER/PILE DRIVER

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 6)

Dockbuilder/Pile Driver (First Year)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 40% of Journeyperson's rate Supplemental Benefit Rate Per Hour: \$31.52

Dockbuilder/Pile Driver (Second Year)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 50% of Journeyperson's rate Supplemental Benefit Rate Per Hour: \$31.52

Dockbuilder/Pile Driver (Third Year)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 65% of Journeyperson's rate Supplemental Benefit Rate Per Hour: \$31.52

Dockbuilder/Pile Driver (Fourth Year)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 80% of Journeyperson's rate Supplemental Benefit Rate Per Hour: \$31.52

(Carpenters District Council)

ELECTRICIAN

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

Electrician (First Term: 0-6 Months)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$13.00

Supplemental Benefit Rate per Hour: \$11.61
Overtime Supplemental Rate Per Hour: \$12.47

Electrician (First Term: 7-12 Months)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$14.00

Supplemental Benefit Rate per Hour: \$12.12 Overtime Supplemental Rate Per Hour: \$13.04

Electrician (Second Term: 0-6 Months)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$15.00

Supplemental Benefit Rate per Hour: \$12.63
Overtime Supplemental Rate Per Hour: \$13.62

Electrician (Second Term: 7-12 Months)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$16.00

Supplemental Benefit Rate per Hour: \$13.14
Overtime Supplemental Rate Per Hour: \$14.19

Electrician (Third Term: 0-6 Months)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$17.00

Supplemental Benefit Rate per Hour: \$13.65 Overtime Supplemental Rate Per Hour: \$14.77

Electrician (Third Term: 7-12 Months)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$18.00

Supplemental Benefit Rate per Hour: \$14.16
Overtime Supplemental Rate Per Hour: \$15.34

Electrician (Fourth Term: 0-6 Months)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$19.00

Supplemental Benefit Rate per Hour: \$14.67
Overtime Supplemental Rate Per Hour: \$15.92

Electrician (Fourth Term: 7-12 Months)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$21.00

Supplemental Benefit Rate per Hour: \$15.68 Overtime Supplemental Rate Per Hour: \$17.07

Electrician (Fifth Term: 0-12 Months - Hired on or after 5/10/07)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$23.00

Supplemental Benefit Rate per Hour: \$18.56
Overtime Supplemental Rate Per Hour: \$20.00

Electrician (Fifth Term: 13-18 Months - Hired on or after 5/10/07)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$27.50

Supplemental Benefit Rate per Hour: \$20.82
Overtime Supplemental Rate Per Hour: \$22.54

Electrician (Fifth Term: 0-18 Months - Hired before 5/10/07)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$26.80

Supplemental Benefit Rate per Hour: \$20.46
Overtime Supplemental Rate Per Hour: \$22.14

Overtime Description

Overtime Wage paid at time and one half the regular rate 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: 7/1/2015 - 3/16/2016

Wage Rate Per Hour: 50% of Journeyperson's rate

Supplemental Rate Per Hour: \$26.94

Effective Period: 3/17/2016 - 6/30/2016

Wage Rate Per Hour: 50% of Journeyperson's rate

Supplemental Rate Per Hour: \$28.41

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Elevator (Constructor) - Second Year

Effective Period: 7/1/2015 - 3/16/2016

Wage Rate Per Hour: 55% of Journeyperson's rate

Supplemental Rate Per Hour: \$27.35

Effective Period: 3/17/2016 - 6/30/2016

Wage Rate Per Hour: 55% of Journeyperson's rate

Supplemental Rate Per Hour: \$28.84

Elevator (Constructor) - Third Year

Effective Period: 7/1/2015 - 3/16/2016

Wage Rate Per Hour: 65% of Journeyperson's rate

Supplemental Rate Per Hour: \$28.17

Effective Period: 3/17/2016 - 6/30/2016

Wage Rate Per Hour: 65% of Journeyperson's rate

Supplemental Rate Per Hour: \$29.69

Elevator (Constructor) - Fourth Year

Effective Period: 7/1/2015 - 3/16/2016

Wage Rate Per Hour: 75% of Journeyperson's rate

Supplemental Rate Per Hour: \$29.00

Effective Period: 3/17/2016 - 6/30/2016

Wage Rate Per Hour: 75% of Journeyperson's rate

Supplemental Rate Per Hour: \$30.54

(Local #1)

ELEVATOR REPAIR & MAINTENANCE

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

Elevator Service/Modernization Mechanic (First Year)

Effective Period: 7/1/2015 - 3/16/2016

Wage Rate Per Hour: 50% of Journeyperson's rate

Supplemental Benefit Per Hour: \$26.87

Effective Period: 3/17/2016 - 6/30/2016

Wage Rate Per Hour: 50% of Journeyperson's rate

Supplemental Benefit Per Hour: \$28.34

Elevator Service/Modernization Mechanic (Second Year)

Effective Period: 7/1/2015 - 3/16/2016

Wage Rate Per Hour: 55% of Journeyperson's rate

Supplemental Benefit Per Hour: \$27.27

Effective Period: 3/17/2016 - 6/30/2016

Wage Rate Per Hour: 55% of Journeyperson's rate

Supplemental Benefit Per Hour: \$28.76

Elevator Service/Modernization Mechanic (Third Year)

Effective Period: 7/1/2015 - 3/16/2016

Wage Rate Per Hour: 65% of Journeyperson's rate

Supplemental Benefit Per Hour: \$28.08

Effective Period: 3/17/2016 - 6/30/2016

Wage Rate Per Hour: 65% of Journeyperson's rate

Supplemental Benefit Per Hour: \$29.60

Elevator Service/Modernization Mechanic (Fourth Year)

Effective Period: 7/1/2015 - 3/16/2016

Wage Rate Per Hour: 75% of Journeyperson's rate

Supplemental Benefit Per Hour: \$28.89

Effective Period: 3/17/2016 - 6/30/2016

Wage Rate Per Hour: 75% of Journeyperson's rate

Supplemental Benefit Per Hour: \$30.43

(Local #1)

ENGINEER

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 5)

Engineer - First Year

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$23.68

Supplemental Benefit Rate per Hour: \$22.55

Engineer - Second Year

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$29.60

Supplemental Benefit Rate per Hour: \$22.55

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Engineer - Third Year

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$32.56

Supplemental Benefit Rate per Hour: \$22.55

Engineer - Fourth Year

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$35.52

Supplemental Benefit Rate per Hour: \$22.55

(Local #15)

ENGINEER - OPERATING

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 5)

Operating Engineer - First Year

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour 40% of Journeyperson's Rate

Supplemental Benefit Per Hour: \$20.15

Operating Engineer - Second Year

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 50% of Journeyperson's Rate

Supplemental Benefit Per Hour: \$20.15

Operating Engineer - Third Year

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 60% of Journeyperson's Rate

Supplemental Benefit Per Hour: \$20.15

(Local #14)

FLOOR COVERER

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

Floor Coverer (First Year)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 40% of Journeyperson's rate

Supplemental Rate Per Hour: \$31.14

Floor Coverer (Second Year)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 50% of Journeyperson's rate

Supplemental Rate Per Hour: \$31.14

Floor Coverer (Third Year)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 65% of Journeyperson's rate

Supplemental Rate Per Hour: \$31.14

Floor Coverer (Fourth Year)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 80% of Journeyperson's rate

Supplemental Rate Per Hour: \$31.14

(Carpenters District Council)

GLAZIER

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

Glazier (First Year)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 40% of Journeyperson's rate

Supplemental Rate Per Hour: \$13.64

Effective 11/1/2015 - Supplemental Rate Per Hour: \$13.79

Glazier (Second Year)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 50% of Journeyperson's rate

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Supplemental Rate Per Hour: \$22.97

Effective 11/1/2015 - Supplemental Rate Per Hour: \$23.13

Glazier (Third Year)

Effective Period: 7/1/2015 - 6/30/2016

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

Supplemental Rate Per Hour: \$25.87

Effective 11/1/2015 - Supplemental Rate Per Hour: \$26.03

Glazier (Fourth Year)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 80% of Journeyperson's rate

Supplemental Rate Per Hour: \$31.04

Effective 11/1/2015 - Supplemental Rate Per Hour: \$31.29

(Local #1281)

HEAT & FROST INSULATOR

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

Heat & Frost Insulator (First Year)

Effective Period: 7/1/2015 - 6/30/2016

Wage and Supplemental Rate Per Hour: 40% of Journeyperson's rate

Heat & Frost Insulator (Second Year)

Effective Period: 7/1/2015 - 6/30/2016

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

Heat & Frost Insulator (Third Year)

Effective Period: 7/1/2015 - 6/30/2016

Wage and Supplemental Rate Per Hour: 70% of Journeyperson's rate

Heat & Frost Insulator (Fourth Year)

Effective Period: 7/1/2015 - 6/30/2016

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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$21.17

Supplemental Benefit Rate per Hour: \$17.33

House Wrecker - Second Year

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$22.32

Supplemental Benefit Rate per Hour: \$17.33

House Wrecker - Third Year

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$23.97

Supplemental Benefit Rate per Hour: \$17.33

House Wrecker - Fourth Year

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$26.53

Supplemental Benefit Rate per Hour: \$17.33

(Mason Tenders District Council)

IRON WORKER - ORNAMENTAL

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

Iron Worker (Ornamental) - 1st Ten Months

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 50% of Journeyperson's rate

Supplemental Rate Per Hour: \$36.50

<u> Iron Worker (Ornamental) - 11 -16 Months</u>

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 55% of Journeyperson's rate

Supplemental Rate Per Hour: \$37.62

Iron Worker (Ornamental) - 17 - 22 Months

Effective Period: 7/1/2015 - 6/30/2016

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

Supplemental Rate Per Hour: \$38.73

Iron Worker (Ornamental) - 23 - 28 Months

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 70% of Journeyperson's rate

Supplemental Rate Per Hour: \$40.97

<u>Iron Worker (Ornamental) - 29 - 36 Months</u>

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 80% of Journeyperson's rate

Supplemental Rate Per Hour: \$43.20

Local #580)

IRON WORKER - STRUCTURAL

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 6)

Iron Worker (Structural) - 1st Six Months

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$25.48

Supplemental Benefit Rate per Hour: \$46.83

Iron Worker (Structural) - 7- 18 Months

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$26.08

Supplemental Benefit Rate per Hour: \$46.83

Iron Worker (Structural) - 19 - 36 months

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Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$26.68

Supplemental Benefit Rate per Hour: \$46.83

(Local #40 and #361)

LABORER (FOUNDATION, CONCRETE, EXCAVATING, STREET PIPE LAYER & COMMON)

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

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

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 50% of Journeyperson's rate

Supplemental Rate Per Hour: \$36.53

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

Effective Period: 7/1/2015 - 6/30/2016

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

Supplemental Rate Per Hour: \$36.53

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

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 75% of Journeyperson's rate

Supplemental Rate Per Hour: \$36.53

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

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 90% of Journeyperson's rate

Supplemental Rate Per Hour: \$36.53

(Local #731)

MARBLE MECHANICS

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

Cutters & Setters - First 750 Hours

Effective Period: 7/1/2015 - 6/30/2016

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: 7/1/2015 - 6/30/2016

Wage and Supplemental Rate Per Hour: 55% of Journeyperson's rate

Cutters & Setters - Third 750 Hours

Effective Period: 7/1/2015 - 6/30/2016

Wage and Supplemental Rate Per Hour: 65% of Journeyperson's rate

Cutters & Setters - Fourth 750 Hours

Effective Period: 7/1/2015 - 6/30/2016

Wage and Supplemental Rate Per Hour: 75% of Journeyperson's rate

Cutters & Setters - Fifth 750 Hours

Effective Period: 7/1/2015 - 6/30/2016

Wage and Supplemental Rate Per Hour: 85% of Journeyperson's rate

Cutters & Setters - Sixth 750 Hours

Effective Period: 7/1/2015 - 6/30/2016

Wage and Supplemental Rate Per Hour: 95% of Journeyperson's rate

Polishers & Finishers - First 750 Hours

Effective Period: 7/1/2015 - 6/30/2016

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: 7/1/2015 - 6/30/2016

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

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Polishers & Finishers - Third 750 Hours

Effective Period: 7/1/2015 - 6/30/2016

Wage and Supplemental Rate Per Hour: 75% of Journeyperson's rate

Polishers & Finishers - Fourth 750 Hours

Effective Period: 7/1/2015 - 6/30/2016

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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$21.39

Supplemental Benefit Rate per Hour: \$18.44

Mason Tender - Second Year

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$22.54

Supplemental Benefit Rate per Hour: \$18.44

Mason Tender - Third Year

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$24.29

Supplemental Benefit Rate per Hour: \$18.49

<u> Mason Tender - Fourth Year</u>

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$26.95

Supplemental Benefit Rate per Hour: \$18.49

(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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$29.41

Supplemental Benefit Rate per Hour: \$22.89

Metallic Lather (Second Year - Called Prior to 6/29/11)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$34.01

Supplemental Benefit Rate per Hour: \$24.54

Metallic Lather (Third Year - Called Prior to 6/29/11)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$39.07

Supplemental Benefit Rate per Hour: \$25.69

Metallic Lather (First Year -Called On Or After 6/29/11)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$23.01

Supplemental Benefit Rate per Hour: \$17.95

Metallic Lather (Second Year - Called On Or After 6/29/11)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$28.11

Supplemental Benefit Rate per Hour: \$17.95

Metallic Lather (Third Year - Called On Or After 6/29/11)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$33.21

Supplemental Benefit Rate per Hour: \$17.95

(Local #46)

MILLWRIGHT

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

Millwright (First Year)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$27.23

Supplemental Benefit Rate per Hour: \$34.06

Millwright (Second Year)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$32.18

Supplemental Benefit Rate per Hour: \$37.62

<u> Millwright (Third Year)</u>

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$37.13

Supplemental Benefit Rate per Hour: \$41.83

Millwright (Fourth Year)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$47.03

Supplemental Benefit Rate per Hour: \$48.31

(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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$27.05

Supplemental Benefit Rate per Hour: \$17.12

Paver and Roadbuilder - Second Year (Minimum 1000 hours)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$28.69

Supplemental Benefit Rate per Hour: \$17.12

(Local #1010)

PAINTER

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

Painter - Brush & Roller - First Year

Effective Period: 7/1/2015 - 10/31/2015

Wage Rate per Hour: \$15.80

Supplemental Benefit Rate per Hour: \$11.88

Effective Period: 11/1/2015 - 6/30/2016

Wage Rate per Hour: \$16.40

Supplemental Benefit Rate per Hour: \$12.13

<u> Painter - Brush & Roller - Second Year</u>

Effective Period: 7/1/2015 - 10/31/2015

Wage Rate per Hour: \$19.75

Supplemental Benefit Rate per Hour: \$15.73

Effective Period: 11/1/2015 - 6/30/2016

Wage Rate per Hour: \$20.50

Supplemental Benefit Rate per Hour: \$15.98

Painter - Brush & Roller - Third Year

Effective Period: 7/1/2015 - 10/31/2015

Wage Rate per Hour: \$23.70

Supplemental Benefit Rate per Hour: \$18.64

Effective Period: 11/1/2015 - 6/30/2016

Wage Rate per Hour: \$24.60

Supplemental Benefit Rate per Hour: \$18.89

Painter - Brush & Roller - Fourth Year

Effective Period: 7/1/2015 - 10/31/2015

Wage Rate per Hour: \$31.60

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Supplemental Benefit Rate per Hour: \$24.02

Effective Period: 11/1/2015 - 6/30/2016

Wage Rate per Hour: \$32.80

Supplemental Benefit Rate per Hour: \$24.27

(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: 7/1/2015 - 6/30/2016

Wage and Supplemental Rate Per Hour: 40% of Journeyperson's rate

Painters - Structural Steel (Second Year)

Effective Period: 7/1/2015 - 6/30/2016

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

Painters - Structural Steel (Third Year)

Effective Period: 7/1/2015 - 6/30/2016

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: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 40% of Journeyperson's rate

Supplemental Rate Per Hour: \$15.76

Plasterer - First Year: 2nd Six Months

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Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 45% of Journeyperson's rate

Supplemental Rate Per Hour: \$16.24

Plasterer - Second Year: 1st Six Months

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 55% of Journeyperson's rate

Supplemental Rate Per Hour: \$18.21

Plasterer - Second Year: 2nd Six Months

Effective Period: 7/1/2015 - 6/30/2016

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

Supplemental Rate Per Hour: \$19,29

Plasterer - Third Year: 1st Six Months

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 70% of Journeyperson's rate

Supplemental Rate Per Hour: \$21.46

Plasterer - Third Year: 2nd Six Months

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 75% of Journeyperson's rate

Supplemental Rate Per Hour: \$22.54

(Local #530)

PLUMBER

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

<u>Plumber - First Year: 1st Six Months</u>

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$14.00

Supplemental Benefit Rate per Hour: \$0.71

Plumber - First Year: 2nd Six Months

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$14.00

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Supplemental Benefit Rate per Hour: \$2.96

Plumber - Second Year

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$23.87

Supplemental Benefit Rate per Hour: \$12.76

Plumber - Third Year

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$25.97

Supplemental Benefit Rate per Hour: \$12.76

Plumber - Fourth Year

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$28.82

Supplemental Benefit Rate per Hour: \$12.76

Plumber - Fifth Year: 1st Six Months

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$30.22

Supplemental Benefit Rate per Hour: \$12.76

Plumber - Fifth Year: 2nd Six Months

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$42.29

Supplemental Benefit Rate per Hour: \$12.76

(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: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$25.01

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Supplemental Benefit Rate per Hour: \$4.75

Pointer - Waterproofer, Caulker Mechanic - Second Year

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$27.25

Supplemental Benefit Rate per Hour: \$9.70

Pointer - Waterproofer, Caulker Mechanic - Third Year

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$32.24

Supplemental Benefit Rate per Hour: \$12.45

Pointer - Waterproofer, Caulker Mechanic - Fourth Year

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate per Hour: \$38.66

Supplemental Benefit Rate per Hour: \$12.45

(Bricklayer District Council)

ROOFER

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

Roofer - First Year

Effective Period: 7/1/2015 - 6/30/2016

Wage and Supplemental Rate Per Hour: 35% of Journeyperson's Rate

Roofer - Second Year

Effective Period: 7/1/2015 - 6/30/2016

Wage and Supplemental Rate Per Hour: 50% of Journeyperson's Rate

Roofer - Third Year

Effective Period: 7/1/2015 - 6/30/2016

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

Roofer - Fourth Year

Effective Period: 7/1/2015 - 6/30/2016

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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 (0-6 Months)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 25% of Journeyperson's rate

Supplemental Rate Per Hour: \$6.24

Sheet Metal Worker (7-18 Months)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 35% of Journeyperson's rate

Supplemental Rate Per Hour: \$16.71

Sheet Metal Worker (19-30 Months)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 45% of Journeyperson's rate

Supplemental Rate Per Hour: \$23.00

Sheet Metal Worker (31-36 Months)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 55% of Journeyperson's rate

Supplemental Rate Per Hour: \$27.02

Sheet Metal Worker (37-42 Months)

Effective Period: 7/1/2015 - 6/30/2016

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

Supplemental Rate Per Hour: \$29.06

Sheet Metal Worker (43-48 Months)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 70% of Journeyperson's rate

Supplemental Rate Per Hour: \$33.10

Sheet Metal Worker (49-54 Months)

PUBLISH DATE: 7/1/2015 EFFECTIVE PERIOD: JULY 1, 2015 THROUGH JUNE 30, 2016 Page 28 of 34

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 75% of Journeyperson's rate

Supplemental Rate Per Hour: \$35.12

Sheet Metal Worker (55-60 Months)

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 80% of Journeyperson's rate

Supplemental Rate Per Hour: \$37.15

(Local #28)

SIGN ERECTOR

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

Sign Erector - First Year: 1st Six Months

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 35% of Journeyperson's rate

Supplemental Rate Per Hour: \$13.18

Sign Erector - First Year: 2nd Six Months

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 40% of Journeyperson's rate

Supplemental Rate Per Hour: \$14.95

Sign Erector - Second Year: 1st Six Months

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 45% of Journeyperson's rate

Supplemental Rate Per Hour: \$16.74

Sign Erector - Second Year: 2nd Six Months

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 50% of Journeyperson's rate

Supplemental Rate Per Hour: \$18.52

Sign Erector - Third Year: 1st Six Months

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 55% of Journeyperson's rate

Supplemental Rate Per Hour: \$24.94

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Sign Erector - Third Year: 2nd Six Months

Effective Period: 7/1/2015 - 6/30/2016

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

Supplemental Rate Per Hour: \$26.87

Sign Erector - Fourth Year: 1st Six Months

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 65% of Journeyperson's rate

Supplemental Rate Per Hour: \$29.47

Sign Erector - Fourth Year: 2nd Six Months

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 70% of Journeyperson's rate

Supplemental Rate Per Hour: \$31.46

Sign Erector - Fifth Year

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 75% of Journeyperson's rate

Supplemental Rate Per Hour: \$33.43

<u> Sign Erector - Sixth Year</u>

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 80% of Journeyperson's rate

Supplemental Rate Per Hour: \$35.41

(Local #137)

STEAMFITTER

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

Steamfitter - First Year

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate and Supplemental Per Hour: 40% of Journeyperson's rate

Steamfitter - Second Year

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate and Supplemental Rate Per Hour: 50% of Journeyperson's rate.

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Steamfitter - Third Year

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate and Supplemental Rate per Hour: 65% of Journeyperson's rate.

Steamfitter - Fourth Year

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate and Supplemental Rate Per Hour: 80% of Journeyperson's rate.

Steamfitter - Fifth Year

Effective Period: 7/1/2015 - 6/30/2016

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)

<u> Stone Mason - Setters - First 750 Hours</u>

Effective Period: 7/1/2015 - 6/30/2016

Wage and Supplemental Rate Per Hour: 50% of Journeyperson's rate

Stone Mason - Setters - Second 750 Hours

Effective Period: 7/1/2015 - 6/30/2016

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: 7/1/2015 - 6/30/2016

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: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 80% of Journeyperson's rate

Supplemental Rate Per Hour: 50% of Journeyperson's rate

Stone Mason - Setters - Fifth 750 Hours

PUBLISH DATE: 7/1/2015 EFFECTIVE PERIOD: JULY 1, 2015 THROUGH JUNE 30, 2016 Page 31 of 34

Effective Period: 7/1/2015 - 6/30/2016

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: 7/1/2015 - 6/30/2016

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: 7/1/2015 - 6/30/2016

Wage and Supplemental Rate Per Hour: 40% of Journeyperson's rate

Drywall Taper - Second Year

Effective Period: 7/1/2015 - 6/30/2016

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

Drywall Taper - Third Year

Effective Period: 7/1/2015 - 6/30/2016

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: 7/1/2015 - 6/30/2016

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Wage and Supplemental Rate Per Hour: 50% of Journeyperson's rate

Tile Layer - Setter - Second 750 Hours

Effective Period: 7/1/2015 - 6/30/2016

Wage and Supplemental Rate Per Hour: 55% of Journeyperson's rate

Tile Layer - Setter - Third 750 Hours

Effective Period: 7/1/2015 - 6/30/2016

Wage and Supplemental Rate Per Hour: 65% of Journeyperson's rate

Tile Layer - Setter - Fourth 750 Hours

Effective Period: 7/1/2015 - 6/30/2016

Wage and Supplemental Rate Per Hour: 75% of Journeyperson's rate

Tile Layer - Setter - Fifth 750 Hours

Effective Period: 7/1/2015 - 6/30/2016

Wage and Supplemental Rate Per Hour: 85% of Journeyperson's rate

Tile Layer - Setter - Sixth 750 Hours

Effective Period: 7/1/2015 - 6/30/2016

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: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 40% of Journeyperson's rate

Supplemental Rate Per Hour: \$31.54

<u>Timberperson - Second Year</u>

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 50% of Journeyperson's rate

Supplemental Rate Per Hour: \$31.54

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Timberperson - Third Year

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 65% of Journeyperson's rate

Supplemental Rate Per Hour: \$31.54

Timberperson - Fourth Year

Effective Period: 7/1/2015 - 6/30/2016

Wage Rate Per Hour: 80% of Journeyperson's rate

Supplemental Rate Per Hour: \$31.54

(Local #1536)



DDC STANDARD GENERAL CONDITIONS FOR SINGLE CONTRACT PROJECTS



No Text



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Issue Date - June 01, 2013 Revised - January 15, 2015

NO TEXT



Division 01 – DDC STANDARD GENERAL CONDITIONS
SINGLE CONTRACT PROJECTS
Issue Date - June 01, 2013
Revised - January 15, 2015

SECTION 01 10 00 SUMMARY

PARTI- GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].
- B. Addendum to the General Conditions: These General Conditions include and are supplemented by the Addendum to the General Conditions (the "Addendum"). The Addendum includes the following: (1) schedules referred to in these General Conditions (Schedule A through F), (2) information regarding the applicability of various articles, and (3) amended articles, if any.

1.2 SUMMARY:

- A. This section includes the following:
 - 1. Scope and Intent
 - 2. Provisions Referenced in the Contract
 - 3. Performance of Work During Non-Regular Work Hours (Pursuant to a Change Order)
 - 4. Interruption of Services at Existing Facilities

1.3 DEFINITIONS:

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.
- B. Design Consultant: "Design Consultant" shall mean the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the "Design Consultant" may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.

1.4 SCOPE AND INTENT:

A. Description of Project: Refer to the Addendum for a description of the project.

REFER TO THE ADDENDUMIFOR THE APPLICABILITY OF SUBSECTION 144B

B. LEED: The City of New York will seek U.S. Green Building Council (USGBC) LEED (Leadership in Energy and Environmental Design) certification for this Project as specified in Section 01 81 13, "SUSTAINABLE DESIGN REQUIREMENTS FOR LEED BUILDINGS" and the Addendum to the General Conditions.



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SINGLE CONTRACT PROJECTS
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REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 1.4 C

- C. COMMISSIONING: The project will be commissioned by an independent third party under separate contract with the City of New York. Commissioning shall be in accordance with ASHRAE and USGBC LEED-NC procedures, as described in Section 01 91 13, GENERAL COMMISSIONING REQUIREMENTS, and the Addendum to the General Conditions. The Contractor shall cooperate with the commissioning agent and provide whatever assistance is required.
- D. PROGRESS SCHEDULE: Refer to Section 01 32 00 CONSTRUCTION PROGRESS DOCUMENTATION for requirements of the project.
- E. COMPLETION OF WORK: Work to be done under the Contract is comprised of the furnishing of all labor, materials, equipment and other appurtenances, and obtaining all regulatory agency approvals necessary and required to complete the construction work in accordance with the Contract.
- F. OMISSION OF DETAILS: All work called for in the Specifications applicable to the Contract but not shown on the Contract Drawings in their present form, or vice versa, is required, and shall be performed by the Contractor as though it were originally delineated or described. The cost of such work shall be deemed included in the total Contract Price.
- G. WORK NOT IN SPECIFICATIONS OR CONTRACT DRAWINGS: Work not particularly specified in the Specifications nor detailed on the Contract Drawings but involved in carrying out their intent or in the complete and proper execution of the work, is required, and shall be performed by the Contractor. The cost of such work shall be deemed included in the total Contract Price.
- H. SILENCE OF THE SPECIFICATIONS: The apparent silence of the Specifications as to any detail, or the apparent omission from them of a detailed description concerning any work to be done and materials to be furnished, 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.
- 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 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.

1.5 CONTRACT DRAWINGS AND SPECIFICATIONS:

A. SCHEDULE C - The Contract Drawings are listed in Schedule C, which is set forth in the Addendum. Such drawings referred to in the Contract, and in the applicable Specifications for the Contract, bear the general title:

City of New York
Department of Design and Construction
Division of Public Buildings

- B. DOCUMENTS FURNISHED TO THE CONTRACTOR After the award of the Contract, the Contractor will be furnished with five (5) complete sets of paper prints of all Contract Drawings mentioned in Paragraph A above, as well as a copy of the Specifications.
- C. ADDITIONAL COPIES of Drawings and Specifications, when requested, will be furnished to the Contractor if available.



- D. SUPPLEMENTARY DRAWINGS When, in the opinion of the Commissioner, it becomes necessary to more fully explain the work to be done, or to illustrate the work further, or to show any changes which may be required, drawings known as Supplementary Drawings will be prepared by the Commissioner.
- E. COMPENSATION Where Supplementary Drawings entail extra work, compensation therefore to the Contractor 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.
- F. SUPPLEMENTARY DRAWING PRINTS Three (3) copies of prints of these Supplementary Drawings will be furnished to the Contractor.
- G. COPIES TO SUBCONTRACTORS The Contractor 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.

1.6 COORDINATION:

- A. COORDINATION AND COOPERATION The Contractor shall consult and study the requirements of the Contract Drawings and Specifications for all required work, including all work to be performed by trade subcontractors, so that the Contractor may become acquainted with the work of the project as a whole in order to achieve the proper coordination and cooperation necessary for the efficient and timely performance of the work.
- B. CONTRACTOR TO CHECK DRAWINGS: The Contractor 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.

1.7 SHOP DRAWINGS AND RECORD DRAWINGS:

Refer to Division I Section 01 33 00 - SUBMITAL PROCEDURES and Section 01 78 39 - PROJECT RECORD DRAWINGS for requirements applicable to shop drawings and record drawings.

1.8 TEMPORARY FACILITIES, SERVICES AND CONTROLS:

Refer to Division I Section 01 50 00 – TEMPORARY FACILITIES SERVICES AND CONTROLS for the responsibilities of the Contractor.

1.9 DUST CONTROL:

The Contractor shall prepare, execute and manage a "Dust Control Plan" for the prevention of the emission of dust from construction related activities in compliance with 15 RCNY 13-01 et. seq.

1.10 PROVISIONS REFERENCED IN THE CONTRACT:

A. SCHEDULE A - Various Articles of the Contract refer to requirements set forth in Schedule A of the General Conditions. Schedule A, which is included in the Addendum, sets forth (1) the referenced Articles of the Contract, and (2) the specific requirements applicable to the Contract.



- B. EXTENSION OF TIME Applications for Extensions of Time, as indicated in Article 13 of the Contract, 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.
 - 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.
 - 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 therefore.

- 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 Documents, the Contractor shall remove and replace, at Contractor's own cost, such defective or improperly incorporated material with materials complying with the Contract Documents. Until such materials are replaced, the City will deduct from the value of the stored materials or from any other money due the Contractor, the amount paid by the City for such rejected or improperly incorporated materials.
- 9. Payments for the cost of materials made hereunder shall not be deemed to be an acceptance of such materials as being in accordance with the Contract Documents, and the Contractor always retains and must comply with the Contractor's duty to deliver to the site and properly incorporate in the work only materials which comply with the Contract Documents.
- 10. The Contractor shall retain any and all risks in connection with the damage, destruction or loss of the materials paid for hereunder to the time of delivery of the same to the site of the work and their proper incorporation in the work in accordance with the Contract Documents.
- 11. The Contractor shall comply with all laws and the regulations of any governmental body or agency pertaining to the priority purchase, allocation and use of the materials.
- 12. When requesting payment for such materials, the Contractor shall submit with the partial estimate duly authenticated documents of title, such as bills of sale, invoices or warehouse receipts, all in quadruplicate. The executed bills of sale shall transfer title to the materials from the Contractor to the City. (In the event that the invoices state that the material has been purchased by a subcontractor, bills of sale in quadruplicate will also be required transferring title to the materials from subcontractor to the Contractor).
- 13. Where the Contractor, with the approval of the Commissioner, has purchased unusually large quantities of materials in order to assure their availability for the work, the Commissioner, at the Commissioner's option, may waive the requirements of Paragraph 12 provided the Contractor furnishes evidence in the form of an affidavit from the Contractor in quadruplicate, and such other proof as the Commissioner may require, that the Contractor is the sole owner of such materials and has purchased them free and clear of all liens and other encumbrances. In such event, the Contractor shall pay for such materials and submit proof thereof, in the same manner as provided in Paragraph 12 hereof, within seven (7) days after receipt of payment therefore from the Comptroller. Failure on the part of the Contractor to submit satisfactory evidence that all such materials have been paid for in full, 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. MOBILIZATION PAYMENT A line item for mobilization shall be allowed on the Contractor's Detailed Bid Breakdown submitted in accordance with Article 41 of the Contract. The Mobilization Payment is intended to include the cost of required bonds, insurance coverage and/or any other expenses required for the initiation of the Contract Work. All costs for mobilization shall be deemed included in the total Contract Price. The Detailed Bid Breakdown shall reflect, and the Mobilization Payment shall be made, in accordance with the following schedule:

Contract Amount	•	Perce	nt	M	obilization	A
Less than - \$	50,000	X	0	=	0	
\$ 50,000 - \$	100,000	X		=	\$ 6,000	
\$ 100,001 - \$	500,000	X	6	=	\$ 6,000 (min) - \$3	0,000 (max)
\$ 500,000 - \$	2,500,000	x .	5	=	\$ 30,000 (min) - \$ 1	25,000 (max)
Over -\$	2,500,000	x	4	=	\$ 125,000 (min) - \$ 3	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.
- 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.

E. ULTRA LOW SULFUR DIESEL FUEL AND BEST AVAILABLE TECHNOLOGY REPORTING: The Contractor shall submit reports to the Commissioner regarding the use of Ultra Low Sulfur Diesel Fuel in Non-Road Vehicles, and the implementation of Best Available Technology (BAT), as set forth in Article 5.4 of the Contract. Such reports shall be submitted in accordance with the schedule, format, directions and procedures established by the Commissioner.



1.11 PERFORMANCE OF WORK DURING NON-REGULAR WORK HOURS:

- A. NON-REGULAR WORK HOURS: The Commissioner may issue a change order in accordance with Article 25 of the Contract which (1) directs the Contractor to perform the Work, or specific components thereof, during other than regular work hours (i.e., evenings, weekends and holidays), and (2) provides compensation to the Contractor for costs in connection with the performance of Work during other than regular work hours. The Commissioner may issue a change order if a delay has occurred and such delay is not the fault of the Contractor, or if the work is of such an important nature that delay in completing such work would result in serious disadvantage to the public.
- B. PROCEDURE: The Contractor shall (1) obtain whatever permits may be required for performance of the work during other than regular business hours, and (2) pay all necessary fees in connection with such permits. In addition, if directed by the Commissioner, the Contractor shall make immediate application to the Commissioner of the Department of Labor, State of New York, for dispensation in accordance with Subdivision 2 of Section 220 of the Labor Law.

1.12 INTERRUPTION OF SERVICES AT EXISTING FACILITIES:

- A. EVENING AND WEEKEND WORK Where performance of the Work requires the temporary shutdown(s) of services, such shutdown(s) shall be made at night or on weekends or at such times that will cause no interference with the established routines and operations of the facility in question.
 - 1 Where weekend or evening work is required due to unavoidable service shutdowns, such work shall be performed at no extra cost to the City. Components of the Work that must be performed during other than regular work hours are indicated in the Drawings and/or the Specifications.

B. INTERRUPTION OF EXISTING FACILITIES:

- 1 The Contractor shall not interrupt any of the services of the facility nor interfere with such services in any way without the permission of the Commissioner. Such interruption or interferences shall be made as brief as possible, and only at such time stated.
- Under no circumstances shall the Contractor, its subcontractors, or its workers, be permitted to use any part of the project as a shop, without the permission of the Commissioner.
- 3 Unnecessary noise shall be avoided at all times and necessary noise shall be reduced to a minimum.
- 4 Toilet facilities, water and electricity must be operational at all times (i.e. 24/7). No services of the facility can be interrupted in any way without the permission of the Commissioner. Careful coordination of all work with the Resident Engineer must be done to maintain the operational level of the project personnel at the facility.
- The Contractor shall schedule the work to avoid noise interference that will affect the normal functions of the facility. In particular, construction operations producing noises that are objectionable to the functions of the facility must be scheduled at times of day or night, day of the week, or weekend, which will not interfere with personnel at the facility. Any additional cost resulting from this scheduling shall be borne by the Contractor.



- 6 The Contractor shall arrange to work continuously, including evening and weekend hours, if required, to assure that services will be shut down only during the time actually required to make the necessary connections to the existing facility.
- 7 The Contractor shall give ample written notice in advance to the Commissioner and personnel at the facility of any required shutdown.

PART II - PRODUCTS (Not Used)

PART III - EXECUTION (Not Used)

END OF SECTION 01 10 00



SECTION 01 31 00 PROJECT MANAGEMENT AND COORDINATION

PART I - GENERAL

RELATED DOCUMENTS:

- The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract1.
- LEED: Refer to the Addendum to identify whether this project is designed to comply with a Certification B. Level according to the U.S. Green Building Council's Leadership in Energy & Environmental Design (LEED) Rating System, as specified in Section 01 81 13, "SUSTAINABLE DESIGN REQUIREMENTS FOR LEED BUILDINGS."
- COMMISSIONING: Refer to the Addendum to identify whether this project will be commissioned by an C. independent third party under separate contract with the City of New York. Commissioning shall be in accordance with ASHRAE and USGBC LEED-NC procedures, as described in Section 01 91 13, GENERAL COMMISSIONING REQUIREMENTS. The Contractor shall cooperate with the commissioning agent and provide whatever assistance is required.

1.2 SUMMARY:

- This Section includes administrative provisions for coordinating construction operations on the Project including without limitation the following.
 - Coordination Drawings.
 - 2. Administrative and supervisory personnel.
 - 3. Project meetings.
 - 4. Requests for Interpretation (RFIs).
- B. This section includes the following:
 - 1. **Definitions**
 - 2. Coordination
 - 3. Submittals
 - 4. Administrative and Supervisory Personnel
 - 5. **Project Meetings**
 - 6. Requests for Interpretation (RFI's)
 - 7. Correspondence
 - 8. Contractor's Daily Reports
 - 9. Alternate and Substitute Equipment

C. RELATED SECTIONS: include without limitation the following:

1.	Section 01 10 00	SUMMARY
2.	Section 01 32 00	CONSTRUCTION PROGRESS DOCUMENTATION
3.	Section 01 33 00	SUBMITTALS
4.	Section 01 35 26	SAFETY REQUIREMENTS
5.	Section 01 73 00	EXECUTION REQUIREMENTS
6.	Section 01 74 19	CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL



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7. Section 01 77 00 PROJECT CLOSEOUT PROCEDURES

1.3 DEFINITIONS:

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.
- B. Design Consultant: "Design Consultant" shall mean the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the "Design Consultant" may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.

1.4 COORDINATION:

- A. Coordination: The Contractor shall coordinate its construction operations, including those of its subcontractors, with other entities to ensure the efficient and orderly installation of each part of the Work. The Contractor shall coordinate the various operations required by different Sections of the Specifications that depend on each other for proper installation, connection, and operation.
 - Schedule construction operations in sequence in order to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components to ensure maximum accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
 - 4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.
- B. The Contractor shall prepare memoranda for distribution to its subcontractors and other involved entities, outlining special procedures required for coordination. Such memoranda shall include required notices, reports, and meeting minutes as applicable.
- C. Administrative Procedures: The Contractor shall coordinate scheduling and timing of required administrative procedures with other construction activities and activities of its subcontractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include without limitation the following:
 - 1. Preparation of Contractor's Construction Schedule.
 - 2. Installation and removal of temporary facilities and controls.
 - 3. Delivery and processing of submittals.
 - 4. Progress meetings.
 - Pre-installation conferences..
 - Startup and adjustment of systems.
 - 7. Project closeout activities.
- D. Conservation: The Contractor shall coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.



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E. Salvaged Items, Material and/or Equipment: The Specifications may identify certain items, materials or equipment which must be salvaged by the Contractor and handled or disposed of as directed. The Contractor shall comply with all directions in the Specifications regarding the salvaging and handling of identified items, material or equipment.

1.5 SUBMITTALS:

- Submit shop drawings, product data, samples etc. in compliance with Section 01 33 00, SUBMITTAL PROCEDURES.
- Coordination Drawings: The Contractor shall prepare applicable Coordination Drawings in compliance B. with the requirements for Coordination Drawings in Section 01 33 00, SUBMITTAL PROCEDURES.
- Safety Plan in compliance with Section 01 35 26, SAFETY REQUIREMENTS PROCEDURES. C.
- Waste Management Plan in compliance with Section 01 74 19, CONSTRUCTION WASTE D. MANAGEMENT AND DISPOSAL
- Key Personnel Names: Within 15 days after the Notice to Proceed, the Contractor shall submit a list of E. key personnel assignments of the Contractor and its subcontractors, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in case of the absence of individuals assigned to Project.
 - Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.
 - In addition to Project superintendent, provide other administrative and supervisory personnel as 2. required for proper performance of the Work. Include special personnel required for coordinating all operations by its subcontractors.

PROJECT MEETINGS: 1.6

- General: The Resident Engineer will hold regularly scheduled construction progress meetings at the A. site, at which time the Contractor and appropriate subcontractors shall have their representatives present to discuss all details relative to the execution of the work. The Resident Engineer shall preside over these meetings.
 - Agenda: Prior to each meeting, the Resident Engineer will consult with the Contractors and will prepare an agenda of items to be discussed. In general, after informal discussion of any item on the agenda, the Resident Engineer will summarize the discussion in a brief written statement, and the Contractor will then dictate a brief statement for the record.
 - Coordination: In addition to construction progress meetings called by the Resident Engineer, the 2. Contractor shall hold regularly scheduled meetings for the purpose of coordinating; expediting and scheduling the work in accordance with the master coordinated Job Progress Chart. The Contractor and its subcontractors, material suppliers or vendors whose presence is necessary, are required to attend. These meetings may, at the discretion of the Contractor, be held at the same place and immediately following the project meetings held by the Resident Engineer. Minutes of these meetings shall be recorded, typed and printed by the Contractor and distributed to all parties concerned.

PRECONSTRUCTION KICK-OFF MEETING: B.

The Resident Engineer will schedule a preconstruction kick-off meeting either at DDC's main office or at the Project site to review responsibilities and personnel assignments and clarify the

PROJECT MANAGEMENT AND COORDINATION

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role of each participant. Unless otherwise directed the Design Consultant will record and distribute meeting minutes.

- 2. Attendees: Authorized representative of the Client Agency; Design Consultant; the Contractor and its superintendents, subcontractor(s) and their superintendent(s); LEED sub-consultant and Commissioning Authority /Agent (CxA) as applicable and other concerned parties. All participants at the meeting shall be familiar with the Project and authorized to conclude matters relating to the Contract Work.
- 3. Agenda: Includes without limitation the following as applicable:
 - a. Establishing construction schedule
 - b. Schedule for regular construction meetings
 - c. Phasing
 - d. Critical work sequencing and long-lead items
 - e. Designation of key personnel and their duties
 - f. Reviewing Application for Payment and Change Order Procedures
 - g. Procedures for Requests for Information (RFIs.)
 - h. Review Permits and Approval requirements
 - Review all recent Administrative Code reporting requirements relating to the project, (i.e. LL 77, LL86 etc.)
 - j. Procedures for testing and inspecting
 - k. Reviewing special conditions at the Project site
 - I. Distribution of the Contract Documents
 - m. Submittal procedures
 - n. Safety Procedures
 - o. LEED requirements
 - p. Commissioning Requirements
 - g. Preparation of Record Documents
 - r. Historic Treatment requirements
 - s. Use of the premises
 - t. Work restrictions
 - u. Client Agency occupancy requirements
 - v. Responsibility for temporary facilities, services and controls
 - w. Construction Waste Management and Disposal
 - x. Indoor Air Quality Management Plan
 - y. Dust Mitigation Plan
 - z. Office, work, and storage areas
 - aa. Equipment deliveries and priorities
 - bb. Security
 - cc. Progress cleaning
 - dd. Working hours

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C. CONSTRUCTION PROGRESS MEETINGS:

- The Resident Engineer will schedule and conduct construction progress meetings at bi-weekly intervals or as otherwise determined. All participants at the meeting shall be familiar with the Project and authorized to conclude matters relating to the Work. Unless otherwise directed the Design Consultant will record and distribute meeting minutes.
- 2. Attendees:
 - a. Design Consultant and applicable sub-consultants
 - b. Client Agency Representative
 - c. Representatives from the Contractor, sub-contractor(s), suppliers or other entities involved in the current progress, planning, coordination or future activities of the Work
 - d. Other appropriate DDC personnel, DDC consultants and concerned parties
- Agenda: Includes without limitation the following:
 - a. Review the Construction Schedule and progress of the Work. Determine if the Work is on time, ahead of schedule or behind schedule. Determine actions to be taken to maintain or accelerate the schedule
 - b. Review and approve prior meeting minutes and follow up open issues
 - c. Coordinate work between each subcontractor
 - d. Sequence of Operations
 - e. Status of submittals, deliveries and off-site fabrication
 - f. Status of inspections and approvals by governing agencies
 - g. Temporary facilities and controls
 - h. Review Site Safety
 - i. Quality and work standards
 - j. Field observations
 - k. Status of correction of deficient items
 - I. RFI's
 - m. Pending changes
 - n. Status of outstanding Payments and Change Orders
 - o. LEED requirements including Construction Waste Management, Indoor Air Quality Plan, Dust Mitigation and Commissioning
 - p. Status of Administrative Code reporting requirements related to the project

1.7 REQUESTS FOR INFORMATION (RFI):

- A. Procedure: Immediately on discovery of the need for information or interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, the Contractor shall prepare and submit an RFI in the form specified by the Resident Engineer.
 - RFI shall originate with the Contractor. RFIs submitted by entities other than Contractor will be returned with no response.
 - Coordinate and submit RFI in a prompt manner to the Resident Engineer so as to avoid delays in Contractor's work or work of its subcontractors.
 - 3. RFI Log: The Contractor shall prepare, maintain, and submit a tabular log of RFIs organized by the RFI number monthly to the Resident Engineer.



4. On receipt of responses and action to the RFI, the Contractor shall update the RFI log and immediately distribute the RFI response to affected parties. Review response(s) and notify the Resident Engineer immediately if the Contractor disagrees with response(s).

1.8 CORRESPONDENCE:

Copies of all correspondence to DDC shall be sent directly to the Resident Engineer at the job site.

1.9 CONTRACTOR'S DAILY REPORTS:

The Contractor shall prepare and submit Daily Construction Progress Reports as outlined in Section 01 32 00, CONSTRUCTION PROGRESS DOCUMENTATION.

PART II - PRODUCTS (Not Used)

PART III - EXECUTION (Not Used)

END OF SECTION 01 31 00



SECTION 01 32 00 CONSTRUCTION PROGRESS DOCUMENTATION

PARTI - GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for establishing an effective base line schedule for the project and documenting the progress of construction during performance of the Work by developing, revising as necessary, various documents including but not limited to the following:
 - 1. Baseline Construction Schedule.
 - 2. Composite Schedule for entire project
 - 3. Recovery Composite Schedule
 - 4. Revised and/or updated Composite Schedule
 - 5. Submittals Schedule.
 - 6. Daily construction reports.
 - 7. Material location reports.
 - 8. Field condition reports.
 - 9. Special reports.
- B. RELATED SECTIONS: include without limitation the following:
 - 1. Section 01 10 00 SUMMARY
 - 2. Section 01 32 22 PHOTOGRAPHIC DOCUMENTATION
 - 3. Section 01 33 00 SUBMITTAL PROCEDURES
 - 4. Section 01 40 00 QUALITY REQUIREMENTS

1.3 DEFINITIONS:

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- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.
- B. Design Consultant: "Design Consultant" shall mean the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the "Design Consultant" may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.



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C. Baseline Construction Schedule:

A horizontal bar chart type schedule (Microsoft Project OR similar program) listing all the activities and their duration for entire contract duration OR construction period, including logical ties and interrelations between the activities necessary for the timely and successful completion of the project. Critical path activities shall be clearly marked. The Baseline construction schedule is a preliminary schedule that must be reviewed and approved by the Resident Engineer.

D. Composite Schedule:

A composite horizontal bar chart type schedule (Microsoft Project OR similar program) listing all activities to be performed by the Contractor and its subcontractors, the duration of each activity including logical ties and interrelations between activities, and the sequence of each of necessary activities for the timely and successful completion of the project within the stipulated contract duration. Critical path activities shall be clearly marked. The Composite schedule must be signed and submitted by the Contractor within thirty (30) calendar days after the date established for commencement of the Contract, unless otherwise directed. The Composite Schedule must be reviewed and approved by the Resident Engineer.

E. Recovery Composite Schedule: A Recovery Composite Schedule is not required unless the City issues an Acceleration Change Order.

A Composite Schedule outlining and incorporating extraordinary efforts required to recover lost time with the aim of achieving completion of the project within the stipulated contract duration, plus authorized time extensions. In such case special attention must be given to keep the delays as minimum as possible and must establish the nature of efforts such as extended hours of work, weekend work, accelerated fabrication, required action(s) or effort(s) by the Contractor, its subcontractors, consultants, clients, end users and/or other concerned parties.

Such schedule must be prepared and submitted within Five (5) calendar days of request by the Resident Engineer. The Recovery Composite Schedule must be reviewed and approved by the Resident Engineer.

F. Revised and/or Updated Composite Schedule:

A Baseline construction schedule OR Composite Schedule OR Recovery Composite Schedule for the project that shows the actual duration of all the completed activities, including duration of and the reasons for delays, if any has occurred, AND revisions to all remaining activities of the Contractor and its subcontractors, including changes, if any, to logical ties, interrelations and the sequence of each of the outlined activities. Any such revisions should be shown on the row just below the approved schedule of the respective activity so that revisions can be compared.

The Revised and/or updated Composite Schedule must be reviewed and approved by the Resident Engineer.

- G. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
- H. Event: The starting or ending point of an activity.
- 1. Fragment: A part of the activity that breaks down activities into smaller activities for greater detail.
- J. Milestone: A key or critical point in time for reference or measurement.
- K. Network Diagram: A graphic diagram of a network schedule, showing activities and activity relationships.

CONSTRUCTION PROGRESS DOCUMENTATION



PART II - PRODUCTS

2.1 **BASELINE CONSTRUCTION SCHEDULE:**

A. The Contractor shall prepare a Baseline horizontal bar-chart-type construction schedule for the project. Submit the Baseline Construction Schedule to the Resident Engineer within (15) fifteen calendar days after the date established for commencement of the Contract, unless directed otherwise. The Baseline Schedule must be reviewed and approved by the Resident Engineer.

Provide a separate time bar for each significant construction activity. Coordinate each activity on

the schedule with other construction activities for proper interrelationship & sequence.

Duration: The duration of each activity on the schedule besides installation must clearly show 2. required duration of filing for permits, inspections, testing, approvals, shop drawings and materials submittals and approvals, fabrication, delivery, phasing for each construction activity. 3.

Schedule shall be time-scaled in not more than weekly increments, with the dates of the first day

(Monday) of each week indicated.

Completion of all the project activities shall be indicated in advance of the date established for 4.

completion of the Contract, allowing time for required inspection and punch list work.

5. Clearly show time bar for all the tasks, to be completed before start of physical work of scheduled activities, including but not limited to obtaining required permit, subcontractor approval, submission and approval of shop drawings, field verification, time for fabrication and delivery, testing of materials and/or samples, preparation and approval of mock-up sample, curing, pre-testing of soil, pre-testing of equipment - including start up, testing & adjusting, filing for inspection by regulatory agencies, training, final use, etc. required to maintain orderly progress of the activity. A special consideration must be given to those activities requiring early approvals because of long lead-time for manufacture or fabrication.

Phasing: Arrange all activities in proper sequence to reflect requirements for phased completion, 6. work by other entities, work by the City, City furnished items, coordination with existing work, limitations arising due to continued occupancies, non-interruptible services, partial completion for occupancy, site restrictions, provisions for future work, seasonal variations, environmental control.

and similar conditions of the project.

Arrange all activities and/or show interrelationship and logical sequence of all activities, determine 7. and mark all critical path activities including any phasing reflecting actual project condition. 8.

Keep at least two blank horizontal bars between all activities for recording actual progress and

submitting Revised Schedule as defined in Sub-Section 1.3 G

If necessary a new revised schedule shall be prepared in the same manner as outlined above. 9.

COMPOSITE SCHEDULE FOR THE PROJECT:

The Contractor shall prepare a Composite Schedule based on the approved Baseline Schedule Such Α. schedule shall indicate graphically and chronologically the start and completion of each and every activity. including all the pre-activity and post activity tasks. Keep at least two blank horizontal bars between all activities for recording actual progress and/or revisions.

If necessary the Contractore shall meet with each subcontractor and with the Resident Engineer to review and make warranted adjustments and finalize the Composite Schedule. Once the schedule is finalized, the Contractor shall sign and date a reproducible form of the Composite Schedule. The Composite Schedule must be finalized and signed by the Contractor within (30) thirty calendar days after the date established for commencement of the Contract, unless directed otherwise. The Composite Schedule must be reviewed and approved by the Resident Engineer.



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RECOVERY COMPOSITE SCHEDULE:

A Recovery Composite Schedule is not required unless the City issues an Acceleration Change Order. A Recovery Composite Schedule outlining and incorporating extraordinary efforts required to recover lost time with the aim of achieving completion of the project within the stipulated contract duration, plus authorized time extensions, must be developed and submitted within (5) five calendar days of the request by the Resident Engineer. Such Recovery Composite Schedule shall include all information as defined in Article 1.3 F and shall be prepared in the same manner as outlined in Sub-Sections 2.1 and 2.2. The Recovery Composite Schedule must be reviewed and approved by the Resident Engineer.

REVISED AND/OR UPDATED COMPOSITE SCHEDULE:

- The Contractor shall revise and/or update the approved Composite Schedule as directed. The Revised schedule shall be prepared in the same manner as outlined above in Sub-Sections 2.1 and 2.2.
- The Contractor shall mark actual progress, delays, work stoppage etc. in the row just below the approved В. schedule for the respective activity so that revisions can be compared.
- Such schedule also shall indicate graphically and chronologically any revisions to the start and completion of the remaining activities including revisions to all the pre-activity and post activity tasks for all subcontractors.
- If necessary, the Contractor shall meet with each subcontractor and with the Resident Engineer to review D. and make warranted adjustments and finalize the Revised Composite Schedule. Once the schedule is finalized, the Contractor shall sign and date a reproducible form of the Schedule. Such schedule must be prepared and submitted by the Contractor within Five (5) calendar days of request by the Resident Engineer. The Revised Composite Schedule must be reviewed and approved by the Resident Engineer.

SUBMITTALS SCHEDULE: 2.5

- Preparation: The Contractor shall submit a schedule of submittals, arranged in chronological order by A. dates required by the construction schedule. Include time required for review, re-submittal, ordering, manufacturing, fabrication, and delivery when establishing dates.
- SCHEDULE F: Schedule F sets forth all submittal requirements for shop drawings and material samples. B. Schedule F is included in the Addendum. At the kick-off meeting, the Contractor must review this Schedule with the Resident Engineer and the Design 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 business 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 business 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.
- Review: The Resident Engineer will review the Schedule F submitted by Contractor. Upon acceptance, C. the Resident Engineer will date and sign the schedule as approved and transmit it to the Consultant, Contractor and others within DDC as he/she deems appropriate.



2.6 REPORTS:

A. Daily Construction Reports: The Contractor shall submit to the Resident Engineer written Daily Construction Reports at the end of each work day, recording basic information such as the date, day, weather conditions, and contract days passed, remaining contract duration/days and the following information concerning the Project.

Information: The reports shall be prepared by the Contractor's Superintendent and shall bear the Contractor's Superintendents signature. Each report shall contain the following information:

- 1. List of name of Contractor, subcontractors, their work force in each category, and details of activities performed.
- 2. The type of materials and/or major equipment being installed by the Contractor and/or by each subcontractor.
- 3. The major construction equipment being used by the Contractor and/or subcontractors.
- 4. Material and Equipment deliveries.
- 5. High and low temperatures and general weather conditions.
- 6. Accidents.
- 7. Meetings and significant decisions.
- 8. Unusual events.
- 9. Stoppages, delays, shortages, and losses.
- 10. Meter readings and similar recordings
- 11. Emergency procedures.
- 12. Orders and/or requests of authorities having jurisdiction.
- 13. Approved Change Orders received and implemented.
- 14. Field Orders and Directives received and implemented.
- 15. Services connected and disconnected.
- 16. Equipment or system tests and startups.
- 17. Partial Completions and occupancies.
- 18. Substantial Completions authorized.

NOTE: If there is NO ACTIVITY at site, a daily report indicating so and the reason for no activity at the site must be submitted.

- B. Material Location Reports: The contractor shall submit a Material Location Report at weekly OR monthly intervals as determined and established by the Resident Engineer. Such report shall include a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site.
- C. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit a Request For Information (RFI) form with a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.7 SPECIAL REPORTS:

A. Accident report, incident report, special condition report for the conditions out of control of any party involved with the project effecting project progress, explaining impact on the project schedule and cost if any.

PART III – EXECUTION (Not Used) END OF SECTION 01 32 00



No Text



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SECTION 01 32 33 PHOTOGRAPHIC DOCUMENTATION

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SECTION 01/32/33

PARTI- GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract]

1.2 SUMMARY:

- A. This Section includes the following:
 - Photographic Media
 - 2. Construction Photographs
 - 3. Pre-construction Photographs
 - 4. Periodic Construction Progress Photographs
 - 5. Special Photographs
 - 6. DVD Recordings
 - 7. Final Completion Construction Photographs
- B. RELATED SECTIONS: include without limitation the following:
 - 1. Section 01 10 00

SUMMARY

- 2. Section 01 33 00
- SUBMITTAL PROCEDURES
- 3. Section 01 35 91
- HISTORIC TREATMENT PROCEDURES
- 4. Section 01 78 39
- CONTRACT RECORD DOCUMENTS
- 5. Section 01 81 19
- INDOOR AIR QUALITY REQUIREMENTS FOR LEED BUILDINGS
- C. PHOTOGRAPHER The Contractor shall employ and pay for the services of a professional photographer who shall take photographs showing the progress of the work for all Contracts.

1.3 DEFINITIONS:

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.
- B. Design Consultant: "Design Consultant" shall mean the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the "Design Consultant" may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.

1.4 SUBMITTALS:

A. Qualification Data: For photographer.



- B. Key Plan: With each Progress Photograph Submittal include a key plan of Project site and building with notation of vantage points marked for location and direction of each image. Indicate location, elevation or story of construction. Include same label information as corresponding set of photographs.
- C. Construction Progress Photograph Prints: Take Progress Photographs bi-weekly and submit four color prints of each photographic view for each trade to the Resident Engineer. Such photographs shall be included in each monthly progress report or as otherwise directed by the Resident Engineer.
- D. Construction Photograph Negatives: Submit a complete set of photographic negatives in individually protected negative sleeves with each submittal of prints. Identify negatives with label matching photographic prints.
- E. Digital Images: If Digital Media is used, submit a complete set of digital color image electronic files on CD-ROM with each submittal of prints. Identify electronic media with date photographs were taken. Submit images that have same aspect ratio as the sensor, un-cropped.

1.5 QUALITY ASSURANCE:

A. Photographer Qualifications: An individual who has been regularly engaged as a professional photographer of construction projects for not less than three years.

1.6 COORDINATION:

A. The Contractor and its subcontractor(s) shall cooperate with the photographer and provide auxiliary services requested, including access to Project site and use of temporary facilities, including temporary lighting required to produce clear, well-lit photographs without obscuring shadows.

1.7 COPYRIGHT:

- A. The Contractor shall include the provisions set forth below in the agreement between the Contractor and the Photographer who will provide the construction photographs described in this section. The Contractor shall submit to the Resident Engineer a copy of its agreement with the Photographer.
- B. Any photographs, images and/or other materials produced pursuant to this Agreement, and any and all drafts and/or other preliminary materials in any format related to such items produced pursuant to this Agreement, shall upon their creation become the exclusive property of the City.
- C. Any photographs, images and/or other materials provided pursuant to this Agreement ("Copyrightable Materials") shall be considered "work-made-for-hire" within the meaning and purview of Section 101 of the United States Copyright Act, 17 U.S.C. § 101, and the City shall be the copyright owner thereof and of all aspects, elements and components thereof in which copyright protection might exist. To the extent that the Copyrightable Materials do not qualify as "work-made-for-hire," the Photographer hereby irrevocably transfers, assigns and conveys exclusive copyright ownership in and to the Copyrightable Materials to the City, free and clear of any liens, claims, or other encumbrances. The Photographer shall retain no copyright or intellectual property interest in the Copyrightable Materials. The Copyrightable Materials shall be used by the Photographer for no purpose other than in the performance of this Agreement without the prior written permission of the City. The Department may grant the Photographer a license to use the Copyrightable Materials on such terms as determined by the Department and set forth in the license.
- D. The Photographer acknowledges that the City may, in its sole discretion, register copyright in the Copyrightable Materials with the United States Copyright Office or any other government agency authorized to grant copyright registrations. The Photographer shall fully cooperate in this effort, and agrees to provide any and all documentation necessary to accomplish this.



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E. The Photographer represents and warrants that the Copyrightable Materials: (i) are wholly original material not published elsewhere (except for material that is in the public domain); (ii) do not violate any copyright Law; (iii) do not constitute defamation or invasion of the right of privacy or publicity; and (iv) are not an infringement, of any kind, of the rights of any third party. To the extent that the Copyrightable Materials incorporate any non-original material, the Photographer has obtained all necessary permissions and clearances, in writing, for the use of such non-original material under this Agreement, copies of which shall be provided to the City.

PART II - PRODUCTS

2.1 PHOTOGRAPHIC MEDIA:

- A. Photographic Film: Medium format, 2-1/4 by 2-1/4 inches (60 by 60 mm).
- B. Digital Images:
 - Construction Progress Images: Color images in JPEG format with minimum sensor size of 1.3 megapixels.
 - 2. Presentation Quality Images: Provide Color images in uncompressed TIFF format, produced by a digital camera with minimum sensor size of 4.0 megapixels, and at an image resolution of not less than 1024 by 768 with 8"x10" original capture at 300 dpi or greater.

C. Prints:

- Format: 8-by-10-inch (203-by-254-mm) smooth-surface matte color prints on single-weight commercial-grade stock paper, with 1inch wide margins and punched for standard 3-ring binder.
- 2. Identification: On the front of each photograph affix a label in the margin with Project name and date photograph was taken. On the back of each print, provide an applied label or rubber-stamped impression with the following information:
 - a. Project Contract I.D. Number.
 - b. Project Contract Name.
 - c. Name of Contractor. (and Subcontractor Trade Represented)
 - d. Subject of Image Taken.
 - e. Date and time photograph was taken if not date stamped by camera.
 - f. Description of vantage point, indicating location, direction and other pertinent information.
 - g. Unique sequential identifier.
 - h. Name and address of photographer.

PART III - EXECUTION

3.1 CONSTRUCTION PHOTOGRAPHS:

- A. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.
 - 1. Maintain key plan with each set of construction photographs that identifies each photographic location and direction of view.

B. Film Images:

1. Date Stamp: Unless otherwise indicated, date and time stamp each photograph as it is being taken so stamp is integral to photograph.



- 2. Field Office Prints: Retain one set of prints of progress photographs in the field office at Project site, available at all times for reference. Identify photographs same as for those submitted to Commissioner.
- C. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
 - 1. Date and Time: Include date and time in filename for each image.
 - 2. Field Office Images: Maintain one set of images on CD-ROM in the field office at Project site, available at all times for reference. Identify images same as for those submitted to Commissioner.

3.2 PRE-CONSTRUCTION & PRE-DEMOLITION PHOTOGRAPHS:

- A. Before commencement of Contract work at the site, take color photographs of Project site and surrounding properties, including existing structures or items to remain during construction, from different vantage points, as directed by the Resident Engineer.
 - 1. Flag applicable excavation areas and construction limits before taking construction photographs.
 - 2. Take photographs of minimum eight (8) views to show existing conditions adjacent to property before starting the Work.
 - 3. Take applicable photographs of minimum eight (8) views of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
 - 4. Take additional photographs as required or directed by the Resident Engineer to record settlement or cracking of adjacent structures, pavements, and improvements.
- B. Demolition Operations: Take photographs as directed by the Resident Engineer of minimum of eight

 (8) views each before commencement of demolition operations, at mid-point of operations and at completion of operations.
- C. Pre-Demolition Photographs: Take archival quality color photographs, to include all exterior building facades, of all structures at the Project site designated to be fully demolished or removed in compliance with NYC Building Code requirements. Submit four (4) complete sets of pre-demolition photographs, in the format specified herein, to the Resident Engineer for submission to the Department of Buildings.

3.3 PERIODIC CONSTRUCTION PROGRESS PHOTOGRAPHS:

A. Take photographs of minimum eight (8) views bi-weekly as directed by the Resident Engineer of construction progress for each contract trade. Select vantage points to show status of construction and progress since last photographs were taken.

3.4 SPECIAL PHOTOGRAPHS:

- A. The photographer shall take special photographs of subject matter or events as specified in other sections of the Project Specifications from vantage points specified or as otherwise directed by the Resident Engineer.
- B. Historical Elements: As required in Section 01 35 91, HISTORIC TREATMENT PROCEDURES, for Contract work at designated landmark structures or sites the photographer, as specified and required by individual sections of the Contract documents or at the direction of the Commissioner, shall take images of existing elements scheduled to be removed for replacement, repair or replication in quantities as directed, including post-construction photographs of completed work as directed by the Commissioner.



1. Take Presentation Quality Photographs of designated landmark structures as directed by the Commissioner for submission to the New York City Landmarks Preservation Commission. Provide a minimum of four color photographic prints of each view as directed.

3.5 DVD RECORDING:

A. When DVD Recording of Demonstration and Training sessions is required for Non-Commissioned projects the Contractor shall provide the services of a Videographer as indicated in Section 01 79 00, DEMONSTRATION AND OWNER'S PRE-ACCEPTANCE ORIENTATION.

3.6 FINAL COMPLETION CONSTRUCTION PHOTOGRAPHS:

A. Take color photographs of minimum eight (8) unobstructed views of the completed project or project 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 is done after date of Substantial Completion for submission as Project Record Documents. Submit four (4) sets of each view of Presentation Quality photographic prints including negatives and/or digital images electronic file.

END OF SECTION 01 32 33



No Text



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SECTION 01 33 00 SUBMITTAL PROCEDURES

PARTI- GENERAL:

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Coordination Drawings, Catalogue Cuts, Material Samples and other submittals required by the Contract Documents.
- B. Review of submittals does not relieve the Contractor of responsibility for any Contractor's errors or omissions in such submittals, nor from responsibility for complying with the requirements of the Contract.
- C. Responsibility of the Contractor: The approval of Shop Drawings will be general and 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.
- D. This Section includes the following:
 - 1. Definitions
 - 2. Submission Procedures
 - 3. Coordination Drawings
 - 4. LEED Submittals
 - 5. Ultra Low Sulfur Diesel Fuel Reporting
 - 6. Construction Photographs and DVD Recordings
 - 7. As-Built Documents

1.3 RELATED SECTIONS: Include without limitation the following:

Α.	Section 01 10 00	SUMMARY
B.	Section 01 31 00	PROJECT MANAGEMENT AND COORDINATION
C.	Section 01 32 00	CONSTRUCTION PROGRESS DOCUMENTATION
D.	Section 01 32 33	PHOTOGRAPHIC DOCUMENTATION
Ē.	Section 01 77 00	CLOSEOUT PROCEDURES
F.	Section 01 78 39	CONTRACT RECORD DOCUMENTS
G.	Section 01 81 13	SUSTAINABLE DESIGN REQUIREMENTS FOR LEED BUILDINGS

1.4 DEFINITIONS:

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.
- B. Design Consultant: "Design Consultant" shall mean the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the "Design Consultant" may be a corporation, firm, partnership, joint venture, individual or



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combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.

- C. Submittals: Written and graphic information that requires responsive actions and includes without limitation all shop drawings, product data, letters of certification, tests and other information required for quality control and as required by the Contract Documents.
- D. Informational Submittals: Written information that does not require responsive action. Submittals may be rejected for non-compliance with the Contract.
- E. Shop Drawings: Include drawings, diagrams, illustrations, schedules, performance charts, brochures, and other data, except for coordination drawings, specifically prepared for the project by the Contractor or any subcontractor, manufacturer, supplier or distributor, which illustrates how specific portions of the work shall be fabricated and/or installed.
- F. Coordination Drawings: As required in Section 01 31 00 PROJECT MANAGEMENT AND COORDINATION.
- G. Product Data and Quality Assurance Submittals: Includes manufacturer's standard catalogs, pamphlets and other printed materials including without limitation the following:
 - 1. Catalogue and Product specifications
 - 2. Installation instructions
 - 3. Color charts
 - 4. Catalog cuts
 - 5. Rough-in diagrams and templates
 - 6. Wiring diagrams
 - 7. Performance curves
 - 8. Operational range diagrams
 - 9. Mill reports
 - 10. Design data and calculations
 - 11. Certification of compliance or conformance
 - 12. Manufacturer's instructions and field reports

1.5 COORDINATION DRAWINGS:

- A. The Contractor shall provide reproducible Coordination Drawing(s) of the reflective ceiling showing the integration of all applicable contract work, including general construction work as well as trade work (Plumbing, HVAC, and Electrical) to be performed by subcontractors. The Coordination Drawing(s) shall include, without limitation, the following information:
 - 1. General Construction work showing the reflective ceiling plan including starting points, ceiling and beam soffits elevations, ceiling heights, roof openings, etc.
 - 2. HVAC Contract work showing ductwork, heating and sprinkler piping, location of grilles, registers etc. and access doors in hung ceilings. Locations shall be fixed by elevations and dimensions from column centerlines and/or walls.
 - 3. Plumbing Contract work including piping, valves, cleanouts etc., indicating locations and elevations and shall indicate the necessary access doors.
 - 4. Electrical Contract work indicating fixtures, large conduit runs, clearances, pull boxes, junction boxes, sound system speakers, etc.
- B. The Contractor shall issue the completed Coordination Drawing(s) to the Resident Engineer for his/her review. The Resident Engineer may call as many meetings as necessary with the Contractor, including



attendance by applicable subcontractors, and may call on the services of the Design Consulting where necessary, to resolve any conflicts that become apparent.

- C. Upon resolution of any conflicts, the Contractor shall provide a final Coordination Drawing(s) which will become the Master Coordination Drawing(s). The Master Coordination Drawing(s) shall be signed and dated by the Contractor to indicate acceptance of the arrangement of the work.
- D. A reproducible copy of the Master Coordination Drawing(s) shall be provided by the Contractor to each of the appropriate subcontractor(s), the Resident Engineer and the Design Consultant for information.
- E. Shop Drawings shall not be submitted prior to acceptance of the final coordinated drawings and shall be prepared in accordance with the Master Coordination Drawing(s). No work will be permitted without accepted Shop Drawings. It is therefore essential that this procedure be instituted as quickly as possible.

1.6 SUBMITTAL PROCEDURES:

- A. Refer to Section 01 35 03 GENERAL MECHANICAL REQUIREMENTS and Section 01 35 06 GENERAL ELECTRICAL REQUIREMENTS for additional submittal requirements involving electrical and mechanical work or equipment of any nature called for the project.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activities, with the Submittal Schedule specified in Section 01 32 00 CONSTRUCTION PROGRESS DOCUMENTATION.
 - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - 3. The Commissioner reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Submittals Schedule: The Submittals Schedule is set forth in Schedule F, which is included in the Addendum.
- D. Identification: Place a permanent label or title block on each submittal for identification.
 - 1. Indicate name of firm or entity that prepared each submittal on label or title block.
 - 2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Design Consultant.
 - 3. Include the following minimum information on label for processing and recording action taken:
 - a. Project name, DDC Project Number and Contract Number
 - b. Date
 - c. Name and address of Design Consultant
 - d. Name and address of Contractor
 - e. Name and address of subcontractor
 - f. Name and address of supplier
 - g. Name of manufacturer
 - h. Submittal number or other unique identifier, including revision identifier
 - i. Number and title of appropriate Specification Section
 - j. Drawing number and detail references, as appropriate
 - k. Location(s) where product is to be installed, as appropriate
 - I. Other necessary identification

E. Transmittal:

 Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form in triplicate. Transmittals received from sources other than the



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Contractor will be returned without review. Re-submission of the same drawings or product data shall bear the original number of the prior submission and the original titles.

- 2. Transmittal Form: Provide locations on form for the following information:
 - a. Project name, DDC Project number and Contract Number
 - b. Date
 - c. Destination (To:)
 - d. Source (From:)
 - e. Names of Contractor, subcontractor, manufacturer, and supplier
 - Category and type of submittal
 - g. Submittal purpose and description
 - h. Specification Section number and title
 - i. Drawing number and detail references, as appropriate
 - j. Transmittal number, numbered consecutively
 - k. Submittal and transmittal distribution record
 - Remarks
 - m. Signature of transmitter

F. Shop Drawings:

- 1. Procedures for Preparing, Forwarding, Checking and Returning all Shop Drawings shall be, generally, as follows:
 - a. The Contractor shall make available to its subcontractors the necessary Contract Documents and shall instruct such subcontractor to determine dimensions and conditions in the field, particularly with reference to coordination between the trade subcontractors. The Contractor shall direct its subcontractors to prepare Shop Drawings for submission to the Design Consultant 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:

- Review and be responsible to the Commissioner, for information shown on its subcontractor's Shop and Installation drawings and manufacturers' data, and also for conformity to Contract Documents.
- 2. "Ring Up" corrections made on all submissions for approval, so as to be readily seen, and that the symbol "GC", "PL", "HVAC" or "EL" be used to indicate that the correction and/or information added was made by the Contractor and/or its subcontractor(s).
- Clearly designate which entity is to perform the work when the term, "work by others" or other similar phrases are indicated on the Contract Drawings before submission to the Design Consultant.
- 4. Stamp submissions "Recommended for Acceptance", date and forward to the Design Consultant.
- 2. The Contractor shall promptly prepare and submit project specific layout detail and Shop Drawings of such parts of the work as are indicated in the Specifications, Schedule F of the Addendum 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 be on sheets of the same size as the Contract Drawings, drawn accurately and of sufficient scale to be legible, with a one half (1/2) inch marginal space on each side and a two (2) inch marginal space for binding on the left side.

- Scope of Drawings: Shop Drawings shall be numbered consecutively and shall accurately and distinctly represent all aspects of the work, including without limitation the following:
 - a. All working and erection dimensions
 - b. Arrangements and sectional views
 - c. Necessary details, including performance characteristics, and complete information for making necessary connections with other work
 - d. Kinds of materials including thickness and finishes
 - e. Identification of products
 - f. Fabrication and installation drawings
 - g. Roughing-in and setting diagrams
 - h. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring
 - i. Shop work manufacturing instructions
 - j. Templates and patterns
 - k. Schedules
 - I. Design calculations
 - m. Compliance with specified standards
 - n. Notation of coordination requirements
 - o. Notation of dimensions established by field measurement
 - p. Relationship to adjoining construction clearly indicated
 - q. Seal and signature of professional engineer if specified
 - r. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring
 - s. All other information necessary for the work and/or required by the Commissioner
- 5. Titles and Reference: Shop Drawings 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 and sequence at which materials, or equipment, are to be installed in the work
 - d. Cross references to the section number, detail number and paragraph number of the Contract Specifications
 - e. Cross references to the sheet number, detail number, etc., of the Contract Drawings
- 6. Field Measurements: In addition to the above requirements, the Shop Drawings shall be signed by the Contractor and, if applicable, the subcontractor responsible for preparation of the Shop Drawings. Each Shop Drawing shall be stamped with the following wording:

FIELD MEASUREMENTS: The Contractor certifies that it has verified and supplemented the Contract Drawings by taking all required field measurements, which said measurements correctly reflect all field conditions and that this Shop Drawing incorporates said measurements.

7. Contractor's Statement with Submittal: Any Submittal by the Contractor for acceptance, including without limitation, all dimensional drawings of equipment, blueprints, catalogues, models, samples and other data relative to the equipment, the materials, the work or any part thereof, must be accompanied by a statement that the Submittal has been examined by the Contractor and that everything shown in the Submittal is in accordance with the requirements of the Contract Drawings and Specifications. If there is any discrepancy between what is shown in the Submittal and the requirements of the Contract Drawings and Specifications, the Contractor shall, in its statement, list and clearly describe each such discrepancy.

Acceptance will be given based upon the Contractor's representation that what is shown in the Submittal is in accordance with the requirements of the Contract Drawings and Specifications. If



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the Contractor's statement indicates any discrepancy between what is shown in the Submittal and the requirements of the Contract Drawings and Specifications, such change is subject to review and prior written acceptance by the Design Consultant. In addition, such change may require a change order in accordance with Article 25 of the Contract. In the event any such change is approved, any additional expense or increased cost in connection with the change is the sole responsibility of the Contractor.

8. Submission of Shop Drawings:

- a. Initial Submission: The Contractor shall submit seven (7) copies of each Shop Drawing to the Design Consultant for his/her review and acceptance. The Design Consultant will transmit Shop Drawings to appropriate sub-consultants for review and acceptance, including Commissioning Authority/Agent as applicable. A satisfactory Shop Drawing will be stamped "No Exceptions Taken", be dated and distributed by the Design Consultant as follows:
 - 1) Two (2) copies thereof will be returned to the Contractor by letter
 - Three (3) copies of the approved Shop Drawing and copy of the transmittal letter to the Contractor will be forwarded to DDC
 - 3) One copy will be retained by the Design Consultant
 - 4) One copy will be forwarded / retained by sub-consultant(s) as appropriate

Should the Shop Drawing(s) be "Rejected" or noted "Revise and Resubmit" by the Design Consultant, the Design Consultant will return the Shop Drawings to the Contractor with the necessary corrections and changes to be made as indicated thereon.

- b. Revisions: The Contractor must make such corrections and changes and again submit seven (7) copies of each shop drawing to the Design Consultant. The Contractor shall revise and resubmit the Shop Drawing as required by the Design Consultant until the Shop Drawings are stamped "No Exceptions Taken". However, Shop Drawings which have been stamped "Make Corrections Noted" shall be considered an "Acceptable" Shop Drawing and NEED NOT be resubmitted.
- c. Commencement of Work: No work or fabrication called for by the Shop Drawings shall be done until the acceptance of the said drawings by the Design Consultant is given. In addition to the foregoing Shop Drawing transmissions, a copy of any Shop Drawing prepared by any of the Contractor's subcontractors which Shop Drawing indicated work related to, adjacent to, impinging upon, or affecting work to be done by other subcontractors shall be transmitted to the subcontractors so affected. [These accepted Shop Drawings shall be distributed to the affected subcontractors when required with a copy of the transmittal to the Resident Engineer.]
- d. Variations: If the Shop Drawings show variations from the Contract requirements because of standard shop practice or other reasons, the Contractor shall make specific mention of such variations in its letter of submittal. Acceptance of the Shop Drawings shall constitute acceptance of the subject matter thereof only and not of any structural apparatus shown or indicated.

G. Product Data:

- General: Except as otherwise prescribed herein, the submission, review and acceptance of Product Data and Catalogue cuts shall conform to the procedures specified in Sub-Section 1.6 F, Shop Drawings.
- 2. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
- Mark each copy of each submittal to show which products and options are applicable.
- 4. Include the following information, as applicable:

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- a. Manufacturer's written recommendations.
- b. Manufacturer's product specifications.
- c. Manufacturer's installation instructions.
- d. Standard color charts.
- e. Manufacturer's catalog cuts.
- f. Wiring diagrams showing factory-installed wiring.
- g. Printed performance curves.
- h. Operational range diagrams.
- i. Mill reports.
- . Standard product operation and maintenance manuals.
- k. Compliance with specified referenced standards.
- I. Testing by recognized testing agency.
- m. Application of testing agency labels and seals.
- n. Notation of coordination requirements.
- 5. Submit Product Data before or concurrent with Samples.
- 6. Submission of Product Data:
 - a. Initial Submission: The Contractor shall submit seven (7) sets of Product Data to the Design Consultant for his/her review and acceptance. The Design Consultant will transmit Product Data to appropriate sub-consultants for review and acceptance, including Commissioning Authority/Agent as applicable. A satisfactory catalogue cut will be stamped "No Exception Taken", be dated and distributed as follows:
 - 1) Two (2) copies thereof will be returned to the Contractor by letter
 - 2) Three (3) copies of the Product Data and copy of the transmittal letter to the Contractor will be forwarded to DDC
 - 3) One copy will be retained by the Design Consultant
 - 4) One copy will be forwarded / retained by sub-consultant(s) as appropriate

Should the Product Data be "Rejected" or noted "Revise and Resubmit" by the Design Consultant, the Design Consultant will return one (1) set of such Product Data to the Contractor with the necessary corrections and changes to be made indicated and one (1) set to DDC.

7. Revisions: The Contractor must make such corrections and changes and again submit seven (7) copies of each Product Data for the review of the Design Consultant. The Contractor shall revise and resubmit the Product Data as required by the Design Consultant until the submission is stamped "No Exceptions Taken" by the Design Consultant. However, Product Data which has been stamped "Make Corrections Noted" shall be considered an "Accepted" Product Data and NEED NOT be resubmitted.

H. Samples of Materials:

- 1. For samples of materials involving electrical work of any nature, refer to Section 00 35 06 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.
- 3. Each of the samples shall be labeled as follows:
 - Name of the Project, DDC Project Number and Contract Number
 - b. Name and quality of the material
 - c. Date



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- d. Name of Contractor, subcontractor, manufacturer and supplier
- e. Related Specification or Contract Drawing reference to the samples submitted
- 4. A letter of transmittal, in triplicate, from the Contractor requesting acceptance must accompany all such samples.
- Transportation charges to the Design Consultant's office must be prepaid on all samples forwarded. 5.
- 6. Samples for testing purposes shall be as required in the Specifications.
- Samples on Display: When samples are specified to be equal to approved product, they shall be 7. carefully examined by the Contractor and by those whom the Contractor expects to employ for the furnishing of such materials.
- Timely Submissions Log/Schedule: Samples shall be submitted in accordance with approved Shop 8. Drawing log so as to permit proper consideration without delaying any operation under the project. Materials should not be ordered until acceptance is received, in writing, from the Design Consultant. All materials shall be furnished equal in every respect to the accepted samples.
- The Acceptance of any samples will be given as promptly as possible, and shall be only for the 9. characteristic color, texture, strength, or other feature of the material named in such approval, and no other. When this approval is issued by the Design Consultant, it is done with the distinct understanding that the materials to be furnished will fully and completely comply with the Specifications, the determination of which may be made at some later date by a laboratory test or by other procedure. Use of materials will be permitted only so long as the quality remains equal to the approved samples and complies in every respect with the Specifications, and the colors and textures of the samples on file in the office of the Design Consultant, for the project.
- Acceptability of test Data: The Commissioner will be the final judge as to acceptability of laboratory test data and performance in service of materials submitted.
- Valuable Samples: Valuable samples, such as hardware, plumbing and electrical fixtures, etc., not 11. 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.
- Equivalent Quality: Any material, article and/or equipment which is designated in the Drawings and/or Specifications by a number in the catalogue of any manufacturer or by a manufacturer's grade or trade name is designated for the purpose of describing the material, article and/or equipment and fixing the standard of performance and/or function, as well as the quality and/or finish. Any material, article and/or equipment which is other than what is specified in the Drawings and/or Specifications will only be accepted if the Commissioner makes a written determination that such material, article and/or equipment is equivalent to that which is specified in the Drawings and/or Specifications.
- The submission of any material, article and/or equipment as the equal of any material, article and/or 13. equipment set forth in the Drawings and/or Specifications as a standard shall be accompanied by any and all information essential for determining whether such proposed material, article and/or equipment is equivalent to that which is specified. Such information shall include, without limitation, illustrations, drawings, descriptions, catalogues, records of tests, samples, as well as information regarding the finish, durability and satisfactory use of such proposed material, article and/or equipment under similar operating conditions.



REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 1.7

1.7 LEED SUBMITTALS:

- A. Comply with submittal requirements specified in Section 01 74 19, CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL; Section 01 81 13, SUSTAINABLE DESIGN REQUIREMENTS FOR LEED BUILDINGS; Section 01 81 13.13, VOLATILE ORGANIC COMPOUND (VOC) LIMITS FOR ADHESIVES, SEALANTS, PAINTS AND COATINGS FOR LEED BUILDINGS; Section 01 81 19, INDOOR AIR QUALITY REQUIREMENTS FOR LEED BUILDINGS and Section 01 91 13, GENERAL COMMISSIONING REQUIREMENTS.
- B. LEED Building submittal information shall be assembled into one package per each applicable specification section, separate from all other non-LEED submittals. Each submittal package shall have a separate transmittal and identification as described in Sub-Section 1.5 herein.
- C. Number of Copies: Submit FOUR (4) copies of LEED submittals, in accordance with procedure described in Article 1.5 herein, unless otherwise indicated.
- D. Material Safety Data Sheets (MSDSs) for LEED Certification: Submit information necessary to show compliance with LEED certification requirements, which will be the limit of the Design Consultant's review for LEED compliance.
 - 1. Designated LEED submittals that include non-LEED MSDS data will not be reviewed. The entire submittal will be returned for re-submission.
- E. Product Cut Sheets and/or Shop Drawings for LEED Certification: Provide product cut sheets and/or shop drawings with the Contractor's or sub-contractor's stamp, confirming that the submitted products are the products installed in the Project. For detailed requirements refer to Sub-Section 1.6 of Section 01 81 13 SUSTAINALE DESIGN REQUIREMENTS FOR LEED PROJECTS.
 - 1. Provide the quantity, length, area, volume, weight, and/or cost of each product submitted as required to satisfy LEED documentation requirements. Refer to Sub-Section 1.6 of Section 01 81 13 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED PROJECTS.

1.8 ULTRA LOW SULFUR DIESEL FUEL AND BEST AVAILABLE TECHNOLOGY REPORTING:

A. In accordance with Section 01 10 00 Summary, Sub-Section 1.5 E, the Contractor shall submit reports to the Commissioner regarding the use of Ultra Low Sulfur Diesel Fuel and Best Available Technology (BAT) in Non road Vehicles. Submission of such reports shall be in accordance with the schedule, format, directions and procedures established by the Commissioner.

1.9 CONSTRUCTION PHOTOGRAPHS AND DVD RECORDINGS:

 Submit construction progress photographs and DVD recordings in accordance with requirements of Section 01 32 33, PHOTOGRAPHIC DOCUMENTATION

1.10 AS-BUILT DOCUMENTS:

A. Submit all as-built documents in accordance with Section 01 78 39 CONTRACT RECORD DOCUMENTS.



PART II - PRODUCTS (Not Used)

PART III - EXECUTION (Not Used)

END OF SECTION 01 33 00

SUBMITTAL PROCEDURES 01 33 00 - 10

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SECTION 01 35 03 GENERAL MECHANICAL REQUIREMENTS

REFER TO THE ADDENDUM FOR APPLICABILITY OF THIS SECTION 01:35 03

PARTI- GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

A. The General Mechanical Requirements contained herein shall be followed by the Contractor, as well as its subcontractor for HVAC work. This Section sets forth the General Requirements applicable to mechanical work for the Project. Such requirements are intended to be read in conjunction with the Specifications and Contract Drawings for the Project. In the event of any conflict between the requirements set forth in this Section and the requirements of the Specifications and/or the Contract Drawings, whichever requirement is the most stringent, as determined by the Commissioner, shall take precedence.

1.3 RELATED SECTIONS: Include without limitation the following:

- A. Section 01 10 00 SUMMARY
- B. Section 01 33 00 SUBMITTAL PROCEDURES
- C. Section 01 35 06 GENERAL ELECTRICAL REQUIREMENTS
- D. Section 01 42 00 REFERENCES
- E. Section 01 77 00 CLOSEOUT PROCEDURES
- F. Section 01 78 39 CONTRACT RECORD DOCUMENTS

1.4 DEFINITIONS:

A. CONCEALED PIPING AND DUCTS -: 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. For work on existing piping any insulation on such existing piping is to be tested for asbestos and abated, if found to be positive by a certified asbestos contractor. Such testing and abatement shall occur prior to the performance of any work on these pipes.

1.5 SUBMITTALS:

- A. INTENT OF MECHANICAL CONTRACT DRAWINGS Mechanical Contract Drawings are in part diagrammatic and show the general arrangement of the equipment, ducts and piping included in the Contract and the approximate size and location of the equipment.
- B. The Contractor shall follow these Contract Drawings in laying out the work and verify the spaces in which it will be installed. The Contractore shall submit, as directed, Mechanical Shop Drawings, roughing drawings, manufacturer's Shop Drawings, field drawings, cuts, bulletins, etc., of all materials, equipment and methods of installation shown or specified in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.



- Submit sheet metal shop standards. Submit manufacturer's product data including gauges, materials, types of joints, scaling materials and installations for metal ductwork materials and products.
- 2. Submit scaled layout drawing (3/8"=1") of metal ductwork and fittings including, but not limited to, duct sizes, locations, elevations, slopes of horizontal runs, wall and floor penetrations and connections. Show modifications of indicated requirements made to conform to local shop practice and how those modifications ensure that free area, materials and rigidity are not reduced. Layouts should include all the room plans, mechanical equipment rooms and penthouses. Method of attachment of duct hangers to building construction all with the support details. Coordinate shop drawings with related trades prior to submission.
- 3. Indicate duct fittings, particulars such as gauges, sizes, welds and configuration prior to start of work for low-pressure systems.
- 4. Submit maintenance data and parts lists for metal ductwork materials and products. Include this data, product data and shop drawings in maintenance manual.

1.6 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.

1.7 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.

1.8 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. For work on existing piping, ducts and equipment the Contractor shall pay special attention during this task so as not to disturb the insulation on such piping, ducts or equipment.

1.9 STANDARDIZATION OF SIMILAR EQUIPMENT:

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.

1.10 SUPPORTING STRUCTURES DESIGNED BY THE CONTRACTOR:

Unless otherwise specified, supporting structures for equipment to be furnished by the Contractor shall be designed by an Engineer licensed in New York State retained by the Contractor. Supporting structures shall be 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:

A. Structural Steel - ASTM Standard Specifications, AISC and New York City Construction Codes.



- B. 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 New York City Construction Codes for average concrete.
- C. 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.
- D. Drawings and calculations shall be submitted for review and acceptance in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

1.11 ELIMINATION OF NOISE:

- A. All systems and/or equipment provided under the Contract shall operate without objectionable noise or vibration.
- B. Should operation of any one or more of the several systems produce noise or vibration which is, in the opinion of the Commissioner, objectionable, the Contractor shall at its own expense make changes in piping, equipment, etc. and do all work necessary to eliminate objectionable noise or vibration.
- C. Should noise or vibration found objectionable by the Commissioner be transmitted by any pipe or portions of the structure from systems and/or equipment installed under the Contract, the Contractor 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.

1.12 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.

1.13 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.

1.14 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 in accordance with Section 01 77 00 CLOSEOUT PROCEDURES. The work shall not be deemed substantially complete until the certificates have been delivered. See General Comments regarding problems with specifying items required for substantial completion.

PART II - PRODUCTS (Not Used)
PART III - EXECUTION (Not Used)
END OF SECTION 01 35 03



No Text



SECTION 01 35 06 GENERAL ELECTRICAL REQUIREMENTS

PARTI- GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

- A. This Section sets forth the General Requirements applicable to electrical work for the Project. Such requirements are intended to be read in conjunction with the Specifications and Contract Drawings for the Project. In the event of any conflict between the requirements set forth in this Section and the requirements of the Project Specifications and/or the Contract Drawings, whichever requirement is the most stringent, as determined by the Commissioner, shall take precedence.
- B. This Section includes the following:
 - 1. Procedure for Electrical Approval
 - 2. Submittals
 - 3. Electrical Installation Procedures
 - 4. Electrical Conduit System Including Boxes (Pull, Junction and Outlet)
 - 5. Electrical Wiring Devices
 - 6. Electrical Conductors and Terminations
 - 7. Circuit Protective Devices
 - 8. Distribution Centers
 - 9. Motors
 - 10. Motor Control Equipment
 - 11. Schedule of Electrical Equipment

1.3 RELATED SECTIONS: Include without limitation the following:

Α.	Section 01 10 00	SUMMARY
B.	Section 01 33 00	SUBMITTAL PROCEDURES
C.	Section 01 35 03	GENERAL MECHANICAL REQUIREMENTS
D.	Section 01 42 00	REFERENCES
E.	Section 01 77 00	CLOSEOUT PROCEDURES
F.	Section 01 78 39	CONTRACT RECORD DOCUMENTS

1.4 DEFINITIONS:

- A. WIRING: means both wire and raceway (rigid steel, heavy wall conduit unless specifically indicated otherwise).
- B. POWER WIRING: means wiring from a panel board or other specified source to a starter (if required) then to a disconnect (if required), then to the final point of usage such as a motor, unit or device.
- C. CONTROL and/or INTERLOCK WIRING: 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.

- D. RIGID STEEL CONDUIT: shall 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 New York City Construction Codes.
- E. ELECTRICAL METALLIC TUBING (EMT): shall mean industry standard thin wall conduit of galvanized steel only. All elbows, bends, couplings and similar fittings which are installed as a part of the conduit system shall be compatible 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.
- F. FLEXIBLE METALLIC CONDUIT (FMC): Shall mean a conduit made through the coiling of a self-interlocking ribbed strip of aluminum or steel, forming a hollow tube through which wires can be pulled. For final connections to motors and motorized equipment, not more than a 4' 0" length of flexible conduit may be used. For watertight installations, this conduit 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.

1.5 PROCEDURE FOR ELECTRICAL APPROVAL:

This Sub-Section sets forth General Electrical information, as well as required approvals for all electrical work required for the Project, including ancillary electrical work which may be included in the work of other trade subcontractors.

- A. ELECTRIC SERVICE: The electric service supply is subject to commercial and operating variation of the utility company. Proper provision shall be made to have all apparatus operate normally under these conditions.
- B. ACCEPTANCE: Acceptance and approval of the work will be contingent upon the inspection and test of the installation by the City regulatory agency.
- C. TESTS: The Contractor shall notify the Commissioner when the Contractor has completed the work and is ready to have it inspected and tested. Upon completion of the work tests 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 is 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.): The Contractor must file prior to requesting a substantial completion inspection a Certificate of Inspection issued by B.E.C. On completion of the work the Contractor shall obtain certificates of inspection, approval, acceptance and compliance from all agencies and/or entities having jurisdiction over the work and shall deliver these certificates to the Commissioner in accordance with Section 01 77 00 CLOSEOUT PROCEDURES.
- E. RESPONSIBILITY FOR CARE AND PROTECTION OF EQUIPMENT:
 - 1. The Contractor furnishing any equipment shall be responsible for the equipment until it has been finally inspected, tested and accepted, in accordance with the requirements of the Contract.



- 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 equipment 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 equipment, apparatus or materials of the same kind, type or classification which are intended to be used for identical types of service, shall be made by the same manufacturer.

1.6 SUBMITTALS:

- A. CONTRACTOR'S ELECTRICAL DRAWINGS AND SAMPLES FOR APPROVAL:
 - 1. The Contractor shall submit to the Commissioner for approval, in accordance with Section 01 33 00 SUBMITTAL PROCEDURES, complete dimensional drawings of all equipment, wiring diagrams, motor test data, details of control, installation layouts showing all details and locations and including all schedules, and descriptions and supplementary data to comprise complete working drawings and instructions for the performance of the work. A description of the operation of the equipment and controls shall be included. A letter, in triplicate, shall accompany each submittal.
 - 2. The Contractor shall submit in accordance with Section 01 33 00 SUBMITTAL PROCEDURES, duplicate samples of such materials and appliances as may be requested by the Commissioner for approval. These samples 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.
- B. TIMELINESS: All material shall be submitted in accordance with the submittal schedule in sufficient time for the progress of construction. Failure to promptly submit acceptable samples and dimensional drawings of equipment will not be accepted as grounds for an extension of time. The Commissioner may decline to consider submittals unless all related items are submitted at the same time.
- C. CONTRACTOR'S STATEMENT WITH SUBMITTALS: Contractor shall submit statement in accordance with Section 01 33 00, SUBMITTAL PROCEDURES.
- D. BULLETINS AND INSTRUCTIONS: The Contractor shall furnish and deliver to the Commissioner in accordance with Section 01 78 39, CONTRACT RECORD DOCUMENTS and Section 01 77 00, CLOSEOUT PROCEDURES, after acceptance of the work, four (4) complete sets of instructions, technical bulletins and any other printed matter (diagrams, prints, or drawings) required to provide complete information for the proper operation, maintenance and repair of the equipment and the ordering of spare parts.

PART II - PRODUCTS (Not Used)



PART III - EXECUTION

3.1 ELECTRICAL INSTALLATION PROCEDURES:

This Sub-Section sets forth the General Installation Procedure that shall apply to all electrical work and electrical equipment appearing in the Contract.

(Refer to Sub-Section 1.4 DEFINITIONS for terms used in this section)

- A. INTENT OF CONTRACT DOCUMENTS: The Drawings and Specifications are to be interpreted as a means of conveying the scope and intent of the work without giving every minor electrical detail. It is intended, nevertheless, that the Contractor shall provide whatever labor and materials are found necessary, within the scope of the Contract, for the successful operation of the installation. Specific details of individual installations are to be finally decided upon when the Contractor submits Working or Shop Drawings for approval to DDC. Whenever there are two (2) or more methods to complete project work within the Contract scope, the Commissioner reserves the right to choose that method which, in the Commissioner's opinion, will afford the most satisfactory performance, lasting qualities, and 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 DDC 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 subcontractor for Plumbing Work and shall extend one (1) inch above finished floor.
- D. COORDINATION: The 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. The Contractor is to consult all other Contract Drawings, as well as approved equipment Shop Drawings on file in the Resident Engineer's Field Office. This will aid in avoiding interferences, omissions and errors in the electrical installation.
- E. RESTORATION: If drilling or cutting is done on finished surfaces of equipment or the structure, any marring of the surface shall be repaired or replaced by the Contractor. The 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. If any piercing of waterproofing occurs because of the installation of the work, the Contractor shall restore the waterproofing, at its own expense, to the satisfaction of the Commissioner.
- F. ELECTRICAL WORK AT SITE: The Contractor furnishing equipment consisting of a number of related electrical devices or appliances, mounted in a single enclosure, or on a common base, 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; without additional cost to the City.
- G. COOPERATION AMONG SUBCONTRACTORS: Whenever an electrically operated unit or system involves the combined work of several subcontractors for its installation and successful operation, the



Contractor shall require each subcontractor to exercise the utmost diligence in cooperating with others to produce a complete, harmonious installation.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION'S 2

3.2 ELECTRICAL CONDUIT SYSTEM INCLUDING BOXES (PULL, JUNCTION AND OUTLET):

This Sub-Section sets forth the requirements applying to the installation of electrical conduits, boxes or fittings. Rigid steel conduit shall be used throughout, unless otherwise directed by the Commissioner. 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.

(Refer to Sub-Section 1.4 DEFINITIONS for terms used in this section)

A. INSTALLATIONS AND APPLICATIONS:

- Unless otherwise specified or indicated on the Contract Drawings, conduit runs shall be installed concealed in finished spaces.
- 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 New York City
 Electrical Code 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.
- Conduits being installed in concrete or masonry shall be securely held in place 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: When installing underground conduits, duct banks or manholes the Contractor shall perform the work of cutting pavement, excavation shoring, keeping trenches or holes pumped dry, backfilling, restoration of surfaces to original condition and removal of excess earth and rubbish from premises. During the work, the Contractor 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 Galvanized 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.



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- 9. The conduit shall be installed with an approved expansion joint:
 - a. Wherever the conduit crosses a building expansion joint the Contractor will be held responsible for determining where the building expansion joints are located.
 - b. Every 200 feet, when in straight runs of 200 feet or longer.
- 10. 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.
- 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 using a ball mandrel and a brush and snake before the installation will be accepted. The ball shall be 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 Resident Engineer. 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 1-1/4 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 Resident Engineer and submitted in triplicate for approval. This record shall be entered on the Contract Record Drawings under Section 01 78 39, CONTRACT RECORD DOCUMENTS.
- 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.

B. BOXES:

 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 Galvanized 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



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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 and be NEMA 4X. All pull boxes shall be suspended from ceiling or walls in the most substantial manner.

- 2. In centering outlets, the Contractor is cautioned to allow for overhead pipes, ducts and other obstructions, and for variations in arrangement and thickness of fireproofing, soundproofing and plastering. Precaution should be exercised regarding the location of window and door trims, paneling, etc. Mistakes resulting from failure to exercise precaution must be corrected by the Contractor at no additional cost to the City. Outlets in hung ceilings shall be supported from the black iron or structure.
- 3. 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.
- Exposed wall outlet boxes shall be erected neatly and tight against the walls and securely anchored to same.
- 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.
- 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	» <u>ξ</u> ~ 4
	(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

- 7. 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.
- 8. 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.
- 9. 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.
- 10. 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.



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- 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.
- 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, non-corrodible and not less than four (4) in number for each box opening.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3:3

3.3 **ELECTRICAL WIRING DEVICES:**

Α. 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.

RECEPTACLES: B.

- CONVENIENCE OUTLETS: shall be of the best specification grade, duplex, two-pole, 3-wire, 20 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.
- WATERTIGHT DEVICES: For installations exposed to weather or in damp locations, the devices shall be D. in a gasketed, cast iron enclosure.

PLATES: E.

- 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.
- Where two (2) or three (3) switches are grouped together, a single faceplate shall be used. Where 2. more than three (3) switches are located at one (1) point, the faceplates may be made up in multiple units.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.4

ELECTRICAL CONDUCTORS AND TERMINATIONS:

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



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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 applicable detailed Specifications.
- 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. WIRE INSTALLATION:

- 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.
- 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:
 - 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.

I. 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 manufacturer. 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 subcontractor furnishing a device containing lugs is to coordinate with the Contractor 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.

REFER TO THE ADDENDUMEOR THE APPLICABILITY OF SUB-SECTION 3.5

3.5 CIRCUIT PROTECTIVE DEVICES:

This Section sets forth the circuit protective devices such as circuit breakers and safety switches, used in connection with Motor Control Equipment, Distribution Centers, Panel boards and Service Entrance.

A. CIRCUIT BREAKERS:

- 1. CIRCUIT BREAKERS: 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 BARRIER: 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.

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- For circuit breakers with frame size up to and including 225 Amperes, the breakers may be 5. 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.
- Single pole circuit breakers for branch circuits shall have a frame size of no less than 100 Amperes, 6. 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 Specifications or indicated on the Contract Drawings.
- INVERSE TIME ACTION: The circuit breakers shall be dual element type, one (1) element with 7. time limit characteristics, so that tripping will be prevented on momentary overloads, but will occur before dangerous values are reached and the other with instantaneous trip action. Inverse time delay action 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.
- CONSTANCY OF CALIBRATION: The tripping elements shall insure constant calibration and be 8. capable of withstanding excessive short circuit conditions without injury.
- CONTACTS: shall be non-welding under operating conditions and of the silver to silver type. 9.
- TEMPERATURE RISE: Current carrying parts, except thermal elements, shall not rise in 10. temperature in excess of 30 degrees C. while carrying rated current at rated frequency.
- NUMBERING: Each circuit breaker shall be distinctly numbered when installed in a group with other 11. 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.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.6

DISTRIBUTION CENTERS: 3.6

This Section sets forth the construction and installation procedure for Switchboards, Panel boards and Cabinets.

- PANELBOARDS-GENERAL TYPE: The panel boards shall be of the automatic circuit breaker type with A. 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."
- NUMBER AND RATING OF CIRCUIT BREAKERS: The Contract Drawings show a layout of each panel, B. 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.
- BUS-BAR CONSTRUCTION AND SUPPORT: Panel Boards shall be of the dead front 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 panel board shall be equipped with main lugs only and capacity as required on Contract Drawings. Where main protection is required, automatic circuit breakers shall be used. A neutral bus of at least the same capacity as a live bus bar shall be provided for the connection of all neutral conductors. Each terminal shall be identified. All current carrying parts, exclusive of circuit breakers, shall be of copper with a minimum number of joints. The bus bar structure shall be a self-supporting unit, firmly fastened to a 1/2

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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.

- CIRCUIT BREAKER ASSEMBLY: The entire circuit breaker and bus bar assembly shall be mounted on D. an adjustable metal base or pan and secured to the back of panel box. The panel shall have edges flanged for rigidity.
- PANEL MOUNTING: The panel shall be centered in the panel box to line up with door openings and set E. level and plumb so that no live parts are exposed with the door open.

PANEL CABINET: F.

- PANEL CABINET INSTALLATION: When installed surface mounted in panel closets they shall be 1. mounted on Kindorf channel.
- 2. 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.
- 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.
- SHOP DRAWINGS: showing all details of boxes, panels, etc., shall be submitted for approval. H.
- DIRECTORIES: A directory shall be fastened with brass screws and consist of a noncorrosive metal I. frame with dimensions not less than five (5) inches x eight (8) inches and a transparent window of Plasticile, Plexiglass, Lucite, Polycarbonate or approved equal that is not less than 1/16 inch thick over cardboard or heavy paper. The directory 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.

CONSTRUCTION J.

- FINISH: Panel boxes, doors and trim for installation in dry locations, shall be zinc coated after 1. fabrication by the hot-dip galvanizing or electroplate process on inside and outside surfaces. In damp locations, panel boards shall be enclosed and gasketed NEMA 3R type. Panel boards located outdoors or exposed to the weather shall be NEMA 3X type.
- PAINTING: Panel boxes, doors and trim shall receive a coat of approved priming paint and a 2. 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.



REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.7

3.7 MOTORS:

This Section sets forth the general design, construction and performance requirements, which shall apply to all motors furnished in the Contract.

- A. MOTOR DESIGN: All motors shall be designed to comply with the New York State Energy Conservation Construction Code and the New York City Energy Conservation Code. In the event of any conflict or inconsistency between such codes, the New York City Energy Conservation Code shall prevail. 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 the 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. STANDARDS OF COMPARISON: In the absence of specific motor specifications, 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.
- C. OBJECTIONABLE NOISES: Objectionable noises will not be tolerated and exceptionally quiet motors may be required for certain specified locations. Noise control tests as per the New York City Construction Codes may be performed as directed by the Commissioner. Such motors shall bear a nameplate lettered "Quiet Motor." Springs and slip rings shall be of approved non-ferrous material.

D. BEARINGS:

- 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. The Contractor furnishing four (4) or more such motors shall also
 furnish, as part of the 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.
- E. 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.
- F. 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.

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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.

- G. 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.
- H. MOTORS ON LIGHTING PANELS: The largest A.C. motor permitted on branch circuits of lighting panels shall not exceed 1/4 horsepower.
- I. MOTORS RATED: ½ horsepower and larger shall be polyphase.

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3.8 MOTOR CONTROL EQUIPMENT:

This Section sets forth the requirements for motor controllers and associated devices. Such requirements are applicable to all motor control equipment furnished or installed.

- A. MANUFACTURER: All control equipment furnished under the Contract 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 furnishing motors 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 shall furnish an approved disconnecting means to be mounted near motor.

C. TYPES OF STARTERS:

- 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.
- 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 Article 3.5 CIRCUIT PROTECTIVE DEVICES. 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 Contractor's subcontractor(s) who furnish electrically operated equipment shall give to the Contractor and the Contractor's electrical subcontractor full information relative to sizes and locations of apparatus furnished by them which require electrical connections.

I. SPARE PARTS:

- 1. FURNISH: The Contractor shall furnish the following spare parts pertaining to equipment furnished by each subcontractor.
 - 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.

END OF SECTION 01 35 06



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SECTION 01 35 26 SAFETY REQUIREMENTS PROCEDURES

PART I - GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].
- B. The Contractor shall comply with the requirements of "The City of New York Department of Design and Construction Safety Requirements". This document is included in the Information for Bidders.

1.2 SUMMARY:

- A. This Section includes administrative and general procedural requirements for Safety and Health Requirements, including:
 - 1. Definitions
 - 2. Required Safety Meeting
 - 3. Compliance with Regulations
 - 4. Submittals
 - 5. Personnel Protective Equipment
 - 6. Hazardous Materials
 - 7. Emergency Suspension of Work
 - 8. Protection of Personnel
 - 9. Environmental Protection

1.3 DEFINITIONS:

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.
- B. Design Consultant: "Design Consultant" shall mean the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the "Design Consultant" may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.

1.4 REQUIRED SAFETY MEETINGS:

- A. Prior to commencing construction, the Resident Engineer will schedule and hold a preconstruction kick-off meeting either at DDC's main office or at the Project site with representatives of the Contractor, including the principal on-site project representative and one or more safety representatives, Commissioner's designated representatives and other concerned parties for the purpose of reviewing the Contract Safety requirements. The Contractor's safety requirements shall be reviewed, and implementation of safety provisions pertinent to the Work shall be discussed.
- B. The Contractor is responsible for conducting weekly documented jobsite safety meetings, given to all jobsite personnel including all subcontractors on the project, with the purpose of discussing safety topics and job specific requirements at the DDC worksite.



1.5 COMPLIANCE WITH REGULATIONS:

- A. The Work, including contact with or handling of hazardous materials, disturbance or dismantling of structures containing hazardous materials, and disposal of hazardous materials, shall comply with the applicable requirement for CFR Parts 1910 and 1926, and 40 CFR, Parts 61, 261, 761 and 763.
- B. Work involving disturbance or dismantling of asbestos or asbestos containing materials, demolition of structures containing asbestos and removal of asbestos, shall comply with 40 CFR Part 61, Subparts A and M, and 40 CFR Part 763, as applicable.
- C. Work shall additionally comply with all applicable federal, state and local safety and health regulations.
- D. In case of a conflict between applicable regulations, the more stringent requirements shall apply.
- E. All workers working on the DDC project site are required by NYC Local Law 41 to complete the OSHA 10 –hour training course.

1.6 SUBMITTALS:

- A. The Contractor shall submit, to the Resident Engineer, copies of the Safety Program, Site Safety Plan and other required documentation in accordance with the "New York City Department of Design and Construction Safety Requirements."
- B. Permits: If hazardous materials are disposed of off-site submit copies of shipping manifests and permits from applicable federal, state or local authorities and disposal facilities, and submit certificates that the material has been disposed of in accordance with regulations to the Resident Engineer.
- C. Accident Reporting: Submit a copy of each accident report to the Resident Engineer in accordance with the "New York City Department of Design and Construction Safety Requirements."
- D. All Asbestos and Lead project regulatory notifications are to be submitted to DDC's Bureau of Environmental and Geotechnical Services (BEGS) through the Resident Engineer.
- E. Request for Subcontractor Approval: Any subcontractor performing environmental work shall submit required documentation for approval to perform such work as required by DDC's BEGS.

PART II - PRODUCTS

2.1 PERSONNEL PROTECTIVE EQUIPMENT:

Special facilities, devices, equipment and similar items used by the Contractor in execution of the Work shall comply with 29 CFR Part 1910, subpart I, Part 1926, subpart E and other applicable regulations.

2.2 HAZARDOUS MATERIALS:

- A. The Contractor shall bring to the attention of the Commissioner, any material encountered during execution of the Work that the Contractor suspects to be hazardous.
- B. The Commissioner shall determine whether the Contractor shall perform tests to determine if the material is hazardous. A change to the Contract price may be provided, subject to the applicable provisions of the Contract.
- C. If the material is found to be hazardous, the Commissioner may direct the Contractor to remediate the hazard and a change to the Contract price may be provided, subject to the applicable provisions of the Contract.



PART III - EXECUTION

3.1 EMERGENCY SUSPENSION OF WORK:

- A. When the Contractor is notified by the Commissioner of noncompliance with the safety provisions of the Contract, the Contractor shall immediately, unless otherwise instructed, correct the unsafe condition, at no additional cost to the City.
- B. If the Contractor fails to comply promptly, all or part of the Work may be stopped by notice from the Commissioner.
- C. When, in the opinion of the Commissioner, the Contractor has taken satisfactory corrective action, the Commissioner shall provide written notice to the Contractor that work may resume.
- D. The Contractor shall not be allowed any extension of time or compensation for damages in connection with a work stoppage for an unsafe condition.

3.2 PROTECTION OF PERSONNEL:

- A. The Contractor shall take all necessary precautions to prevent injury to the public, occupants, or damage to property of others. The public and occupants includes all persons not employed by the Contractor or a subcontractor.
- B. Whenever practical, the work area shall be fenced, barricaded or otherwise blocked off from the Public or occupants to prevent unauthorized entry into the work area, in compliance with the requirements of Section 01 50 00, TEMPORARY FACILITIES, SERVICES AND CONTROLS, and including, without limitation, the following:
 - Provide traffic barricades and traffic control signage where construction activities occur in vehicular areas.
 - 2. Corridors, aisles, stairways, doors and exit ways shall not be obstructed or used in a manner to encroach upon routes of ingress or egress utilized by the public or occupants, or to present an unsafe condition to the public or occupants.
 - 3. Store, position and use equipment, tools, materials, scraps and trash in a manner that does not present a hazard to the public or occupant by accidental shifting, ignition or other hazardous activity.
 - 4. Store and transport refuse and debris in a manner to prevent unsafe and unhealthy conditions for the public and occupants. Cover refuse containers, and remove refuse on a frequent regular basis acceptable to the Resident Engineer. Use tarpaulins or other means to prevent loose transported materials from dropping from trucks or other vehicles.

3.3 ENVIRONMENTAL PROTECTION:

- A. Dispose of solid, liquid and gaseous contaminants in accordance with local codes, laws, ordinances and regulations.
- B. Comply with applicable federal, state and local noise control laws, ordinances and regulations, including but not limited to 29 CFR 1910.95, 29 CFR 1926.52 and NYC Administrative Code Chapter 28 of Title 15.

END OF SECTION 01 35 26



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SECTION 01 35 91 HISTORIC TREATMENT PROCEDURES

REFER TO THE ADDENDUM FOR APPLICABILITY OF THIS SECTION OF SECTION

PART I - GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

- A. This Section includes administrative and procedural requirements for the treatment of Landmark Structures and Landmark Quality Structures, as identified in the Addendum. Specific requirements are indicated in other sections of the Specifications.
- B. This Section includes, without limitation, the following:
 - 1. Storage and protection of existing historic materials
 - 2. Temporary protection of historic materials during construction
 - 3. General Protection
 - 4. Protection during use of heat-generating equipment
 - 5. Photographic Documentation
 - 6. NYC Landmarks Preservation Commission Final Approval signoffs

1.3 RELATED SECTIONS: include without limitation the following:

A.	Section 01 10 00	SUMMARY
B.	Section 01 32 33	PHOTOGRAPHIC DOCUMENTATION
C.	Section 01 33 00	SUBMITTAL PROCEDURES
D.	Section 01 77 00	CLOSEOUT PROCEDURES
E.	Section 01 78 39	CONTRACT RECORD DOCUMENTS

1.4 DEFINITIONS:

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.
- B. Design Consultant: "Design Consultant" shall mean the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the "Design Consultant" may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.
- C. Landmark Structure or Site: Any building or site which has been designated as a landmark, or any building or site within a landmark district, as designated by the New York City Preservation Commission or the New York State Historic Preservation Office.



- D. Landmark Quality Structure: Any building which has been determined by the City to be of landmark quality and/or historical significance.
- E. Preservation: To apply measures necessary to sustain the existing form, integrity, and materials of a historic property. Work may include preliminary measures to protect and stabilize the property.
- F. Rehabilitation: To make possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features that convey its historical, cultural, or architectural values.
- G. Restoration: To accurately depict the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and the reconstruction of missing features from the restoration period.
- H. Reconstruction: To reproduce in the exact form and detail a building, structure, or artifact as it appeared at a specific period in time.
- Stabilize: To apply measures designed to reestablish a weather-resistant enclosure and the structural reinforcement of an item or portion of the building while maintaining the essential form as it exists at present.
- J. Protect and Maintain: To remove deteriorating corrosion, reapply protective coatings, and install protective measures such as temporary guards; to provide the least degree of intervention.
- K. Repair: To stabilize, consolidate, or conserve; to retain existing materials and features while employing as little new material as possible. Repair includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials. Within restoration, repair also includes limited replacement in kind, rehabilitation, and reconstruction, with compatible substitute materials for deteriorated or missing parts of features when there are surviving prototypes.
 - L. Replace: To duplicate and replace entire features with new material in kind. Replacement includes the following conditions:
 - 1. Duplication: Includes replacing elements damaged beyond repair or missing. Original material is indicated as the pattern for creating new duplicated elements.
 - 2. Replacement with New Materials: Includes replacement with new material when original material is not available as patterns for creating new duplicated elements.
 - 3. Replacement with Substitute Materials: Includes replacement with compatible substitute materials. Substitute materials are not allowed, unless otherwise indicated.
 - M. Remove: To detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
 - N. Remove and Salvage: To detach items from existing construction and deliver them to the City ready for reuse.
 - O. Remove and Reinstall: To detach items from existing construction, repair and clean them for reuse, and reinstall them where indicated.
 - P. Existing to Remain or Retain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed and salvaged, or removed and reinstalled.

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Material in Kind: Material that matches existing materials, as much as possible, in species, cut, color, Q. grain, and finish.

SUBMITTALS: 1.5

- A. Historic Treatment Program: Submit a written plan for each phase or process, including protection of surrounding materials during operations. Describe in detail materials, methods, and equipment to be used for each phase of work.
- Alternative Methods and Materials: If alternative methods and materials to those indicated are proposed B. for any phase of work, submit for Commissioner's approval a written description including evidence of successful use on other comparable projects, and program of testing to demonstrate effectiveness for use on this Project.
- Qualification Data: For historic treatment specialists as specified and required by individual sections of C. the project specifications.
- D. Photographs for Designated Landmark Structures: Submit photographs in accordance with Section 01 32 33, PHOTOGRAPHIC DOCUMENTATION and as described in this section.
- E. Record Documents: Include modifications to manufacturer's written instructions and procedures, as documented in the historic treatment preconstruction conference and as the Work progresses.

QUALITY ASSURANCE: 1.6

- Special Experience Requirements: Special Experience Requirements may apply to the firm that will provide Historic Treatment Services. If applicable, such Special Experience Requirements are set forth in the Bid Booklet and the Addendum.
- B. Historic Treatment Preconstruction Conference: The Resident Engineer will schedule and hold a preconstruction meeting at the site in accordance with Section 01 31 00, PROJECT MANAGEMENT AND COORDINATION.
 - Review manufacturer's written instructions for precautions and effects of products and procedures on building materials, components, and vegetation.
 - a. Record procedures established as a result of the review and distribute to affected parties.

1.7 STORAGE AND PROTECTION OF HISTORIC MATERIALS:

- A. Removed and Salvaged Historic Materials: As specified and required by individual sections of the project specifications.
- Removed and Reinstalled Historic Materials: As specified and required by individual sections of the В. project specifications.
- C. Existing Historic Materials to Remain: Protect construction indicated to remain against damage and soiling during historic treatment. When permitted by the Commissioner, items may be removed to a suitable, protected storage location during historic treatment and reinstalled in their original locations after historic treatment operations are complete.
- D. Storage and Protection: When removed from their existing location, store historic materials, at a location acceptable to the Commissioner, within a weather tight enclosure where they are protected from wetting by rain, snow, or ground water, and temperature variations. Secure stored materials to protect from theft.
 - 1. Identify removed items with an inconspicuous mark indicating their original location.



PART II - PRODUCTS (Not Used)

PART III - EXECUTION

3.1 PROTECTION, GENERAL:

- A. Comply with manufacturer's written instructions for precautions and effects of products and procedures on adjacent building materials, components, and vegetation.
- B. Ensure that supervisory personnel are present when work begins and during its progress.
- C. Temporary Protection of Historic Materials during Construction:
 - 1. Protect existing materials during installation of temporary protections and construction. Do not deface or remove existing materials.
 - 2. Attachments of temporary protection to existing construction shall be approved by the Commissioner prior to installation.
- D. Protect landscape work adjacent to or within work areas as follows:
 - 1. Provide barriers to protect tree trunks.
 - 2. Bind spreading shrubs.
 - 3. Use coverings that allow plants to breathe and remove coverings at the end of each day. Do not cover plant material with a waterproof membrane for more than 8 hours at a time.
 - 4. Set scaffolding and ladder legs away from plants.
- E. Existing Drains: Prior to the start of work or any cleaning operations, test drains and other water removal systems to ensure that drains and systems are functioning properly. Notify Commissioner immediately of drains or systems that are stopped or blocked. Do not begin Work of this Section until the drains are in working order.
 - Provide a method to prevent solids, including stone or mortar residue, from entering the drains or drain lines. Clean out drains and drain lines that become blocked or filled by sand or any other solids because of work performed under this Contract.
 - 2. Protect storm drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.

3.2 PROTECTION DURING USE OF HEAT-GENERATING EQUIPMENT:

- A. No roofing work requiring the use of an open flame shall be permitted on any Landmark Structure or any Landmark Quality Structure, whose roof or wall structure is made of wood or primarily of wood.
- B. Comply with the following procedures while performing work with heat-generating equipment, including welding, cutting, soldering, brazing, paint removal with heat, and other operations where open flames or implements utilizing heat are used:
 - Obtain Commissioner's approval for operations involving use of open-flame or welding equipment. Notification shall be given for each occurrence and location of work with heat-generating equipment.
 - 2. As far as practical, use heat-generating equipment in shop areas or outside the building.
 - 3. Before work with heat-generating equipment commences, furnish personnel to serve as a fire watch (or watches) for location(s) where work is to be performed.



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- 4. Do not perform work with heat-generating equipment in or near rooms or in areas where flammable liquids or explosive vapors are present or thought to be present. Use a combustible gas indicator test to ensure that the area is safe.
- 5. Remove and keep the area free of combustibles, including, rubbish, paper, waste, etc., within area of operations.
- 6. If combustible material cannot be removed, provide fireproof blankets to cover such materials.
- Where possible, furnish and use baffles of metal or gypsum board to prevent the spraying of sparks or hot slag into surrounding combustible material.
- 8. Prevent the extension of sparks and particles of hot metal through open windows, doors, holes, and cracks in floors, walls, ceilings, roofs, and other openings.
- Inspect each location of the day's work not sooner than 30 minutes after completion of operations to detect hidden or smoldering fires and to ensure that proper housekeeping is maintained.
- C. Where sprinkler protection exists and is functional, maintain it without interruption while operations are being performed. If operations are performed close to automatic sprinkler heads, shield the individual heads temporarily with guards.

3.3 PHOTOGRAPHIC DOCUMENTATION:

Photographs for Designated Landmark Structures: Show existing conditions prior to any historic treatments, including one overall photograph and two close-up photographs of all areas of work affected. Show one overall photograph and two close-up photographs of all areas of work after the successful execution of all historical treatments.

3.4 NEW YORK CITY LANDMARKS PRESERVATION COMMISSION FINAL APPROVALS SIGNOFF:

For all projects involving a Landmark Structure or Site, the Contractor, at the completion of the work, shall submit to the Commissioner, in accordance with Section 01 78 39, CONTRACT RECORD DOCUMENTS, all documentation concerning the successful execution of all historic treatments. This shall include, but not be limited to, copies of all before and after photographs of historic treatments, one copy of the Contractor's as-built drawings, copies of testing and analysis results, including cleaning, mortar analysis, pointing mortars and all other information pertaining to work performed under the New York City Landmarks Preservation Commission jurisdiction.

END OF SECTION 01 35 91



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SECTION 01 40 00 QUALITY REQUIREMENTS

PARTI- GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

- A. This Section includes the following:
 - a. Definitions
 - b. Conflicting Requirements
 - c. Quality Assurance
 - d. Quality Control
 - e. Approval of Materials
 - f. Special Inspections (Controlled Inspection)
 - g. Inspections by Other City Agencies
 - h. Certificates of Approval
 - i. Acceptance Tests
 - j. Repair and Protection
- B. This Section includes administrative and procedural requirements for quality control to assure compliance with quality requirements specified in the Contract Documents.
- C. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
- D. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and control procedures that facilitate compliance with the Contract Document requirements.
- E. Provisions of this Section do not limit requirements for the Contractor to provide quality-assurance and control services required by the Commissioner or authorities having jurisdiction.
- F. Specific test and inspection requirements are specified in the individual sections of the Specifications.
- G. LEED: Refer to the Addendum to identify whether this project is designed to comply with a Certification Level according to the U.S. Green Building Council's Leadership in Energy & Environmental Design (LEED) Rating System, as specified in Section 01 81 13, "SUSTAINABLE DESIGN REQUIREMENTS FOR LEED BUILDINGS."
- H. COMMISSIONING: Refer to the Addendum to identify whether this project will be Commissioned by an independent third party under separate contract with the City of New York. Commissioning shall be in accordance with ASHRAE and USGBC LEED-NC procedures, as described in Section 01 91 13, GENERAL COMMISSIONING REQUIREMENTS. The Contractor shall cooperate with the commissioning agent and provide whatever assistance is required.



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1.3 RELATED SECTIONS: Include without limitation the following:

Α.	Section 01 10 00	SUMMARY PROJECT MANAGEMENT AND COORDINATION
В.	Section 01 31 00	
C.	Section 01 32 00	CONSTRUCTION PROGRESS DOCUMENTATION
D.	Section 01 33 00	SUBMITTAL PROCEDURES
E.	Section 01 77 00	CLOSEOUT PROCEDURES
F	Section 01 78 39	CONTRACT RECORD DOCUMENTS

1.4 DEFINITIONS:

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.
- B. Design Consultant: "Design Consultant" shall mean the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the "Design Consultant" may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.
- C. Commissioning: A Total Quality Assurance process that includes checking the design and installation of equipment, as well as performing functional testing of the same to confirm that the installed equipment is operating and in conformance with the Contract Documents and the City's requirements.

1.5 CONFLICTING REQUIREMENTS:

- A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, the Contractor shall comply with the most stringent requirement as determined by the Commissioner. The Contractor shall refer any uncertainties and/or conflicting requirements to the Commissioner for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. The Contractor shall refer any uncertainties to the Commissioner for a decision before proceeding.

1.6 QUALITY ASSURANCE:

- A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required. Individual Specification Sections specify additional requirements.
- B. Installer Qualifications: Special Experience Requirements may apply to the firm that will install, erect or assemble specified work required for the Project. If applicable, such Special Experience Requirements are set forth in the Bid Booklet and the Addendum.
- C. Manufacturer Qualifications: Special Experience Requirements may apply to the firm that will manufacture equipment, products or systems specified for the Project. If applicable, such Special Experience Requirements are set forth in the Bid Booklet and the Addendum.

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- D. Fabricator Qualifications: Special Experience Requirements may apply to the firm that will fabricate material, products or systems specified for the Project. If applicable, such Special Experience Requirements are set forth in the Bid Booklet and the Addendum.
- E. Professional Engineer Qualifications: A professional engineer who is licensed to practice in the State of New York and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or products that are similar to those indicated for this Project in material, design, and extent.
- F. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- G. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 - Build mockups in location and of size indicated or, if not indicated, as directed by the Resident Engineer.
 - 2. Notify Resident Engineer seven (7) days in advance of dates and times when mockups will be constructed.
 - Demonstrate the proposed range of aesthetic effects and workmanship.
 - 4. Obtain Design Consultant's approval of mockups before starting work, fabrication, or construction.
 - 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - 6. Demolish and remove mockups when directed, unless otherwise directed or indicated.

1.7 QUALITY CONTROL:

- A. City's Responsibilities: Where quality-control services are indicated as the City's responsibility in the Specifications, the City will engage a qualified testing agency to perform these services.
 - 1. COST OF TESTS BORNE BY THE CITY: Where the City directs tests to be performed to determine compliance with the Specifications regarding materials or equipment, and where such compliance is ascertained as a result thereof, the City will bear the cost of such tests.
 - 2. The City will furnish the Contractor with names, addresses, and telephone numbers of testing entities engaged and a description of the types of testing and inspecting they are engaged to perform.
 - 3. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to the Contractor.
- B. Contractor's Responsibility: Tests and inspections not explicitly assigned to the City are the Contractor's responsibility. Unless otherwise indicated, the Contractor shall provide quality-control services as set forth in the Specifications and those required by Authorities having jurisdiction. The Contractor shall provide quality-control services required by Authorities having jurisdiction, whether specified or not.
 - 1. COST OF TESTS BORNE BY CONTRACTOR In the case of tests which are specifically called for in the Specifications to be provided by the Contractor or tests which are required by any Authority having jurisdiction, but are not indicated as the responsibility of the City, the cost thereof shall be borne by the Contractor and shall be deemed to be included in the Contract price. The Contractor shall reimburse the City for expenditures incurred in providing tests on materials and equipment submitted by the Contractor as the equivalent of that specifically named in the Specifications and rejected for non-compliance.
 - 2. Where services are indicated as Contractor's responsibility, the Contractor shall engage a qualified testing agency to perform these quality-control services. Any testing agency engaged by the Contractor to perform quality control services is subject to prior approval by the Commissioner.



- 3. The Contractor shall not employ same entity engaged by the City, unless agreed to in writing by the Commissioner.
- 4. The Contractor shall notify testing agencies and the Resident Engineer at least 72 hours in advance of the date and time for the performance of Work that requires testing or inspecting.
- 5. Where quality-control services are indicated as Contractor's responsibility, the Contractor shall submit a certified written report, in triplicate to the Commissioner, of each quality-control service.
- 6. Testing and inspecting requested by the Contractor and not required by the Contract Documents are Contractor's responsibility.
- 7. The Contractor shall submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Manufacturer's Field Services: Where indicated, the Contractor shall engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Results shall be submitted in writing as specified in Section 01 33 00 SUBMITTAL PROCEDURES.
- D. Retesting/Re-inspecting: Regardless of whether the original tests or inspections were the Contractor's responsibility, the Contractor shall provide quality-control services, including retesting and re-inspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- E. Associated Services: The Contractor shall cooperate with entities performing required tests, inspections, and similar quality-control services, and shall provide reasonable auxiliary services as requested. The Contractor shall notify the testing agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
 - 1. Access to the Work.
 - 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 - 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist testing entity in obtaining samples.
 - 4. Facilities for storage and field curing of test samples.
 - 5. Delivery of samples to testing entities.
 - 6. Design mix proposed for use for material mixes that require control by the testing entity.
 - 7. Security and protection for samples and for testing and inspecting equipment at the Project site.
- F. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
 - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.
 - 2. Coordinate and cooperate with the Commissioning Authority/Agent as applicable for start-up, inspection and functional testing in the implementation of the Commissioning Plan.
- G. Manufacturer's Directions: Where the Specifications provide that the manufacturer's directions are to be used, such printed directions shall be submitted to the Commissioner.
- H. Inspection of Material: In the event that the Specifications require the Contractor to engage the services of an entity to witness and inspect any material especially manufactured or prepared for use in or part of the permanent construction, such entity shall be subject to prior written approval by the Commissioner.
 - 1. 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



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other than the point of manufacture, or the Commissioner will notify the Contractor that inspection will

- No Shipping Before Inspection: The Contractor shall comply with the foregoing before shipping any 1. material.
- J. 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.
- Acceptance: When materials or manufactured products shall comprise such quantity that it is not practical K. 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.
- Testing Compliance: The testing personnel shall make the necessary inspections and tests, and the L. 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.
- Reports: Six (6) copies of the reports shall be submitted and authoritative certification thereof must be M. furnished to the Commissioner as a prerequisite for the acceptance of any material or equipment.
- Rejections: If, in making any test, it is ascertained by the Commissioner that the material or equipment N. does not comply with the Specifications, the Contractor will be notified thereof, and will be directed to refrain from delivering said materials or equipment, or to promptly remove it from the site or from the work and replace it with acceptable material at no additional cost to the City.
- Furnish Designated Materials: Upon rejection of any material or equipment submitted as the equivalent of O. that specifically named in the Specifications, the Contractor shall immediately proceed to furnish the designated material or equipment.

APPROVAL OF MATERIALS: 1.8

- Local Laws: All materials, appliances and types or methods of construction shall be in accordance with A. the Specifications and shall in no event be less than that necessary to conform to the requirements of the New York City Construction Codes, Administrative Code and Charter of the City of New York.
- Approval of Manufacturer: The names of proposed manufacturers, material suppliers, and dealers who B. 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. No manufacturer will be approved for any materials to be furnished under the Contract unless it shall have a plant of ample capacity and shall have successfully produced similar products. All approvals of materials or equipment that are legally required by the New York City Construction Codes and other governing Authorities must be obtained prior to installation.
- C. All Materials: Fixtures, fittings, supplies and equipment furnished under the Contract shall be new and unused, except as approved by the Commissioner, and of standard first-grade quality and of the best workmanship and design. The City of New York encourages the use of recycled products where practical.
- INFORMATION TO SUPPLIERS In asking for prices on materials under any item of the Contract, the D. Contractor shall provide the manufacturer or dealer with such complete information from the



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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.

1.9 **SPECIAL INSPECTIONS:**

SPECIAL INSPECTIONS: A.

- Inspection of selected materials, equipment, installation, fabrication, erection or placement of components and connections made during the progress of the Work to ensure compliance with the Contract Documents and provisions of the New York City Construction Codes, shall be made by a Special Inspector. The City of New York will retain the services of the Special Inspector and bear the costs for the performance of Special Inspections in compliance with NYC Construction Codes requirements or as additionally may be called for in the project specifications, except as noted below for Form TR-3: Technical Report for Concrete Design Mix. The Special Inspector shall be an entity compliant with the requirements of the New York City Construction Codes. The Contractor shall notify the relevant Special Inspector in writing at least 72 hours before the commencement of any work requiring special inspection.
- Form TR3: Technical Report Concrete Design Mix: The contractor shall be responsible for, and 2. 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.
- The Contractor shall notify the relevant Special Inspector in writing at least 72 hours before the 3. commencement of any work requiring Special Inspection. The contractor shall be responsible for, and bear related costs to assure that all construction or work shall remain accessible and exposed for inspection purposes until the required inspection is completed.
- 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".
- The contractor must coordinate with the Resident Engineer or DDC Project Manager to provide 5. access and schedule the work for inspection by the Special Inspector.

1.10 INSPECTIONS BY OTHER CITY AGENCIES:

- Letter of Completion: Just prior to substantial completion of this Project, the Commissioner will file with A. the Department of Buildings, an application for a Letter of Completion or a Certificate of Occupancy for the structure.
- Final Inspections: In connection with the above mentioned application for a Letter of Completion or a В. Certificate of Occupancy and before certificates of final payments are issued, the Contractor will be required to arrange for all final inspections by the inspection staff of the Department of Buildings, Fire Department or other Governmental Agencies having jurisdiction, and secure all reports, sign offs, certificates, etc., by such inspection staff or other governmental agencies, in order that a Letter of Completion or Certificate of Occupancy can be issued promptly.

1.11 CERTIFICATES OF APPROVAL:

- Responsibility: The Contractor shall be responsible for and shall obtain all final approvals for the work A. installed under the Contract in the form of such certificates that are required by all governmental agencies having jurisdiction over the work of the Contract.
- B. Transmittal: All such certificates shall be forwarded to the Commissioner through the Resident Engineer.



1.12 ACCEPTANCE TESTS:

- A. Government Agencies: All equipment and appliances furnished and installed under the Contract shall conform to 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 Tests: 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 Special Inspections indicate that the material or procedures do not meet requirements as set forth on the Contract Drawings or in the Specifications or are otherwise unsatisfactory, the Contractor shall only proceed as directed by the Resident Engineer. Additional costs resulting from retesting, re-inspecting, replacing of material and/or damage to the work and any delay caused to the schedule shall be borne by the Contractor.

PART II - PRODUCTS (Not Used)

PART III - EXECUTION

3.1 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, the Contractor shall repair damaged construction and restore substrates and finishes.

 Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.

END OF SECTION 01 40 00



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SECTION 01 42 00 REFERENCES

PART I - GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 DEFINITIONS:

elen on akokwatendka akonfinieed lakkonfidda fiot kigaka Mudhedida eth ov seeeri Akonfaktelaeke dika toasteka

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.
- B. "APPROVED," ETC. "Approved," "acceptable," "satisfactory," and words of similar import shall mean and intend approved, acceptable or satisfactory to the Commissioner.
- C. Design Consultant: "Design Consultant" shall mean the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the "Design Consultant" may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.
- D. "DIRECTED," "REQUIRED," ETC.- Wherever reference is made in the Contract to the work or its performance, the terms "directed," "required," "permitted," "ordered," "designated," "prescribed," "determined," and words of similar import shall, unless expressed otherwise, imply the direction, requirements, permission, order, designation or prescription of the Commissioner.
- E. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings.



1.3 CODES, AGENCIES AND REGULATIONS:

A.D.A.A.G.

Americans with Disabilities Act (ADA) - Architectural Barriers Act (ABA)

B.G. & E.

Bureau of Gas and Electricity of the City of New York

B.S. & A.

New York City Board of Standards and Appeals

DOE

Department of Energy

E.C.C.C.N.Y.S.

Energy Conservation Construction Code of New York State

EPA

Environmental Protection Administration

N.Y.C.C.C.

New York City Construction Codes - includes:

New York City Plumbing Code

New York City Building Code New York City Mechanical Code

New York City Fuel Gas Code

N.Y.S.D.O.L

New York State Department of Labor

N.Y.C.D.E.P

New York City Department of Environmental Protection

N.Y.C.E.C.

New York City Electrical Code

N.Y.C.E.C.C

New York City Energy Conservation Code

N.Y.C.F.C

New York City Fire Code

N.Y.S...D.E.C.

New York State Department of Environmental Conservation

O.S.H.A.

Occupational Safety & Health Administration

1.4 INDUSTRY STANDARDS:

- A. STANDARD REFERENCES Unless otherwise specifically indicated in the Contract Documents, whenever reference is made to the furnishing of materials or testing thereof that conforms to the standards of any technical society, organization or body, it shall be construed to mean the latest standard, code, specification adopted and published by that technical society, organization or body, as of the date of the bid opening, Unless the provisions of the New York City Construction Codes adopts a different or earlier dated version of such standard.
- B. APPLICABILITY OF STANDARDS: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect, to the extent referenced, as if bound or copied directly into the Contract Documents. Such standards are made a part of the Contract Documents by reference.
- C. CONFLICTING REQUIREMENTS: Where compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantity or quality, comply with the most stringent requirements. Immediately refer uncertainties, and requirements that are different but apparently equal, to the Commissioner in writing for a decision before proceeding.
- D. STANDARD SPECIFICATIONS When no reference is made to a code, standard or specification, the Standard Specifications of the ASTM or the AIEE, as the case may be, shall govern.
- E. REFERENCES Reference to a technical society, organization or body may be made in the Specifications by abbreviations. Abbreviations and acronyms used in the Specifications and other Contract Documents mean the associated name. The following names are subject to change and are



believed, but are not assured, to be accurate and up-to-date as of the Issue Date of the Contract Documents.

AA

Aluminum Association, Inc. (The)

AAADM

American Association of Automatic Door Manufacturers

AABC

Associated Air Balance Council

AAMA

American Architectural Manufacturers Association

AASHTO

American Association of State Highway and Transportation Officials

AATCC

American Association of Textile Chemists and Colorists (The)

ABAA

Air Barrier Association of America

ABMA

American Bearing Manufacturers Association

ACI

ACI International (American Concrete Institute)

ACPA

American Concrete Pipe Association

AEIC:

Association of Edison Illuminating Companies, Inc. (The)

AF&PA

American Forest & Paper Association

AGA

American Gas Association

AGC

Associated General Contractors of America (The)

AGMA

American Gear Manufacturer Association

AHA

American Hardboard Association (Now part of CPA)

AHAM

Association of Home Appliance Manufacturers

ΑI

Asphalt Institute

AIA

American Institute of Architects (The)

AIEE

American Institute of Electrical Engineers

AISC

American Institute of Steel Construction

AISI

American Iron and Steel Institute

AITC

American Institute of Timber Construction

ALCA

Associated Landscape Contractors of America (Now PLANET - Professional Landcare Network)

REFERENCES 01 42 00 -3



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ALSc American Lumber Standard Committee, Incorporated

ALI Automotive Lift Institute

AMCA Air Movement and Control Association International, Inc.

ANSI American National Standards Institute

AOSA Association of Official Seed Analysts, Inc.

APA APA - The Engineered Wood Association

APA Architectural Precast Association

API American Petroleum Institute

ARI Air-Conditioning & Refrigeration Institute

ARMA Asphalt Roofing Manufacturers Association

ASA American Standards Association

ASAE American Society of Agricultural Engineers

ASCE/SEI American Society of Civil Engineers, Structural Engineering Institute

ASHRAE American Society of Heating, Refrigerating and Air-Conditioning

Engineers

ASME American Society of Mechanical Engineers

ASSE American Society of Sanitary Engineering

ASTM ASTM International

(American Society for Testing and Materials International)

AWCI AWCI International

(Association of the Wall and Ceiling Industry International)

AWCMA American Window Covering Manufacturers Association (Now WCSC)

AWI Architectural Woodwork Institute

AWPA American Wood-Preservers' Association

AWSC American Welding Society

AWWA American Water Works Association

BHMA Builders Hardware Manufacturers Association

BIA Brick Industry Association (The)



BICSI

BICSI

BIFMA

BIFMA International

(Business and Institutional Furniture Manufacturer's Association

International)

BISSC

Baking Industry Sanitation Standards Committee

CIBSE

Charted Institute of Building Services Engineers

CCC

Carpet Cushion Council

CDA

Copper Development Association

CEA

Canadian Electricity Association

CFFA

Chemical Fabrics & Film Association, Inc.

CGA

Compressed Gas Association

CGSB

Canadian General Standards Board

CIMA

Cellulose Insulation Manufacturers Association

CIPRA

Cast Iron Pipe Research Association

CISCA

Ceilings & Interior Systems Construction Association

CISPI

Cast Iron Soil Pipe Institute

CLFMI

Chain Link Fence Manufacturers Institute

CPA

Composite Panel Association

CPPA

Corrugated Polyethylene Pipe Association

CPSC

Consumer Product Safety Commission

CRI

Carpet & Rug Institute (The)

CRSI

Concrete Reinforcing Steel Institute

CSA

Canadian Standards Association

CSI

Cast Stone Institute

CSI

Construction Specifications Institute (The)

CSSB

Cedar Shake & Shingle Bureau

CTI

Cooling Technology Institute (Formerly: Cooling Tower Institute)



Division 01 – DDC STANDARD GENERAL CONDITION SINGLE CONTRACT PROJECTS

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DASMA Door and Access Systems Manufacturer's Association International

DHI Door and Hardware Institute

DOC U.S. Department of Commerce – National Institute of Standards and

Technology

ElA Electronic Industries Alliance

DOJ U.S. department of Justice

EIMA EIFS Industry Members Association

DOL U.S. Department of labor

EJCDC Engineers Joint Contract Documents Committee

DOTn U.S. Department of Transportation

EN European Committee of Standards

EJMA Expansion Joint Manufacturers Association, Inc.

ESD ESD Association

EVO Efficiency Valuation Organization

FEME . Federal Emergency Management Agency

FIBA Federation Internationale de Basketball Amateur

(The International Basketball Federation)

FIVB Federation Internationale de Volleyball

(The International Volleyball Federation)

FMG FM Global (Formerly: FM - Factory Mutual System)

FMRC Factory Mutual Research (Now FMG)

FRSA Florida Roofing, Sheet Metal & Air Conditioning Contractors Association,

inc.

FSA Fluid Sealing Association

FSC Forest Stewardship Council

GA Gypsum Association

GANA Glass Association of North America

GRI (Now GSI)

GS Green Seal

GSI Geosynthetic Institute



HI

Hydraulic Institute

HI

Hydronics Institute

HMMA

Hollow Metal Manufacturers Association (Part of NAAMM)

HPVA

Hardwood Plywood & Veneer Association

HPW

H. P. White Laboratory, Inc.

HUD

U.S. Department of Housing and Urban Development

IAPMO

International Association of Plumbing and Mechanical Officials

IAS

International Approval Services (Now CSA International)

IBF

International Badminton Federation

ICC

International Code Council, Inc.

ICEA

Insulated Cable Engineers Association, Inc.

ICRI

International Concrete Repair Institute, Inc.

IEC

International Electrotechnical Commission

IEEE

Institute of Electrical and Electronics Engineers, Inc. (The)

IESNA

Illuminating Engineering Society of North America

IEST

Institute of Environmental Sciences and Technology

IGCC

Insulating Glass Certification Council

IGMA

Insulating Glass Manufacturers Alliance

ILI

Indiana Limestone Institute of America, Inc.

ISO

International Organization for Standardization

ISSFA

International Solid Surface Fabricators Association

ITS

Intertek

ITU

International Telecommunication Union

KCMA

Kitchen Cabinet Manufacturers Association

LMA

Laminating Materials Association (Now part of CPA)

LPI

Lightning Protection Institute

MBMA

Metal Building Manufacturers Association



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MFMA Maple Flooring Manufacturers Association, Inc.

MFMA Metal Framing Manufacturers Association

MH Material Handling (Now MHIA)

MHIA Material Handling Industry of America

MIA Marble Institute of America

MPI Master Painters Institute

MSS Manufacturers Standardization Society of The Valve and Fittings

Industry Inc.

NAAMM National Association of Architectural Metal Manufacturers

NACE International

(National Association of Corrosion Engineers International)

NADCA National Air Duct Cleaners Association

NAGWS National Association for Girls and Women in Sport

NAIMA North American Insulation Manufacturers Association

NBGQA National Building Granite Quarries Association, Inc.

NCAA National Collegiate Athletic Association (The)

NCMA National Concrete Masonry Association

NCPI National Clay Pipe Institute

NCTA National Cable & Telecommunications Association

NEBB National Environmental Balancing Bureau

NECA National Electrical Contractors Association

NeLMA Northeastern Lumber Manufacturers' Association

NEMA National Electrical Manufacturers Association

NETA InterNational Electrical Testing Association

NFHS National Federation of State High School Associations

NFPA NFPA (National Fire Protection Association)

NFRC National Fenestration Rating Council



NGA National Glass Association

NHLA National Hardwood Lumber Association

NLGA National Lumber Grades Authority

NIS National Institute of Standards and Technology

NOFMA: The Wood Flooring Manufacturers Association

(Formerly: National Oak Flooring Manufacturers Association)

NRCA National Roofing Contractors Association

NRMCA National Ready Mixed Concrete Association

NSF International (National Sanitation Foundation International)

NSSGA National Stone, Sand & Gravel Association

NTMA National Terrazzo & Mosaic Association, Inc. (The)

NTRMA National Tile Roofing Manufacturers Association (Now TRI)

NWWDA National Wood Window and Door Association (Now WDMA)

OPL Omega Point Laboratories, Inc. (Acquired by ITS - Intertek)

PCI Precast / Pre-stressed Concrete Institute

PDCA Painting & Decorating Contractors of America

PDI Plumbing & Drainage Institute

PGI PVC Geomembrane Institute

PLANET Professional Landcare Network

(Formerly: ACLA - Associated Landscape Contractors of America)

PPS Power Piping Society

PTI Post-Tensioning Institute

RCSC Research Council on Structural Connections

RFCI Resilient Floor Covering Institute

RIS Redwood Inspection Service

RMI Rack Manufacturers Institute

RTI (Formerly: NTRMA - National Tile Roofing Manufacturers Association)

(Now TRI)



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SAE SAE International

SCAQMD South Coast Air Quality Management District

SCS Scientific Certification System

SDI Steel Deck Institute

SDI Steel Door Institute

SEFA Scientific Equipment and Furniture Association

SGCC Safety Glazing Certification Council

SHBI Steel Heating Boiler Institute

SIA Security Industry Association

SIGMA Sealed Insulating Glass Manufacturers Association (Now IGMA)

SJI Steel Joist Institute

SMA Screen Manufacturers Association

SMACNA Sheet Metal and Air Conditioning Contractors' National Association

SMPTE Society of Motion Picture and Television Engineers

SPFA Spray Polyurethane Foam Alliance

(Formerly: SPI/SPFD - The Society of the Plastics Industry, Inc.; Spray Polyurethane Foam Division)

SPIB Southern Pine Inspection Bureau (The)

SPRI Single Ply Roofing Industry

SSINA Specialty Steel Industry of North America

SSPC SSPC: The Society for Protective Coatings

STI Steel Tank Institute

SWI Steel Window Institute

SWRI Sealant, Waterproofing, & Restoration Institute

TCA Tile Council of America, Inc.

TIA/EIA Telecommunications Industry Association/Electronic Industries Alliance

TMS The Masonry Society



Division 01 – DDC STANDARD GENERAL CONDITION SINGLE CONTRACT PROJECTS

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TPI Truss Plate Institute, Inc.

TPI Turfgrass Producers International

TRI Tile Roofing Institute (Formerly: RTI - Roof Tile Institute)

UL Underwriters Laboratories Inc.

ULC Underwriters Laboratories of Canada

UNI Uni-Bell PVC Pipe Association

USAV USA Volleyball

USC United States Code

USGBC U.S. Green Building Council

USITT United States Institute for Theatre Technology, Inc.

WASTEC Waste Equipment Technology Association

WCLIB West Coast Lumber Inspection Bureau

WCMA Window Covering Manufacturers Association (Now WCSC)

WCSC Window Covering Safety Council

(Formerly: WCMA - Window Covering Manufacturers Association)

WDMA Window & Door Manufacturers Association

(Formerly: NWWDA - National Wood Window and Door Association)

WI Woodwork Institute (Formerly: WIC - Woodwork Institute of California)

WIC Woodwork Institute of California (Now WI)

WMMPA Wood Moulding & Millwork Producers Association

WRI Wire Reinforcement Institute, Inc.

USEPA United States Environmental Protection Agency

WSRCA Western States Roofing Contractors Association

WWPA Western Wood Products Association

PART II - PRODUCTS (Not Used)

PART III - EXECUTION (Not Used)

END OF SECTION 01 42 00



No Text



SECTION 01 50 00 TEMPORARY FACILITIES, SERVICES AND CONTROLS

PARTI- GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

- A. This section includes the following:
 - a. Temporary Water System
 - b. Temporary Sanitary Facilities
 - c. Temporary Electric Power, Temporary Lighting System, And Site Security Lighting
 - d. Temporary Heat
 - e. Dewatering Facilities And Drains
 - f. Temporary Field Office for Contractor
 - g. Resident Engineer's Office
 - h. Material Sheds
 - i. Temporary Enclosures ___.
 - j. Temporary Partitions *
 - k. Temporary Fire Protection
 - I. Work Fence Enclosure
 - m. Rodent and Insect Control
 - n. Plant Pest Control Requirements
 - o. Project Identification Signage
 - p. Security Guards/Fire Guards on Site
 - q. Project Sign and Rendering
 - r. Safety

1.3 RELATED SECTIONS: include without limitation the following:

- A. Section 01 10 00 SUMMARY
- B. Section 01 42 00 REFERENCES
- C. Section 01 54 11 TEMPORARY ELEVATORS AND HOISTS
- D. Section 01 54 23 TEMPORARY SCAFFOLDS AND SWING STAGING
- E. Section 01 77 00 CLOSE OUT PROCEDURES

1.4 DEFINITIONS:

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.
- B. Permanent Enclosure: As determined by Commissioner, permanent or temporary roofing that is complete, insulated, and weather tight; exterior walls which are insulated and weather tight; and all openings that are closed with permanent construction or substantial temporary closures.



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C. Design Consultant: "Design Consultant" shall mean the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the "Design Consultant" may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.

1.5 SUBMITTALS:

- A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.
- B. Reports: Submit reports of tests, inspections, meter readings and similar procedures for temporary use.

1.6 PROJECT CONDITIONS:

- A. Temporary Use of Permanent Facilities and Services: The Contractor shall be responsible for the operation, maintenance, and protection of each permanent facility and service during its use as a construction facility before Final Acceptance by the City, regardless of previously assigned responsibilities.
- B. Install, operate, maintain and protect temporary facilities, services and controls.
 - 1. Keep temporary services and facilities clean and neat in appearance.
 - Operate temporary services in a safe and efficient manner.
 - 3. Relocate temporary services and facilities as needed as Work progresses.
 - Do not overload temporary services and facilities or permit them to interfere with progress.
 - 5. Provide necessary fire prevention measures.
 - Do not allow hazardous, dangerous or unsanitary conditions, or public nuisances to develop or persist on-site.

1.7 NON-REGULAR WORK HOURS (OVERTIME):

- A. The Contractor shall provide the temporary services, facilities and controls set forth in this Section during other than regular working hours if the Drawings and/or the Specifications indicate that the Work, or specific components thereof, must be performed during other than regular working hours. In such case, all costs for the provision of temporary services, facilities and controls during other than regular working hours shall be deemed included in the total Contract Price.
- B. The Contractor shall provide the temporary services, facilities and controls set forth in this Section during other than regular working hours if a change order is issued directing the Contractor to perform the Work, or specific components thereof, during other than regular working hours. In such case, compensation for the provision of temporary services, facilities and controls during other than regular working hours shall be provided through the change order.

1.8 SERVICES BEYOND COMPLETION DATE:

A. The Contractor shall provide the temporary services, facilities and controls set forth in this Section until the date on which it completes all required work at the site, including all punch list work, as certified in writing by the Resident Engineer, or earlier if so directed in writing by the Commissioner. The Contractor shall provide such temporary services, facilities and controls even if completion of all required work at the site occurs after the time fixed for such completion in Schedule A.



PART II - PRODUCTS

2.1 **MATERIALS:**

Α. Provide undamaged materials in serviceable condition and suitable for use intended.

B. Tarpaulins: Waterproof, fire-resistant UL labeled with flame spread rating of 15 or less. For temporary enclosures, provide translucent, nylon-reinforced, laminated polyethylene or polyvinyl chloride, fire-retardant tarpaulins.

Water: Potable and in compliance with requirements of the Department of Environmental Protection. C.

2.2 **EQUIPMENT:**

Provide undamaged equipment in serviceable condition and suitable for use intended. A.

Water Hoses: Heavy-duty abrasive-resistant flexible rubber hoses, 100 feet (30 m) long with pressure B. rating greater than the maximum pressure of the water distribution system. Provide adjustable shutoff nozzles at hose discharge.

Electric Power Cords: Grounded extension cords. C.

1. Provide hard-service cords where exposed to abrasion or traffic.

Provide waterproof connectors to connect separate lengths of electric cords where single 2. lengths will not reach areas of construction activity.

Do not exceed safe length-voltage ratio.

Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART III -EXECUTION:

3.1 **INSTALLATION, GENERAL:**

Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no B. longer needed or are replaced by authorized use of completed permanent facilities as approved by the Resident Engineer.

3.2 **TEMPORARY WATER SYSTEM:**

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.2 A

TEMPORARY WATER SYSTEM - NEW FACILITIES: During construction, the Contractor shall furnish a Temporary Water System as set forth below.

Immediately after the Commissioner has issued an order to start work, the Contractor shall file an application with the Dept. of Environmental Protection for the schedule of charges for water use during construction. The Contractor will be responsible for payment of water charges.

2. Immediately after the Commissioner has issued an order to start work, the Contractor shall file an application with the Department of Environmental Protection's Bureau of Water Supply and obtain a permit to install the temporary water supply system. The system shall be installed and maintained for the use of the Contractor and its subcontractors. A copy of the above mentioned permit shall be filed with the Commissioner. The Contractor 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 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 shall take the necessary precautions to prevent the temporary water system from freezing. The Contractor shall provide repairs to the temporary water supply system for the duration of the project until said temporary system is dismantled and removed.

3. Disposition of Temporary Water System: The Contractor shall be responsible for dismantling the temporary water system when no longer required for the construction operations, or when replaced by the permanent water system installed for the project, or as otherwise directed by the Resident Engineer. All repair work resulting from the dismantling of the temporary water system shall be the responsibility of the Contractor.

REFERMOTHE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3/2 B

- B. TEMPORARY WATER SYSTEM PROJECTS IN EXISTING FACILITIES:
 - When approved by the Commissioner, use of existing water system will be permitted for temporary water service during construction, as long as the system is cleaned and maintained in a condition acceptable to the Commissioner. At Substantial Completion, the Contractor shall restore the existing water system to conditions existing before initial use.
 - The Contractor shall be responsible for all repairs to the existing water system permitted to be used for temporary water service during construction. The Contractor shall be responsible to maintain the existing system in a clean condition on a daily basis, acceptable to the Commissioner.
 - The Contractor will be responsible for payment of water charges as directed by the Commissioner. Billing will be in accordance with the Department of Environmental Protection schedule of charges for Building Purposes.
- C. WASH FACILITIES: The Contractor shall install wash facilities supplied with potable water at convenient locations for personnel involved in handling materials that require wash-up for a healthy and sanitary condition.
 - 1. Dispose of drainage properly.
 - 2. Supply cleaning compounds appropriate for each condition.
 - Include safety showers, eyewash fountains and similar facilities for the convenience, safety and sanitation of personnel.
- D. DRINKING WATER FACILITIES: The Contractor shall provide drinking water fountains or containerized tap-dispenser bottled-drinking water units, complete with paper cup supplies. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45 to 55 deg. F (7 to 13 deg. C).

3.3 TEMPORARY SANITARY FACILITIES:

A. The Contractor shall provide toilets, wash facilities and drinking water fixtures in compliance with regulations and health codes for type, number, location, operation and maintenance of fixtures and facilities. Provide toilet tissue, paper towels, paper cups and similar disposable materials as appropriate for each facility, and provide covered waste containers for used materials.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.3 B

B. SELF-CONTAINED TOILET UNITS:

変量量

- 1. The Contractor shall provide temporary single-occupant toilet units of the chemical, aerated recirculation, or combustion type for use by all construction personnel. Units shall be properly vented and fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material. Quantity of toilet units shall comply with the latest OSHA regulations.
- 2. Toilets: Install separate self-contained toilet units for male and female personnel. Shield toilets to ensure privacy.



REFERITO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3:3 C

C. EXISTING TOILETS:

- TOILET FACILITIES: When approved by the Commissioner, the Contractor shall arrange for the use of existing toilet facilities by all personnel during the execution of the work. The Contractor shall be responsible to clean and maintain facilities in a condition acceptable to the Resident Engineer and, at completion of construction, to restore facilities to their condition at the time of initial use.
- 2. MAINTENANCE The Contractor shall maintain the temporary toilet facilities in a clean and sanitary manner and make all necessary repairs.
- NUISANCES The Contractore shall not cause any sanitary nuisance to be committed by its
 employees or the employees of its subcontractors in or about the work, and shall enforce all
 sanitary regulations of the City and State Health Authorities.

3.4 TEMPORARY ELECTRIC POWER, TEMPORARY LIGHTING SYSTEM, AND SITE SECURITY LIGHTING:

- A. SCOPE: This Section sets forth the General Conditions and procedures relating to Temporary Electric Power, Temporary Lighting System and Site Security Lighting during the construction period.
- B. TEMPORARY ELECTRIC POWER:

The Contractor shall provide and maintain a Temporary Electric Power service and distribution system of sufficient size, capacity and power characteristics required for construction operations for all required work by the Contractor and its subcontractors, including but not limited to power for the Temporary Lighting System, Site Security Lighting, construction equipment, hoists, temporary elevators and all field offices. Temporary Electric Power shall be provided as follows:

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3:4 B (1).

CONNECTION TO UTILITY LINES:

- a. Temporary Electric Power Service for use during construction shall be provided as follows: The Contractor shall make all necessary arrangements with the Public Utility Company and pay all charges for the Temporary Electric Power system. The Contractor shall include in its total Contract Price any charges for Temporary Electric Power, including charges that may be made by the Public Utility Company for extending its electrical facilities, and for making final connections. The Contractor shall make payment directly to the Public Utility Company.
- b. APPLICATIONS FOR METER: The Contractor 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 Electric Power. The Contractor shall pay to the Public Utility Company, all bills for Temporary Electric energy used throughout the work, as they become due.
- c. SERVICE AND METERING EQUIPMENT The Contractor shall furnish and install, at a suitable location on the site, approved service and metering equipment for the Temporary Electric Power System, ready for the installation of the Public Utility Company's metering devices. The temporary service mains to and from the metering location shall be not less than 100 Amperes, 3-phase, 4-wire and shall be of sufficient capacity to take care of all demands for all construction operations and shall meet all requirements of the NYCEC.



REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.4 B (2)

2. CONNECTION TO EXISTING ELECTRICAL POWER SERVICE:

- When approved by the Commissioner, electrical power service for the Temporary Lighting System and for the operation of small tools and equipment less than 1/4 horsepower may be taken from the existing electric distribution system if the existing system is of adequate capacity for the temporary power load. The Contractor shall cooperate and coordinate with the facility custodian, so as not to interfere with the normal operation of the facility.
- There will be no charge to the Contractor for the electrical energy consumed. b.
- The Contractor shall provide, maintain and pay all costs for separate temporary electric C. power for any temporary power for equipment larger than 1/4 horsepower. When directed by the Commissioner, the Contractor shall remove its own temporary power system.

REFERMONTE ADDENDUMEDENTE APRICABILITY OF SUBSECTIONS ABOVE

ELECTRICAL GENERATOR POWER SERVICE:

- When connection to Utility Lines or existing facility electric service is not available or is not adequate to supply the electric power need for construction operations, the Contractor shall provide self-contained generators to provide power beyond that available.
- Pay for all energy consumed in the progress of the Work, exclusive of that available from b. the existing facility or Utility Company.
- C. Provide for control of noise from the generators.
- d. Comply with the Ultra Low Sulfur Fuel in Non-Road Vehicles requirements as set forth in Article 5.4 of the Contract.

C. USE OF COMPLETED PORTIONS OF THE ELECTRICAL WORK:

- 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 shall have the temporary lighting and power system changed over from the temporary service points to the main distribution panel.
- 2. COST OF CHANGE OVER - The Contractor shall be responsible for all costs 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.
- The requirements for temporary electric power service specified herein shall be adhered to after 3. change over of service until final acceptance of the project.
- 4. NO EXTRA COST - The operation of the service and switchboard equipment shall be under the supervision of the Contractor, 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.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.4 D

D. TEMPORARY LIGHTING SYSTEM:

The Contractor shall provide adequate service for the temporary lighting system, or a minimum 1. of 100 Amperes, 3-phase, 4-wire service for the temporary lighting system, whichever is



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greater, and make all necessary arrangements with the Public Utility Company and pay all charges by them for the Temporary Lighting System

- The Contractor shall furnish and connect to the metered service point, a Temporary Lighting 2. System to illuminate the entire area where work is being performed and points adjacent to the work, with separately fused circuits for stairways and bridges. Control switches for stairway circuits shall be located near entrance on ground floor.
- 3. ITEMS: The Temporary Lighting System provided by the Contractor 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, pigtails and any other incidental material. Additional details may be outlined in the detailed Specifications for the Electrical Work. Changes may be made, provided the full equivalent of those requirements is maintained.
- The Temporary Lighting System shall be progressively installed as required for the 4. advancement of the work under the Contract.
- RELOCATION: The cost for the relocation or extension of the original Temporary Lighting 5. System, required by the Contractor or its subcontractors, that is not required due to the normal advancement of the work, as determined by the Resident Engineer, shall be borne by the Contractor.
- PIGTAILS: shall be furnished with left-hand sockets with locked type guards and 40 feet of 6. rubber covered cable. The Contractor shall furnish and distribute a minimum of three (3) complete pigtails to each subcontractor. See the detailed Electrical Specifications for possible additional pigtails required.
- LAMPS: The Contractor shall furnish and install one (1) complete set of lamps, including those 7. for the trailers. Broken and burned out lamps in the temporary lighting system, DDC field office and construction trailers, shall be replaced by the Contractor. All lamps shall be compact fluorescent.
- CIRCUIT PROTECTION: The Contractor shall furnish and install GFI protection for the 8. Temporary Lighting and Site Security Lighting Systems.
- MAINTENANCE OF TEMPORARY LIGHTING SYSTEM: 9.
 - The Contractor shall maintain the Temporary Lighting System in good working order a. during the scheduled hours established.
 - The Contractor shall include in its total Contract Price all costs in connection with the b. Temporary Lighting System, including all costs for installation, maintenance and electric power.
- REMOVAL OF TEMPORARY LIGHTING SYSTEM: The temporary lighting system shall be 10. removed by the Contractor when authorized by the Commissioner.
- HAND TOOLS: The temporary lighting system shall not be used for power purposes, except that light hand tools not larger than 1/4 horsepower may be operated from such system by the Contractor and its subcontractors.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.4 E

E. SITE SECURITY LIGHTING (FOR NEW CONSTRUCTION ONLY):

- The Contractor 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. All costs in connection with site security lighting shall be deemed included in the total Contract Price.
- It is essential that the site security lighting system be completely installed and operating, at the 2. earliest possible date. The Contractor shall direct its subcontractors to 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, if a part of the system interferes with the work of any trade, the Contractor shall be completely responsible for the expense of removing,

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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.
- 5. The site security lighting shall be kept illuminated at all times during the hours of darkness. The Contractor shall, at its own expense, shall keep the system in operation, and shall furnish and install all material necessary to replace all damaged or burned out parts.
- 6. The Contractor shall be on telephone call alert for maintaining the system during the operating period stated above.
- All materials and equipment furnished under this section shall remain the property of the Contractor and shall be removed and disposed of by the Contractor when authorized in writing by the Resident Engineer.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 315

3.5 TEMPORARY HEAT:

A. GENERAL:

- 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 Sub-Section 3.5 C herein.
 - 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 Fire Watch 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's responsibility for the provision of Temporary Heat, including all expenses in connection therewith, shall be as set forth below:
 - a. Projects Involving Enclosure of the Building:



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Prior to Enclosure - Until the Commissioner determines that the building has been 1) enclosed, as set forth in Sub-Section 3.5 B; the Contractor shall be responsible for the provision of Temporary Heat.

Post Enclosure - Once the Commissioner determines that the building, or any 2) portion thereof, has been enclosed, as set forth in Sub-Section 3.5 B, the Contractor 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).

3) The Contractor 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 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 provided for herein is subject to the exception set forth in Sub-Section 3.5 A.2 (b) herein.

Projects not involving Enclosure of the Building: b.

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 shall be responsible for the provision of Temporary Heat, except as otherwise provided in Sub-Section 3.5 H.3(b).2 herein.

2) If the Project does not involve the installation of a new permanent heating system if one did not exist previously, or the replacement, modification and/or shut down of the existing permanent heating system, or any key component thereof; there is no Contractor responsibility of the provision of Temporary Heat, unless otherwise specified in the Contract Documents. However, if the Commissioner, pursuant to Sub-Section 3.5 H.3 (b).1 herein, determines that the provision of Temporary Heat is necessary due to special and/or unforeseen circumstances, the Contractor shall be responsible for the provision of Temporary Heat and shall be paid for the same in accordance with Sub-Section 3.5 H.3 (b).1 herein.

B. **ENCLOSURE OF STRUCTURES:**

Notification: The Contractor shall notify all its subcontractors and the Resident Engineer at least 1.

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 Sub-Section 3.5 A.2 above, once the building has been enclosed, the Contractor 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:
 - A building shall be considered to be roofed when the area to be roofed is covered 1) by a permanent structure and all openings through the permanent structure are covered and protected by temporary covers as described in Paragraph (c) below.
 - 2) Intermediate floor structures of multi-floor buildings 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.
- Walls: For the walls to be determined to be enclosed permanent exterior wall elements or b. 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 and such work shall be deemed included in the Contract price.

C. TEMPERATURE REQUIREMENTS:

- 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.

DURATION: D.

- The Contractor shall be required to provide Temporary Heat until the date on which it completes all required work at the site, including all punch list work, as certified in writing by the Resident Engineer, or earlier if so directed in writing by the Commissioner. The Contractor 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 shall include in its Total Contract Price all expenses in connection with the provision of Temporary Heat in accordance with the requirements specified herein.
- 2. The total Contract duration is set forth in consecutive calendar days in Schedule A of the Addendum. The Table set forth below indicates the number of full heating seasons that are deemed included in various contract durations, which are specified in consecutive calendar days (ccd)s. 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

METHOD OF TEMPORARY HEAT: E.

1750

- The method of temporary heat shall be in conformance with the New York City Fire Code and 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:
 - Not cause the deposition of dirt or smudges upon any finished work or cause any a. defacement or discoloration to the finished work.
 - Not be injurious or harmful to people or materials. b.

- c. Portable fueled heating devises or equipment SHALL NOT BE ALLOWED for use as temporary heat other than construction-related curing or drying in conformance with the NYC Fire Code.
- 3. No open fires will be permitted.

F. TEMPORARY HEATING SYSTEM:

1. The temporary system for the provision of Temporary Heat provided by the Contractor following enclosure of the building shall be complete including, subject to provisions of paragraph E above, boilers pumps, radiators, space heaters, water and heating piping, insulation and controls. The temporary system for the provision of Temporary Heat shall be capable of maintaining the minimum temperature requirements set forth in Paragraph C above.

G. COORDINATION:

1. The Contractor, in the provision of Temporary Heat, shall coordinate its operations in order to insure sufficient and timely performance of all required work, including work performed by trade subcontractors. The Contractor 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 shall include all expenses in connection with the supply of water for Temporary Heat in its Total Contract Price. During the period in which Temporary Heat in an enclosed building is being furnished and maintained, the Contractor shall 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 shall maintain all permanent or temporary enclosures at its own expense.

H. USE OF PERMANENT HEATING SYSTEMS:

1. Use of Permanent Heating System for Temporary Heat after Building Enclosure

a. The Contractor 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 at his/her 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 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 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, including the placing of ancillary system equipment, shall be coordinated with the operations of all trade subcontractors so as to insure sufficient and timely performance of the work. Once the permanent heating system is operating properly, the Contractor shall remove all portions of the system for Temporary Heat not part of the permanent heating system.
- 3. Temporary Heat Allowance for Special Conditions or and/or Unforeseen Circumstances.
 - a. The City may establish an allowance in the Contract for payment of costs and expenses in connection with the provision of Temporary Heat as set forth herein. If established, the City will include an amount for such allowance on the Bid Form, and the Contractor shall



include such allowance amount in its Total Contract Price. The Contractor 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.
 - 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 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 the Commissioner determines that there is a need for maintenance of the permanent heating system by the Contractor after written acceptance by the Commissioner of the work, and that the need for such maintenance is not the fault of the Contractor, the Contractor 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 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 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 must present original invoices for the same. DDC reserves the right to furnish the required fuel.

I. RELATED ELECTRICAL WORK:

- 1. The Contractor shall be responsible for providing the items set forth below and shall include all expenses in connection with such items in its Total Contract Price. The Contractor shall provide such items promptly when required and shall in all respects coordinate its work with the work performed by trade subcontractors in order to facilitate the provision of Temporary Heat.
 - a. The Contractor 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 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. Such power shall be provided by the Contractor for the duration the Contractor is required to provide Temporary Heat, as set forth in Sub-section 3.5 D herein.
- 2. In providing the items set forth in Paragraph 1 above, the Contractor is advised that labor may be required seven (7) days a week and/or during other than normal working hours for the period of time required by seasonal weather conditions.



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J. **RELATED PLUMBING WORK:**

The Contractor 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 this Contract. The Contractor shall include all expenses in connection with such items of work in its Total Contract Price. The Contractor shall provide such items of work promptly when required and shall in all respects coordinate its work with the work performed by trade subcontractors in order to facilitate the provision of Temporary Heat.

In the event portions of the permanent plumbing equipment furnished by the Contractor as part 2. of the work of this Contract are used for the provision of Temporary Heat either during construction or prior to acceptance by the City of the complete plumbing system, the Contractor 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.

For Projects requiring the installation of new and/or modified gas service, as well as associated meter installations, the Contractor 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).

STORM WATER CONTROL, DEWATERING FACILITIES AND DRAINS:

A. **PUMPING:**

Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, 1. and construction free of water. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of storm water from heavy rainfall.

Contractor shall furnish and install all necessary automatically operated pumps of adequate 2. 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.

All pumps shall be maintained at all times in proper working order. 3.

Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining 4. properties nor endanger permanent Work or temporary facilities.

5. Remove snow and ice as required to minimize accumulations.

TEMPORARY FIELD OFFICE FOR CONTRACTOR: 3.7

.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.

The field office shall be located where it will not interfere with the progress of any part of the work or B. with visibility of traffic control devices.

- CONTRACTOR'S REPRESENTATIVE: In charge of the office there shall be a responsible and C. competent representative of the Contractor, duly authorized to receive orders and directions and to put them into effect.
- Arrangements shall be made by the Contractor whereby its representative may be readily accessible D. by telephone.

All temporary structures shall be of substantial construction and neat appearance, and shall be E. painted a uniform gray unless otherwise directed by the Commissioner.

CONTRACTOR'S SIGN - The Contractor shall post and keep posted, on the outside of its field office, F. 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.



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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.

3.8 DDC FIELD OFFICE:

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.8 A

A. OFFICE SPACE IN EXISTING BUILDING:

- 1. The Resident Engineer will arrange for office space for sole use in the building where work is in progress. The Contractor shall provide and install a lockset for the door to secure the equipment in the room. The Contractor shall provide two (2) keys to the Resident Engineer. After completion of the project the Contractor shall replace the original lockset on the door and ensure its proper operation.
- 2. In addition to equipment specified in Sub-Section 3.8 D, the Contractor shall provide, for exclusive use of the DDC Field Office, the following:
 - a. Two (2) single pedestal desks, 42" x 32"; two (2) swivel chairs with arms and three (3) side chairs without arms to match desk. Two metal (2) lockers, single units, 15" x 18" x 78" overall including 6" legs. Lockers to have flat key locks with two (2) keys each, General Steel products or approved equal. Two (2) full ball bearing suspension four (4) drawer vertical legal filing cabinets with locks, approximately 52"H x 28 ½"D x 18"W.
 - b. One (1) 9000 B.T.U air conditioner or as directed by Commissioner. Wiring for the air conditioner shall be minimum No. 12 AWG fed from individual circuits in the fuse box.
 - c. One (1) folding conference table, 96" x 30" and ten (10) folding chairs.
 - d. Two (2) metal wastebaskets.
 - e. One (1) fire extinguisher, one (1) quart vaporizing liquid type, brass, wall mounted by Pyrene No. C21 or approved equal.
 - f. One (1) Crystal Springs water cooler with bottled water, Model No. LP14058 or approved equal to be furnished for the duration of the project as required.
- 3. The Contractor shall provide one (1) telephone, where directed and shall pay all costs for telephone service for calls within the New York City limits for the duration of the project.
- 4. All furniture and equipment, except computer equipment specified in Sub-Section 3.8 D.3, shall remain the property of the Contractor.
- Computer Workstation quantities shall be provided as specified in Sub-Section 3.8 B 3-a for DDC Managed Projects, or Sub-Section 3.8 B 3-b for CM Managed Projects.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SEECTION 3.8 B

B. DDC FIELD OFFICE TRAILER:

- 1. GENERAL: The Contractor shall, for the time frame specified herein, provide and maintain at its own cost and expense a DDC Construction Field Office and all related items as specified herein [hereinafter collectively referred to as the "DDC Field Office"] for the exclusive use of the Resident Engineer. The DDC Field Office shall be located at the Project site and shall be solely dedicated to the Project. Provision of the DDC Field Office shall commence within THIRTY (30) days from Notice to proceed and shall continue through forty-five (45) days after Substantial Completion of the required construction at the Project site. The Contractor shall remove the DDC Field Office forty-five (45) days after Substantial Completion of the required construction, or as otherwise directed in writing by the Commissioner.
- 2. TRAILER: The Contractor shall provide at its own cost and expense a mobile office trailer for use as the DDC Field Office. The Contractor shall install and connect all utility services to the



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trailer within thirty (30) days from Notice to Proceed. The trailer shall have equipment in compliance with the minimum requirements hereinafter specified. Any permits and fees required for the installation and use of said trailer shall be borne by the Contractor. The trailer including furniture and equipment therein, except computer equipment specified in Sub-Section 3.8D.3 herein, shall remain the property of the Contractor.

3. Trailer shall be an office type trailer of the size specified herein, with exterior stairs at entrance. Trailer construction shall be minimum 2 x 4 wall construction fully insulated with paneled interior walls, pre-finished gypsum board ceilings and vinyl tile floors.

- a. <u>DDC Managed Project Trailer</u>: DDC Field Office Trailer Size, Layout and Computer Workstation:
 - 1) Overall length: 32 Feet Overall width: 10 Feet
 - 2) Interior Layout: Provide one (1) general office/conference room area and one (1) private office at one end of the trailer. Provide equipment and amenities as specified in Sub-Section 3.8.B herein.
 - 3) Computer Workstation: Provide one (1) complete computer workstation, as specified in Sub-Section 3.8.D herein, in the private office area as directed by the Resident Engineer.
- b. <u>CM Managed Project Trailer</u>: DDC Field Office Trailer Size, Layout and Computer Workstation:
 - Overall length: 50 Feet Overall width: 10 Feet
 - 2) Interior Layout:
 Provide one (1) large general office/conference room in the center of the trailer and two (2) private offices, one (1) each at either end of the trailer.
 Provide equipment and amenities as specified in Sub-Section 3.8.B herein.
 - 3) Computer Workstation: Provide three (3) complete computer workstations as specified in Sub-Section 3.8.D herein. Provide one (1) each complete computer workstation in each private office and one (1) complete computer workstation at the secretarial position as directed by the Resident Engineer.
- 4. The exterior of the trailer shall be lettered with black block lettering of the following heights with white borders:

CITY OF NEW YORK

DEPARTMENT OF DESIGN AND CONSTRUCTION

DIVISION OF PUBLIC BUILDINGS

DDC FEILD OFFICE

2-1/2"

2-1/2"

NOTE: In lieu of painting letters on trailer the Contractor may substitute a sign constructed of a good quality weatherproof material with the same type and size of lettering above.

- 5. All windows and doors shall have aluminum insect screens. Provide wire mesh protective guards at all windows.
- 6. The interior shall be divided by partitions into general and private office areas as specified herein. Provide a washroom located adjacent to the private office and a built-in wardrobe closet opposite the washroom. Provide a built-in desk in the private office(s) with fixed overhead shelf and clearance below for two (2) file cabinets.

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- 7. Provide a built-in drafting or reference table, located in the general office/conference room, at least 60 inches long by 36 inches wide with cabinet below and wall type plan rack at least 42 inches wide.
- 8. The washroom shall be equipped with a flush toilet, wash basin with two (2) faucets, medicine cabinet, complete with supplies and a toilet roll tissue holder. Plumbing and fixtures 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.
- 9. HVAC: The trailer shall be equipped with central heating and cooling adequate to maintain a temperature of 72 degrees during the heating season and 75 degrees during the cooling season when the outside temperature is 5 degrees F. winter and 89 degrees F. summer.
- 10. Lighting shall be provided via ceiling mounted fluorescent lighting fixtures to a minimum level of 50 foot candles in the open and private office(s) along with sufficient lighting in the washroom. Broken and burned out lamps shall be replaced by the Contractor. A minimum of four (4) duplex convenience outlets shall be provided in the open office and two (2) each in the private office(s). These outlets shall be in addition to special outlet requirements for computer stations, copiers, HVAC unit, etc.
- 11. Electrical service switch and panel shall be adequately sized for the entire trailer load. Provide dedicated circuits for HVAC units, hot water heater, copiers and other equipment as required. All wiring and installation shall conform to the New York City Electrical Code.
- 12. The following movable equipment shall be furnished:
 - a. Two (2) single pedestal desks, 42" x 32"; two (2) swivel chairs with arms and three (3) side chairs without arms to match desk. Two (2) full ball bearing suspension four (4) drawer vertical legal filing cabinets with locks and two (2) full ball bearing two (2) drawer vertical legal filing cabinets in each private office located below built-in desk.
 - b. One (1) folding conference table, 96" x 30" and ten (10) folding chairs.
 - c. Three (3) metal wastebaskets.
 - d. One (1) fire extinguisher one (1) quart vaporizing liquid type, brass, wall mounted by Pyrene No. C21 or approved equal.
 - e. One (1) Crystal Springs water cooler with bottled water, Model No. LP14058 or approved equal to be furnished for the duration of the Contract as required.
- 13. TRAILER TEMPORARY SERVICE: Plumbing and electrical work required for the trailer will be furnished and maintained as below.
 - PLUMBING WORK: The Contractor shall provide temporary water and drainage service connections to the DDC Field Office trailer for a complete installation. Provide all necessary soil, waste, vent and drainage piping.

Contractor to frost-proof all water pipes to prevent freezing.

- REPAIRS, MAINTENANCE: The Contractor shall provide repairs for the duration of the project until the trailer is removed from the site.
- DISPOSITION OF PLUMBING WORK: At the expiration of the time limit set forth in Sub-Section 3.8 B 1 herein, the temporary water and drainage connections and piping to the DDC Field Office trailer shall be removed by the Contractor 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.

b. **ELECTRICAL WORK:**

- The Contractor shall furnish, install and maintain a temporary electric feeder to the DDC Field Office trailer immediately after it is placed at the job site.
- The temporary electrical feeder and service switch/fuse shall be adequately sized based on the trailer load and installed per the New York City Electrical Code and complying with utility requirements.

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Make all arrangements and pay all costs to provide electric service. 3)

The Contractor shall pay all costs for current consumed and for maintenance of the 4) system in operating condition, including the furnishing of the necessary bulb replacements lamps, etc., for the duration of the project and for a period of fortyfive (45) days after the date of Substantial Completion.

5) Disposition of Electric Work: At the expiration of the time limit set forth, the temporary feeder, safety switch, etc., shall be removed and disposed of as

directed.

All repair work due to these removals shall be the responsibility of the Contractor. 6)

MAINTENANCE C.

- The Contractor shall provide and pay all costs for regular weekly janitor service and furnish toilet paper, sanitary seat covers, cloth towels and soap and maintain the DDC Field Office in first-class condition, including all repairs, until the trailer is removed from the site.
- Supplies: The Contractor shall be responsible for providing (a) all office supplies, 2) including without limitation, pens, pencils, stationery, filtered drinking water and sanitary supplies, and (b) all supplies in connection with required computers and printers, including without limitation, an adequate supply of blank CD's/DVD's, storage boxes for blank CDs/DVDs, and paper and toner cartridges for the printer.

Risk of Loss: The entire risk of loss with respect to the DDC Field Office and 3) equipment shall remain solely and completely with the Contractor. The Contractor shall be responsible for the cost of any insurance coverage determined by the

Contractor to be necessary for the Field Office.

At forty-five (45) days after the date of Substantial Completion, or sooner as 4) directed by the Commissioner, the Contractors shall have all services disconnected and capped to the satisfaction of the Commissioner. All repair work due to these removals shall be the responsibility of the Contractor.

TELEPHONE SERVICE: The Contractor shall provide and pay all costs for the following d.

telephone services for the DDC Field Office trailer:

Separate telephone lines for one (1) desk phone in each private office. 1)

2) One (1) wall phone (with six (6) foot extension cord) at plan table.

Separate telephone lines for the fax machine and internet access in each private 3) office. Telephone service shall include voice mail.

4) A remote bell located on outside of trailer

The telephone service shall continue until the trailer is removed from the site.

- PERMITS: The Contractor shall make the necessary arrangements and obtain all permits e. and pay all fees required for this work.
- RENTED SPACE: The Contractor has the option of providing, at its cost and expense, rented office C. 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 the DDC Field Office must be approved by the Commissioner before the area is rented. All insurance, maintenance and equipment, including computer workstations specified in Sub-Section 3.8 D in quantities required as specified in Sub-Section 3.8 B 3 for the DDC Field Office trailer, shall also apply to rented spaces.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.8 D

D. ADDITIONAL EQUIPMENT FOR THE DDC FIELD OFFICE:

The Contractor shall provide a high volume copy machine (50 copies per minute) for paper sizes 8½ x 11, 8½ x 14 & 11 x 17. Copier shall remain at job site until the DDC Field office trailer is removed from the site.



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- The Contractor shall furnish a fax machine and a telephone answering machine at 2. commencement of the project for the exclusive use of the DDC Field Office. 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.
- 3. COMPUTER WORKSTATION: The Contractor shall provide one complete computer workstation, in quantities specified in Sub-Section 3.8.B.4, as specified herein:
 - Hardware/Software Specification:
 - Computer Equipment Computers shall be provided for all contracts that have a Total Consecutive Calendar Days for construction duration as set forth in Schedule "A" of 180 CCD's or greater. Contracts of lesser duration shall not require computers.
 - Computers furnished by the Contractor for use by City Personnel, for the 2) duration of the contract, shall be in accordance with Specific Requirements, contained herein, shall remain the property of the City of New York at the completion of the project and shall meet the following minimum requirements:

Personal Computer(s) - Each Workstation Configuration. 3)

Dell; HP; Gateway; Acer; or, an approved a) Make and Model:

> equivalent. (Note: an approved equivalent requires written approval of the Assistant Commissioner of

i5-2400 (6MB Cache, 3.1GHz) or faster computer -Processor:

Single Processor.

Minimum of 4GB (Gigabytes) Dual Channel DDR3 System RAM:

SDRAM at 1333MHz - 2 DIMMSs

Hard Disk Drive(s): 500 GB (Gigabytes) Serial ATA (7200RPM)

w/DataBurst Cache, or larger.

Internal CD-RW, 48x Speed or faster. CD-RW: e)

DVD Burner (with double layer write capability) 16x 16xDVD+/-RW

Speed or faster

Must have at least one (1) Serial Port, one (1) I/O Ports:

Parallel Port, and three (3) USB Ports.

HD Graphics (VGA, HDMI) with a minimum of 64 MB Video Display Card:

of RAM.

22" W, 23.0 Inch VIS, Widescreen, VGA/DVI LCD Monitor: i)

Monitor.

System as configured above shall have at least two Available Exp. Slots:

(2) full size PCI Slots available.

Network Interface: Integrated 10/100/1000 Ethernet card.

Optical scroll Mouse, 101 Key Keyboard, Mouse Other Peripherals:

Pad and all necessary cables.

m) Software Requirement: Microsoft Windows 7 Professional SP1, 32 bit;

> Microsoft Office Professional 2010 or 2013; Microsoft Project 2010; Adobe Acrobat reader; Anti-Virus software package with 2 year updates subscription; and, either Auto Cad LT or Microsoft

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Visio Standard Edition, as directed by the Resident Engineer.

4) DDC Field Office Specs: DDC Field Offices requiring computers shall be provided with the following:

a) One (1) broad-band internet service account. Wideband Internet connectivity at a minimum throughput of 15 Mbps download and 5 Mbps upload is required at each field office location with 1-5 staffers. For larger field offices see table below for minimum required upload speeds. Telephone service should be bundled together with Internet connectivity. Because of throughput requirements Verizon FIOS is the preferred connectivity provider where available.

Office Personnel #	Upload Speeds (<i>Minimum</i>)
1 – 5	5 Mbps
6 – 10	10 Mbps
11 – 15	15 Mbps
16 – 20	20 Mbps

This account will be active for the life of the project. The e-mail name for the account shall be the DDC Field Office/project ld (e.g. <u>FLD K HWK666 McGuinness@earthlink.com</u>).

b) One (1) 600 DPI HP Laser Jet Printer (twelve (12) pages per minute or faster) with one (1) Extra Paper (Legal Size)

c) All necessary cabling for equipment specified herein.

d) Storage Boxes for Blank CD's

e) Printer Table

f) UPS/Surge Suppressor combo

- 5) All computers required for use in the Engineer's Field Office shall be delivered, installed, and setup in the Field Office by the Contractor.
- 6) 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.

7) An adequate supply of blank CDs/DVDs, 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 Resident Engineer.

8) It is the Contractor's responsibility to ensure that electrical service and phone connections are also available at all times; that is, the Field Office Computer(s) is to be powered and turned on twenty-four (24) hours each day.

- Broadband connectivity is preferred at each field office location. Please take into consideration that an extra phone line dedicated to the modern must be ordered as part of the contract unless Internet broadband connectivity, via Cable or DSL, is available at the planned field office location. Any questions regarding this policy should be directed to the Assistant Commissioner of Information Technology Services at 718-391-1761.
- Ownership: The equipment specified above shall, unless otherwise directed by the Commissioner, be the sole property of the City of New York upon delivery to the DDC Field Office. The Contractor shall prepare and maintain an accurate inventory of all equipment which it purchases for the DDC Field Office. Such inventory shall be provided to the City of New York. Upon completion of the



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required services, as directed by the Commissioner, the Contractor shall turn such equipment over to the City of New York.

HEAD PROTECTION (HARD HATS): E.

- 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 DDC Field Office.
- Upon completion of the project, the helmets shall become the property of the Contractor. 2.

MATERIAL SHEDS: 3.9

- Material sheds used by the Contractor for the storage of its materials shall be kept at locations which A. will not interfere at any time with the progress of any part of the work or with visibility of traffic control devices.
- Store combustible materials apart from the facility. В.

3.10 TEMPORARY ENCLOSURES:

- Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weather tight enclosure for building exterior.
- Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary B. enclosures.

3.11 TEMPORARY PARTITIONS:

- Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate occupied tenant areas from fumes and noise.
 - 1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fireretardant plywood on construction operations side.
 - Construct dustproof partitions with 2 layers of 3-mil (0.07-mm) polyethylene sheet on each side. Cover floor with 2 layers of 3-mil (0.07-mm) polyethylene sheet, extending sheets 18 inches (460 mm) up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant plywood.
 - Construct vestibule and airlock at each entrance through temporary partition with not less than 48 inches (1219 mm) between doors. Maintain water-dampened foot mats in vestibule.
 - 3. Insulate partitions to provide noise protection to occupied areas.
 - 4. Seal joints and perimeter. Equip partitions with dustproof doors and security locks.
 - 5. Protect air-handling equipment.
 - 6. Weather strip openings.
 - 7. Provide walk-off mats at each entrance through temporary partition.

3.12 TEMPORARY FIRE PROTECTION:

- Install and maintain temporary fire-protection facilities of types needed to protect against reasonably A. predictable and controllable fire losses. Comply with NFPA 241.
- Prohibit smoking in all areas. B.
- Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.



- D. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
- E. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB SECTION 3.13

3.13 WORK FENCE ENCLOSURE:

- A. The Contractor shall furnish, erect and maintain a wood construction or chain-link fence to the extent shown on the drawings or required by the work enclosing the entire project on all sides. All materials used shall be new. Any permit required for the installation and use of said fence and costs shall be borne by the Contractor.
- B. WOOD FENCE shall be 7'-0" high with framing construction of yellow pine, using 4" x 4" approved preservative-treated posts on not more than 6'-0" centers, with three (3) rails of at least 2" x 4" size to which shall be secured minimum 1/2 inch thick exterior grade plywood. 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.
 - 1. 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 provided with tension or sag rods for the swinging sections.
 - 2. PAINTING The fence and gates shall be entirely painted on the street and public sides with one (1) coat of exterior primer and one (1) top coat of exterior grade acrylic-latex emulsion paint. Black stenciled signs reading "POST NO BILLS" shall be painted on fence with three (3) inch high letters on 25 foot spacing for the entire length of fence on street traffic sides. Signs shall be stenciled five (5) feet above the sidewalk.
- C. CHAIN-LINK FENCING shall be minimum 2-inch thick, galvanized steel, chain-link fabric fencing; 8 feet high with galvanized steel pipe posts; minimum 2-3/8-inch OD line posts and 2-7/8-inch OD corner and pull posts, with 1-5/8-inch OD top and bottom rails. Fence shall be accurately aligned and plumb, adequately braced and complete with gates, locks and hardware as required. Under no condition shall fencing be attached or anchored to existing construction or trees.
- D. 1. It shall be the obligation of the Contractor to remove all posters, advertising signs, and markings, etc., immediately.
 - 2. Should the fencing be required to be relocated during the course of the Contract, it shall be done by the Contractor at no additional cost to the City.
 - 3. Where sidewalks are used for "drive over" purposes for Contractor vehicles, a suitable wood mat or pad shall be provided for protection of sidewalks and curbs.
 - 4. Where required, make provision for fire hydrants, lampposts, etc.
 - 5. REMOVAL When directed by the Resident Engineer, the fence shall be removed.

3.14 RODENT AND INSECT CONTROL:

A. DESCRIPTION: The 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:



- 1 Wet areas within the project area, including all temporary structures.
- 2 All exterior and interior temporary toilet structures within the project area.
- 3 All Field Offices and shanties within the project area of all subcontractors and DDC.
- Wherever there is evidence of food waste and/or discarded food or drink containers, in quantity, that would cause breeding of rodents or the insects herein specified.
- 5 Any other portion of the premises requiring such special attention.

B. 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.

C. PERSONNEL:

1 All pest control personnel must be supervised by an exterminator licensed in categories 7A and 8

D. METHODS:

- Application and dosage of all materials shall be done in strict compliance with the manufacturer's recommendations.
- Any unsanitary conditions, such as uncollected garbage or debris, resulting from all Contractor's activities, which will provide food and shelter to the resident rodent population shall be corrected by the Contractor immediately after notification of such condition by the Resident Engineer.

E. RODENT CONTROL WORK:

- 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 stream banks. Live traps must be used in these seventy-five (75) foot buffer zone areas and within wetland and woodland areas.
- 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.
- 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.
- The Contractor shall be responsible for collecting and disposing of all trapped and poisoned rodents found in live traps and tamper proof bait stations. The Contractor shall also be responsible for posting and maintaining signs announcing the baiting of each particular location.
 - The Contractor shall be responsible for the immediate collection and disposal of any visible rodent remains found on streets or sidewalks within the project area.
- It is anticipated that public complaints will be addressed to the Commissioner. The 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.
- 6 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.



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EDUCATION & NOTICES:

The 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 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.

Prior to application of any chemicals, the Contractor shall furnish to the Commissioner copies or 2 sample labels for each pesticide, antidote information, and Material Data Safety Sheets

(MSDS) for each chemical used.

G. RECORDS

The Contractor shall keep a record of all rodent and waterbug infestation surveys conducted by 1. 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.

The Contractor shall maintain records of all locations baited along with the type and quantity of 2.

rodenticide and insecticide bait used.

3.15 PLANT PEST CONTROL REQUIREMENTS and TREE PROTECTION REQUIREMENTS:

- Plant Pest Control Requirements: The Contractor and its subcontractors, including the Certified A. 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.
 - All tree work performed within the quarantine areas must be performed by New York State 1. 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.
 - 2. 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.
 - 3. 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.
 - Quarantine areas, for the purpose of this contract shall be defined as all five boroughs of the 4. 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.

- B. <u>Tree Protection Requirements</u>: 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.
 - 1. <u>Surveys and Reports</u>: 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 in paragraph A above; (3) evaluation of the general health and condition of any infected plant material.
 - 2. 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.
 - 3. <u>Proximity to Project Site</u>: 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.
 - a. 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).
 - b. 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.
 - c. The Certified Arborist determines that the critical root zone (CRZ) of an off-site tree, significant shrub, or primary cluster of stems in a planting mass extends into the project site, whether or not that plant material is located within the 50-foot inclusionary perimeter as outlined above.
 - 4. 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



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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.

No Separate Payment. No separate payment shall be made for compliance with Plant Pest Control C. 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.

3.16 PROJECT IDENTIFICATION SIGNAGE:

The Contractor shall provide, install and maintain Project identification and other signs where indicated to inform public and individuals seeking entrance to the Project.

In order to properly convey notice to persons entering upon a City construction site, the Contractor B. shall furnish and install a sign at the entrance (gates) as follows:

NO TRESPASSING

AUTHORIZED PERSONNEL ONLY

Case If no construction fence exists at the site, this notice shall be conveyed by incorporating the abovelanguage into safety materials (barriers, tape, and signs). D.

Provide temporary, directional signs for construction personnel and visitors.

E. Maintain and touch up signs so that they are legible at all times.

3.17 PROJECT CONSTRUCTION SIGN AND RENDERING:

A. PROJECT SIGN:

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 place and in a position 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 the sign in first class condition and in proper position. Prior to fabrication, the Contractor shall submit an 8-1/2" x 11" color match print proof from the sign manufacturer of the completed sign for approval by the Commissioner.

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.

Schedule: Upon project mobilization, the Contractor shall commence production and installation of the sign.

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:

- 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
- Edging: U-shaped, 22 gauge aluminum edging, with a white enameled finish to match sign b.



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 pre-finished both sides with a glossy white baked-on enamel finish and be flush with edge of 2" x 2" wood frame. Samples must be submitted for approval.

d. Fastening: Fasten sign panel to wood frame using cadmium plated no. 8 sheet metal screws at ½" below edge of panel and 8" on center. The U-shaped aluminum channel 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. A digital file of the project sign will be provided to the Contractor by the Commissioner's representative for printing. 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. All signs may include a second panel for a project rendering as described in Sub-Section 3.17.B herein.
- b. The digital file shall be reproduced at the Sign Panel size of 4' x 8' on 3M High Performance Vinyl or approved equal. The 3M High Performance Vinyl or equivalent shall be guaranteed for nine (9) years. Guarantee must cover fading, peeling, chipping or cracking. The sign manufacturer is required to maintain all specified Pantone Matching System (PMS) type and other composition elements represented in the digital file of the project sign.

REFER TO THE ADDENDUMED RUHE APPLICABILITY OF SUB-SETTION S. 17/E

B. PROJECT RENDERING:

- 1. Responsibility: In addition to the Project Sign, the Contractor shall furnish and install one (1) sign showing a rendering of the project. A digital file of the project rendering will be provided to the Contractor by the Commissioner's representative. From an approved image file provided by DDC, the Project Rendering is to be sized, printed, and mounted in an identical manner as described in Sub-Section 3.17.A above for the Project Sign. A color match print proof from the sign manufacturer of the Rendering Sign printed from the supplied file is to be submitted to DDC for approval before fabrication. The Rendering Sign is to be posted at the same height as the Project Sign. Where possible, the Rendering Sign 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.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3:18

3.18 SECURITY GUARDS/FIRE GUARDS ON SITE:

- A. SECURITY GUARDS (WATCHMEN):
 - The Contractor shall provide competent Security Guard Service on the site, beginning on the date on which the Contractor commences actual construction work, or on such earlier date on which there is activity at the site related to the work, including without limitation, delivery of



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materials or construction set-up. The Contractor shall continue to provide such Security Guard Service until the date on which it completes all required work at the site, including all punch list work, as certified in writing by the Resident Engineer, or earlier if so directed in writing by the Commissioner. Throughout the specified time period, there 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 trade subcontractors. 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.

Every Security Guard shall be required to hold a "Certificate of Fitness" issued by the Fire 2. Department. Every Security Guard shall, during his/her tour of duty, perform the duties of Fire

Guard in addition to his/her security obligations.

Should the Commissioner find that any Security Guard is unsatisfactory; such guard shall be 3. replaced by the Contractor upon the written demand of the Commissioner.

Each Security Guard furnished by the Contractor shall be instructed by the Contractor to 4. include in his/her duties the entire construction site including the Field Office, temporary structures, and equipment, materials, etc.

Should the Contractor or any other subcontractor consider the security requirements outlined 5. above inadequate, the Contractor 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.

Nothing contained in this Sub-Section shall diminish in any way the responsibility of the 6. Contractor and each subcontractor for its own work, materials, tools, equipment, nor for any of

the other risks and obligations outlined hereinbefore in this Article.

COSTS - The Contractor shall employ Security Guards/Fire Guards throughout the specified time В. period, except as otherwise modified by the detailed Specifications and as approved by the Commissioner, for the purpose of safeguarding and protecting the site. All costs for Security Guards/Fire Guards shall be borne by the Contractor.

RESPONSIBILITY - The Contractor and its subcontractors will be responsible for safeguarding and C.

protecting their own work, materials, tools and equipment.

3.19 SAFETY:

A. The Contractor, in compliance with requirements of Section 01 35 26, SAFETY REQUIREMENTS PROCEDURES, shall provide and maintain all necessary temporary closures, guard rails, and barricades to adequately protect all workers and the public from possible injury. Any removal of these items, during the progress of the work, shall be replaced by the Contractor at no additional cost to the City.

END OF SECTION 01 50 00



No Text



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SECTION 01 54 11 TEMPORARY ELEVATORS AND HOISTS

PART I -GENERAL

1.1 **RELATED DOCUMENTS:**

The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Α. Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

- A. This section includes the following:
 - 1. Temporary Use, Operation and Maintenance of Elevators during Construction
 - For New buildings up to 15 Stories
 - b. For New buildings over 15 Stories
 - C. For Existing Buildings
 - 2. Temporary Construction Hoists and Hoist ways (For Material and Personnel)

RELATED SECTIONS: include without limitation the following: 1.3

A. Section 01 10 00 SUMMARY

B. Section 01 42 00 REFERENCES

C.

Section 01 50 00 TEMPORARY FACILITIES AND CONTROLS

D. Section 01 54 23 TEMPORARY SCAFFOLDS AND SWING STAGING

Section 01 77 00 E. **CLOSE OUT PROCEDURES**

PART II - PRODUCTS (Not Used)

PART III - EXECUTION

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.1

TEMPORARY USE, OPERATION AND MAINTENANCE OF ELEVATORS DURING CONSTRUCTION FOR NEW BUILDINGS UP TO AND INCLUDING 15 STORIES:

- INSTALLATION: The Contractor shall install, complete, operate, and maintain in good working order, as A. indicated herein, one (1) selected main elevator for the transport of employees of the Contractor and/or its subcontractors, and representatives of the DDC and other Governmental Agencies having jurisdiction of work at the project. The Contractor shall furnish, install, and maintain such elevator in good working order, including all necessary hoisting ropes, governor cables, traveling conductor cables, operating devices, temporary hand reset target annunciators, temporary signal devices, and all other permanent or temporary parts. The installation, operation and maintenance of the temporary elevator and all equipment and/or parts utilized in connection therewith shall be in accordance with the rules and regulations of all agencies and/or entities having jurisdiction over elevators in temporary use.
- RESPONSIBILITY: The Contractor shall be responsible for any injury to persons or damage to property B. arising out of the temporary elevator and all equipment and/or parts utilized in connection therewith.



- C. COSTS: The Contractor shall be responsible for all costs in connection with the temporary elevator, including without limitation: (1) installing and operating the temporary elevator, (2) maintaining the temporary elevator in clean, proper operating condition, including the cost of lubricants and/or parts for such maintenance, (3) performing all work in pits, shaft ways and machine rooms necessary for the operation of the temporary elevator, (4) replacing the temporary elevator or any equipment or parts utilized in connection therewith, if required, due to damage, destruction or excessive wear or corrosion, except for the replacement of hoisting ropes as set forth below, (5) performing all required electrical work in connection with the temporary elevator, (6) providing all electric power required to operate the temporary elevator, (7) providing all necessary conduit and wiring connections for the proper operation and signaling of the temporary elevator, and (8) providing all labor for the operation and maintenance of the temporary elevator, including on an overtime basis if necessary. The total Contract Price shall include all costs in connection with the temporary elevator, including without limitation, the costs specified herein.
- D. COMMENCEMENT OF SERVICE: The Contractor 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:
 - The shaft shall have been completely enclosed by either the permanent or a temporary enclosure meeting the requirements of the law.
 - 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 shaft way 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 shaft ways.
 - 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, 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 shaft way and for the car control and signal traveling cables. The Contractor shall make all these required connections as soon as the equipment is declared ready for such connections by the Resident Engineer.
- F. REMOVAL: When elevators for permanent use have been installed and are in condition for service, and when directed by the Commissioner, the Contractor shall remove the temporary enclosures and all temporary elevator equipment and promptly proceed with the installation of the permanent equipment as required under the Contract.
- G. INSPECTION: Before temporary elevator equipment is removed, a joint inspection of the equipment shall be made by the Contractor and the Commissioner to determine the condition of this equipment upon the discontinuation of its temporary use. If this inspection deems it necessary, the Contractor 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 therefore will be made in accordance with Article 26 of the Contract.

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- H. REPLACEMENT: The Contractor shall furnish and install new equipment or parts for any equipment or parts of the temporary elevator installation that have been damaged, destroyed, or that indicate excessive wear or corrosion, excepting the replacement of hoisting ropes. All shaft ways, 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 except for the replacement of hoisting ropes.
- I. LIMITATIONS ON USE: The temporary elevator shall not be used during its operation for the hoisting of materials or the removal of rubbish, but shall be limited only to the transportation of employees of the Contractor and/or its subcontractors, and representatives of DDC and other Governmental Agencies having jurisdiction of work at the project. However, the Resident Engineer may grant special permission at specified times to the Contractor and/or its subcontractors to hoist materials, which in the Resident Engineer's opinion will not overload or damage the elevator installation, but only after such times as all plastering has been completed from the second floor up. In the event of any damage to the temporary elevator, the Contractor shall notify the Resident Engineer within 24 hours after such damage has occurred. As indicated above, the Contractor shall be responsible for the replacement of any equipment or parts of the temporary elevator that have been damaged.
- J. LIQUIDATED DAMAGES: The Contractor will be charged at the rate of \$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.

REFER TO WHE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3/2

3.2 TEMPORARY USE, OPERATION AND MAINTENANCE OF ELEVATORS DURING CONSTRUCTION FOR NEW BUILDING OVER 15 STORIES:

- A. INSTALLATION: The Contractor shall install, complete, operate, and maintain in good working order, as indicated herein, two (2) selected main elevators for the transport of employees of the Contractor and/or its subcontractors, and representatives of the DDC and other Governmental Agencies having jurisdiction of work at the project. The Contractor shall furnish, install, and maintain such elevators in good working order, including all necessary hoisting ropes, governor cables, traveling conductor cables, operating devices, temporary hand reset target annunciators, temporary signal devices, and all other permanent or temporary parts. The installation, operation and maintenance of the temporary elevators and all equipment and/or parts utilized in connection therewith 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 shall not be operated simultaneously.
- B. RESPONSIBILITY: The Contractor shall be responsible for any injury to persons or damage to property arising out of the temporary elevators and all equipment and/or parts utilized in connection therewith.
- C. COSTS: The Contractor shall be responsible for all costs in connection with the temporary elevators, including without limitation: (1) installing and operating the temporary elevators, (2) maintaining the temporary elevators in clean, proper operating condition, including the cost of lubricants and/or parts for such maintenance, (3) performing all work in pits, shaft ways and machine rooms necessary for the operation of the temporary elevators, (4) replacing the temporary elevators or any equipment or parts utilized in connection therewith, if required due to damage, destruction or excessive wear or corrosion, except for the replacement of hoisting ropes as set forth below, (5) performing all required electrical work in connection with the temporary elevators, (6) providing all electric power required to operate the temporary elevators, (7) providing all necessary conduit and wiring connections for the proper operation and signaling of the temporary elevators, and (8) providing all labor for the operation and maintenance of the temporary elevators, including on an overtime basis if necessary. The total Contract Price shall



include all costs in connection with the temporary elevators, including without limitation, the costs specified herein.

- D. LOW RISE ELEVATOR: The Contractor 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 shaft ways.
 - 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 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 shall make all these required connections as soon as the Equipment is declared ready for such connections by the Resident Engineer.
- F. HIGH RISE ELEVATOR: The Contractor 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.
 - 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 shaft way 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 shaft ways.
 - 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. ELECTRICAL INSTALLATION: The Contractor, 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

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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 shaft way. The Contractor shall make all these required connections as soon as the equipment is declared ready for such connections by the Resident Engineer.

- H. When the high rise elevator is completed and ready for temporary operation, the low rise temporary elevator shall be shut down.
- I. REMOVAL: 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 shall remove the temporary enclosures and all temporary elevator equipment, and promptly proceed with the installation of the permanent equipment as required under the Contract.
- J. INSPECTION: Before temporary elevator equipment is removed, a joint inspection of the equipment shall be made by the Contractor and the Commissioner to determine the condition of this equipment upon the discontinuation of its temporary use. If this inspection determines it necessary, the Contractor 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 therefore will be made in accordance with Article 26 of the Contract.
- K. REPLACEMENT: The Contractor shall furnish and install new equipment or parts for any equipment or parts of the temporary elevator installations that have been damaged, destroyed, or that indicate excessive wear or corrosion, excepting the replacement of hoisting ropes. All shaft ways, 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 except for the replacement of hoisting ropes.
- L. LIMITATIONS ON USE: The temporary elevators shall not be used during their operation for the hoisting of materials or the removal of rubbish, but shall be limited only to the transportation of employees of the Contractor and/or its subcontractors, and representatives of DDC and other Governmental Agencies having jurisdiction of work at the project. However, the Resident Engineer may grant special permission at specified times to the Contractor and/or its subcontractors to hoist materials, which in the Resident Engineer's opinion will not overload or damage the elevator installation, but only after such times as all plastering has been completed from the second floor up. In the event of any damage to the temporary elevator, the Contractor shall notify the Resident Engineer within 24 hours after such damage has occurred. As indicated above, the Contractor shall be responsible for the replacement of any equipment or parts of the temporary elevator that have been damaged.
- M. LIQUIDATED DAMAGES: The Contractor will be charged at the rate of \$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.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3:3

3.3 TEMPORARY USE, OPERATION AND MAINTENANCE OF ELEVATORS DURING CONSTRUCTION FOR EXISTING BUILDINGS:

A. The Contractor may use, at the Commissioner's discretion, one (1) selected elevator in the building for temporary operation by the Contractor for the transportation of employees of the Contractor and/or its subcontractors, and representatives of DDC and other Governmental Agencies having jurisdiction over the work at the Project. The operation of the temporary elevator and all equipment and/or parts utilized in



connection therewith shall be in accordance with the rules and regulations of all agencies and/or entities having jurisdiction over elevators in temporary use.

- RESPONSIBILITY: The Contractor shall be responsible for any injury to persons or damage to property B. arising out of the temporary elevator and all equipment and/or parts utilized in connection therewith.
- REPLACEMENT: The Contractor shall furnish and install new equipment or parts for any equipment or parts of the elevator for temporary operation that have been damaged, destroyed, or that indicate excessive wear or corrosion, excepting the replacement of hoisting ropes. All shaft ways, 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 except for the replacement of hoisting ropes. If it is determined and ordered by the Commissioner that new hoist ropes are required, such ropes shall be installed and payment therefore will be made in accordance with Article 26 of the Contract.
- LIMITATIONS ON USE: The temporary elevator shall not be used during its operation for the hoisting of materials or the removal of rubbish, but shall be limited only to the transportation of employees of the Contractor and/or its subcontractors, and representatives of DDC and other Governmental Agencies having jurisdiction of work at the project. However, the Resident Engineer may grant special permission at specified times to the Contractor and/or its subcontractors to hoist materials, which in the Resident Engineer's opinion will not overload or damage the elevator installation. In the event of any damage to the temporary elevator, the Contractor shall notify the Resident Engineer within 24 hours after such damage has occurred. As indicated above, the Contractor shall be responsible for the replacement of any equipment or parts of the temporary elevator that have been damaged.
- LIQUIDATED DAMAGES: The Contractor will be charged at the rate of \$100 per day for each day it fails E. 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.

TEMPORARY HOISTS AND HOISTWAYS (FOR MATERIAL AND PERSONNEL): 3.4

- RESPONSIBILITY: The Contractor shall provide adequate numbers of material hoists for the most Α. expeditious performance of all parts of the work including the work of all its subcontractors. .
- LOCATIONS: No hoists shall be constructed at such locations as will interfere with, or affect the B. construction of, floor arches, or the work of subcontractors. The hoists may be located at the exterior sides of the structure or in the courtyard and extend upward adjacent to the line of window openings. The hoists 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.
- ELEVATOR SHAFT: Wherever possible, one or more of the permanent elevator shafts may be used as C. temporary hoist ways, providing such use complies with the requirements of the Building Code of the City of New York and has been approved by the Commissioner, and providing further it entails no interference with the progress of the work.
- PROTECTION FOR INTERIOR HOISTS: All interior material hoist ways shall be enclosed on each floor D. and shall be adequately protected with appropriate safety guards. In no event shall the protection be less than that required by law.

END OF SECTION 01 54 11



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SECTION 01 54 23 TEMPORARY SCAFFOLDING AND PLATFORMS

PARTI- GENERAL

1.1 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].
- B. Section 01 35 26: Safety Requirements Procedures.
- C. The Contractor shall comply with the requirements of "The City of New York Department of Design and Construction Safety Requirements". This document is included in the Information for Bidders.

1.2 SUMMARY:

- A. This Section includes administrative and general procedural requirements for Temporary Scaffolding and Platforms, including:
 - 1. Conformance
 - 2. Responsibility
 - 3. Jobsite Documentation and Submittals
 - 4. Inspections
- B. This Section governs ALL scaffold used on DDC project sites including, but not limited to, Suspended Scaffold, Supported Scaffold and Sidewalk Sheds.

1.3 CONFORMANCE:

A. Unless otherwise indicated, the Contractor is responsible for providing, erecting, installing and maintaining all temporary scaffolding and platforms which 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 items and personnel set forth in this section.

1.4 RESPONSIBILITY:

- A. Jobsite Safety Coordinator: The Contractor shall designate and employ a Jobsite Safety Coordinator, who shall be a competent person, who shall have a daily presence on the project site during scaffold use. This designee must possess and maintain a valid New York City Department of Buildings supported scaffold certificate of completion. An alternate shall also be designated, in the event that the Jobsite Safety Coordinator is absent. The Jobsite Safety Coordinator shall:
 - Verify completeness of documentation and submittals (as described below).
 - Verify that inspections are performed, including pull tests (see below), reports are filed and reported deficiencies are corrected.
 - Monitor trades using scaffold.
 - Limit access to scaffold areas that are tagged for non-use.
 - 5. Inform trades of scaffold load limitations.
 - 6. Monitor loading of decks.
 - Verify that any ties that are temporarily removed are properly restored in the same shift.
 - 8. Verify that outriggers and planks that are moved are properly set up and secured.
 - Verify that all scaffold decks in use have proper access/egress.
 - 10. Verify that all open sides of decks in excess of 14 inches have proper guardrails and toe-boards.



- 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.
- Keep a log of significant actions and events connected with the scaffolding. 12.
- The Contractor shall be responsible for erecting, maintaining and dismantling the scaffolding and/or B. sidewalk shed in conformance with requirements of the New York City Building Code, OSHA and the Contract documents, including the specifications. The Contractor shall also be guided by generally accepted standards of scaffold industry practice as promulgated by the Scaffold Industry Association.
- The Contractor shall require the subcontractor responsible for erecting the scaffolding to engage a C. Scaffold Engineer, licensed as a professional engineer by the State of New York. The Scaffold Engineer shall be responsible to ensure the following: (1) that the installation design is in compliance with requirements of the New York City Building Code and OSHA, (2) that the design comports with the capabilities of the components and the characteristics of the site, (3) that scaffold loads on the host building, including netting, have been properly considered, and (4) that the design documents provide accurate information for erectors and users.
- Scaffold users are trade contractors assigned to work on the scaffold. Training certificates from a New D. 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 Safety Coordinator and to inform the Jobsite Safety Coordinator of known hazards, non-conformances or violations.

JOBSITE DOCUMENTATION AND SUBMITTALS:

The Contractor shall prepare, obtain and submit the following to the Resident Engineer:

- NYC Department of Buildings permit(s) for scaffold and sidewalk sheds (as applicable) including filing A. applications signed and sealed by a Professional Engineer licensed in the State of New York;
- Site logistics plan / site safety plan; B.
- Installation drawing(s), design and product data to be provided for all scaffold(s) and shed(s) must C. include, at a minimum:
 - 1. Plan(s);
 - 2. Elevation(s);
 - Duty load designation; "standard" (150 psf live load) or "heavy duty" (300 psf live load). 3.
 - Details including base support, anchors and ties; 4.
 - Notes and specifications including load limits, number of planked levels, tie spacing, netting, and 5. sequence of installation and removal.
 - Anchorage into sound material. 6.
 - Load limits based on pull tests; 7.
 - Specifications for pull test(s), method, proof load and the number of trials; 8.
 - Elevations, levels or heights, where anchorage is made into masonry; 9.
 - Specifications for frames, planks, screw jacks, anchors, and any other ancillary hardware; 10.
 - Samples for anchors, ties and netting;
 - Sequence of operations for erection and demolition;
 - Location plan, heights, widths, "jumps" over doorways and driveways;
 - Specify size, maximum span and maximum spacing of headers and stringers;
 - Specify legs, girts, braces, nailing and connections; 15.
 - All sidewalk sheds shall be designed, engineered, signed and sealed by a Professional Engineer licensed in the State of New York;
 - Generic (not job specific) engineering drawings are satisfactory for standard sheds and arrangements.

b. Special engineering is required for custom sheds, site-specific problems or non-standard arrangements.

1.6 INSPECTIONS:

- A. Signed inspection reports shall be issued for each inspection and pull-test below, and shall be logged and maintained on site by the Jobsite Safety Coordinator for the duration of the project.
- B. 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.
- C. 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.
- D. 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.
- E. 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.
- F. 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.
- G. Scaffolds and Sidewalk Sheds shall be inspected daily by the Jobsite Safety Coordinator or alternate prior to use by scaffold users. The inspection results must be recorded in the maintenance log, and be available on-site at all times.
- H. At the completion of the project, submit all inspection documents as Miscellaneous Record Documents in accordance with Section 01 78 39, CONTRACT RECORD DOCUMENTS.

1.7 LADDERS AND STAIRS:

A. The Contractor 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.

1.8 ACCESS AND EXITS:

A. 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.

PART II - PRODUCTS (Not Used)

PART III - EXECUTION (Not Used)

END OF SECTION 01 54 23



No Text



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SECTION 01 73 00 EXECUTION

PARTI - GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

- A. This Section includes general procedural requirements governing execution of the Work including without limitation the following:
 - 1. Delivery of Materials
 - 2. Contractor's Superintendent
 - 3. Surveys
 - 4. Borings
 - 5. Examination
 - 6. Environmental Assessment
 - 7. Preparation
 - 8. Deferred Construction
 - 9. Installation
 - 10. Permits
 - 11. Transportation
 - 12. Sleeves and Hangers
 - 13. Sleeve and Hanger Drawings
 - 14. Cutting and Patching
 - 15. Location of Partitions
 - 16. Furniture and Equipment
 - 17. Removal of Rubbish and Surplus Material

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- 18. Cleaning
- 19. Security And Protection of Work Site
- 20. Maintenance of Site and Adjoining Property
- 21. Maintenance of Project Site
- 22. Safety Precautions for Control Circuits
- 23. Obstructions in Drainage Lines

1.3 RELATED SECTIONS: Include without limitation the following:

- A. Section 01 10 00 SUMMARY

 B. Section 01 31 00 PROJECT MANAGEMENT AND COORDINATION
- C. Section 01 33 00 SUBMITTAL PROCEDURES
 D. Section 01 74 19 CONSTRUCTION WASTE MANAGEMENTS
- D. Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT & DISPOSAL
 E. Section 01 77 00 CLOSEOUT PROCEDURES
- F. Section 01 78 39 CONTRACT RECORD DOCUMENTS



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1.4 DEFINITIONS:

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.
- B. Design Consultant: "Design Consultant" shall mean the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the "Design Consultant" may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.

1.5 QUALITY ASSURANCE:

A. Land Surveyor Qualifications: A professional land surveyor who is licensed in the State of New York and who is experienced in providing land-surveying services of the kind indicated.

PART II - PRODUCTS (Not Used)

PART III - EXECUTION

3.1 DELIVERY OF MATERIALS:

- A. Material Orders: 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. Deliveries: The Contractor shall coordinate deliveries in order to avoid delaying or impeding the progress of the work.
- E. Handling: The Contractor shall provide equipment and personnel to handle products by methods to prevent soiling or damage.
 - Promptly inspect shipments to assure products comply with requirements, quantities are correct, and products are undamaged.
 - 2. Promptly return damaged shipments or incorrect orders to manufacturer.
 - 3. For materials or equipment to be reused or salvaged, use special care in removal, storage and reinstallation to insure proper function in completed work.
- F. Storage: Store products in accordance with provisions of Article 3.1, and periodically inspect to assure that stored products are undamaged and are maintained under required conditions.
- G. 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.
- H. 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.



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No Interference: If it becomes necessary to remove and restack materials to avoid impeding the progress
of any part of the work or interfering with the work to be done by any trade subcontractor, the Contractor
shall remove and restack such materials at no additional cost to the City.

3.2 CONTRACTOR'S CONSTRUCTION SUPERINTENDENT:

- A. Contractor's Construction Superintendent: The Contractor 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 Construction Superintendent. The Contractor's Construction Superintendent shall be registered with the New York City Department of Buildings in compliance with the Construction Superintendent Rule of the City of New York and shall be competent and capable of maintaining proper supervision and care of the work and shall be acceptable to the Commissioner. The Construction Superintendent shall, in the absence of the Contractor, and irrespective of any superintendent or foreman employed by any subcontractor, shall see that the instructions of the
- B. Replacement: The Contractor's Construction Superintendent on the job shall not be changed or removed without the consent of the Commissioner.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.3

3.3 SURVEYS:

- A. Line and Grade: The City will establish a baseline and bench mark near the site of the work for use 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: The 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 Markers: 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 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.
 - 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 shall establish the permanent lines of exterior walls. The 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 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.



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- 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 land Surveyor licensed in the State of New York 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 shall submit to DDC 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.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUBSECTION 3.4

3.4 BORINGS:

- A. The work of this article shall be the responsibility of the Contractor unless otherwise indicated.
- B. Reference Drawings: The Boring Drawings as listed on the title sheet are for information to the bidder and are to be used under the conditions as follows:
 - 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.
 - 2. Soils and Rock Samples: All inferences are drawn from the indications observed as made by engineering and scientific personnel. All such inferences and all records of the work including soil samples and rock cores, if any, are available to bidders for inspection.
 - 3. Certification of Samples: The City certifies that the work was carried out as stated, and that the soil samples and rock cores, 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.
 - 4. Bidder's Responsibility: The bidder, however, is responsible for any conclusions to be drawn from the work. If the bidder accepts those of the City, it must do so at its own risk. If the bidder prefers not to assume such risk, the bidder is under the obligation of employing its own experts to analyze the available information, and must be responsible for any consequences of acting on their conclusions.
 - 5. Continuity Not Guarantee: The City does not guarantee continuity of conditions shown at actual boring locations over the entire site. Where possible, borings are located to avoid all obstructions and previous construction which can be found by inspection of the surface and the bidder is required to estimate the influence of such features from its own inspection of the site.



3.5 EXAMINATION:

- A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
 - 1. Before construction, verify the location and points of connection of utility services.
- B. Existing Utilities: The existence and location of underground utilities and other construction indicated as existing are not guaranteed. Before beginning site work, investigate and verify the existence and location of underground utilities and other construction affecting the Work.
 - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
 - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- C. Acceptance of Conditions: Examine substrates, areas, and conditions, with the subcontractor responsible for installation or application present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 - 1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - 2. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 3. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - 4. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.6 ENVIRONMENTAL ASSESSMENTS:

- A. City Responsibilities: An Environmental Assessment and survey is performed by the NYC DDC and its findings are included in the Contract Documents. In accordance with the NYC Administrative Code Title 15 Chapter 1 an asbestos survey is required to be performed by an Asbestos Investigator certified by the NYC Department of Environmental Protection (DEP) to identify the presence of asbestos containing material (ACM) prior to any alteration, renovation or demolition activity. The findings of such survey are required for the submission of approvals and permits issued by the NYC Department of Buildings (DOB). When the findings indicate that asbestos containing material is present and will be disturbed during the alteration, renovation or demolition activity then abatement design specifications will be incorporated into the contract documents. The Contractor shall comply with all federal, state and local asbestos regulations affecting the work for this Contract.
- B. Contractor Responsibility: The Contractor shall comply with all federal, state and local environmental regulations, including without limitation USEPA and OSHA regulations which require the Contractor to assess if lead based paint will be disturbed during the work in order to protect his/her workers and the building occupants from migration of lead dust into the air. The Contractor shall comply with all federal, state and local environmental waste disposal regulation which may be required during the work. The Contractor is required to hire licensed abatement and disposal companies for the requisite work.

3.7 PREPARATION:

- A. Field Measurements: The Contractor shall verify all dimensions and conditions on the job so that all work will properly join the existing work.
- B. The Contractor, before commencing work, shall examine all adjoining work on which its work is in any way dependent on good workmanship in accordance to the intent of the Specifications and the Contract



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Drawings. The Contractor shall report to the Commissioner any condition that will prevent it from performing work that conforms to the required standard.

- Existing Utility Information: Furnish information to the Commissioner that is necessary to adjust, move, or C. relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on D. Drawings.

DEFERRED CONSTRUCTION: 3.8

- Where necessity for deferred construction is certified by the Commissioner, in order to permit the A. installation of any item or items of equipment required to be furnished and installed 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.
- The Contractor shall confer with the affected trade subcontractors and ascertain arrangements, time and B. facilities necessary to be made by the Contractor in order to execute the provisions specified herein.

INSTALLATION: 3.9

- General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as A. indicated.
 - Make vertical work plumb and make horizontal work level.
 - Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
- Comply with manufacturer's written instructions and recommendations for installing products in B. applications indicated.
- Install products at the time and under conditions that will ensure the best possible results. Maintain C. conditions required for product performance until Substantial Completion.
- Conduct construction operations so no part of the Work is subjected to damaging operations or loading in D. excess of that expected during normal conditions of occupancy.
- Tools and Equipment: Do not use tools or equipment that produce harmful noise levels. E.
- Templates: Obtain and distribute to the parties involved templates for work specified to be factory F. prepared and field installed. Check Shop Drawings of other work and work of trade subcontractors to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely G. in place, accurately located and aligned with other portions of the Work.
 - Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by the Design Consultant.
 - Allow for building movement, including thermal expansion and contraction. 2.
 - Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for 3. 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.



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- H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.10 PERMITS:

A. 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

3.11 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.

REFER TO THE ADDENDUMINOR THE APPLICABILITY OF SUB-SECTIONS, P

3.12 SLEEVES AND HANGERS:

- A. Coordinate with Progress Schedule: The Contractor shall promptly furnish and install conduits, outlets, piping sleeves, boxes, inserts and all other materials and equipment that is to be built into the work in conformity with the requirements of the project.
- B. Cooperation of Subcontractors: All subcontractors 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 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 shall fill around them with materials as required by the Contractor.
- D. Inserts: The Contractor is to install strip inserts four (4) foot on center and perpendicular to beams in ceiling slabs of boiler, machine and mechanical equipment rooms. Inserts are to be installed for strippable concrete slabs only.



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REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.13

3.13 SLEEVE AND PENETRATION DRAWINGS:

As soon as practicable after the commencement of work and when the order in which concrete for the first slabs, walls, etc. to be poured is determined, the Contractor shall submit to the DDC a sketch indicating the location and size of all penetrations for sleeves, ducts, etc. which will be required to accommodate the mechanical trades, in order to determine if such penetrations will materially weaken the project's structure. The sketch shall be stamped and returned if approved and/or comments will be transmitted. The Contractor shall continue to submit sketches as the pouring schedule and the concrete work progresses and, until approvals for the penetration sketches have been given. The Contractor shall not predicate its layout work on unapproved sketches.

3.14 CUTTING AND PATCHING:

- A. Responsibility: The Contractor shall do all cutting, patching and restoration required by its work, unless otherwise particularly specified in the Specifications.
- B. Restore Work: The Contractor shall restore any work damaged during the performance of the work.
- 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. Structural Elements: Do not cut and patch structural elements without the prior approval, in writing, of the Resident Engineer.
- E. Operational Elements: Do not cut and patch operating elements and related components.
- F. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Commissioner's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- G. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.
- H. Removals: The Contractor must remove from the premises all demolished materials of every nature or description resulting from cutting, patching and restoration work, in accordance with the requirements hereinafter stipulated under Sub-Section 3.17 herein and as further required in Section 01 74 19, CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.15

3.15 LOCATION OF PARTITIONS:

A. Within three (3) weeks after the concrete slabs have been poured on each floor level, the Contractor shall immediately locate accurately all of the partitions, including the door openings, on the floor slabs in a manner approved by the Resident Engineer.



3.16 FURNITURE AND EQUIPMENT:

- A. Responsibility: The Contractor is responsible for moving all loose furniture and/or equipment in all areas where the location of such furniture and/or equipment interferes with the proper performance of its work.
- B. Protection: All such furniture and/or equipment must be adequately protected with dust cloths and returned to their original locations when directed to do so by the Resident Engineer.

3.17 REMOVAL OF RUBBISH AND SURPLUS MATERIALS:

- A. Of the waste that is generated during demolition, as many of the waste materials as economically feasible, and as stated here, shall be reused, salvaged, or recycled. Waste disposal in landfills shall be minimized. Comply with requirements of Section 01 74 19, CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.
- B. 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.
- C. Location: The Contractor shall clean Project site and work area daily and sweep up and deposit, at a location designated on each floor, all of its rubbish, debris and waste materials, as it accumulates and when directed by the Resident Engineer. Wood crating shall be broken up, neatly bundled, tied and stacked ready for removal and be deposited at a location designated on each floor.
 - Comply with requirements in NYC Fire Department for removal of combustible waste materials and debris.
 - 2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 degrees F (27 degrees C).
 - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- D. Laborers: The Contractor 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 crating 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.
- E. Surplus Materials: The Contractor shall remove from the site all surplus materials when there is no further use for same.
- F. Tools And Materials: At the conclusion of the work, all erection plant, tools, temporary structures and materials belonging to the Contractor shall be promptly removed.
- G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

3.18 CLEANING:

- A. The Contractor 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 up to date of Final Acceptance.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- D. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

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- Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure E. freedom from damage and deterioration up to date of Final Acceptance.
- During handling and installation, clean and protect construction in progress and adjoining materials F. already in place. Apply protective covering where required to ensure protection from damage or deterioration up to date of Final Acceptance.

3.19 SECURITY AND PROTECTION OF WORK SITE:

- Provide protection of installed work, including appropriate protective coverings and maintain conditions A. that ensure installed Work is without damage or deterioration up to date of Final Acceptance.
- Comply with manufacturer's written instructions for temperature and relative humidity. B.
- Secure and protect work and work site against damage, loss, injury, theft and/or vandalism. C.
- Maintain daily sign-in sheets of workers and visitors and make the sheets available to the Commissioner D.

3.20 MAINTENANCE OF SITE AND ADJOINING PROPERTY:

- The Contractor shall take over and maintain the Project site, after order to start work. A.
- The Contractor shall be responsible for the safety of the adjoining property, including sidewalks, paving, B. fences, sewers, water, gas, electric and other mains, pipes and conduits etc. until the date of Final Acceptance. The Contractor shall, at its own expense, except as otherwise specified, protect same and maintain them in at least as good a condition as that in which the Contractor finds them.
- All pavements, sidewalks, roads and approaches to fire hydrants shall be kept clear at all times, C. maintained and repaired to serviceable condition with materials to match existing.
- Provide and keep in good repair all bridging and decking necessary to maintain vehicular and pedestrian D.
- The Contractor shall also remove all snow and ice as it accumulates on the sidewalks within the Contract E. Limits Lines.

3.21 MAINTENANCE OF PROJECT SITE:

- The Contractor shall take over and maintain all project areas, after order to start work.
- Until the date of Final Acceptance, the Contractor shall be responsible for the safety of all project areas, B. 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.
- C. 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.
- The Contractor shall keep the space for the Resident Engineer in a clean condition.

3.22 SAFETY PRECAUTIONS FOR CONTROL CIRCUITS:

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.

3.23 OBSTRUCTIONS IN DRAINAGE LINES:

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.

END OF SECTION 01 73 00



SECTION 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART I - GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

- A. This section includes administrative and procedural requirements for the management and disposal of construction waste and includes the following requirements:
 - 1. Waste Management Goals
 - 2. Waste Management Plan
 - 3. Progress Reports
 - 4. Progress Meetings
 - 5. Management Plan Implementation
- B. This Section includes:
 - 1. Definitions
 - 2. Waste Management Performance Requirements
 - 3. Reference Resources
 - 4. Submittals
 - 5. Quality Assurance
 - 6. Waste Plan Implementation
 - 7. Additional Demolition and Salvage Requirements
 - 8. Disposal

1.3 RELATED SECTIONS: Include without limitation the following:

- A. Section 01 10 00 SUMMARY
- B. Section 01 31 00 PROJECT MANAGEMENT AND COORDINATION
- C. Section 01 32 00 CONSTRUCTION PROGRESS DOCUMENTATION
- D. Section 01 73 00 EXECUTION
- E. Section 01 77 00 CLOSEOUT PROCEDURES
- F. Section 01 78 39 CONSTRUCTION RECORD DOCUMENTS
- G. Section 01 81 13 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED BUILDINGS

1.4 DEFINITIONS:

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- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.
- B. Design Consultant: "Design Consultant" shall mean the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the "Design Consultant" may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.
- C. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk or the like.



- D. Construction and Demolition Waste: Solid wastes typically including building materials, trash debris and rubble resulting from remodeling, repair and demolition operations. Hazardous materials and land clearing waste are not included.
- E. Diversion from Landfill: To remove, or have removed, from the site for recycling, reuse or salvage, material that might otherwise be sent to a landfill.
- F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product.
- G. Recycle (recycling): To sort, separate, process, treat or reconstitute solid waste and other discarded materials for the purpose of redirecting such materials into the manufacture of useful products. Recycling does not include burning, incinerating or thermally destroying waste.
- H. Return: To give back reusable items or unused products to vendors.
- 1. Reuse: To reuse excess or discarded construction material in some manner on the Project site.
- J. Salvage: To remove a waste material from the Project site for resale or reuse.
- K. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable and reusable material.
- L. Waste Management Plan: A project-related plan for the collection, transportation and disposal of waste generated at the construction site. The purpose of the plan is to ultimately reduce the amount of material becoming landfill.

1.5 WASTE MANAGEMENT PERFORMANCE 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 waste that is generated during demolition, as many of the waste materials as economically feasible, and as stated here, shall be reused, salvaged, or recycled. Waste disposal in landfills shall be minimized.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 1.5 C

- C. LEED CERTIFICATION: The City of New York will seek LEED (Leadership in Energy and Environmental Design) certification for this Project as indicated in the Addendum to the General Conditions from the U.S. Green Building Council. The documentation required here will be used for this purpose. LEED awards points for a variety of sustainable design measures on a project, one of which is the reuse and recycling of project waste.
- D. DIVERSION REQUIREMENTS. A minimum of 75% of total Project demolition waste (by weight) shall be diverted from landfill. The following waste categories are likely candidates to be included in the diversion plan as applicable for this project:
 - 1. Concrete
 - 2. Bricks
 - 3. Concrete masonry units (CMU)
 - Asphalt
 - 5. Metals (e.g. banding, stud trim, ceiling grid, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized, stainless steel, aluminum, copper, zinc, brass, bronze)

- 6. Clean dimensional wood
- 7. Carpet and pad
- 8. Drywall
- 9. Ceiling tiles
- 10. Cardboard, paper and packaging
- 11. Reuse items indicated on the Drawings and/or elsewhere in the Specification
- E. All fluorescent lamps, HID lamps and mercury-containing thermostats removed from the site shall be recycled.
- F. Recycling on the job, subject to the Commissioner's approval, is encouraged on the site itself, such as the crushing and reuse of removed sound concrete and stone. Include these categories in the Waste Management Plan.

1.6 REFERENCES, RESOURCES:

- A. DDC encourages its contractors to seek information from websites and experts in salvage or recycling in order to minimize disposal costs. There are numerous opportunities to sell, salvage, or to donate materials and accrue tax benefits (which would accrue to the contractor); also there are outlets that will pick up, and in some cases buy recyclable materials. Examples of information resources are as follows:
 - 1. DDC's Sustainable Design web site:

 http://www.nyc.gov/html/ddc/html/design/sustainable home.shtml

 Construction and Demolition Waste Reduction and Recycling, a Sample Waste Management Plan and sample C&D Waste Management log. A standard Construction and Demolition Waste Management Log form is included at the end of this section.
 - 2. Web Resources

(Information only; no warranty or endorsement is implied.)

www.wastematch.org Site of New York Waste Match, a materials exchange database and service www.bignyc.org Site of Build It Green NYC, a non profit outlet for salvaged and surplus building materials

www.usgbc.org Site of the United States Green Building Council, with a description of the LEED certification process and requirements for C&D waste recycling

www.epa.gov/epawaste/index.htm Site of the U.S. Environmental Protection Agency that discusses construction and demolition waste issues, and links to other resources.

1.7 SUBMITTALS:

- A. The Contractor shall be responsible for the development and implementation of a Waste Management Plan for the Project. The Contractor's subcontractors shall assist in the development of that Plan, and collect and deposit their waste and recyclable materials in accordance with the approved Plan.
- B. DRAFT WASTE MANAGEMENT PLAN. Within fifteen (15) days after receipt of 'Notice to Proceed', or prior to any waste removal, whichever occurs sooner, the Contractor shall submit to the Commissioner a Draft Waste Management Plan. Include separate sections for demolition and construction waste. The Plan shall demonstrate how the performance goals will be met, and contain the following:



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- List of materials targeted for reuse, salvage, or recycling, and names, addresses, and phone 1. numbers of receiving facilities/companies that will be purchasing or accepting each material.
- Description of onsite and/or offsite sorting methods for all materials to be removed from site. 2.
- If mixed construction and demolition waste is to be sorted off-site, provide a letter from the 3. processor stating the average percentage of mixed construction and demolition waste they recycle.
- Landfill information: Names of landfills where non-recyclable/reusable/salvageable waste will be 4. disposed, and list of applicable tipping fees.
- Materials handling procedures: A description of the means by which any recyclable, salvaged, or 5. reused materials will be protected from contamination, and collected in a manner that will meet the requirements for acceptance by the designated recycling processors.
- Transportation: A description of the means of transportation and destination for recycled materials. 6.
- Meetings: Description of regular meetings to be held to address waste management. 7.
- Sample spreadsheet and description of how the implementation of the plan will be documented on 8. a monthly basis.
- FINAL WASTE MANAGEMENT PLAN. Within fifteen (15) days of Commissioner's approval of the Draft C. Plan, the Contractor shall submit a Final Waste Management Plan.
- PROGRESS REPORTS. The Contractor shall submit monthly a Waste Management Progress Report, D. containing the following information:
 - Project title, name of company completing report, and dates of period covered by the report 1.
 - Report on the disposal of all jobsite waste. A DDC C&D Waste Management Log form is available 2. on the DDC Sustainable Design website and included at the end of this section. For each shipment of material removed from the site, provide the following:
 - Date and ticket number of removal a.
 - Identity of material hauler b.
 - **Material Category** C.
 - Total quantity of waste, in tones/cubic yards, by type d.
 - Quantity of waste salvaged, recycled and/or reused, by type e.
 - Total quantity of waste diverted from landfill (recycled, salvaged, reused) as a percentage of f. total waste
 - Recipient of each material type g.
 - Provide monthly and cumulative project totals of waste, quantity diverted, and percentage diverted. 3.
 - Note that the unit of measure may be either tons or cubic yards, but must be consistent for all 4. shipments and all materials throughout the project. Reports with inconsistent or mixed units will not be reviewed and will be returned for re-submission.
 - Include legible copies of on-site logs, weight tickets and receipts. Receipts shall be from charitable 5. organizations, recycling and/or disposal site operators who can legally accept the materials for the purpose of reuse, recycling or disposal. Contractor shall save such original documents for the life of the project plus seven (7) years.
- LEED Submittal: For LEED designated projects submit LEED Letter Template for Credit 2.2, signed by E. the Contractor, tabulating total waste material, quantities diverted and means by which it is diverted, and statement that requirements for the credit have been met.
- Refrigerant Recovery. Submit Qualification data for Refrigerant recovery technician. Statement of F. refrigerant recovery, signed by the 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.

1.8 QUALITY ASSURANCE:

- A. The Contractor shall designate a Waste Management Coordinator, to ensure compliance with this section. Coordinator shall be present at Project site full time for the duration of the project.
- B. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.
- C. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
- Waste management plans, documentation and implementation shall be discussed at the following meetings:
 - 1. Pre-demolition kick-off meeting
 - 2. Pre-construction kick-off meeting
 - 3. Regular job-site meetings
 - 4. Contractor toolbox meetings

PART II - PRODUCTS (Not Used)

PART III - EXECUTION

3.1 WASTE PLAN IMPLEMENTATION:

- A. The Contractor shall implement the Waste Management Plan, coordinate the Plan with all affected trades, and designate one individual as the Construction Waste Management Representative, who will be responsible for communicating the progress of the Plan with the Commissioner on a regular basis, and for assembling the required LEED documentation.
- B. The Contractor shall be responsible for the provision of containers and the removal of all waste, non-returned surplus materials, and rubbish from the site in accordance with the approved Waste Management Plan. The Contractor shall oversee and document the results of the Plan. Monies received for salvaged materials shall remain with the Contractor, except the monies for those items specifically identified elsewhere in the specifications, or indicated on the drawings as belonging to others.
- C. Responsibilities of Subcontractors: Each subcontractor shall be responsible for collecting its waste, non-returned surplus materials, and rubbish, in accordance with the Waste Management Plan.
- D. Distribution. The Contractor shall distribute copies of the Waste Management Plan to each Subcontractor, Resident Engineer, Construction Manager, and Commissioner.
- E. Instruction: The Contractor shall provide on-site instruction of proper waste management procedures to be used by all parties in appropriate stages of the Project.
- F. Procedures. Conduct waste management operations to ensure minimum interference with site vegetation, roads, streets, walks and other adjacent occupied and used facilities.
 - Collect co-mingled waste and/or separate all recyclable waste in accordance with the Plan Specific areas on the Project site are to be designated, and appropriate containers and bins clearly marked with acceptable and unacceptable materials.
 - 2. Inspect containers and bins for contamination and remove contaminated materials if found.



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3. Comply with the General Conditions for controlling dust and dirt, environmental protection, and noise control.

3.2 ADDITIONAL DEMOLITION AND SALVAGE REQUIREMENTS:

A. Demolition and salvage of additional items indicated in other sections of the Project Specifications require special attention as part of the overall 75 % diversion from landfill. Specific requirements for special attention are designated in other sections of the Project Specifications.

3.3 DISPOSAL:

- A. General. Except for items or material to be salvaged, recycled or otherwise reused, remove waste material from the Project site and legally dispose of them in a manner acceptable to authorities having jurisdiction.
 - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of to accumulate on site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning. Do not burn waste materials
- C. Disposal. Transport waste materials off Project Site and legally dispose of them.

END OF SECTION 01 74 19



CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT TOG

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Notes:

Volume (cubic yards) may be used instead of weight if used for ALL amounts and ALL materials.

% Diverted to Date

- Includes concréte; bricks; concrete masonry units (CMU); asphalt; metals; clean dimensional wood; carpet and pad; drywall; ceiling tiles; cardboard, paper, and packaging; and any other reuse items indicated on the Drawings and/or elsewhere in the Specification.
 - Excluded material includes soil or land clearing debris. ယ<u>်</u> 4
- Diverted material includes recycled and reused material diverted from landfill. Recycled material is reprocessed into new products. Reused material is reclaimed, salvaged or otherwise used in its original form, either on-site or off-site.
 - These items must be listed in order to receive LEED credit.

:





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SECTION 01 77 00 CLOSEOUT PROCEDURES

PARTI- GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

- A. This Section includes administrative and general procedural requirements for Closeout Procedures, including without limitation the following:
 - 1. Definitions
 - 2. Substantial Completion
 - 3. Final Acceptance
 - 4. Warranties
 - 5. Final Cleaning
 - 6. Repair of the Work
- B. LEED: Refer to the Addendum to identify whether this project is designed to comply with a Certification Level according to the U.S. Green Building Council's Leadership in Energy & Environmental Design (LEED) Rating System, as specified in Section 01 81 13, "SUSTAINABLE DESIGN REQUIREMENTS."
- C. COMMISSIONING: Refer to the Addendum to identify whether this project will be commissioned by an independent third party under separate contract with the City of New York. Commissioning shall be in accordance with ASHRAE and USGBC LEED- NC procedures, as described in Section 01 91 13, GENERAL COMMISSIONING REQUIREMENTS. The Contractor shall cooperate with the commissioning agent and provide whatever assistance is required.

1.3 RELATED SECTIONS: include without limitation the following:

- A. Section 01 10 00 SUMMARY
- B. Section 01 33 00 SUBMITTAL PROCEDURES
- C. Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT & DISPOSAL
- D. Section 01 78 39 CONTRACT RECORD DOCUMENTS
- E. Section 01 79 00 DEMONSTRATION AND OWNER'S PRE-ACCEPTANCE ORIENTATION

1.4 DEFINITIONS:

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.
- B. Design Consultant: "Design Consultant" shall mean the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the "Design Consultant" may be a corporation, firm, partnership, joint venture, individual or



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combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.

- Substantial Completion: shall mean the written determination by the Commissioner that the Work C. required under the Contract is substantially, but not entirely, complete.
- Final Acceptance: shall mean final written acceptance of all the Work by the Commissioner, a copy of D. which shall be sent to the Contractor.

1.5 SUBSTANTIAL COMPLETION:

- A. Preliminary Procedures: Before requesting inspection to determine the date of Substantial Completion, the Contractor shall complete and supply all items required by the contract specifications, General Conditions, Addendum to the General Conditions, change orders or other directives from the Commissioner's representatives. The required items will include all contract requirements for substantial completion, including but not limited to items related to releases, regulatory approvals, warranties and guarantees, record documents, testing, demonstration and orientation, final clean up and repairs, and all specific checklist of items by the Resident Engineer. (See Attachment "A" at the end of this section for sample requirements for Substantial Completion).
- B. Prepare and submit a list to the Resident Engineer of incomplete items, the value of incomplete construction, and reasons the work is not complete.
- Inspection: The Contractor shall submit to the Resident Engineer a written request for inspection for Substantial Completion. Within ten (10) days of receipt of the request, the Resident Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. The Resident Engineer may request the services, as required, of the Design Consultant, Client Agency Representative and/or other entities having involvement with the Work to assist in the inspection of the Work .If the Resident Engineer makes a determination that the work is substantially complete and approves the Final Punch List and the date for Final Acceptance, he/she will so advise the Commissioner and recommend issuance of the Certificate of Substantial Completion. If the Resident Engineer determines that the work is not substantially complete, he/she will notify the Contractor of those items that must be completed or corrected before the Certificate of Substantial Completion will be issued.
 - Re-inspection: Contractor shall request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.
 - Results of completed inspection will form the basis of requirements for Final Acceptance. 2

FINAL ACCEPTANCE: 1.6

- Preliminary Procedures: Before requesting final inspection for Final Acceptance of the Work, the Α. Contractor shall complete the following. (Note that the following are to be completed, submitted as appropriate, and approved by the Commissioner, as applicable, prior to the final inspection and are not to be submitted for approval or otherwise at the final inspection unless specifically indicated). List exceptions in the request.
 - Verify that all required submittals have been provided to the Commissioner including but not limited to the following:
 - Manufacturer's cleaning instructions a.
 - Posted instructions b.
 - As-built Record Documents (Drawings, specifications, and product data) as described in C. Section 01 78 39, CONTRACT RECORD DOCUMENTS, incorporating any changes required by the Commissioner as a result of the review of the submission prior to the pre-final inspection.
 - Operation and Maintenance Manuals, including Preventive Maintenance, Special Tools, d. Repair Requirements, Parts List, Spare Parts List, and Operating Instructions.

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Completion of required Demonstration and Orientation, as applicable, of designated personnel in operation and maintenance of systems, sub-systems and equipment.

Applicable LEED Building submittals as described in Section 01 81 13, SUSTAINABLE f. DESIGN REQUIREMENTS FOR LEED BUILDINGS.

- Construction progress photographs as described in Section 01 32 33, PHOTOGRAPHIC g. DOCUMENTATION.
- Submit a certified copy of the final approved Punch List of items to be completed or corrected. The 2. certified copy of the Punch List shall state that each item has been completed or otherwise resolved for acceptance, and shall be endorsed and dated by the Contractor.

Submit pest-control final inspection report and survey as required in Section 01 50 00, 3.

TEMPORARY FACILITIES AND CONTROLS.

4. Submit record documents and similar final record information.

Deliver tools, spare parts, extra stock and similar items. 5.

Complete final clean-up requirements including touch-up painting of marred surfaces. 6.

- Submit final meter readings for utilities, as applicable, a measured record of stored fuel, and similar data as of the date when the City took possession of and assumed responsibility for corresponding elements of the work.
- Final Inspection: The Contractor shall submit to the Resident Engineer a written request for inspection for B. Final Acceptance of the Work. Within ten (10) days of receipt of the request, the Resident Engineer will either proceed with inspection or notify the Contractor of unfulfilled requirements. The Resident Engineer may request the services, as required, of the Design Consultant, Client Agency Representative and/or other entities having involvement with the Work to assist in the inspection of the Work. If the Resident Engineer finds that all items on the Final Approved Punch List are complete and no further work remains to be done, he/she will so advise the Commissioner and recommend the issuance of the determination of Final Acceptance. If the Resident Engineer determines that the work is not complete, he/she will notify the Contractor of those items that must be completed or corrected before the determination of Final Acceptance will be issued.
- Final Acceptance: The Work will be accepted as final and complete as of the date of the Resident C. Engineer's inspection if, upon such inspection, the Resident Engineer finds that all items on the Punch List are complete and no further Work remains to be done. The Commissioner will then issue a written determination of Final Acceptance.

WARRANTIES: 1.7

- The items of materials and/or equipment for which manufacturer warranties are required are listed in A. Schedule B of the Addendum. For each item of material and/or equipment listed in Schedule B, 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 in Schedule B and will be replaced or repaired within such specified period. The contractor shall deliver all required warranties to the Commissioner.
- Unless indicated otherwise Warranties are to take effect on the date of Substantial Completion. В.
- Submittal Time: Submit written Warranties on request of the Commissioner for designated portions of the C. Work where commencement of Warranties other than date of Substantial Completion is indicated.
- Partial Occupancy: Submit properly executed Warranties to the Commissioner within 15 days of D. completion of designated portions of the Work that are completed and occupied or used by the City.
- Organize the Warranty documents into an orderly sequence based on the Project Specification Divisions E. and Section Numbers.



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- 1. Bind Warranties in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
- 2. Identify each binder on the front and spine with the typed or printed title "WARRANTIES;" name and location of Project; Capitol Budget Project Number (FMS ID); and Contractor's and applicable subcontractor's name and address.
- 3. Provide heavy paper dividers with plastic-covered tabs for each separate Warranty. Mark tab to identify the product or installation.
- 4. Provide a typed description of each product or installation being warranted, including the name of the product, and the name, address, and telephone number of the Installer.
- F. When warranted materials and/or equipment require operation and maintenance manuals, provide additional copies of each required Warranty in each required manual. Refer to Section 01 78 39, CONTRACT RECORD DOCUMENTS, for requirements of Operation and Maintenance Manuals.

PART II - PRODUCTS

2.1 MATERIALS:

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART III - EXECUTION

3.1 FINAL CLEANING:

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 - 1. Complete the following cleaning operations, as applicable, before requesting inspection for Final Acceptance of the Work for entire Project or for a portion of Project:
 - Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Remove snow and ice to provide safe access to building.
 - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - h. Sweep concrete floors broom clean in unoccupied spaces.
 - Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.

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j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.

k. Remove labels that are not permanent.

- I. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
- m. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.

n. Replace parts subject to unusual operating conditions.

- o. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
- Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.

q. Clean ducts, blowers, and coils if units were operated without filters during construction.

r. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

s. Leave Project clean and ready for occupancy.

- t. Construction Waste Disposal: Comply with waste disposal requirements in Section 01 74.19, CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.
- C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests, as required in Section 01 50 00, TEMPORARY FACILITIES, SERVICES AND CONTROLS. Prepare and submit a Pest Control report to the Commissioner.
- D. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on City's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

3.2 REPAIR OF THE WORK:

- A. Subject to the terms of the Contract the Contractor shall complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Contractor shall repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.

- Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.
 - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.



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3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.

4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 01 77 00



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SECTION 01 77 00

ATTACHMENT 'A'

The following list is a general sample of Substantial Completion requirements, including but not limited to:

1. Prepare and submit a list to the Resident Engineer, of incomplete items, the value of incomplete construction, and reasons the work is not complete.

 Obtain and submit any necessary releases enabling the City unrestricted use of the project and access to services and utilities.

3. Regulatory Approvals: Submit all required documentation from applicable Governing Authorities, including, but not limited to, Department of Buildings (DoB); Department of Transportation (DoT); Department of Environmental Protection (DEP); Fire Department (FDNY); etc. Documentation to include, but not limited to, the following:

a. Building Permits, Applications and Sign-offs.

b. Permits and Sign-off for construction fences; sidewalk bridges; scaffolds, cranes and derricks; utilities; etc.

c. Certificates of Inspections and Sign-offs.

d. Required Certificates and Use Permits.

e. Certificate of Occupancy (C.O.), Temporary Certificate of Occupancy (T.C.O.) or Letter of Completion as applicable.

4. Submit specific warranties required by the specifications, final certifications, and similar documents.

- Prepare and submit Record Documents as described in Section 01 78 39, CONTRACT RECORD DOCUMENTS, including but not limited to; approved documentation from Governing Authorities; as-built record drawings and specifications; product data; operation and maintenance manuals; Final Completion construction photographs; damage or settlement surveys; final property surveys; and similar final record information. The Resident Engineer will review the submission and provide appropriate comments. If comments are significant the initial submission will be returned to the Contractor for correction and re-submission incorporating the comments prior to the Final Inspection.
- Record Waste Management Progress Report: Submit C&D Waste Management logs, with legible copies of weight tickets and receipts required in accordance with Section 01 74 19, CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.
- 7. If applicable submit LEED Letter Template in accordance with the requirements of Section 01 81 13, SUSTAINABLE DESIGN REQUIREMENTS FOR LEED BUILDINGS.
- 8. Schedule applicable Demonstration and Orientation required in other Sections of the Project Specifications and as described in Section 01 79 00, DEMONSTRATION AND OWNER'S PRE-ACCEPTANCE ORIENTATION.
- Deliver tools, spare parts, extra materials, and similar items to location designated by Resident Engineer. Label with manufacturer's name and model number where applicable.
- Make final changeover of permanent locks and deliver keys to the Resident Engineer. Advise Commissioner of changeover in security provisions.
- 11. Complete startup testing of systems as applicable.

12. Submit approved test/adjust/balance records.

- 13. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements as directed by the Resident Engineer.
- If applicable complete Commissioning requirements as defined in Section 01 91 13, GENERAL COMMISSIONING REQUIREMENTS.

15. Complete final cleaning requirements, including touchup painting.

16. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.



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No Text



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SECTION 01 78 39 CONTRACT RECORD DOCUMENTS

PARTI- GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

- A. This Section includes administrative and general procedural requirements for Contract Record Documents, including:
 - As-built Contract Record Drawings.
 - As-built marked-up copies of Record Specifications, addenda and Change Orders.
 - 3. As-built marked-up Product Data
 - 4. Record Samples
 - 5. Construction Record Photographs
 - 6. Operating and Maintenance Manuals
 - 7. Final Site Survey
 - 8. Guarantees and Warranties
 - 9. Waste Disposal Documentation
 - 10. LEED Materials and Matrix
 - 11. Miscellaneous Record Submittals
- B. The Department of Design and Construction, at the start of construction (kick-off meeting), will furnish to the Contractor at no cost a complete set of Contract Drawings Mylars (reproducible) pertaining to the work to be performed under the Contract. It is the responsibility of the Contractor to modify the Contract Drawings to indicate all changes and corrections, if any, occurring in the work as actually installed. The Contractor is required to furnish all other Mylar (reproducible) drawings, if necessary, such as Addenda Drawings and Supplementary Drawings as may be necessary to indicate all work in detail as actually completed. All professional seals must be blocked out. Title box complete with project title and Design Consultants' names will remain.
- C. Maintenance of Documents and Samples: The Contractor shall maintain, during the progress of the work, an accurate record of the work as actually installed, on Contract Record Drawings, on Mylar (reproducible), in ink. Store record documents and samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition. Make documents and samples available at all times for the Resident Engineer's inspections.

The Contractor's attention is particularly directed to the necessity of keeping accurate records of all subsurface and concealed work, so that the Contract Record Drawings contain this information in exact detail and location. Contract Record Drawings shall also show all connections, valves, gates, switches, cut-outs and similar operating equipment.

For projects designated to achieve a LEED rating the Contractor shall receive a copy of the project's LEED scorecard for the purpose of monitoring compliance with the target objectives and to facilitate coordination with the LEED Consultant. The Contractor shall receive periodic updates of this scorecard,



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and is required to submit the final version of the Scorecard at Substantial Completion with other project Record Documents.

1.3 RELATED SECTIONS: include without limitation the following:

A. B. C. D.	Section 01 10 00 Section 01 32 00 Section 01 32 33 Section 01 33 00 Section 01 77 00	SUMMARY CONSTRUCTION PROGRESS DOCUMENTATION PHOTOGRAPHIC DOCUMENTATION SUBMITTAL PROCEDURES PROJECT CLOSEOUT PROCEDURES
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1.4 DEFINITIONS:

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.
- B. Design Consultant: "Design Consultant" shall mean the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the "Design Consultant" may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.

1.5 SUBMITTALS:

- A. As-Built Contract Record Drawings: Comply with the following:
 - Progress Submission: As directed by the Resident Engineer, submit progress As-Built Contract Record Drawings at the 50% Construction Completion stage.
 - 2. Final Submission: Before substantial completion payment, the Contractor shall furnish to the Commissioner one (I) complete set of marked-up Mylar (reproducible) As-Built Contract 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 the sponsoring agency by DDC.
 - 3. As-Built Contract 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 for binding.
 - 4. Each As-Built Contract Record Drawing shall bear the legend "AS-BUILT CONTRACT RECORD DRAWING" in heavy block lettering, one half (I/2) inch high, and contain the following data:

AS-BUILT CONTRACT REC Contractor's Name Contractor's Address Subcontractor's Name (whe Subcontractor's Address			
Made by:	Date		
Checked by:	Date		
Commissioner's Representa (Resident Engineer) (Plumbing Inspector) (Heating & Ventilating Inspector) (Electrical Inspector)		DDC DDC DDC DDC	

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- Record Drawing Title Sheet: The Contractor shall prepare a title sheet, the same size as the Contract Record Drawings, which shall contain the following:
 - a. Heading:

The City of New York
Department of Design and Construction

Division of Public Buildings

- b. Capital Budget Project Number (FMS ID)
- c. Name and Location of Project
- d. Contractor's Name and Address
- e. Subcontractor's Name and Address (where applicable)
- f.. Record of changes (a caption description of work affected, and the date and number of Change Order or other authorization)
- g.. List of Record Drawings
- B. Record Specifications, Addenda and Change Order: Submit to the Commissioner two (2) copies each of marked-up Record Specifications, Addenda and Change Orders.
- C. Record Product Data: Submit to the Commissioner two (2) sets of Record Product Data.
- D. Record Construction Photographs: Submit to the Commissioner final as-built construction photographs and negatives of the completed work as described in Section 01 32 33, PHOTOGRAPHIC DOCUMENTATION.
- E. Operating and Maintenance Manuals:
 - 1. Submit three (3) copies each of preliminary manuals to the Resident Engineer for review and approval. The Contractor shall make such corrections, changes and/or additions to the manual until deemed satisfactory by the Resident Engineer. Deliver three (3) copies of the final approved manuals to the Resident Engineer for distribution.
 - 2. Commissioning: Comply with the requirements of Section 01 91 13, GENERAL COMMISSIONING REQUIREMENTS, as well as the requirements set forth in sections of the Project Specifications, for projects designated for Commissioning. Submit four (4) copies each of data designated to be included in the Commissioning Operation and Maintenance Manual to the Resident Engineer. The Resident Engineer will forward such data to the Commissioning Authority/Agent (CxA) for review and comment. The Contractor shall make such corrections, changes and/or additions to the data until deemed satisfactory and deliver four (4) copies of the final data to the Resident Engineer for use by the Commissioning Authority/Agent (CxA) to prepare the Commissioning Operation and Maintenance Manual.
 - a. Non-Commissioning Data: All remaining data not designated for Commissioning and required as part of Maintenance and Operation Manual shall be prepared and assembled in accordance with the requirements of this section for Operating and Maintenance Manuals.
- F. Final Site Survey: Submit Final Site Survey as described in Section 01 73 00, EXECUTION, in quantities requested by the Commissioner, signed and sealed by a Land Surveyor licensed in the State of New York.
- G. Guarantees and Warranties.
- H. Waste Disposal Documents and Miscellaneous Record Documents.



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PART II - PRODUCTS

2.1 CONTRACT RECORD DRAWINGS:

- A. Record Prints: The Contractor shall maintain one set of blue- or black-line white prints as applicable of the Contract Drawings and Shop Drawings. If applicable, the Record Contract Drawings and Shop Drawings shall incorporate the arrangement of the work based on the accepted Master Coordination Drawing(s) as described in Section 01 33 00, SUBMITTAL PROCEDURES.
 - 1. Preparation: The Contractor shall mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an understandable drawing technique.
 - Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
 - Change Orders: 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.
- B. Content: Types of items requiring marking include, but are not limited to, the following:
 - Dimensional changes to Drawings.
 - 2. Revisions to details shown on Drawings.
 - 3. Depths of foundations below first floor.
 - 4. Locations and depths of underground utilities.
 - 5. Revisions to routing of piping and conduits.
 - 6. Revisions to electrical circuitry.
 - 7. Actual equipment locations.
 - 8. Duct size and routing.
 - 9. Locations of concealed internal utilities.
 - 10. Changes made by Change Order
 - 11. Changes made following Commissioner's written orders.
 - 12. Details not on the original Contract Drawings.
 - 13. Field records for variable and concealed conditions.
 - 14. Record information on the Work that is shown only schematically.
- C. Progress Record Mylar's (reproducible): As directed by the Resident Engineer at 50% construction completion, review marked-up Record Prints with the Resident Engineer and the Design Consulting. When directed by the Resident Engineer transfer progress mark-ups to a full set of Mylar's (reproducible) and submit one blue line or black line record copy to the Resident Engineer. The marked-up Mylar's (reproducible) shall be retained by the contractor for completion of mark-up and final submission.
- D. Final Contract Record Mylar's (reproducible): Immediately before final inspection for Certificate of Substantial Completion, review marked-up Record Prints with the Resident Engineer and the Design Consulting. When authorized, complete mark-up of a full set of corrected Mylar's (reproducible) of the Contract Drawings.
 - Incorporate changes and additional information previously marked on Record Prints. Erase, redraw, and add details and notations where applicable.
 - 2. Refer instances of uncertainty to Resident Engineer for resolution.
 - 3. Print the As-Built Contract Drawings and Shop Drawings for use as Record Transparencies as described in Sub-Section 1.5.

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RECORD SPECIFICATIONS, ADDENDA AND CHANGE ORDERS: 2.2

- Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
 - Give particular attention to information on concealed products and installations that cannot be 1. readily identified and recorded later.

Mark copy with the proprietary name and model number of products, materials, and equipment 2. furnished, including substitutions and product options selected.

Record the name of manufacturer, supplier, Installer, and other information necessary to provide a 3. record of selections made

For each principal product, indicate whether Record Product Data has been submitted in operation 4. and maintenance manuals instead of submitted as Record Product Data. 5.

Note related Change Orders and Record Drawings where applicable.

Upon completion of mark-up, submit two (2) complete copies of the marked-up Record 6. Specifications to the Commissioner.

RECORD PRODUCT DATA: 2.3

- Preparation: Mark Product Data to indicate the actual product installation where installation varies A. substantially from that indicated in Product Data submittal.
 - Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - Include significant changes in the product delivered to Project site and changes in manufacturer's 2. written instructions for installation.
 - If possible, a Change Order proposal should include resubmitting updated Product Data. This 3. eliminates the need to mark up the previous submittal. 4.

Note related Change Orders and Record Drawings where applicable.

- Upon completion of mark-up submit to the Commissioner two (2) sets of the marked-up Record 5. Product Data.
- Where Record Product Data is required as part of Maintenance Manuals, submit marked-up 6. Product Data as an insert in the manual instead of submittal as record Product Data.

RECORD SAMPLE SUBMITTAL: 2.4

- Prior to the date of Substantial Completion, the Contractor shall meet with the Resident Engineer at the A. site to determine which of the Samples maintained during the construction period shall be transmitted to the Commissioner for record purposes.
- Comply with the Resident Engineer's instructions for packaging, identification marking and delivery to B. DDC. Dispose of other samples as specified for disposal of surplus and waste material.

OPERATING AND MAINTENANCE MANUALS: 2.5

- The Contractor shall provide preliminary and final versions of Operating and Maintenance Manuals required for those systems, equipment and materials listed in other Sections of the Project Specifications.
- Format: Prepare and assemble Operation and Maintenance Manuals in heavy-duty, 3-ring, hardback B. loose leaf binders in the form of an instructional manual. All binders for each discipline shall be the same color. When multiple binders are used, correlate data into related consistent groupings. Binder front shall containing permanently attached labels displaying the following:



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- Heading:
 The City of New York
 Department of Design and Construction
 Division of Public Buildings
- 2. Capital Budget Project Number (FMS ID)
- 3. Name and Location of Project
- 4. Contractor's name and Address
- 5. Subcontractor's Name and Address (where applicable)
- Dates of the work covered by the contents of the Project Manual.
- 7. Binder spine shall display Project Number (FMS ID) and date of completion.
- C. Organization: Include a section in the directory for each of the following:
 - 1. List of documents
 - 2. List of systems
 - 3. List of equipment
 - Table of contents

SEE

- D. Arrange content by systems under Specification Section numbers and sequence of Table of Contents of the Project manual. Provide tabbed flyleaf for each separate product, equipment and/or system/subsystem with typed description of product and major component parts of equipment.
- E. Safety warnings or cautions shall be visibly highlighted within each maintenance procedure. Use of such highlights shall be limited to only critical items and shall not be used in an excessive manner which would reduce their effectiveness.
- F. For each product or system, list names, addresses and telephone numbers of Subcontractors and Suppliers, including local source of supplies and replacement parts. Vendors and Supplier listings are to include names, addresses and telephone numbers, including nearest field service telephone numbers.
- G. Where contents of the manual include any manufacturer's catalog pages, clearly indicate the precise items and options included in the installation and delete all manufacturers' data regarding products not included in the installation.
- H. All material within manuals shall be new. Copies used for prior submittals or used in construction shall not be used.
- Submit preliminary and final manual editions to the Commissioner according to the approved progress schedule.
- J. Manuals shall present all technical material to the greatest extent possible, with respect to text, tabular matter and illustrations. Illustrations shall preferably consist of line drawings. All applicable drawings shall be included. If available, color photograph prints may be included.
- K. Preliminary manual editions shall be as technically complete as the final manual edition. All illustrations shall be in final forms.
- L. Final manual editions shall be technically accurate and complete and shall represent all "as-built" systems, pieces of equipment, or materials, which have been accepted by the Commissioner. All illustrations, text and tabular material shall be in final form. All shop drawings shall be included as specified in individual Specification Sections.
- M. Building products, applied materials, and finishes: Include product data, with catalog number, size, composition, and color texture designations. Where applicable, provide information for re-ordering custom manufactured products.
- N. Instructions for care and maintenance: Include manufacturers' recommendations for cleaning agents and methods, and recommended schedule for cleaning and maintenance.

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- O. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical compositions, and details of installation. Provide recommendations for inspections, maintenance, and repair.
- P. Additional Requirements: Specified in individual Specification Sections.

2.6 DEMONSTRATION AND ORIENTATION DVD:

A. Non-Commissioned Projects: The Contractor shall submit final version of applicable Demonstration and Training DVD recordings in compliance with Section 01 79 00, DEMONSTRATION AND OWNER'S PRE-ACCEPTANCE ORIENTATION.

2.7 GUARANTEES AND WARRANTIES:

- A. SCHEDULE B Requirements for guarantees and warranties for the Project are set forth in Schedule B, which is included as part of the Addendum.
- B. FORM For all guarantee requirements set forth in Schedule B, the Contractor shall provide a written guaranty, in the form set forth herein.
- C. Submit fully executed and signed manufacturers' Warranties as listed in the Project Specifications and outlined in Schedule B of the Addendum. Refer to Section 01 77 00, CLOSEOUT PROCEDURES for submittal requirements.



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GUARANTY

DDC PROJECT #		
PROJECT DESCRIPTION		:
CONTRACT#		
SPECIFICATION SECTION # AND TITLE		
GUARANTY TO BE IN EFFECT FROM		
то		
necessary by the City, any or all defective m within the guaranty period and any finished satisfaction of the City and without any cost of	iaterial or workmand work to which or expense to the Country the cost of the c	estore, rebuild or replace whichever may be deemed nship of the aforementioned section, that may appear damage may occur because of such defects, to the city. The repairs or replacements should the City make the
	Contractor:	•
	Ву:	Signature of Partner or Corporate Officer
	Print Name:	
Subscribed and sworn to before me this day of, year		
Notary Public		



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2.8 WASTE DISPOSAL DOCUMENTATION:

A. Certify and deliver to the Commissioner all documentation including reports, receipts, certificates, records etc. for the collection, handling, storage, classification, testing, transportation, recycling and/or disposal of all Non-Hazardous Construction Waste as required by Section 01 74 19, CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL, and Hazardous Waste as required by other Project Specification Sections. Certify compliance with all applicable governing laws, codes, rules and regulations.

2.9 MISCELLANEOUS RECORD DOCUMENTS:

- A. Refer to other Project Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Prior to Final Acceptance, complete miscellaneous records and place in good order, properly identified and bound or otherwise organized to allow for use and reference.
- B. Submit three (3) copies of each document to the Commissioner or as otherwise directed by the Commissioner.

PART III - EXECUTION

3.1 RECORDING AND MAINTENANCE:

- A: Recording: Maintain one copy of each submittal during the construction period for Contract Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Contract Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to the Contract Record Documents for the Resident Engineer's reference during normal working hours.

END OF SECTION 01 79 39



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SECTION 01 79 00 DEMONSTRATION AND OWNER'S PRE-ACCEPTANCE ORIENTATION

REFER TO THE ADDENDUM FOR APPLICABILITY OF THIS SECTION OF 79 00

PARTI- GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

- A. This Section includes administrative and procedural requirements, when set forth in sections of the Project Specifications, for instructing facility's personnel, including the following:
 - 1. Demonstration of operation of systems, subsystems, and equipment.
 - 2. Owner's Pre-Acceptance Orientation in operation and maintenance of systems, subsystems, and equipment.
 - 3. Demonstration and Orientation videotapes. (Non-Commissioned Projects)
- B. The Contractor shall provide the services of equipment manufacturers orientation specialists experienced in the type of equipment to be demonstrated.
- C. Separate Orientation sessions shall be conducted for mechanical operations and maintenance personnel and for electronic and electrical maintenance personnel.
- D. Commissioning: Refer to the Addendum to identify whether this project is to be Commissioned. For Commissioned projects the Contractor shall provide Demonstration and Orientation as described in this section and cooperate with the Commissioning Authority/Agent (CxA) to implement Commissioning requirements as described in Section 01 91 13, GENERAL COMMISSIONING REQUIREMENTS.

1.3 RELATED SECTIONS: include without limitation the following:

- A. Section 01 10 00 SUMMARY
- B. Section 01 33 00 SUBMITTAL PROCEDURES
- C. Section 01 77 00 CLOSEOUT PROCEDURES
- D. Section 01 78 39 CONTRACT RECORD DOCUMENTS
- E. Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS
- F. Specific requirements for demonstration and training indicated in other sections of the Project Specifications

1.4 DEFINITIONS:

A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein

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B. Design Consultant: "Design Consultant" shall mean the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the "Design Consultant" may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.

1.5 SUBMITTALS:

- A. Instruction Program: Submit three (3) copies of outline of instructional program for demonstration and orientation, including a schedule of proposed dates, times, length of instruction time, and instructors' names for each orientation module to the Commissioner for approval no less than thirty (30) days prior to the date the proposed orientation is to take place. Include learning objectives and outline for each orientation module.
 - 1. At completion of training, submit three (3) complete training manual(s) and three (3) applicable DVD recording(s) to the Commissioner for the facility's and City's use.
- B. Qualification Data: For facilitator, instructor and Videographer.
- C. Attendance Record: For each orientation module, submit list of participants and length of instruction time.
- D. Evaluations: For each participant and for each orientation module, submit results and documentation of performance-based test.
- E. Submit all final orientation material to the Resident Engineer a minimum of fourteen (14) days prior to the scheduled training.
- F. Demonstration and Orientation Recordings:
 - 1. Non-Commissioned Projects:
 - a. The Contractor shall submit to the Commissioner three (3) copies of Demonstration and Orientation DVD (Digital Video Disk) recordings within seven (7) days of end of each training module.
 - b. Identification: On each copy, provide an applied label with the following information:
 - 1) Project Contract I.D. Number
 - 2) Project Contract Name
 - 3) Name of Contractor
 - 4) Name of Subcontractor as applicable
 - 5) Name of Design Consultant
 - 6) Name of Construction Manager as applicable
 - 7) Date recorded.
 - 8) Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
 - 9) Table of Contents including list of systems covered.
 - c. Transcript: Prepared on 8-1/2-by-11-inch paper, punched and bound in heavy-duty, 3-ring, vinyl-covered binders. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as the corresponding DVD recording. Include name of Project and date of recording on each page.
 - 2. Commissioned Projects:
 - Demonstration and Orientation DVD recordings for Commissioned projects will be recorded by the Commissioning Authority/Agent (CxA) under separate contract with the City of New



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York. The Contractor performing Demonstration and Orientation shall cooperate with the CxA in the recording of each Demonstration and Orientation module.

1.6 QUALITY ASSURANCE:

- A. Facilitator Qualifications: A firm or individual experienced in orientation or educating maintenance personnel in an orientation program similar in content and extent to that indicated for this Project.
- B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 01 40 00, QUALITY REQUIREMENTS, experienced in operation and maintenance procedures and orientation.
- Videographer Qualifications: A professional Videographer who has experience with orientation and construction projects.
- D. Pre-instruction Conference: Schedule with the Resident Engineer a conference at Project site to comply with requirements in Section 01 31 00, PROJECT MANAGEMENT AND COORDINATION. Review methods and procedures related to demonstration and orientation including, but not limited to, the following:
 - Inspect and discuss locations and other facilities required for instruction.
 - 2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
 - Review required content of instruction.
 - For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

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1.7 COORDINATION:

- A. Coordinate instruction schedule with the Resident Engineer and facility's operations. Adjust schedule as required to minimize disrupting facility's operations.
- Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of orientation modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by the Commissioner.

PART II - PRODUCTS

2.1 INSTRUCTION PROGRAM:

- A. Program Structure: Develop an instruction program that includes individual orientation modules for each system and equipment not part of a system, as specified and required by individual Specification Sections.
- B. Orientation Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following:
 - Basis of System Design, Operational Requirements, and Criteria: Include the following:
 - a. System, subsystem, and equipment descriptions.
 - b. Performance and design criteria if Contractor is delegated design responsibility.
 - c. Operating standards.

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- d. Regulatory requirements.
- e. Equipment function including auxiliary equipment and systems.
- f. Operating characteristics.
- g. Limiting conditions.
- h. Performance curves.
- Documentation: Review the following items in detail:
 - a. Emergency manuals.
 - b. Operations manuals.
 - c. Maintenance manuals.
 - d. Project Record Documents.
 - e. Identification systems.
 - f. Warranties
- 3. Emergencies: Include the following, as applicable:
 - Instructions on meaning of warnings, trouble indications, and error messages.
 - b. Instructions on stopping.
 - c. Shutdown instructions for each type of emergency.
 - d. Operating instructions for conditions outside of normal operating limits.
 - e. Sequences for electric or electronic systems.
 - f. Special operating instructions and procedures.
- 4. Operations: Include the following, as applicable:
 - Startup procedures.
 - b. Equipment or system break-in procedures.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Control sequences.
 - f. Safety procedures.
 - g. Instructions on stopping.
 - h. Normal shutdown instructions.
 - i. Operating procedures for emergencies.
 - j. Operating procedures for system, subsystem, or equipment failure.
 - k. Seasonal and weekend operating instructions.
 - I. Required sequences for electric or electronic systems.
 - m. Special operating instructions and procedures.
- 5. Adjustments: Include the following:
 - a. Alignments.
 - b. Checking adjustments.
 - c. Noise and vibration adjustments.
 - d. Economy and efficiency adjustments.
- 6. Troubleshooting: Include the following:
 - a. Diagnostic instructions.
 - b. Test and inspection procedures.
- 7. Maintenance: Include the following:
 - a. Inspection procedures.
 - b. Types of cleaning agents to be used and methods of cleaning.
 - c. List of cleaning agents and methods of cleaning detrimental to product.
 - d. Procedures for routine cleaning

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- Procedures for preventive maintenance. e.
- Procedures for routine maintenance. f.
- Instruction on use of special tools. g.
- Housekeeping practices h.
- Repairs: Include the following:
 - a. Diagnosis instructions.
 - b. Repair instructions.
 - Disassembly; component removal, repair, and replacement; and reassembly instructions. C.
 - d. Instructions for identifying parts and components.
 - Review of spare parts needed for operation and maintenance. e.

PART III - EXECUTION

3.1 **INSTRUCTION:**

- Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to A. coordinate instructors, and to coordinate between Contractor and the Resident Engineer for the number of participants, instruction times, and location.
- The Contractor shall engage qualified instructors to instruct facility's personnel to adjust, operate, B. and maintain systems, subsystems, and equipment not part of a system.
- Scheduling: Schedule instruction with the Resident Engineer at mutually agreed times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
 - Schedule orientation with the Resident Engineer with at least fourteen (14) days' advance 1.
- Evaluation: At conclusion of each orientation module, assess and document each participant's D. mastery of module(s) by use of an oral a written or a demonstration performance-based test.
- Cleanup: Collect and remove used and leftover educational materials from project site. Remove E. instructional equipment. Restore systems and equipment to condition existing before initial orientation

DEMONSTRATION AND ORIENTATION RECORDINGS: 3.2

- Non-Commissioned projects:
 - The Contractor shall engage a qualified commercial Videographer to record demonstration and orientation sessions. Record each orientation module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
 - At beginning of each orientation module, record each chart containing learning objective and 2. lesson outline
 - 3. All recordings must be close captioned.
 - 4. Recording Format: Provide high-quality DVD (Digital Video Disk) format.
 - Recording: Mount camera on tripod before starting recording, unless otherwise necessary to 5. show area of demonstration and orientation. Display continuous running time.
 - Narration: Describe scenes on the recording by audio narration by microphone while recording 6. or by dubbing audio narration off-site after. Include description of items being viewed. Describe vantage point, indicating location, direction (by compass point), and elevation or story of construction.



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- 7. Transcript: Provide a typewritten transcript of the narration. Display images and running time captured from opposite the corresponding narration segment.
- B. Commissioned Projects:

Refer to the Addendum to determine if the project is to be Commissioned.

1. The Commissioning Authority/Agent (CxA) under separate contract with the City of New York will assess and comment on the adequacy of the Orientation Instruction sessions by reviewing the Orientation and Instruction program and agenda provided by each contractor. The provider of the Orientation program will videotape the sessions and provide a copy to the CxA for final review and comments. If necessary, Contractor shall edit the DVD recording per CxA comments.

END OF SECTION 01 79 00



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SECTION 01 81 13 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED BUILDINGS

REFER NO THE ADDENDUM FOR APPLICABILITY OF THIS SECTION OF BUTE

PARTI - GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

A. LEED BUILDING - GENERAL REQUIREMENTS:

The City of New York is committed to implementing good environmental practices and procedures which include achieving a LEED™ Green Building rating. Specific project requirements related to this goal are listed in the applicable paragraphs of this section of the General Conditions. The Contractor shall ensure that these requirements as defined in the sections below and in related sections of the Contract Documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors; şhall not be allowed if such changes compromise the stated LEED BUILDING criteria.

B. This Section includes:

- 1. Definitions
- 2. LEED Provisions
- 3. LEED Building Submittals
- 4. LEED Building Submittal Requirements
- LEED Action Plan

1.3 RELATED SECTIONS: Include without limitation the following:

A. B.	Section 01 74 19 Section 01 81 13.13	CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL VOLATILE ORGANIC COMPOUND (VOC) LIMITS FOR ADHESIVES,
C. D.	Section 01 81 19 Section 01 91 13	SEALANTS, PAINTS AND COATINGS INDOOR AIR QUALITY REQUIREMENTS FOR LEED BUILDINGS GENERAL COMMISSIONING REQUIREMENTS

1.4 DEFINITIONS:

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.
- B. Agrifiber Products: Products derived from recovered agricultural waste fiber from sources such as cereal straw, sugarcane bagasse, sunflower husk, walnut shells, coconut husks, and agricultural prunings, processed and mixed with resins to produce panels with characteristics similar to composite wood.

Division

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NEW YORK CITY DEPARTMENT OF DESIGN + CONSTRUCTION

- C. Composite Wood: Products composed of wood or plant particles or fibers bonded by a synthetic resin or binder to produce panels such as plywood, particleboard, and medium density fiberboard (MDF). Does not include hardboard, structural panels, glued laminated timber, prefabricated wood I-joists, or fingerjointed lumber.
- D. Design Consultant: "Design Consultant" shall mean the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the "Design Consultant" may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.
- E. Forest Stewardship Council (FSC) Certified Wood: Wood-based materials and products certified in accordance with the Forest Stewardship Council's principles and criteria.
- F. LEED: The Leadership in Energy & Environmental Design rating system developed by the United States Green Building Council.
- G. Rapidly Renewable Materials: Materials made from agricultural products that are typically harvested within a ten-year or shorter cycle. Rapidly renewable materials include products made from bamboo, cotton, flax, jute, straw, sunflower seed hulls, vegetable oils, or wool.
- H. Regionally Manufactured Materials: Materials that are manufactured within a radius of 500 miles from the Project location. Manufacturing refers to the final assembly of components into the building product that is installed at the Project site.
- Regionally Extracted, Harvested, or Recovered Materials: Materials which are extracted, harvested, or recovered and manufactured within a radius of 500 miles from the Project site.
- J. Recycled Content: The percentage by weight of constituents that have been recovered or otherwise diverted from the solid waste stream, either during the manufacturing process (pre-consumer), or after consumer use (post-consumer).
 - Spills and scraps from the original manufacturing process that are combined with other constituents after a minimal amount of reprocessing for use in further production of the same product are not recycled materials.
 - Discarded materials from one manufacturing process that are used as constituents in another manufacturing process are pre-consumer recycled materials.
 - 3. "Pre-consumer" may also be referred to as "post-industrial".
- K. Solar Reflectance Index (SRI): A measure of a material's ability to reflect solar heat, as shown by a small temperature rise. It is defined so that a standard black (reflectance 0.05, emittance 0.90) is equal to 0, and a standard white (reflectance 0.80, emittance of 0.90) is equal to 100.
- L. Volatile Organic Compound (VOC): Any compound of carbon (excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate) which vaporizes (becomes a gas) and participates in atmospheric photochemical reactions, as specified in Part 51.00 of Chapter 40 of the U.S. Code of Federal Regulations, at normal room temperatures. For the purposes of this specification, formaldehyde and acetaldehyde are considered to be VOCs.



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LEED PROVISIONS:

Refer to the Addendum for the LEED rating to be achieved for this project. The provisions to achieve this LEED rating are integrated within the project construction documents and specifications. The Contractor is specifically directed to the "LEED BUILDING Performance Criteria" and "LEED BUILDING Submittals" sections within the contract specification. Additional LEED requirements are met through aspects of the project design, including material and equipment selections, which may not be specifically identified as LEED BUILDING requirements. Compliance with the requirements needed to obtain LEED prerequisites and credits will be used as one criterion to evaluate substitution requests.

LEED BUILDING SUBMITTALS: 1.6

- Scope: LEED BUILDING submittals are required for all installed materials included in General Construction work. LEED BUILDING Submittals are only required for field-applied adhesives, sealants, paints and coatings included in Plumbing, Mechanical and Electrical work. Submit all required LEED BUILDING submittals in accordance with Section 01 33 00, SUBMITTAL PROCEDURES.
- Applicability: The extent of the LEED BUILDING Submittals varies depending on the specification section. B. Applicable LEED BUILDING Submittals are listed under the "LEED BUILDING Submittals" heading in each specification section. The detailed requirements for the LEED BUILDING Submittals are defined in Item C below.
- Detailed Requirements: Sub-Sections 1.6 C.1through 1.6 C.3 below defines the information and C. documents to be provided for each type of LEED BUILDING Submittal as identified in the LEED Submittal Requirements of each specification section:
 - ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM (EBMCF)[GHI]: Information to be supplied for this form (blank sample copy attached at end of this Section to be modified as appropriate to the project) shall include some or all of the following items, as identified in the LEED Submittal Requirements of each specification section:
 - Cost breakdowns for the materials included in the contractor or sub-contractor's scope of a. work. Cost reporting shall include itemized material costs (excluding the contractor's labor, equipment, overhead and profit).
 - The percentages (by weight) of post-consumer and/or post-industrial recycled content in the b. supplied product(s).
 - For each product with recycled content, also indicate the total recycled content value (1/2 x pre-consumer percentage x product value + 1 x post-consumer percentage x product value = total recycled content value).
 - See additional requirements for concrete below.
 - Identification (Yes/No) of materials manufactured within 500 miles of the project site AND C. containing raw materials harvested or extracted within 500 miles of the project site.
 - Indicate the percentage by weight, relative to the total weight of the product that meets 1) these criteria
 - 2) Indicate the point of harvest/extraction/recovery of regional raw materials, the point of final assembly of regional manufactured products, and the distance from each point to the project site.
 - Volatile Organic Compound (VOC) content of all field-applied adhesives, sealants, paints, d. and coatings, listed in grams/liter or lbs./gallon, less water.
 - For detailed requirements refer to Section 01 81 13.13 VOC LIMITS FOR ADHESIVES, SEALANTS, PAINTS AND COATINGS.
 - The amount of "Forest Stewardship Council (FSC) Certified" wood products if used in the e. Project.
 - Record only new FSC-certified wood products. Do not record reclaimed, salvaged, or 1) recycled FSC-certified wood products.



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Reclaimed, salvaged, or recycled FSC-certified wood may be recorded as post-2) consumer recycled content.

The amount of Rapidly Renewable materials if used in the Project. f.

- Indicate the type of rapidly renewable material used, and the percentage by weight, relative to the total weight of the product, that consists of rapidly renewable material.
- The percentage (by weight), relative to the total weight of cementitious materials, of g. supplementary cementitious materials or pozzolans such as fly ash used in each concrete mix used in the Project.

For each concrete mix, provide a complete breakdown of all components, by weight 1)

Identification (Yes/No) of composite wood or agrifiber products used in the project that are h. free of added urea-added formaldehyde resins.

- Identification (Yes/No) of flooring products used in the project that have Carpet and Rug i. Institute (CRI) Green Label or Green Label Plus certification, or Resilient Floor Covering Institute FloorScore certification.
 - Untreated solid wood flooring, and mineral-based flooring products such as tile, masonry, terrazzo, and cut stone that have no organic-based coatings or sealants, are excluded from this requirement.
- The EBMCF shall record the above information only for those materials or products j. permanently installed in the project. The EBMCF shall record VOC content, composite and agrifiber products, and CRI or FloorScore ratings only for those materials or products permanently installed within the weather barrier of the LEED building.
- EBMCF BACK-UP DOCUMENTATION: These documents are used to validate the information 2. provided on the EBMCF (except cost data). For each material listed on the EBMCF, provide documentation to certify the material's LEED BUILDING attributes, as applicable:
 - 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
 - REGIONAL MANUFACTURING AND REGIONAL RAW MATERIALS (WITHIN 500 MILES): b. Provide published product literature or letter of certification on the manufacturer's letterhead indicating the city/state where the manufacturing plant is located, where each of the raw materials in the product were extracted, harvested or recovered and the distance in miles from the project site.

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.

- VOC CONTENT: Provide Material Safety Data Sheets (MSDS) certifying the Volatile Organic Compound (VOC) content of the adhesive, sealant, paint, or coating products. VOC content is to be reported in grams/liter or lbs./gallon, less water. If the MSDS does not show the product's VOC content, this information must be provided through other published product literature from the manufacturer, or stated in a letter of certification from the product manufacturer on the manufacturer's letterhead.
- RAPIDLY RENEWABLE MATERIALS: If used in the project, provide published literature or d. letter of certification on the manufacturer's letterhead certifying the percentage of each product that is rapidly renewable (by weight).
- PRODUCT CUT SHEETS: Provide product cut sheets with the Contractor's or sub-contractor's 3. stamp, confirming that the submitted products are the products installed in the Project.
- CRI GREEN LABEL PLUS CERTIFICATION: For carpets and carpet cushions, provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying that the products comply with the "Green Label Plus" IAQ testing program of the Carpet and Rug Institute of Dalton, GA.

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- CERTIFICATION OF COMPOSITE WOOD OR AGRIFIBER RESINS: For all composite wood, engineered wood and agrifiber products (including plywood, particleboard, and medium density fiberboard), provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying that that the products do not contain added urea-formaldehyde resins.
- 6. CERTIFICATION OF COMPOSITE WOOD OR AGRIFIBER LAMINATING ADHESIVES: For all laminating adhesives used with composite wood, engineered wood and agrifiber products (e.g., adhesives used to laminate wood veneers to an engineered wood substrate), provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying that the adhesive products do not contain urea-formaldehyde.
- FSC-CERTIFIED WOOD:
 - a. If used in the project, provide chain of custody documents and copies of invoices regarding wood products, including whether or not such wood product is FSC-certified.
 - b. If used in the project, for assemblies, provide the percentage (by cost and by weight) of the assembly that is FSC-certified wood.
 - c. If used in the project, for assemblies, provide published product literature or letter from the manufacturer(on the manufacturer's letterhead) verifying the percentage that is FSC-certified wood.
- 8. GREEN SEAL COMPLIANCE: Provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying that the following product types comply with the VOC limits and chemical component restrictions developed by the Green Seal organization of Washington, DC:
 - Interior Architectural Paints and Coatings: refer to Green Seal standard GS-11 (1st edition, May 1993)
 - Anti-corrosive and Anti-rust paints: refer to Green Seal standard GC-03 (2nd Edition, January 1997)
 - c. Aerosol Adhesives: refer to Green Seal standard GS-36 (1st edition, October 2000)
- 9. HIGH ALBEDO PAVING AND WALKWAY MATERIALS: For paving and walkway materials made from concrete or brick provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying a minimum Solar Reflectance Index (SRI) value of 29. SRI values 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.
- 10. HIGH ALBEDO ROOFING MATERIALS: For exposed roofing membranes, pavers, and ballast products, provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying the following minimum Solar Reflectance Index (SRI) values:
 - a. 78 for low-sloped roofing applications (slope ≤ 2:12)
 - b. 29 for steep-sloped roofing applications (slope > 2:12)

SRI values 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.

Vegetated roof surfaces are exempt from the SRI criteria.

- 11. LOW MERCURY LAMPS: For all fluorescent, compact fluorescent, and HID lamps installed in the project, provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying:
 - 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
 - The rated average life of the lamp in hours.



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In addition, provide the total number of each lamp type installed in the project.

- FLOORSCORE CERTIFICATION: For all hard surface flooring, including vinyl, linoleum, laminate flooring, wood flooring, ceramic flooring, rubber flooring, and wall base, provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying that the products comply with the current FloorScore standard requirements.
- CONCRETE: Provide concrete mix design for each mix, designated by a distinct identifying code or number and signed by a Professional Engineer licensed in the state in which the concrete manufacturer or supplier is located.
- INTERIOR LIGHTING FIXTURES: For each lighting fixture type installed within the building's weather barrier, provide manufacturer's cut sheets indicating the following:
 - a. Fixture power in watts.
 - b. Initial lamp lumens.
 - c. Photometric distribution data.
 - d. Dimming capability, in range of percentages.
- EXTERIOR LIGHTING FIXTURES: For each lighting fixture type installed on site, provide manufacturer's cut sheets indicating the following:
 - a. Fixture power in watts.
 - b. Initial lamp lumens.

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- c. Photometric distribution data.
- d. Range of field adjustability, if any.
- e. Warranty of suitability for exterior use.
- 16. ALTERNATIVE TRANSPORTATION: Provide manufacturer's cut sheets and/or shop drawings for the following items installed on site:
 - a. Bike racks, including total number of bicycle slots provided.
 - b. Signage indicating parking spaces reserved for electric or low-emitting vehicles and for carpools/vanpools, including total number of signs.
- 17. WATER CONSERVING FIXTURES: For all water consuming plumbing fixtures and fittings, provide manufacturer's cut sheets showing maximum flow rates and/or flush rates.
- ENERGY SAVING APPLIANCES: Provide manufacturer's cut sheets and published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying the product's rating under the U.S. EPA/DOE Energy Star program, for all of the following:
 - a. Appliances (i.e., refrigerators, dishwashers, microwave ovens, televisions, clothes washers, clothes dryers, chilled water dispensers).
 - b. Office equipment (i.e., copy machines, fax machines, plotters/printers, scanners, binding and publishing equipment).
 - c. Electronics (i.e., servers, desktop computers, computer monitor displays, laptop computers, network equipment).
 - d. Commercial food service equipment
- 19. GLAZING: For glazing in any windows, doors, storefront and window wall systems, curtainwall systems, skylights, and partitions, provide manufacturer's cut sheets indicating the following:
 - a. Glazed area.
 - b. Visible light transmittance.
 - c. Solar heat gain coefficient.
 - d. Fenestration assembly u-factor.



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- VENTILATION: Provide manufacturer's cut sheets for the following:
 - a. Carbon dioxide monitoring systems, if any, installed to measure outside air delivery.
 - b. Air filters: for detailed requirements refer to Section 01 81 19 INDOOR AIR QUALITY REQUIREMENTS.
- REFRIGERATION: For all refrigeration equipment, provide manufacturer's cut sheets indicating the following:

a. Equipment type.

b. Equipment life. Default values specified by the 2007 ASHRAE Applications Handbook will be used unless otherwise demonstrated by the manufacturer's guarantee and an equivalent long-term service contract.

c. Refrigerant type.

d. Refrigerant charge in pounds of refrigerant per ton of gross cooling capacity.

Tested refrigerant leakage rate, in percent per year. A default rate of 2% will be used unless otherwise demonstrated by test data.

Tested end-of-life refrigerant loss, in percent. A default rate of 10% will be used unless otherwise demonstrated by test data.

LEED BUILDING SUBMITTAL REQUIREMENTS:

The LEED BUILDING Submittal information shall be assembled into one package per contract A. specification section(s) (or per subcontractor), and submitted in accordance with Section 01 33 00, SUBMITTAL PROCEDURES. Incomplete or inaccurate LEED BUILDING submittals may be used as the basis for the rejection of products or assemblies. Incomplete or inaccurate LEED BUILDING Submittals may be used as the basis for rejecting the submitted products or assemblies.

1.8 **LEED ACTION PLANS:**

- Construction Waste Management Plan- Refer to Section 01 74 19, Construction Waste Management and A. Disposal for detailed submittal requirements.
- Construction IAQ Management Plan- Refer to Section 01 81 19, Indoor Air Quality Requirements for B. LEED Buildings, for detailed submittal requirements.

C. Erosion and Sedimentation Control Plan:

- The Plan shall be in accordance with the New York State Department of Environmental Conservation (NYSDEC) or the 2003 EPA Construction General Permit, whichever is more stringent.
- The Plan shall be submitted in accordance with Section 01 33 00, SUBMITTAL PROCEEDURES. 2.

3. Detailed requirements: ESC Plan

Include the Stormwater Pollution Prevention Plan, if required.

Identify the party responsible for Plan monitoring and documentation. The party must be b. regularly on site.

Describe all site work that will be implemented on the project. C.

Provide site plan with location of ESC measures, including, but not limited to, stormwater quantity controls, stormwater quality controls, stabilized construction entrances, washdown areas, and inlet/catch basin protection.

Describe the inspection and maintenance of the ESC measures. Provide a construction schedule indicating weekly site review.

Describe reporting and documentation measures.

4. Detailed requirements: ESC Measures



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5. Submittal requirements: ESC Tracking Log

a. Note date of major rain events, describe damage, describe any repairs or maintenance performed, and note responsible party.

b. Note date and findings of weekly site review, describe any repairs or maintenance performed, and note responsible party.

c. Submit monthly.

6. Implementation

- a. The Contractor shall implement the ESC Plan, coordinate the Plan with all affected trades, and designate one individual as the Erosion and Sedimentation Control Representative, who will be responsible for communicating the progress of the Plan with the Commissioner on a regular basis, and for assembling the required LEED documentation.
- b. The Contractor shall be responsible for the provision, maintenance, and repair of all ESC measures.
- c. Demonstration. The Contractor shall provide on-site instruction of proper construction practices required to prevent erosion and sedimentation.
- d. Meetings. Urgent or ongoing ESC issues shall be discussed at weekly on-site job meetings.

1.9 QUALITY ASSURANCE:

- A. The Contractor shall implement all LEED Action Plans, coordinate the Plans and LEED Building Submittals with all affected trades, and designate one individual as the Sustainable Construction Representative at no additional cost to the City of New York, who will be responsible for communicating the progress of LEED activities with the Commissioner on a regular basis, and for assembling the required LEED documentation.
- B. Responsibilities of Contractor's Subcontractors: The Contractor shall be responsible for his/her subcontractors complying with the LEED Action Plans and for providing required LEED documentation as required for the project.
- C. Distribution and Compilation: The Contractor shall be responsible for distributing the EBMCF and any other forms or templates required for the subcontractors to record LEED documentation. The Contractor shall also be responsible for collecting and compiling EBMCF information into packages as described in Section 01 33 00 SUBMITTAL PROCEDURES.
- D. Meetings: Sustainable design and construction issues shall be discussed at the following meetings:
 - 1. Demolition kick-off meeting
 - 2. Construction kick-off meeting
 - 3. Construction kick-off meeting for LEED (independent meeting)
 - 4. Weekly job-site progress and coordination meetings
 - 5. Closeout meeting

PART II - PRODUCTS (Not Used)

PART III - EXECUTION (Not Used)

END OF SECTION 01 81 13



ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM

Contractor Name: Contractor Contact: Telephone Number:						5-0		g g	Project Name: Project I.D.:	е: 			
	•	Recycled Content	Content		Regional4	• e-		Rapidly Re	newable ⁷	VOC conter	Rapidly Renewable VOC content® Flooring® Wood	Wood	
Product/Manufacturer	Material Cost¹	Pre- Consumer (% by wt) ²	Post- Consumer (% bv wt) ³	Total % (1/2 Pre + Post)	Location & Distance to Extractions	Material Consumer Total % Location & Location & Extracted Cost¹ (% by wt)² (% by wt)³ + Post) Extracted Cost¹ (% by wt)² (% by wt)³ + Post) Extraction & Manufactures (% by wt)²	Extracted & Manuf.		3	*VOC *VC	*VOC *VOC *Green content content content	*VOC *VOC *Green *Added urea FSC content content Label or formaldehyde Certified	FSC Certified ¹
				3	TO TO TO TO TO TO TO TO TO TO TO TO TO T	iviai iniacini d	(to Dy w()		% by wt	isted allo	wed FloorScore	% by wt listed allowed FloorScore (Yes/No) 10 (% by wt)	(% by wt)
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Material Cost: As it appears on the manufacturer's or distributor's invoice to the contractor or subcontractor. Does not include labor or equipment costs associated with installation.

2 Pre-Consumer Recycled Content: Industrial/manufacturing waste material (e.g., fly-ash and synthetic gypsum, both waste products from coal burning electricity plants) diverted from landfill and incorporated into a finished product. Scrap raw materials that can be reused in the same manufacturing process from which they are recovered are not considered Pre-Consumer Recycled Content.

Post-Consumer Recycled Content: Material or product that has served its intended consumer use (e.g., an empty plastic bottle) and has been diverted from landfill and incorporated into a finished product.

4 Regional: Refers to a material/product that is BOTH extracted AND manufactured within 500 miles of the Project site. Record this information ONLY for materials/products meeting BOTH of these criteria

⁵ Extraction: Refers to the location from which the raw resources used in a building product are extracted, harvested, or recovered.

* Manufacture: Refers to the location of the final assembly of components into a building product that is furnished and installed by the Contractor.

Rapidly Renewable: Refers to materials/products derived from agricultural products that are typically harvested within a ten-year or shorter cycle.

VOC Content: The quantity of volatile organic compounds contained in adhesives, sealants, paints and architectural coatings. Reported in grams/liter or lbs/gallon, less water,

Flooring: For carpet, indicate Carpet and Rug Institute (CRI) Green Label Plus certification. For carpet cushion, indicate CRI Green Label certification. For all flooring except unfinished/untreated wood and mineral-based flooring (tile, masonry, terrazzo, cut stone) without organic-based coatings or sealants, indicate Resilient Floor Covering Institute FloorScore rating. VOC limits for adhesives, sealants, etc. still apply

¹⁰Added Urea Formaldehyde: Applies to composite wood and agrifiber products only (plywood, particleboard, MDF, OSB, wheatboard, strawboard). Resins or binders with added urea formaldehyde are <u>prohibited</u>. 1FSC Certified: Certification from the Forest Stewardship Council. This column is only applicable to wood products.

Applies only to materials/products installed within the weather barrier,

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Signature of Authorized Representative:

l, a duly authorized representative of contained by the Contractor) hereby certify that the material informa contained herein is an accurate representation of the material qualifications to be provided by the Contractor as components of the final building construction Furthermore, I understand that any change in such qualifications during the purchasing period will require prior written approval from the Commissioner
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Date:

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SECTION 01 81 13.13

VOLATILE ORGANIC COMPOUND (VOC) LIMITS FOR ADHESIVES, SEALANTS, PAINTS AND COATINGS FOR LEED BUILDINGS

REFER TO THE ADDENDUM FOR APPLICABILITY OF THIS SECTION 01/81/13/13

PARTI- GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

- A. This Section includes requirements for volatile organic compound (VOC) content in adhesives, sealants, paints and coatings used for the project.
- B. All sections in the Project Specifications with adhesives, sealant or sealant primer applications, paints and coatings shall follow all requirements of this section. In the event of any conflict or inconsistency between this section and the Specifications regarding adhesives, sealant or sealant applications, paints and coatings, the requirements set forth in this Section shall prevail.
- C. This Section includes:
 - 1. General Requirements
 - 2. References
 - 3. VOC Requirements for Interior Adhesives
 - 4. VOC Requirements for Interior Sealants
 - 5. VOC requirements for Interior Paints
 - 6. VOC requirements for Interior Coatings
 - 7. Submittals

1.3 RELATED SECTIONS: Include without limitation the following:

- A. Section 01 10 00 SUMMARY
- B. Section 01 31 00 PROJECT MANAGEMENT AND COORDINATION
- C. Section 01 32 00 CONSTRUCTION PROGRESS DOCUMENTATION
- D. Section 01 33 00 SUBMITTAL PROCEDURES
- E. Section 01 73 00 EXECUTION
- F. Section 01 77 00 CLOSEOUT PROCEDURES
- G. Section 01 78 39 CONTRACT RECORD DOCUMENTS
- H. Section 01 81 13 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED BUILDINGS
- Section 01 81 19 INDOOR AIR QUALITY FOR LEED BUILDINGS

1.4 DEFINITIONS:

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- A. ADHESIVE: Any substance used to bond one surface to another by attachment. Includes adhesive primers and adhesive bonding primers.
 - Aerosol Adhesive: Any adhesive packaged as an aerosol with a spray mechanism permanently housed in a non-refillable can designed for hand-held application without the need for ancillary equipment.
- B. CARCINOGEN: A chemical listed as a known, probable, reasonably anticipated, or possible human

VOLATILE ORGANIC COMPOUND (VOC) LIMITS FOR ADHESIVES, SEALANTS, PAINTS & COATINGS FOR LEED BUILDINGS



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carcinogen by the International Agency for Research on Cancer (IARC) (Groups 1, 2A, and 2B), the National Toxicology Program (NTP) (Groups 1 and 2), the U.S. Environmental Protection Agency (EPA) Integrated Risk Information System (IRIS) (weight-of-evidence classifications A, B1, B2, and C, carcinogenic, likely to be carcinogenic, and suggestive evidence of carcinogenicity or carcinogen potential), or the Occupational Safety and Health Administration (OSHA).

- C. CLEAR WOOD FINISH: Clear/semi-transparent coating applied to wood substrates to provide a transparent or translucent solid film.
 - Lacquer: Clear/semi-transparent coating formulated with cellulosic or synthetic resins to dry by evaporation without chemical reaction and provide a solid, protective film.
 - Sanding Sealer: A sanding sealer that also meets the definition of a lacquer. 2.
 - Varnish: Clear/semi-transparent coating, excluding lacquers and shellacs, formulated to dry by 3. chemical reaction on exposure to air. May contain small amounts of pigment.
- D. COATING: Liquid, liquefiable, or mastic composition that is converted to a solid adherent film after application to a substrate as a thin layer; and is used for decorating, protecting, identifying or to serve some functional purpose such as the filling or concealing of surface irregularities or the modification of light and heat radiation characteristics; and is intended for on-site application to interior or exterior surfaces of buildings. Does not include stains, clear finishes, recycled latex paint, specialty (industrial, marine or automotive) coatings or paint sold in aerosol cans.
- E. FLOOR COATING: Opaque coating applied to flooring. Excludes industrial maintenance coatings.
- F. HAZARDOUS AIR POLLUTANT: Any compound listed by the U.S. EPA in the Clean Air Act Section 112(b)(1) as a hazardous air pollutant.
- G. MUTAGEN: A chemical that meets the criteria for category 1, chemicals known to induce heritable mutations or to be regarding as if they induce heritable mutations in the germ cells of humans, under the Harmonized System for the Classification of Chemicals Which Cause Mutations in Germ Cells (United Nations Economic Commission for Europe, Globally Harmonized System of Classification and Labeling of Chemicals).
- H. OZONE-DEPLETING COMPOUNDS: A compound with an ozone-depletion potential greater than 0.1 (CFC 11=1) according to the U.S. EPA list of Class I and Class II Ozone-Depleting Substances.
- PAINT: A pigmented coating. For the purposes of this specification, paint primers are considered to be paints.
 - Flat Coating or Paint: Has a gloss of less than 15 (using an 85-degree meter) or less than 5 (using a 60-degree meter).
 - Non-Flat Coating or Paint: Has a gloss of greater than or equal to 15 (using an 85-degree meter) or 2. greater than or equal to 5 (using a 60-degree meter).
 - Non-Flat High-Gloss Coating or Paint: Has a gloss of greater than or equal to 70 (using a 60-degree 3. meter).
 - Anti-Corrosive / Rust Preventative Paint: Coating formulated and recommended for use in preventing 4. the corrosion of ferrous metal substrates.
- J. PRIMER: Coating that is formulated and recommended for one or more of the following purposes: to provide a firm bond between the substrate and a subsequent coating; to prevent a subsequent coating from being absorbed into the substrate; to prevent harm to a subsequent coating from materials in the substrate; or to provide a smooth surface for application of a subsequent coating.
- K. REPRODUCTIVE TOXIN: A chemical listed as a reproductive toxin (including developmental, female, and male toxins) by the State of California under the Safe Drinking Water and Toxic Enforcement Act of 1986 (California Code of Regulations, Title 22, Division 2, Subdivision 1, Chapter 3, Sections 1200, et. Seq.).
- L. SANDING SEALER: Clear/semi-transparent coating formulated to seal bare wood. Can be abraded to create a smooth surface for subsequent coatings. Does not include sanding sealers that are lacquers (see Clear Wood Finish above).
- M. SEALANT: Any material with adhesive properties, formulated primarily to fill, seal, or waterproof gaps or joints



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between surfaces. Includes sealant primers and caulks.

- N. SHELLAC: Clear or pigmented coating formulated solely with the resinous secretions of the lac beetle, thinned with alcohol and formulated to dry by evaporation without chemical reaction. Excludes floor applications.
- O. STAIN: Clear semi-transparent/opaque coating formulated to change the color but not conceal the grain pattern or texture of the substrate.
- P. VOLATILE AROMATIC COMPOUND: Any hydrocarbon compound containing one or more 6-carbone benzene rings, and having an initial boiling point less than or equal to 280 degrees Celsius measured at standard conditions of temperature and pressure.
- Q. VOLATILE ORGANIC COMPOUND: Any compound of carbon (excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate) which vaporizes (becomes a gas) and participates in atmospheric photochemical reactions, as specified in Part 51.00 of Chapter 40 of the U.S. Code of Federal Regulations, at normal room temperatures. For the purposes of this specification, formaldehyde and acetaldehyde are considered to be VOCs.
- R. WATERPROOFING SEALER: A coating that prevents the penetration of water into porous substrates.

1.5 GENERAL REQUIREMENTS:

A. The City of New York is committed to implementing good environmental practices and procedures which include achieving a LEED Green building rating. Specific project requirements related to this goal which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements as defined in the sections below and in related sections of the Contract Documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the stated environmental goals.

1.6 REFERENCES:

- A. Rule 1168 "Adhesive and Sealant Applications", amended 7 January 2005): South Coast Air Quality Management District (SCAQMD), State of California, www.aqmd.gov
- B. Rule 1113 "Architectural Coatings", amended 9 July 2004: South Coast Air Quality Management District (SCAQMD), State of California, www.aqmd.gov
- C. Green Seal Standard GS-11- "Paints", of Green Seal, Inc., Washington, DC, www.greenseal.org
- D. Green Seal Standard GC-03- "Anti-Corrosive Paints", of Green Seal, Inc., Washington, DC, www.greenseal.org

1.6 VOC REQUIREMENTS FOR INTERIOR ADHESIVES, SEALANTS, PAINTS AND COATINGS:

- A. GENERAL: Unless otherwise specified herein, the VOC content of all interior adhesives, sealants, paints and coatings (herein referred to as "products") shall not be in excess of 250 grams per liter.
- B. No product shall contain any ingredients that are carcinogens, mutagens, reproductive toxins, persistent bioacculmulative compounds, hazardous air pollutants, or ozone-depleting compounds. An exception shall be made for titanium dioxide and, for products that are pre-tinted by the manufacturer, carbon black, which shall be less than or equal to 1% by weight of the product.
- C. No product shall contain the following:
 - methylene chloride
 - 2. 1,1,1-trichloroethane
 - 3. benzene

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- 4. toluene
- ethylbenzene 5.
- vinyl chloride 6.
- naphthalene 7.
- 1,2-dichlorobenzene 8.
- di (2-ethylhexyl) phthalate 9.
- 10. butyl benzyl phthalate
- 11. di-n-butyl phthalate
- 12. di-n-octyl phthalate
- 13. diethyl phthalate
- dimethyl phthalate 14.
- 15. isophorone
- 16. antimony
- 17. cadmium
- 18. hexavalent chromium
- 19. lead
- 20. mercury
- 21. formaldehyde
- 22. methyl ethyl ketone
- 23. methyl isobutyl ketone
- 24. acrolein
- acrylonitrile 25.
- No product shall contain more than 1.0% by weight of sum total of volatile aromatic compounds.

VOC REQUIREMENTS FOR INTERIOR ADHESIVES: 1.8

- The volatile organic compound (VOC) content of adhesives, adhesive bonding primers, or adhesive A. primers used in this project 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 B. water and less exempt compounds.
- For specified building construction related applications, the allowable VOC content is as follows: C.

1. Architectural Applications:

a.	Indoor carpet adhesive	50
b.	Carpet pad adhesive	50
C.	Wood flooring adhesive	100
d.	Rubber floor adhesive	60
e.	Subfloor adhesive	50
f	Ceramic tile adhesive	65
g.	VCT and asphalt tile adhesive	50
h.	Drywall and panel adhesive	50
i	Cove base adhesive	50
i.	Multipurpose construction adhesive	70
ķ.	Structural glazing adhesive	100

2. Specialty Applications:

-		
a.	PVC welding	510
b.	CPVC welding	490
C.	ABS welding	325
ď	Plastic cement welding	250



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e.	Adhesive primer for plastic	550
f.	Contact Adhesive	80
g.	Special Purpose Contact Adhesive	250
h.	Structural Wood Member Adhesive	140
i.	Sheet Applied Rubber Lining Operations	850
j.	Top and Trim Adhesive	250
Substra	ate Specific Applications:	
a.	Metal to metal	30
b.	Plastic foams	50
C.	Porous material (except wood)	50
d.	Wood	30
e.	Fiberglass	80
Aeroso	Adhesives:	
a.	General purpose mist spray	6E% \/OC's b
b.	General purpose web spray	65% VOC's by weight 55% VOC's by weight
C.	Special purpose aerosol adhesives (all type	nes)
	to a dan typ	70% VOC's by weight
		remarkable weight

VOC REQUIREMENTS FOR INTERIOR SEALANTS: 1.9

- The volatile organic compound (VOC) content of sealants, or sealant primers used in this project 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 - B. water and less exempt compounds.
 - 1. Sealants:

2.

3.

4.

a.	Architectural	250
b.	Non-membrane roof	300
C.	Roadway	250
d.	Single-ply roof membrane	450
e.	Other	420
Sealant	Primer:	
a.	Architectural - Nonporous	250
b.	Architectural – Porous	775
. C.	Other	750

1.10 VOC REQUIREMENTS FOR INTERIOR PAINTS:

- Paints and Primers: Paints and primers used in non-specialized interior applications (i.e., for wallboard, plaster, wood, metal doors and frames, etc.) shall meet the VOC limitations of the Green Seal Paint Standard GS-11, of Green Seal, Inc., Washington, DC. Product-specific environmental requirements are as follows:
 - 5. Volatile Organic Compounds:
 - a. The VOC concentrations (in grams per liter) of the product shall not exceed those listed below as determined by U. S. Environmental Protection Agency (EPA) Reference Test Method 24.

Interior Paints and Primers:

Non-flat: 150 g/l

Flat: 50 g/l

The calculation of VOC shall exclude water and tinting color added at the point of sale.

VOLATILE ORGANIC COMPOUND (VOC) LIMITS FOR ADHESIVES, SEALANTS, PAINTS & COATINGS FOR LEED BUILDINGS 01 81 13.13 - 5



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- Anti- Corrosive and Anti-Rust Paints: Anti-corrosive and anti-rust paints applied to interior ferrous metal B. substrates shall meet the VOC limitations of the Green Seal Paint Standard GC-03, of Green Seal, Inc., Washington, DC. Product-specific environmental requirements are as follows:
 - Volatile Organic Compounds:
 - The VOC concentrations (in grams per liter) of the product shall not exceed those listed below as determined by U. S. Environmental Protection Agency (EPA) Reference Test Method 24.

Anti-Corrosive and Anti-Rust Paints: 250 g/l

The calculation of VOC shall exclude water and tinting color added at the point of sale.

1.11 VOC REQUIREMENTS FOR INTERIOR COATINGS:

Clear wood finishes, floor coatings, stains, sealers, and shellacs applied to the interior shall meet the VOC limitations defined in Rule 1113, "Architectural Coatings" of SCAQMD, of the State of California. The VOC limits defined by SCAQMD, based on 7/9/04 amendments, are as follows. VOC limits are defined in grams per liter, less water and less exempt compounds.

1	Clea	r Wood Finishes:	
••	a.	Varnish	350
	b.	Sanding Sealers	350
	C.	Lacquer	550
2.	Shellac:		
	a.	^a Clear	730
	b.	Pigmented	550
^	Ct-:	~~	250

3. Stains 4. Floor Coatings 100 5. Waterproofing Sealers 250 275 6. Sanding Sealers

200 7. Other Sealers

The calculation of VOC shall exclude water and tinting color added at the point of sale.

1.12 SUBMITTALS:

- Submit Material Safety Data Sheets, for all applicable products in accordance with Section 01 33 00, SUBMITTAL PROCEDURES. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings. Material Safety Data Sheets 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).
- Submit Environmental Building Materials Certification Form (EBMCF) as referenced in Section 01 81 13 B. SUSTAINABLE REQUIREMENTS FOR LEED BUILDINGS: For each field-applied adhesive, sealant, paint, and coating product, provide the VOC requirement, as provided in this Specification, for the relevant material category indicated on the documentation noted above.

PART II - PRODUCTS (Not Used) PART III - EXECUTION (Not Used) **END OF SECTION 01 81 13.13**



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SECTION 01 81 19 INDOOR AIR QUALITY REQUIREMENTS FOR LEED BUILDINGS

REFER TO THE ADDENDUM FOR APPLICABILITY OF THIS SECTION 01/81/19

PART I - GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 CONSTRUCTION IAQ MANAGEMENT GOALS FOR THE PROJECT:

A. The City of New York has determined that this Project 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, poor housekeeping, shall be minimized.

1.3 RELATED SECTIONS:

- A. All sections of the Specifications related to interior construction, MEP systems, and items affecting indoor air quality.
- B. Section 01 81 13, SUSTAINABLE DESIGN REQUIREMENTS FOR LEED BUILDINGS
- C. Section 01 81 13.13, VOLATILE ORGANIC COMPOUND (VOC) LIMITS FOR ADHESIVES, SEALANTS, PAINTS AND COATINGS.
- D. Division 9 (of the Specifications): Finishes.

1.4 DEFINITIONS:

- A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.
- B. Design Consultant: "Design Consultant" shall mean the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the "Design Consultant" may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.
- C. Volatile Organic Compounds (VOC's): 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 VOC's are harmful, but many of those contained within building products contribute to the formation of smog and may irritate building occupants by their smell and/or health impact.



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- D. Materials that act as "sinks" for VOC contamination: Absorptive materials, typically dry and soft materials (such as textiles, carpeting, acoustical ceiling tiles and gypsum board) that readily absorb VOC's emitted by "source" materials and release them over a prolonged period of time.
- E. Materials that act as "sources" for VOC contamination: Products with high VOC contents that emit VOC's either rapidly during application and curing (typically "wet" products, such as paints, sealants, adhesives, caulks and sealers) or over a prolonged period (typically "dry" products such as flooring coverings with plasticizers and engineered wood with formaldehyde).

1.5 REFERENCES, RESOURCES:

- A. "IAQ Guidelines for Occupied Buildings Under Construction", First Edition, November 1995, 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", <u>www.ashrae.org</u>

1.6 LEED BUILDING GENERAL REQUIREMENTS:

A. Implement practices and procedures as necessary to meet the project's environmental performance goals as set forth in the specific requirements of this section. Specific project goals that may impact this area of work include: use of recycled-content materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. Ensure that the requirements related to these goals, as defined in this Section, are implemented to the fullest extent. Substitutions or other changes to the work shall not be allowed if such changes compromise the stated LEED BUILDING Performance Criteria.

1.7 CONSTRUCTION IAQ MANAGEMENT PLAN:

- A. The Contractor shall prepare a Construction IAQ Management Plan in coordination with each subcontractor and submit the IAQ Management Plan to the Commissioner for approval in accordance with Section 01 33 00, SUBMITTAL PROCDEURES. The Construction IAQ Management Plan shall meet the following criteria:
 - 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.
 - Absorptive materials shall be protected from moisture damage when stored on-site and after installation.
 - If air handlers are to be used during construction, filtration media with a Minimum Efficiency Reporting Value (MERV) of 8 must be used at each return air grill, as determined by ASHRAE 52.2-1999.
 - 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 if the
 project is pursuing Indoor Air Quality Credit 5: Indoor Chemical Pollutant Source Control.
 - 5. A "Sequence of Finish Installation Plan" shall be developed, highlighting measures to reduce the absorption of VOCs by materials that act as "sinks".
 - Upon approval of the Plan by the Commissioner, it shall be implemented by the Contractor through the duration of the construction process, and documented in accordance with the Submittal Requirements of Sub-Section 1.8 herein.



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- Further description of the Construction IAQ Management Plan requirements is as follows: B.
 - 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**

- Protect air handling and distribution equipment and air supply and return ducting during 1) construction.
- All ductwork arriving on site will be sealed with plastic sheeting and stored on pallets or 2) dunnage until installed.
- Cover and protect all exposed air inlets and outlets, openings, grilles, ducts, plenums, 3) etc. to prevent water, moisture, dust and other contaminant intrusion.

4) Apply protection immediately after ducting.

Protect ducting runs at the end of day's work. 5)

Inspect temporary filtration weekly and replace as required to maintain the proper 6) ventilation rates in the building.

Source Control b.

Protect stored on-site or installed absorptive or porous materials. 1)

Do not use wet or damaged porous materials in the building. 2)

Recover, isolate, and ventilate containers housing toxic materials and materials with 3) VOC levels above the limits for interior adhesives, sealants, paints, and coatings described in these Specifications.

Exhaust fumes from idling vehicles and gasoline fueled tools through use of funnels or 4) temporary piping.

Containers housing toxic materials and materials with VOC levels above the limits for 5) interior adhesives, sealants, paints, and coatings described in these Specifications, shall be closed when not in use.

C. Pathway Interruption

- 1) Depressurize work areas to contain dust and odors.
- Pressurize occupied spaces to prevent intrusion of dust and odors. 2)
- Erect barriers to contain construction areas. 3)

4) Relocate pollutant sources.

Temporarily seal the building and provide 100% outside air for ventilation. 5)

d. Housekeeping

Store materials on elevated platforms under cover, in a designated dry, clean location, 1) prior to unpacking for installation.

If materials are not stored in an enclosed location, cover tops and sides of material with 2) waterproof sheeting, securely tied.

Institute cleaning activities to remove contaminants from the building prior to 3) occupancy. Clean all coils, air filters, and ductwork prior to performing testing, adjusting, and balancing of HVAC systems.

Sweep the work area on a daily basis. Use an efficient and effective dust collecting 4) method such as damp cloth, wet mop, or vacuum with particulate filters. Activities which produce high levels of dust shall be cleaned up immediately upon completion.

Spills or excess applications of products containing solvents, or with VOC levels above 5) the limits for interior adhesives, sealants, paints, and coatings described in these Specifications, must be removed immediately.

Dust all walls prior to application of finishes. 6)

- 7) Vacuum all stud tracks prior to application of insulation.
- Materials which become contaminated through direct exposure to moisture from

INDOOR AIR QUALITY REQUIREMENTS FOR LEED BUILDINGS 01 81 19-3



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precipitation, plumbing leaks, or condensation shall be replaced by the Contractor.

Schedulina e.

2)

Phase construction such that absorptive materials are installed only in areas that are 1) weathertight.

Schedule activities that utilize "sources" of VOC contamination to take place prior to

installing high absorbent materials that will act as "sinks" for contaminants.

- Review of the appropriate components of the Construction IAQ Management Plan shall 3) be a regular action topic at weekly site coordination meetings. Implementation of the Plan shall be documented in the meeting minutes.
- Protection of Materials from Moisture Damage: As part of the "Housekeeping" section of the 2. Construction IAQ Management Plan, measures to prevent installed materials or material stored onsite 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 3. 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 4. after the installation of materials or finishes which have high short-term emissions of VOC's, 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 and implement an Indoor Air Quality (IAQ) Management Plan for the pre-occupancy phase 5. as follows:

OPTION 1 — Flush-Out

 After construction ends, prior to occupancy and with all interior finishes installed, perform a building flush-out by supplying a total air volume of 14,000 cu.ft. of outdoor air per sq.ft. of floor area while maintaining an internal temperature of at least 60 degrees F and relative humidity no higher than 60%.

OR

· If occupancy is desired prior to completion of the flush-out, the space may be occupied following delivery of a minimum of 3,500 cu.ft. of outdoor air per sq.ft. of floor area to the space. Once a space is occupied, it shall be ventilated at a minimum rate of 0.30 cfm/sq.ft. of outside air or the design minimum outside air rate determined in EQ Prerequisite 1, whichever is greater. During each day of the flush-out period, ventilation shall begin a minimum of three hours prior to occupancy and continue during occupancy. These conditions shall be maintained until a total of 14,000 cu.ft./sq.ft. of outside air has been delivered to the space.

OR



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OPTION 2 — Air Testing

Conduct baseline IAQ testing, after construction ends and prior to occupancy, using testing
protocols consistent with the United States Environmental Protection Agency Compendium of
Methods for the Determination of Air Pollutants in Indoor Air and as additionally detailed in the
LEED-NC Reference Guide.

• Demonstrate that the contaminant maximum concentrations listed below are not exceeded.

CONTAMINANT	MAXIMUM CONCENTRATION
Formaldehyde Particulates (PM10) Total Volatile Organic Compounds (TVOC) * 4-Phenylcyclohexene (4-PCH)	27 parts per billion 50 micrograms per cubic meter 500 micrograms per cubic meter 6.5 micrograms per cubic meter
Carbon Monoxide (CO)	9 part per million and no greater than 2 parts per million above outdoor levels
* This test is only required if carpets and fabrics backing material are installed as part of the bas	s with styrene butadiene rubber (SBR) latex se building systems.

- For each sampling point where the maximum concentration limits are exceeded, conduct additional flush-out with outside air and retest the specific parameter(s) exceeded to indicate the requirements are achieved. Repeat procedure until all requirements have been met. When retesting non-complying building areas, take samples from the same locations as in the first test.
- The air sample testing shall be conducted as follows:
- a. All measurements shall be conducted prior to occupancy, but during normal occupied hours and with the building ventilation system starting at the normal daily start time and operated at the minimum outside air flow rate for the occupied mode throughout the duration of the air testing.
- b. The building shall have all interior finishes installed, including but not limited to millwork, doors, paint, carpet and acoustic tiles. Non-fixed furnishings such as workstations and partitions are encouraged, but not required, to be in place for the testing.
- c. The number of sampling locations will vary depending upon the size of the building and number of ventilation systems. For each portion of the building served by a separate ventilation system, the number of sampling points shall not be less than one per 25,000 sq.ft., or for each contiguous floor area, whichever is larger, and include areas with the least ventilation and greatest presumed source strength.
- d. Air samples shall be collected between 3 feet and 6 feet from the floor to represent the breathing zone of occupants, and over a minimum 4-hour period.
- 6. Implementation and Coordination: Implement the Construction IAQ Management Plan, and coordinate the Plan with all affected trades. Designate one individual as the Construction IAQ Representative at no additional cost to the City of New York, who will be responsible for communicating the progress of the Plan with the Commissioner on a regular basis, and for assembling the required LEED documentation. Include provisions in the Construction IAQ Management Plan for addressing conditions in the field that do not adhere to the Plan, including provisions to implement a stop work order, or to rectify non-compliant conditions.



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- a. Distribution: The Contractor shall distribute copies of the Construction IAQ Management Plan in accordance with Section 01 33 00, SUBMITTAL PROCEDURES.
- b. Instruction: The Contractor shall provide on-site instruction of appropriate site management to all Contractor's Subcontractors.
- c. Monitoring: The Construction IAQ Representative shall monitor the implementation of the Construction IAQ Management Plan.

1.8 SUBMITTALS:

Submit the following LEED-required records and documents in accordance with Section 01 33 00, SUBMITTAL PROCEDURES and Section 01 81 13, SUSTAINABLE DESIGN REQUIREMENTS FOR LEED BUILDINGS.

- A. A copy of the Construction IAQ Management Plan as defined in Sub-Section 1.07 herein.
- B. 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.
- C. Provide the Commissioner with a minimum of 18 photographs as required under the provision for Special Photographs, in accordance with Section 01 32 33, PHOTOGRAPHIC DOCUMENTATION, comprised of at least six photographs taken on three different occasions during construction. 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.
- D. A copy of the project's TAQ Testing report if applicable.

1.9 QUALITY ASSURANCE:

- A. The Contractor shall be responsible for preparing and implementing the Construction IAQ Management Plan and shall coordinate and incorporate the work of its subcontractors in the IAQ Management Plan.
- B. Responsibility of Subcontractors: Subcontractors for this project shall be responsible to cooperate with the Contractor in the preparation and implementation of the Construction IAQ Management Plan.

PART II - PRODUCTS (Not Used)

PART III - EXECUTION (Not Used)

END OF SECTION 01 81 19



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SECTION 01 91 13 GENERAL COMMISSIONING REQUIREMENTS

REFER TO THE ADDENDUM FOR APPLICABILITY OF THIS SECTION 01:91:13

PART I - GENERAL

1.1 **RELATED DOCUMENTS:**

- The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the A. Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].
- OPR and BoD documentation are included by reference for information only. B.
- The Commissioning Plan, prepared by the Commissioning Agent (CxA) under separate contract with the C. City of New York, contains requirements that apply to this section.

1.2 SUMMARY:

- This Section includes general requirements that apply to implementation of Commissioning without Α. regard to systems, subsystems, and equipment being commissioned.
- B. This Section includes:
 - Definitions 1.
 - Commissioning Team 2.
 - 3. City's Responsibilities
 - Each Contractor's Responsibilities 4.
 - Commissioning Authority's/Agent's (CxA) Responsibilities 5.
 - Commissioning Documentation 6.
 - 7. Submittals
 - Coordination

RELATED SECTIONS: Include without limitation the following: 1.3

- "HVAC Commissioning Requirements" indicated in other sections of the project specifications for specific A. requirements for commissioning HVAC systems.
- This project will be commissioned by an independent third party under separate contract with the City of В. New York. Commissioning shall be in accordance with ASHRAE and USGBC LEED procedures, and specific commissioning requirements of the Project Specifications, whichever is more stringent. The Contractor shall cooperate with the CxA and provide whatever assistance is required.
- Related Sections include without limitation the following: C.
 - 1 Section 01 10 00 SUMMARY
 - 2. PROJECT MANAGEMENT AND COORDINATION Section 01 31 00
 - 3. Section 01 32 00 CONSTRUCTION PROGRESS DOCUMENTATION
 - 4. Section 01 78 39 CONTRACT RECORD DOCUMENTS
 - DEMONSTRATION AND OWNERS PRE-ACCEPTANCE ORIENTATION 5. Section 01 79 00 6.
 - Section 01 81 13 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED BUILDINGS

DEFINITIONS:

Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General A. Conditions not otherwise defined herein.

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- B. Design Consultant: "Design Consultant" shall mean the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the "Design Consultant" may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.
- C. Commissioner: The Commissioner of the Department of Design and Construction of the City of New York, his/her successors, or duly authorized representative(s).
- D. BoD: Basis of Design: A document, prepared by the Consultant Architect/Engineer, that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.
- E. Commissioning Plan: A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process.
- F. CxA: Commissioning Agent (Aka Commissioning Authority) under separate contract with the City of New York to provide Commissioning Services for this project.
- G. OPR: Owner's (City of New York) Project Requirements: A document, prepared by the Consulting Architect/Engineer) that details the functional requirements of a project and the expectations of how it will be used and operated. These include Project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.
- H. Systems, Subsystems, Equipment, and Components: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, equipment, and components.
- I. TAB: Testing, Adjusting, and Balancing.

1.5 COMMISSIONING TEAM:

- A. Members Appointed by the Contractor and its Subcontractors: Individuals, each having authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated actions. The commissioning team shall consist of, but not be limited to, representatives of the Contractor, including Project superintendent and subcontractors, installers, suppliers, and specialists deemed appropriate by the CxA.
- B. Members Appointed by the City:
 - 1. Commissioning Authority/Agent (CxA): The designated person, company, or entity under separate contract with the City that plans, schedules, and coordinates the commissioning team to implement the commissioning process.
 - 2. Representatives of the facility user and operation and maintenance personnel.
 - Consultant Architect/Engineer and other concerned entities.

1.6 CITY'S RESPONSIBILITIES:

- A. Provide the OPR documentation to the Commissioning Agent (CxA) for use in developing the commissioning plan; systems manual; operation and maintenance training plan; and testing plans and checklists.
- B. Assign operation and maintenance personnel and schedule them to participate in commissioning team activities.

Division 01 – DDC STANDARD GENERAL CONDITIONS
SINGLE CONTRACT PROJECTS
Issue Date - June 01, 2013

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C. Provide the BoD documents, prepared by the Consulting Architect/Engineer and approved by the Commissioner, to the Commissioning Agent (CxA) for use in developing the commissioning plan, systems manual, and operation and maintenance training plan.

1.7 CONTRACTOR'S RESPONSIBILITIES:

- The Contractor shall provide utility services required for the commissioning process.
- B. As a member of the Commissioning Team, the Contractor and subcontractor(s) shall assign representatives with expertise and authority to act on behalf of the Contractor and its subcontractor(s) and schedule them to participate in and perform commissioning team activities including, but not limited to, the following:
 - Participate in scheduled construction-phase coordination and commissioning team meetings.
 - 2. Integrate and coordinate commissioning process activities with the construction schedule.
 - 3. Review and accept commissioning process test procedures provided by the CxA.
 - 4. Review and accept construction checklists provided by the CxA.
 - 5. Perform testing required in the Commissioning Schedule as per the Commissioning Process test procedures provided by the CxA.
 - 6. Complete installation checklists as Work is completed and return to CxA through the Resident Engineer.
 - Cooperate with the CxA for resolution of issues recorded in the Issues Log.
 - Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
 - 9. Submit As-Built documents, operation and maintenance manuals for systems and subsystems, and equipment in accordance with Section 01 78 39, CONTRACT RECORD DOCUMENTS.
 - 10. Provide orientation sessions for operation and maintenance personnel (sessions will be video recorded by the CxA) in accordance with Section 01 79 00, DEMONSTRATION AND OWNER'S PRE-ACCEPTANCE ORIENTATION.

1.8 COMMISSIONING AGENT'S (CxA) RESPONSIBILITIES:

- A. Organize and lead the commissioning team.
- B. Prepare a construction-phase commissioning plan. Collaborate through the Resident Engineer with each Contractor and with subcontractors to develop test and inspection procedures. Include design changes and coordinate commissioning activities with the overall Project schedule. Identify commissioning team member responsibilities, by name, firm, and trade specialty, for performance of each commissioning task.
- C. Review and comment in accordance with Section 01 33 00, SUBMITTAL PROCEDURES, on submittals from the Contractor for compliance with the OPR, BoD, Contract Documents, and construction-phase commissioning plan. Review and comment on performance expectations of systems and equipment and interface between systems relating to the OPR and BoD.
- D. Coordinate with the Resident Engineer to convene commissioning team meetings for the purpose of coordination, communication, and conflict resolution; discuss progress of the commissioning processes. Responsibilities include arranging for facilities, preparing agenda and attendance lists, and notifying participants. The Commissioning Agent CxA will prepare and distribute minutes to commissioning team members and attendees within three workdays of the commissioning meeting.
- E. At the beginning of the construction phase, coordinate with the Resident Engineer's kick-off meeting schedule to conduct an initial construction-phase coordination meeting for the purpose of reviewing the commissioning activities and establishing tentative schedules for operation and maintenance submittals, operation and maintenance training sessions, TAB Work, and Project completion.



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- Observe and inspect construction. Report progress and deficiencies to the Commissioner. In addition to F. compliance with the OPR, BoD, and Contract Documents, inspect systems and equipment installation for adequate accessibility required for component maintenance replacement and repair.
- Prepare Project-specific test and inspection procedures and checklists. G.
- Coordinate with the Resident Engineer to schedule, direct, witness, and document tests, inspections, and H. systems startup.
- Compile test data, inspection reports, and certificates and include them in the systems manual and ١. commissioning report.
- Certify date of acceptance and startup for each item of equipment for start of warranty periods. J.
- Review and comment on operation and maintenance documentation and systems manual outline for K. compliance with the OPR, BoD, and Contract Documents. Operation and maintenance documentation requirements are specified in other sections of the project specifications and described in Section 01 78 39, CONTRACT RECORD DOCUMENTS.
- Record and edit demonstration and orientation sessions on DVD. L.
- Prepare commissioning reports. M.
- Assemble the final commissioning documentation, including the commissioning report and Systems N. Manual.

COMMISSIONING DOCUMENTATION: 1.9

· Film

The Contractor shall assist the Commissioning Agent (CxA) in the development and compiling of the following Commissioning Documentation: ,...

- Index of Commissioning Documents: The Commissioning Agent (CxA) will prepare an index including the A. storage location of each document.
- OPR: A written document prepared by the Commissioning Agent (CxA) that details the functional B. requirements of the Project and expectations of how it will be used and operated. This document includes the Project and design goals, measurable performance criteria, budgets, schedules, success criteria, and supporting information.
- BoD Document: A document prepared by the Consulting Architect/Engineer that records concepts, C. calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that explain the designed systems.
- Commissioning Plan: A document prepared by the Commissioning Agent (CxA) that outlines the D. schedule, allocation of resources, and documentation requirements of the commissioning process.
- Test Checklists: The Commissioning Agent (CxA) will develop test checklists for each system, E. subsystem, or equipment including interfaces and interlocks, and include a separate entry, with space for comments, for each item to be tested. The CxA will prepare separate checklists for each mode of operation and provide space to indicate whether the mode under test responded as required. Space will be provided for testing personnel to sign off on each checklist. Specific checklist content requirements are specified in other sections of the project specifications.
- Inspection Checklists will be signed by the Contractor, Subcontractor(s), Installer(s), and CxA certifying F. that systems, subsystems, equipment, and associated controls are ready for testing.
- Test and Inspection Reports: The Commissioning Agent (CxA) will record test data, observations, and G. measurements on test checklists. Photographs, forms, and other means appropriate for the application will be included with data. CxA shall compile test and inspection reports and test and inspection certificates and include them in systems manual and commissioning report.

Division 01 – DDC STANDARD GENERAL CONDITIONS SINGLE CONTRACT PROJECTS Issue Date - June 01, 2013

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- H. Corrective Action Documents: The Commissioning Agent (CxA) will document corrective action taken for systems and equipment that fail tests and include required modifications to systems and equipment and revisions to test procedures, if any. The Contractor shall retest systems and equipment requiring corrective action. The CxA will document retest results.
- I. Issues Log: The Commissioning Agent (CxA) will prepare and maintain an issues log that describes design, installation, and performance issues that are at variance with the OPR, BoD, and Contract Documents. The log will identify and track issues as they are encountered, documenting the status of unresolved and resolved issues.
 - Commissioning Report: The Commissioning Agent (CxA) will document results of the commissioning process including unresolved issues and performance of systems, subsystems, and equipment. The commissioning report will indicate whether systems, subsystems, and equipment have been completed and are performing according to the OPR, BoD, and Contract Documents.
- J. Systems Manual: The Commissioning Agent (CxA) will gather required information and compile systems manual as specified in other sections of the project specifications and described in Section 01 78 39, CONTRACT RECORD DOCUMENTS..

1.10 SUBMITTALS:

- A. Commissioning Plan Pre-final Submittal: The Commissioning Agent (CxA) will submit six (6) copies of the pre-final commissioning plan to the Commissioner for review and distribution.
- B. Commissioning Plan Final Submittal: The Commissioning Agent (CxA) will submit six (6) hard copies and electronically formatted information of the final commissioning plan to the Commissioner. The final submittal will address previous review comments.
- C. Test and Inspection Reports: CxA will submit test and inspection reports.
- D. Corrective Action Documents: CxA will submit corrective action documents.

1.11 COORDINATION:

- A. Coordinating Meetings: The Commissioning Agent (CxA) will coordinate with the Resident Engineer's regularly scheduled construction progress meetings to conduct coordination meetings of the commissioning team to review progress on the commissioning plan, to discuss scheduling conflicts, and to discuss upcoming commissioning process activities.
- B. Pre-testing Meetings: The Commissioning Agent (CxA) will coordinate with the Resident Engineer to conduct pretest meetings of the commissioning team to review startup reports, pretest inspection results, testing procedures, testing personnel and instrumentation requirements, and manufacturers' authorized service representative services for each system, subsystem, equipment, and component to be tested.
- C. Testing Coordination: The Commissioning Agent (CxA) will coordinate with the Resident Engineer the sequence of testing activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
 - Coordinate schedule times with the Resident Engineer for tests, inspections, obtaining samples, and similar activities.
- D. Manufacturers' Field Services: The Commissioning Agent (CxA) will coordinate services of manufacturers' field services.

PART II - PRODUCTS (Not Used)



Division 01 - DDC STANDARD GENERAL CONDITIONS SINGLE CONTRACT PROJECTS

Issue Date - June 01, 2013 Revised - January 15, 2015

PART III - EXECUTION

OPERATION & MAINTENANCE MANUALS 3.1

A. General

The CxA shall review the Operation & Maintenance manuals provided by the Contractor or subcontractors for completeness of the document. The review process shall verify that Operation & Maintenance instructions meet specifications and are included for all commissioned equipment furnished by the Contractor.

Published literature shall be specifically oriented to the provided equipment, indicating required 2. operation and maintenance procedures, parts lists, assembly / disassembly diagrams and related

information.

- The Contractor shall incorporate the standard technical literature into system specific formats for 3. this facility as designed and as actually installed. The resulting Operation & Maintenance information shall be system specific, concise, to the point and tailored specifically to this facility. The CxA shall review these documents as necessary for final corrections by the Contractor.
- The Operation & Maintenance Manual review and coordination efforts shall be completed prior to Owner B. orientation sessions, as these documents are to be utilized in the training sessions.

System Operations Manual C.

- The CxA shall prepare and deliver these documents with inputs from other agencies. The contractors will confirm the proper documents are onsite and readily available. Typically, the manual includes the following:
 - Commissioned systems single line diagrams (Mechanical, Electrical, Plumbing, and Building Management System (BMS) subcontractors).
 - As built sequences of operations, control drawings and original set points (Design Consultant b. and BMS subcontractor)
 - Operating instructions for integrated building systems (mechanical and BMS subcontractors). Ç.
 - Recommended schedule of maintenance requirements and frequency (subcontractors). d.
 - Recommended schedule for calibrating sensors and actuators (BMS subcontractor) e.

DEMONSTRATION AND INSTRUCTION 3.2

- The Contractor shall schedule and coordinate instruction sessions for the facility's staff for each A. commissioned system. Demonstrations shall be held per Contract Documents, along with the appropriate schematics, handouts and visual / audio training aids onsite with equipment.
- The equipment vendors shall provide instruction on the specifics of each major equipment item including B. philosophy, troubleshooting and repair techniques.
- For additional prescription pertinent to instruction, refer to other specific divisions for demonstration and C. instruction requirements.

WARRANTY REVIEW / SEASONAL TESTING 3.3

- The CxA will return upon the start of the new season (cooling or heating) after project completion to conduct performance tests that could not be performed due to ambient conditions. The seasonal testing A. will only be performed if unsuitable loads / conditions were unavailable during the performance testing stages (in other words; the requirement for testing is warranted).
- If agreed upon by facility, Seasonal Testing can also be used for the Warranty Review. During which the В. CxA will interview the occupants, maintenance staff, review the operation of the building, provide recommendations for installation and operational problems and document warranty and operational issues in the issues database.



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

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

WEBSITE www.nyc.gov/buildnyc

Contract for	Furnishing	all Labor	and Material	Necessary
Contraction	i aimaiiig	WII MUNCI		

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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





PV175AQUA



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

LOCATION:

GENERAL CONSTRUCTION WORK

Staten Island Zoo Aquarium Reconstruction

614 Broadway

BOROUGH: Staten Island, NY 10310 CITY OF NEW YORK	
Signature Constructi	Our Grusp
Dated	, 20
Approved as to Form Certified as to Legal Authority Acting Corporation Counsel	
Dated August 31	, 20_/
Entered in the Comptroller's Office	
First Assistant Bookkeeper	
Dated	

8.31.15 JP



20



PROJECT ID:

PV175AQUA

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 Zoo Aquarium Reconstruction

LOCATION: BOROUGH:

CITY OF NEW YORK

614 Broadway Staten Island, NY 10310

CONTRACT NO. 1

GENERAL CONSTRUCTION WORK

Department of Cultural Affairs

LEESER Architecture

Date:

June 4, 2015

15-182



SCHEDULE A (FOR PUBLICLY BID PROJECTS) PART I - Contract Requirements

Various Articles of the Contract refer to requirements which are set forth in Schedule A of the General Conditions. The Schedule set forth below specifies the following: (1) the referenced Articles of the Contract, and (2) the specific requirements applicable to the contract.

REFERENCE	<u>ITEM</u>	REQUIREMENTS	CONTRACT #1	
Information For Bidders	Bid Security		See Attachment 1 – Bid Information in the	Bid Booklet
Information For Bidders	Performance ar Payment Bonds		See Attachment 1- Bid Information in the	Bid Booklet
Article 14 Contract	Time of Completion	Consecutive Calendar Days	540 ccds	
Article 15 Contract	Liquidated Damages	For each consecutive calendar day over completion time	\$600	
Article 17 Contract Article 21	Sub- Contracts	Not to exceed Percent of Contract Price	60%	
Contract	Retainage	Percent of Voucher	If 100% bonds are required	5%
			If 100% bonds are not required, and Contract Price is \$1,000,000 or less	5%
			If 100% bonds are not required, and Contract Price is more than \$1,000,000	10%
Article 24 Contract	Deposit Guarantee	Percent of Contract Price	1%	
Article 24 Contract	Period of Guarantee		See Schedule B of the Addendum to the Ge	eneral Conditions
Article 74 Contract	Statement of Work		See Contract Article 74	
Article 75 Contract	Compensation to be Paid to Contractor		See Contract Article 75	
Article 78 Contract	MWBE Program		See M/WBE Utilization Plan in the Bid Book	let

Relating to Article 22 - Insurance

PART II. Types of Insurance, Minimum Limits and Special Conditions

Note: All certificate(s) of insurance submitted pursuant to Contract Article 22.3. 3 must be accompanied by a Certification by Broker consistent with Part III below and include the following information:

- For each insurance policy, the name and NAIC number of issuing company, number of policy, and effective dates; Policy limits consistent with the requirements listed below;
- Additional insureds or loss payees consistent with the requirements listed below; and
- The number assigned to the Contract by the City (in the "Description of Operations" field).

Insurance indicated by a blackened box (■) or by (X) in the □ to left will be required under this contract.

Types of Insurance (per Article 22 in its entirety, including listed paragraph)		e U to left will be required under this contract. Minimum Limits and Special Conditions		
■ Commercial General Liability	Art. 22.1.1	The minimum limits shall be \$1,000,000.00 per occurrence and \$2,000,000.00 per project aggregate applicable to this Contract . Additional Insureds: 1. City of New York, including its officials and employees, with coverage at least as broad as ISO Forms CG 20 10 and CG 20 37, and 2. All person(s) or organization(s), if any, that Article 22.1.1(b) of the Contract requires to be named as Additional Insured(s), with coverage at least as broad as ISO Form CG 20 26. The Additional Insured endorsement shall either specify the entity's name, if known, or the entity's title (e.g., Project Manager).		
■ Workers' Compensation	Art. 22.1.2	Workers' Compensation, Employers' Liability, and		
Disability Benefits Insurance	Art. 22.1.2	Disability Benefits Insurance: Statutory per New York State law without regard to jurisdiction.		
Employers' Liability	Art. 22.1.2	Note: The following forms are acceptable: (1) New York State Workers' Compensation Roard Farm N		
Jones Act	Art. 22.1.3	(3) New York State Workers' Compensation Board Form No. DB-120.1 and (3) Request for MC/DB		
U.S. Longshoremen's and Harbor ct Art. 22.1.3	Workers Compensation	Exemption Form No. CE-200. The City will not accept an ACORD form as proof of Workers' Compensation or Disability Insurance. Jones Act and U.S. Longshoremen's and Harbor Workers' Compensation Act: Statutory per U.S. law.		

Relating to Article 22 - Insurance

PART II. Types of Insurance, Minimum Limits and Special Conditions

Insurance indicated by a blackened box (\blacksquare) or by (X) in the \square 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		
■ Builders' Risk	Art. 22.1,4	100 % of total value of Work Contractor the Named Insured; the City both an Additional Insured and one of the loss payees as its interests may appear. If the Work does not involve construction of a new building or gut renovation work, the Contractor may provide an installation floater in lieu of Builders Risk insurance. Note: Builders Risk Insurance may terminate upon Substantial Completion of the Work in its entirety.		
■ Commercial Auto Liability	Art. 22.1.5	\$1,000,000.00 per accident combined single limit If vehicles are used for transporting hazardous materials, the Contractor shall provide pollution liability broadened coverage for covered vehicles (endorsement CA 99 48) as well as proof of MCS 90		
□ Contractor's Pollution Liability	Art. 22.1.6	\$ per occurrence \$ aggregate Additional Insureds: 1. City of New York, including its officials and employees, and 2 3		
Marine Protection and Indemnity	Art. 22.1.7(a)	\$ per occurrence \$ aggregate Additional Insureds: 1. City of New York, including its officials and employees, and 2 3		

Relating to Article 22 - Insurance

PART II. Types of Insurance, Minimum Limits and Special Conditions (Continued)

Insurance indicated by a blackened box (■) or by (X) in the □ to left will be required under this contract. Types of Insurance (per Article 22 in its entirety, including listed paragraph) Minimum Limits and Special Conditions □ Hull and Machinery Insurance \$_____ per occurrence Art. 22.1.7(b) \$_____ aggregate Additional Insureds: 1. City of New York, including its officials and employees, and □ Marine Pollution Liability Art. 22.1.7(c) \$_____ each occurrence Additional Insureds: 1. City of New York, including its officials and employees, and [OTHER] Art. 22.1.8 \$_____each occurrence □ Ship Repairers Legal Liability [OTHER] Art. 22.1.8 \$_____ per occurrence □ Collision Liability/Towers Liability \$_____ aggregate Additional Insureds: 1. City of New York, including its officials and employees, and [OTHER] Art. 22,1,8 \$_____ per occurrence □ Railroad Protective Liability \$_____ aggregate Additional Insureds: 1. City of New York, including its officials and employees, and

Relating to Article 22 - Insurance

PART II. Types of Insurance, Minimum Limits and Special Conditions (Continued)

Insurance indicated by a blackened box (■) or by (X) in the □ to left will be required under this contract.

[OTHER] Art. 22.1.8	Only required of the Contractor or Subcontractor
■ Asbestos Liability	performing any required asbestos removal.
	\$1,000,000 each occurrence,
	\$2,000,000 aggregate (Combined Single Limit); only required of the Contractor or Subcontractor performing any required asbestos removal.
	Additional Insureds: 1. City of New York, including its officials and employees
[OTHER] Art. 22.1.8	
■ Boiler Insurance	\$200,000
OTHER] Art. 22.1.8	\$1,000,000 per occurrence
Professional Liability In the event any section of the Specifications requires the Contractor to engage a Professional Engineer to provide lesign and/or engineering services, the Engineer engaged by the Contractor, as well as any sub consultant(s) performing rofessional services, shall provide Professional Liability insurance.	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
	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.

Relating to Article 22 - Insurance

PART III. Certificates of Insurance

All certificates of insurance (except certificates of insurance solely evidencing Workers' Compensation Insurance, Employer's Liability Insurance, and/or Disability Benefits Insurance) must be accompanied by one of the following:

(1) the Certification by Insurance Broker or Agent on the following page setting forth the required information and signatures;

-- OR --

(2) copies of all policies as certified by an authorized representative of the issuing insurance carrier that are referenced in such certificate of insurance. If any policy is not available at the time of submission, certified binders may be submitted until such time as the policy is available, at which time a certified copy of the policy shall be submitted.

Relating to Article 22 - Insurance

PART III. Certification by Insurance Broker or Agent

The undersigned insurance broker or agent represents to the City of New York that the attached Certificate of Insurance is accurate in all material respects.

ounty of) worn to before me this		[Name of broker or agent (typewritten)]
[Phone number/Fax number of broker or agent (typewritten)] [Signature of authorized official or broker or agent] [Name and title of authorized official, broker or agent (typewritted) State of		[Address of broker or agent (typewritten)]
[Signature of authorized official or broker or agent] [Name and title of authorized official, broker or agent (typewritted) [State of		[Email address of broker or agent (typewritten)]
[Name and title of authorized official, broker or agent (typewritted) State of		[Phone number/Fax number of broker or agent (typewritten)]
State of		[Signature of authorized official or broker or agent]
State of		[Name and title of authorized official, broker or agent (typewritten
Oounty of) Sworn to before me this	State of)	
	· · · · · · · · · · · · · · · · · · ·	
	Sworn to before me this	
	day of, 20	
IOTARY PUBLIC FOR THE STATE OF		

Relating to Article 22 - Insurance

PART IV. Address of Commissioner

Wherever reference is made in Article 7 or Article 22 to documents to be sent to the C filings, or submissions), such documents shall be sent to the address set forth below address, to the Commissioner's address as provided elsewhere in this Contract.	commissioner (e.g., notices, or, in the absence of such
ACCO's Office, Insurance Unit	
30-30 Thomson Avenue, 4 th Floor	
Long Island City, New York 11101	



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

ADDENDUM TO THE GENERAL CONDITIONS FOR SINGLE CONTRACT PROJECTS

The General Conditions are hereby amended in accordance with the terms and conditions set forth in this Addendum.

I. PROJECT DESCRIPTION

FMS #:

PV175AQUA

Staten Island Zoo Aquarium Reconstruction

PROJECT DESCRIPTION: This Project consists of the reconstruction of the zoo's aquarium exhibit, foyer and central boiler plant. The aquarium is located on the ground floor of the main zoo building and the boiler plant is located beneath the aquarium in the double height cellar space.

The reconstruction of the aquarium involves demolition of the existing exhibit followed by installation of new stateof-the-art tanks and life support systems. The project also includes installation of dedicated MEP/FP systems to support the aquarium exhibit space. The new HVAC units are to be located in the attic space 2 floors above the exhibit and new condensing units are to be installed on the flat roof above the adjacent Reptile Wing. This work is to be undertaken whilst the adjacent zoo wings remain open to the public and should be phased accordingly to

The reconstruction of the central boiler plant involves demolition of the existing boiler equipment serving the maintain egress from the building. building and installation of new modular boiler units. The work is to be undertaken whilst the building is open to the public. A temporary boiler unit is to be installed at the exterior of the building to maintain full operational capacity for the animal wings the existing boiler serves.

PROJECT LOCATION:

614 Broadway

BOROUGH:

CITY OF NEW YORK

Staten Island

ZIP CODE:

10310

COMMUNITY BOARD #:

501

LANDMARK STATUS:

If this is a Designated Landmark Structure or Site, Section 01 3591, Historic Treatment Procedures applies DESIGNATED LANDMARK STRUCTURE OR SITE: NO

If this is a Landmark Quality Structure, Section 01 3591, Historic Treatment Procedures applies to this project.

II. LEED GREEN BUILDING REQUIREMENTS

Not Used

III. COMMISSIONING REQUIREMENTS

Not Used

IV. PROJECT MANAGEMENT

DDC shell a true
using its own personnel.
DDC shall publicly bid and enter into all contracts for the Project. A Construction Management firm (the CM") hired by DDC shall manage the Project. The Contractor is advised that the CM shall serve as the responsible for the inspection, management, coordination and administration of the required construction work, as delineated in the article of the Standard Construction Contract entitled "The Resident Engineer".
• •

V. CONTRACTS FOR THE PROJECT

The Project consists of a single contract, the Contract for General Construction Work. The Contractor for General Construction Work is responsible for the performance of all required work for the Project as set forth in the Contract Documents (General Conditions, Drawings and Specifications), including all responsibilities and obligations assigned to separate Contractors for the following subdivisions of the work: Plumbing Work, HVAC Work, and Electrical Work. All responsibilities and obligations in the Contract Documents assigned to separate Contractors for such subdivisions

VI. 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

VII. APPLICABILITY OF SECTIONS/SUB-SECTIONS AND AMENDED SUB-SECTIONS

The Contractor is advised that various Sections/Sub-Sections in the General Conditions may not apply to this Project or may apply as amended. Such Sections/Sub-Sections advise the Contractor to "Refer to the Addendum for the applicability of this Section/Sub-Section." Such Sections/Sub-Sections are set forth below. A check mark indicates whether the Section/Sub-Section (1) applies to the Project, (2) does not apply to the Project, or (3) applies to the Project as amended. If no box is checked, the Section/Sub-Section, as set forth in the General Conditions, applies to the Project. Amended Sections/Sub-Sections, if any, are set forth following this list of Sections.

	ch		ation	Applies	Does not Apply	Applies as Amended
<u>Section</u>	<u>Sub-</u> Section	Sub-Se	ection		X	
	1.4 (B)	Scope	and Intent / LEED	X		
01 1000	1.4(C)	Scope	and Intent / Commissioning	X		
_	1.4(0)	Photo	graphic Documentation		X	
01 3233	47 (A D)	IFFD	Submittals	X		
01 3300	1.7 (A-D)	**	Peguirements	^		Х
01 3503		Electi	rical Conduit System Including Boxes (
01 3506	3.2 (A-B)	lunci	ion and Odder	Х		
	3.3 (A-E)	Elect	rical Wiring Devices	Х		
	3.4 (A-I)	Elect	trical Conductors and Terminations	Х		
	3.5 (A-B)		uit Protective Devices	X		
	3.6 (A-J	Dist	ribution Centers	Х		
	3.7 (A-l		ors	Х		
	3.8 (A-I		or Control Equipment		Х	
	3.0 (A-1		tario Treatment Procedures		Х	
01 3591	- 0 / 1		- Viting / Temporary Water	rk		
01 5000		Το	moorary Water Facilities / Temporary	rk X		
	3.2 (B) in	Existing Facilities mporary Sanitary Facilities / Self-Contained Toilet	X		
	3.3 (E	Te 3) Hr	imporary Samuary 1 source (Scienting Toilets	Х		
	3.3 (0	٥.	Caritary Facilities / Existing Tollets	X		
		T. Te	emporary Power, Lighting, and Oile 19	^		
	3.4 (E) ا (ف	onnection to Utility Lines and Site Lighting /	Х		
01 500	o 3.4 (E	s) 2 C	emporary Power, Lighting, and Site Lighting emporary Power Service connection to Existing Electrical Power Service			X
0, 555	3.4 (7	emporary Power, Lighting, Convice	.,		
	3.4 (7	Temporary Power, Lighting, San	Х		
	3.4	(ロ) -	Temporary Lighting and Site Lighting / Sit	ie		X
	3.4	(E)	Temporary Power, Lighting, and Old Lighting (Security Lighting (for New Construction Only)	X		
			Heat	- 0		X
		,	DDC Field Office / Office Space in Existing Building	iy S	<	
		• •	DDC Field Office Italies			
		8 (B)	DDC Field Office / DDC Managed Field Office Transport	allei	X	
		8 (B- 3a)	DDC Field Office / CM Managed Field Office Tra	iler		Х
	3.	8 (B-	DDC Field Office / CW Warres	Odd	X	
		3b)	DDC Field Office / Additional Equipment for the		^	X
	3	.8 (D)	Field Office			^
	3.1	3(A-D)	Work Fence Enclosure		X	
	3	17(B)	Project Rendering			X
	3	.18 (A-	Security Guards / Fire Guards on Site			
		C)				Page 3

01 5411	Section 3.1 (A-J)	Temporary Use, Operation and Maintenance of	Applies	Does not Apply	Applies as Amende
	3.2 (A-M)			X	
	3.3 (A-E)	remporary lies O		X	
01 7300	3.3 (A-I)	Elevators During Construction for Existing Buildings Surveys	X		·
	3.4 (A-B)	Borings		X	<u> </u>
	3.12 (A- D)	Sleeves and Hangers		X	
	3.13 (A)	Sleeve and Penetration Drawings	X		
	3.15 (A)	Location of Partitions	Χ		
01 7419	1.5 (C)	Waste Management Performance Requirements /		X	
01 7900		Demonstration and Owned D		X	
01 8113		Sustainable Design Requirement	X		
1 8113.13	\	VOC Limits for Adhesives, Sealants, Paints and Coatings for LEED Buildings		X	
01 8119	li	Coatings for LEED Buildings Indoor Air Quality Requirements for LEED Buildings		X	
01 9113	G	Seneral Commissioning Requirements		X	
		requirements		X	

VIII. SPECIAL EXPERIENCE REQUIREMENTS FOR THE PROJECT

- GENERAL: Special Experience Requirements for the Project are set forth below. Such Special Experience Requirements may apply to either or both of the following entities: (a) the contractor or subcontractor that will perform specific areas of work, and/or (b) the manufacturer that will provide specific material or equipment. (1)
- REVISION OF SPECIFICATIONS AND DRAWINGS: In the event the Specifications and/or the Contract Drawings contain any Special Experience Requirements that are not set forth below, such Special Experience Requirements are deemed deleted, except as otherwise expressly provided in Section VIII of this Addendum. (2)
- 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 Special 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 any specific area of work with its own forces, it must demonstrate compliance with the Special Experience Requirements. If the contractor intends to subcontract any specific area 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. In addition, for roofing work, the contractor or subcontractor must be licensed or approved by the manufacturer of the roofing system. 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 075000: Existing Roof Work
- Section 131000: Aquatic Life Support Systems
- Section 131300: Aquarium Exhibit Tanks & Habitats
- SPECIAL EXPERIENCE REQUIREMENTS FOR MANUFACTURERS: The special experience requirements set forth below apply to the manufacturer that will supply or fabricate specific material or equipment. Compliance with such experience requirements will be evaluated after an award of contract. Within two (2) weeks of award, the contractor will be required to submit the qualifications of the proposed manufacturer(s). Once approved, no (4) substitution will be permitted, unless the qualifications of the proposed replacement have been approved in writing in advance by the City
 - Special Experience Requirement #2: The manufacturer providing the material or equipment specified in this section must, for the past five (5) 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 five (5) years. This Special (a) Experience Requirement applies to the manufacturer that will provide material or equipment specified in the section(s) set forth below.

General Construction Work:

Section 131300: Aquarium Exhibit Tanks & Habitats

IX. REVISIONS: SPECIFICATIONS AND CONTRACT DRAWINGS

The Specifications and the Contract Drawings for the Project are revised in accordance with the provisions set forth (1)

- Owner: Wherever the term "Owner" is used in the Specifications and/or the Contract Drawings, such term shall
- Other Entities: In the event any entity other than the City of New York is referred to or named as the "Owner" in (2)the Specifications and/or the Contract Drawings, the name of such other entity is deemed deleted and replaced
- Architect / Engineer: Wherever the words "Architect", "Engineer", "Architect / Engineer" or "Architect and/or (3) Engineer" are used in the Specifications and/or the Contract Drawings, such words are deemed deleted and
- Products / Manufacturers: Wherever the Specifications and/or the Contract Drawings require the contractor to provide a particular product (i.e., material and/or equipment) from a designated manufacturer and/or vendor, the term "or approved equal" is deemed inserted, even if only one product and/or manufacturer is specified, except (a)
 - Proprietary Items: If the Bid Booklet contains a Notice which identifies a particular product from a designated manufacturer as a "Proprietary Item", the Contractor shall be required to provide such specified product. In such case, no substitution or "approved equal" will be permitted.
- Special Experience Requirements: Special Experience Requirements for the Project, if any, are set forth in the (5) Special Experience Requirements may apply to contractors, subcontractors, installers, manufacturers and/or suppliers. If the Specifications and/or the Contract Drawings contain any Special Experience Requirement that is not set forth in the Bid Booklet, such Special Experience Requirement is deemed deleted, except as otherwise provided below. (a)
 - Any Special Experience Requirement that provides that the entity performing the work or supplying the material must have more than three (3) years of experience, is revised to provide that the entity performing the work or supplying the material must have three (3) years of experience, except as described in
 - Any Special Experience Requirement that pertains to the abatement of hazardous materials shall not be subject to the deletion and/or revision set forth above. Such Special Experience Requirement shall remain
 - Any Special Experience Requirement that provides that the entity performing the work must be licensed, authorized, certified, approved by or acceptable to the manufacturer, is deemed deleted and replaced with the requirement that such entity must be properly trained for the specified work.
 - Any Special Experience Requirement that provides that the individual workers performing the work must (d) be licensed, authorized, certified, approved by or acceptable to the manufacturer, is deemed deleted and replaced with the requirement that such individual workers must be properly trained for the specified work.
- Alternate Bids: If the agency is requesting the submission of Alternate Bids, a Notice regarding such Alternate (6) Bids is set forth in the Bid Booklet. In the event of any conflict or inconsistency between (1) the Notice regarding Alternate Bids set forth in the Bid Booklet and (2) a provision in the Specifications and/or the Contract Drawings regarding Alternate Bids, the Notice set forth in the Bid Booklet shall prevail. If the agency is not requesting the submission of Alternate Bids, as indicated by the absence of a Notice in the Bid Booklet, and the Specifications and/or the Contract Drawings contain any provision regarding Alternate Bids, such provision is deemed deleted.
- Contractor Retained Engineer: If the Specifications and/or the Contract Drawings require the Contractor to retain an Engineer to provide engineering services for the Project, the following sentence is deemed inserted: "Such Engineer must be a Professional Engineer, licensed in the State of New York."
- <u>LEED Related Provisions</u>: If the Specifications and/or the Contract Drawings require the Contractor to purchase (8) Addendum to the General Conditions



- FSC certified wood, rapidly renewable materials, or materials within 500 miles, such provisions are deemed deleted and replaced with the requirement that if the contractor has purchased FSC certified wood, rapidly renewable materials, or materials within 500 miles, the contractor shall submit such forms or documentation as may be required by the City in order for the USGBC to certify that the Project qualifies for the related LEED credit(s).
- (9) <u>Guarantees</u>: Requirements for Guarantees and Maintenance are set forth in Schedule B, which is included in the Addendum to the General Conditions. In the event of any conflict or inconsistency between (1) a guarantee and/or maintenance requirement set forth in the Specifications and/or the Contract Drawings and (2) a guarantee and/or maintenance requirement set forth in Schedule B, the guarantee and/or maintenance requirement set forth in Schedule B, the guarantee and/or maintenance requirement set forth in Schedule B shall prevail.
- (10) <u>Warranties</u>: Requirements for Warranties are set forth in Schedule B, which is included in the Addendum to the General Conditions.
 - (a) In the event of any conflict or inconsistency between (1) a warranty requirement set forth in the Specifications and/or the Contract Drawings and (2) a warranty requirement set forth in Schedule B, the warranty requirement set forth in Schedule B shall prevail.
 - (b) In the event a warranty requirement set forth in the Specifications and/or the Contract Drawings is omitted from Schedule B, such omission from Schedule B shall have no effect and the Contractor's obligation to provide the manufacturer's warranty, as set forth in the Specifications and/or the Contract Drawings, shall remain in full force and effect.
 - (c) In the event a warranty requirement for a particular item of material or equipment is omitted from Schedule B, as well as from the Specifications or the Contract Drawings, and the manufacturer of such item actually provides a warranty, the Contractor shall be obligated to obtain and deliver to the Commissioner the highest level of warranty actually provided by that manufacturer.
 - (11) Exculpatory Provisions: In the event the Specifications and/or the Contract Drawings contain any provision whereby the consultant and/or any of its officers, employees or agents, including subconsultants, is absolved of responsibility for any act or omission, such provision is deemed deleted.
 - (12) <u>Insurance</u>: Provisions regarding insurance coverage the Contractor is required to provide are set forth in Article 22 of the City of New York Standard Construction Contract and Schedule A, which is included in the Addendum to the General Conditions. In the event the Specifications and/or the Contract Drawings contain any provision regarding insurance requirements, such provision is deemed deleted.
 - (13) Indemnification: Provisions regarding indemnification are set forth in Articles 7, 12, 22 and 57 of the City of New York Standard Construction Contract. In the event the Specifications and/or the Contract Drawings contain any provision regarding indemnification, such provision is deemed deleted.
 - (14) <u>Dispute Resolution</u>: Provisions regarding dispute resolution are set forth in Article 27 of the City of New York Standard Construction Contract. In the event the Specifications and/or the Contract Drawings contain any provision regarding dispute resolution, such provision is deemed deleted.
 - (15) Payment to Other Entities: In the event the Specifications and/or the Contract Drawings contain any provision which requires the Contractor to make payments to an entity other than a subcontractor and/or supplier providing services and/or material for the project, such provision is deemed deleted.
 - (16) <u>General Conditions</u>: In the event of any conflict or inconsistency between (1) the Specifications and/or the Contract Drawings and (2) the General Conditions, the General Conditions shall prevail.
 - (17) <u>Standard Construction Contract</u>: In the event of any conflict or inconsistency between (1) the Specifications and/or the Contract Drawings and (2) the City of New York Standard Construction Contract, the City of New York Standard Construction Contract shall prevail.

SCHEDULE A (FOR PUBLICLY BID PROJECTS) PART I - Contract Requirements

Various Articles of the Contract refer to requirements which are set forth in Schedule A of the General Conditions. The Schedule set forth below specifies the following: (1) the referenced Articles of the Contract, and (2) the specific requirements applicable to the contract.

REFERE Information)n	- TAOINENIS	referenced Articles of the Contract,	(=) the s
For Bidde	rs Bid Security		CONTRACT#1	
Informatio For Bidder	n Performance 's Payment Bo	e and	See Attachment 1 – Bid Information in	the Bid Booklet
Article 14 Contract	Time of Completion	Consecutive Calendar Days	See Attachment 1- Bid Information in th	ne Bid Booklet
Article 15 Contract	Liquidated Damages	For each consecutive calendar day over	540 ccds	
Article 17 Contract	Sub-	completion time	\$600	
Article 21 Contract	Contracts Retainage	Not to exceed Percent of Contract Price Percent of	60%	
		Voucher	If 100% bonds are required	
			If 100% bonds are not required, and Contract Price is \$1,000,000	5% 5%
Anti-L			If 100% bonds are not required, and Contract Price is more than \$1,000,000	
Article 24 Contract	Deposit Guarantee	Percent of Contract Price		10%
Article 24 Contract	Period of		1%	
Article 74	Guarantee Statement of		See Schedule B of the Addendum to the Ge	neral Conditions
Contract	Work		See Contract Article 74	
rticle 75 ontract	Compensation to be Paid to Contractor		See Contract Article 75	
ticle 78 Intract	MWBE Program			
			See M/WBE Utilization Plan in the Bid Booklei	

Relating to Article 22 - Insurance

PART II. Types of Insurance, Minimum Limits and Special Conditions

Note: All certificate(s) of insurance submitted pursuant to Contract Article 22.3. 3 must be accompanied by a Certification by Broker consistent with Part III below and include the following information:

- For each insurance policy, the name and NAIC number of issuing company, number of policy, and effective dates;
- Policy limits consistent with the requirements listed below;
- Additional insureds or loss payees consistent with the requirements listed below; and
- The number assigned to the Contract by the City (in the "Description of Operations" field).

Insurance indicated by a blackened box (■) or by (X) in the □ to left will be required under this contract.

The number assigned to the Contract by the City (in and rance indicated by a blackened box (■) or by (X) in the	Minimum Limits and Special Conditions
Types of Insurance (per Article 22 in its entirety, including listed paragraph)	24 000 000 00 per
Commercial General Liability Art. 22.1.1	applicable to this Contract .
	Additional Insureds: 1. City of New York, including its officials and employees, with coverage at least as broad as ISO Forms CG 20 10 and CG 20 37, and
	2. All person(s) or organization(s), if any, that Article 22.1.1(b) of the Contract requires to be named as Additional Insured(s), with coverage at least as broad as ISO Form CG 20 26. The Additional Insured endorsement shall either specify the entity's name, if known, or the entity's title (e.g., Project Manager).
Art. 22.1.2	Workers' Compensation, Employers' Liability, and Disability Benefits Insurance: Statutory per New York State law without regard to jurisdiction.
■ Workers' Compensation Art. 22.1.2 ■ Disability Benefits Insurance Art. 22.1.2	State law without regard to june and the state law with the state law with the state law with the state law without regard to june and the state law with the state law w
■ Employers' Liability Art. 22.1.2	C-105.2, (2) State illistration from Board
□ Jones Act	Form No. DB-120.1 and (o). The City will not accep Exemption Form No. CE-200. The City will not accep
□ U.S. Longshoremen's and Harbor Workers Compensa Art. 22.1.3	an ACORD form as proof of the Disability Insurance. Jones Act and U.S. Longshoremen's and Harbor Workers' Compensation Act: Statutory per U.S. law.

Relating to Article 22 - Insurance

PART II. Types of Insurance, Minimum Limits and Special Conditions

Insurance indicated by a blackened box (■) or by (X) in the □ to left will be required under this contract.

Types of Ins (per Article 22 in its entirety, in	surance ocluding listed paragraph)	Minimum Limits and Special Conditions
■ Builders' Risk	Art. 22.1.4	
	.	100 % of total value of Work
		Contractor the Named Insured; the City both an Additional Insured and one of the loss payees as its interests may appear.
		If the Work does not involve construction of a new building or gut renovation work, the Contractor may provide an installation floater in lieu of Builders Risk insurance.
		Note: Builders Risk Insurance may terminate upon Substantial Completion of the Work in its entirety.
■ Commercial Auto Liability	Art. 22.1.5	\$1,000,000.00 per accident combined single limit
		If vehicles are used for transporting hazardous materials, the Contractor shall provide pollution liability broadened coverage for covered vehicles (endorsement CA 99 48) as well as proof of MCS 90
Contractor's Pollution Liability	Art. 22.1.6	\$ per occurrence
		\$aggregate
		Additional Insureds:
		City of New York, including its officials and employees, and
Marine Protection and Indemnity	Art. 22.1.7(a)	3 per occurrence
	, ,	\$aggregate
	6	Additional Insureds: 1. City of New York, including its officials and employees, and 2.

Relating to Article 22 - Insurance

PART II. Types of Insurance, Minimum Limits and Special Conditions (Continued)

Insurance indicated by a blackened box (\blacksquare) or by (X) in the \Box to left will be required under this contract.

r-	Les less will be required under this contract.
nnce indicated by a blackened box (■) or by (X) in the	Minimum Limits and Special Conditions
Types of insurance r Article 22 in its entirety, including listed paragraph)	Minimum Limits and Special Community \$per occurrence
Hull and Machinery Insurance Art. 22.1.7(b)	\$aggregate
	Additional Insureds: 1. City of New York, including its officials and employees, and 2
Art. 22.1.7(c)	2
Marine Pollution Liability Art. 22.1.7(c)	Additional Insureds: 1. City of New York, including its officials and employees, and 2
[OTHER] Art. 22.1.8	\$each occurrence
□ Ship Repairers Legal Liability	
Art. 22.1.8	\$per occurrence
[OTHER] □ Collision Liability/Towers Liability	\$aggregate
	Additional Insureds: 1. City of New York, including its officials and employees, and 2. 3.
Art. 22.1.8	\$per occurrence
[OTHER]	\$aggregate
□ Railroad Protective Liability	Additional Insureds: 1. City of New York, including its officials and employees, and 2

Relating to Article 22 - Insurance

PART II. Types of Insurance, Minimum Limits and Special Conditions (Continued)

Insurance indicated by a blackened box (■) or by (X) in the □ to left will be required under this contract.

	the ∟ to left will be required under this contract.
Art. 22.1.8 Asbestos Liability	Only required of the Contractor or Subcontractor performing any required asbestos removal.
	\$1,000,000 each occurrence, \$2,000,000 aggregate (Combined Single Limit); only required of the Contractor or Subcontractor performing any required asbestos removal. Additional Insureds: 1. City of New York, including its officials and employees
OTHER] Art. 22.1.8	
Boiler Insurance	0000
OTHER]	\$200,000
Art. 22.1.8 Professional Liability	\$1,000,000 per occurrence
the event any section of the Specifications requires the ontractor to engage a Professional Engineer to provide sign and/or engineering services, the Engineer engaged by of Contractor, as well as any sub consultant(s) performing of Services, shall provide Professional Liability surance.	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
	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.

Relating to Article 22 - Insurance

PART III. Certificates of Insurance

All certificates of insurance (except certificates of insurance solely evidencing Workers' Compensation Insurance, Employer's Liability Insurance, and/or Disability Benefits Insurance) must be accompanied by one of the following:

(1) the Certification by Insurance Broker or Agent on the following page setting forth the required information and signatures;

-- OR --

(2) copies of all policies as certified by an authorized representative of the issuing insurance carrier that are referenced in such certificate of insurance. If any policy is not available at the time of submission, certified binders may be submitted until such time as the policy is available, at which time a certified copy of the policy shall be submitted.

Relating to Article 22 - Insurance

PART III. Certification by Insurance Broker or Agent

The undersigned insurance broker or agent represents to the City of New York that the attached Certificate of Insurance is accurate in all material respects.

[Address of broker or agent (typewritten)] [Email address of broker or agent (typewritten)] [Phone number/Fax number of broker or agent (typewritten)] [Signature of authorized official or broker or agent] [Name and title of authorized official, broker or agent (typewritter) State of		[Name of broker or agent (typewritten)]
[Phone number/Fax number of broker or agent (typewritten)] [Signature of authorized official or broker or agent] [Name and title of authorized official, broker or agent (typewritter of state of		[Address of broker or agent (typewritten)]
[Signature of authorized official or broker or agent] [Name and title of authorized official, broker or agent (typewritter of		[Email address of broker or agent (typewritten)]
[Name and title of authorized official, broker or agent (typewritter State of) County of) Sworn to before me this		[Phone number/Fax number of broker or agent (typewritten)]
County of) Sworn to before me this		[Signature of authorized official or broker or agent]
County of) Sworn to before me this	State of	[Name and title of authorized official, broker or agent (typewritten)
day of, 20	worn to before me this	
	, 20	
OTARY PUBLIC FOR THE STATE OF	OTARY PUBLIC FOR THE STATE OF	

Relating to Article 22 - Insurance

PART IV. Address of Commissioner

Wherever reference is made in Article 7 or Article filings, or submissions), such documents shall be address, to the Commissioner's address as pro	Selli to the sale	mmissioner (e.g., notices, , in the absence of such
address, to the Commission		

Comme	
	ACCO's Office, Insurance Unit
	30-30 Thomson Avenue, 4 th Floor
	Long Island City, New York 11101

SCHEDULE B

Guarantees and Warranties

(Reference: Section 01 7839, Article 2.7 of the DDC Standard General Conditions)

GUARANTY FROM CONTRACTOR

- 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)
- 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
- Guaranty Period: The obligation of the Contractor, and its Surety under the Performance Bond, is limited to the period(s) of time specified above.
- Other Provisions Deemed Deleted: In the event the Specifications and/or the Contract Drawings (3) contain any provisions regarding guaranty requirements, such provisions are deemed deleted and replaced ***********************************

WARRANTY FROM MANUFACTURER

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.

Specification Number 071420 075000 079200 087000	Material or Equipment Elastomeric Coating Existing Roof Work Joint Sealers Finish Hardware: Surface Closers Locksets Exit Devices	Warranty Period 10 years 20 years 10 years 25 years
088000 131000	Balance of Hardware Glass and Glazing Aquatic Life Support Systems: Pumps and Motors Pipe, fittings and supports Valves and Valve actuators Pressure filter vessels Fractionators Ozone contacting systems Heaters and heat exchangers	1 year 3 years 1 year 5 years 1 year 1 year 1 year 1 year 1 year 1 year 1 year 1 year

	Aquatic Life Support Systems:	1 year
131000	Aquatic Life Support Systems: Fiberglass/PVC tanks and materials	1 year
, ,	nket etraineis	1 year
	Water quality instrumentation	• •
	Drainage Systems:	5 years
221300	Drainage Systems Duplex sump pumps	20 years
221000	Dublex samp band	2 years
	Motors Complete System	2 900
	General Requirements for HVAC: General Requirements for HVAC: General Requirements for HVAC:	1 year
230500	General Requirements for HVAO. All equipment, materials and appurtenances	5 years
230000		5 years
	Compressors Heat pump unit refrigerant circuit Heat pump unit refrigerant circuit	J you.
	Heat pump unit refrigerant chosen (incl. compressors, coils, reversing valve	
	(incl. compressors, early)	5 years
	and expansion valve) AC unit or heat pump unit control board	5 years
	Energy recovery wheels	2 years
		1 year
230513	Water Treatment & Chemical Cleaning Water Treatment & Reeching and Chimney	10 years
232500	Water Treatment & Chemical Cleaning Sheet Metal Ductwork: Breeching and Chimney	2 years
232300	Sheet Metal Ductwork, Broom 5	10 years
233513	VFDs Emergency Lighting Unit Batteries Emergency Lighting Unit Batteries Balloot and Self-Powered Exit Sign Ba	Harios 7 Vears
265100	Emergency Lighting Unit Batteries Emergency Ballast and Self-Powered Exit Sign Ba	tteries / years
203100	Emergency Ballast and Com	1 year
	Ballasts	5 years
	T5 and T8 Fluorescent Lamps	2 years
	LEDs Control Equipment	1 year
	Lighting Control Equipment	i year
283111	Fire Alarm System	
203111		fied above shall a

- (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.
- In the event of any conflict between a warranty requirement set forth in the Specifications and a 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
- 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.
- In the event a warranty requirement is provided for a particular item of material or equipment, and such requirement specifies a warranty period that is longer than that which is actually provided by any of the specified manufacturers, the Contractor shall be obligated to obtain and deliver to the Commissioner the highest level of warranty actually provided by any of the specified manufacturers, unless otherwise directed in writing by the Commissioner.
- (e) Unless indicated otherwise Warranties are to take effect on the date of Substantial Completion.

SCHEDULE C

Contract Drawings

(Reference: Section 01 1000, Article 1.5 (A) of the DDC Standard General Conditions)

The Schedule set forth below lists all Contract Drawings for the Project.

	criedule set forth below lists all Contract Drawings for th
G	201 Title Short
	ine Slieet
	Ochicla illinimation
Do	General Notes Ruilding D
D1	Demolition General Notes
D1	Cellar and Ground Floor D
D10	Second Floor Demolition Plans Attic Demolition Plan
D10	- Auc Demoirion Dian
AOC	. Nooi Demolition Dian
A10	Site Plan
A10	. Cellar and Ground Floor Di
A10	2 CCONU FIOOT Plan
A10:	_ Auc Plan
A20	_ Nooi Fian
A20	Quial diff Ground Flagger
A202	Olouily Floor Lank Lighting Da-
A300	
A301	Exicitor Elevations
A400	Exterior Elevations
A401	Dully Nev Sections E
A402	
A403	
A404	
A405	Exhibit Area Sections
A406	Cellar Area Sections
A407	General Sections
A408	Exhibit Area Details
A409	Ceiling Details
A501	Audio Visual Details
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FA001 FA100	Fire Alarm Riser Diagram, Gequarity Ground Floor and Cellar Fire Alarm Plans Attic Fire Alarm Plans
FA10	Second Floor and Allic Fire Allica
EN20	0 MEP Energy Compliance Sheet 1
EN20	1 MEP Energy Compliance Shows
	Aquatic Filtration Equipment Schedule
AQ00 AQ00	as Logand for P&IDS
AQ0	P & ID for Kelp System
AQ0	B a ID for Atlantic Cambboarr of
AQ0 AQ0	
AQC	P & ID for Water Make-up System
AQ	108 Filtration Sump Plan View Floor 1
AQI AQ	
AQ	711 Filtration Kelp Forest Isometrics
AQ	- CL VEISH LIEAGNON
AC AC	0014 Filtration SE Asian Isometrico
AC	KO 10 A Hontic Callboan 100
AC	The Coral Elevation
A(2017 Filtration Live Coral Isometrics 2018 Filtration Live Coral Isometrics 2019 Aquatic Filtration Cellar Elevations 2019 Aquatic Filtration Live Cellar
A	CO I CON CONCE
A	FRP Tank Type A
Α	Q022 FRP Tank Type A
A	Q023 FRP Tank Type A
Α.	FRP Tank Type A
Į.	AQ026 FRP Tank Type B
	AQ027 FRP Tank Type B
	AQ028 FRP Tank Type B

AQ029	FRP Tank Type B
AV1	Audio/Video Systems
H001 AQ028 AQ029	Asbestos Abatement Location – General Notes Asbestos Abatement Location – First Floor Partial Plan Asbestos Abatement Location – Roof Partial Plan

SCHEDULE D

Electrical Motor Control Equipment

(Reference: 01 3506, Article 3.8 of the DDC Standard General Conditions)

Requirements for electrical motor equipment may be included in one or more sections of the Specifications for the Contract for the Project. Schedule D set forth below delineates specific information for electrical not the control equipment. In the event of any conflict between the Specifications and this Schedule D, Schedule D shall take precedence; provided, however, in the event of an omission from Schedule D (i.e., Schedule D omits either a reference to or information concerning electrical motor equipment which is set forth in the Specifications), such omission from Schedule D shall have no effect and the Contractor's obligation with respect to the electrical motor control equipment, as set forth in the Specifications, shall remain in full force and effect.

DB Disconnect Circuit Breaker (Switch) P Pilot Light

TS Thermal Switch MS Magnetic Starter CMS Comb. Mag. Starter T Thermostat AL Alternator **BG** Break Glass Station HOA Hand-Off Auto PB Push Button Station RO Remote "off"

Equip.	Location	# of Units	HP or KW	Volts and Phas	See	ntrol Type: e legend above	Remarks:
AC-1	AQUA.	1	.04 KW	208/ 60		Т	
AC-2	SUPPORT. Coral Reef	1	.029 KW	208/ 60			
AC-3	Pacific Kelp	1	.029 KW	208 60			
AC-4	South Asian	1	.029 KW	208 6 208)	<u>'</u>	
AC-5	Atlantic Caribean	1	.029 KW	6		T	
AC-6		1	KW 2 @	6	8/1/	DB	
VRF CU		1	.080 KV	6	30	HOA/AL	
BFP-	1 Boiler Roo	m 2	1 H		08/3/ 60 20/1/	DB	
TEX	-1 Attic	1	.0 H	P	60 08/3/	VFD/HOA	
AHU	J-1 Attic	1	<u> </u>	P	60 08/3/	VFD/HOA	
ERU	J-1 attic	1	2	.5 IP	60	HOATEC	
B-	-1 BOILEI		3	3/4	208/3/ 60	HOA/BG HOA/BG	
B	-2 BOILE			3/4	208/3/		Page

B-3	ROOM BOILER	1		60		
B-4	ROOM BOILER	<u> </u>	3/4	208/3/ 60	HOA/BG	
B-5	ROOM BOILER	1	3/4	208/3/ 60	HOA/BG	
SD OU	ROOM	'	3/4	208/3/ 60	HOA/BG	
SP-C/1	Cellar-Boiler Room	2	1.8 KW	200/3/ 60		Provide an automatic duplex control panel with auto pump lead/lag alternator, alarm, start/stop

SCHEDULE E

Separation of Trades

NOT USED FOR SINGLE CONTRACTS

Submittals Schedule

SCHEDULEF

(Reference: Section 01 3300 Article 1.5 (C) 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, information concerning a submittal requirement which is set forth in the Specifications), such omission from Schedule F shall have no effect and the Leeser Architecture 718.643.6656 DDC PROJECT MANAGER: TELEPHONE NUMBER:

Amar Malla

TELEPHONE NUMBER:

APPROVED:	(DDC RESIDENT ENGINEER/CPM) TRADE: CONTRACT#: Contract 1 – GENERAL CONSTRUCTION FABRIC. SUBMISSIONS TIME	REC'D RET'D ACTION REC'D RET'D ACTION REC'D RET'D ACTION				
I ELEPHONE NUMBER: 718.391,1023	SPEC. SECT.# DESCRIPTION COORD. SUBMITTAL SUB. REG'D FA	O13526 Health	Program Contractor's Safety Plan Historic	013591 Treatment X Plan 015000 Site Plan	015423 Scaffold & X X Sidewalk Shed X X	015423 Logistics/Site X Safety Plan

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Domestic Water System; related piping, valves, etc.	System related piping, sprinkler heads etc.	Urainage System, Piping, valves etc.	Equipment, Specialties & Accessories	Fixtures Sheet Shop	sbui	Motors	Motor starters	le l	Air Testing and	Testing	ancing	S	숙 드	Sion		ping,	o	
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SECTION 024119

SELECTIVE DEMOLITION AND ALTERATION WORK

PART 1 GENERAL

RELATED DOCUMENTS 1.1

The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) A. the Contract (City of New York Standard Contract).

SECTION INCLUDES 1.2

- 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 A. specified herein, including, but not limited to, the following:
 - Alterations, selective demolition and removals as noted on drawings and as required to accommodate new construction.
 - Removal of debris.
 - Protection of existing building and spaces to remain, and shoring of the structure as required for structural integrity and personal safety.
 - Protection of existing curbs and sidewalks.
 - Alterations, selective demolition and removals of exterior façade, where noted.
 - Patching and refinishing of existing surfaces damaged as a result of this work. 6.
 - Protection.

QUALITY ASSURANCE 1.3

- 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.
- The Contractor shall be responsible for any damage to any adjacent structures or В. buildings to remain.
- 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.
- 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

Alteration and removal requirements for mechanical and electrical work - Mechanical A.

1.5 **SUBMITTALS**

- 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:
 - The work of tying in or connecting to operational systems of the building, including electrical, mechanical and security systems.
 - The work of the City of New York or any separate Contractor.
 - The structural value or integrity of any element of the project or of adjacent
 - The integrity or effectiveness of weather-exposed and moisture-resistant elements
 - The efficiency, operational life, maintenance, or safety of operational elements or
- Notice of Differing Conditions: Submit a written notification if, during the work of B. demolition and cutting, conditions are discovered which significantly vary from those shown on the drawings. Do not commence work until approval of Commissioner.

1.6 SPECIAL PRECAUTION

If hazardous materials are encountered during demolition stop and notify the City of New York. Comply with Section 028013 - Allowance for Incidental Asbestos and Section 028213 - Asbestos Abatement as applicable.

1.7 JOB CONDITIONS

A. Condition of Structure

- 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.
 - 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, the City of New York and their consultants do not assume responsibility for its accuracy or

- Notify the Commissioner if, during the course of demolition, conditions are discovered which significantly vary from those shown on the drawings. Do b. not proceed until authorized by Commissioner.
- The Contractor shall accept the condition of the site and structures as found. The Commissioner and the 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.
- Areas of building to be demolished or altered will be vacated and discontinued in use В. prior to the start of the work.
 - Surrounding areas of the building shall remain operational by the City of New York.

Partial Removal C.

- 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.
- Storage or sale of removed items on the site will not be permitted.
- Explosives: The use of explosives will not be permitted. D.

Traffic E.

- Conduct demolition operations and the removal of debris to ensure minimum interference with roads, streets, walks and other adjacent occupied or used facilities.
- Do not close or obstruct streets, walks or other occupied or used facilities without permission from the City of New York. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

Utilities F.

- Refer to Division 22 and 26 of the specifications for special requirements concerning utilities and services.
- Maintain any existing utilities required to remain; keep in service and protect against damage during demolition operations.
- Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by the City of New York. Provide temporary services during interruptions to existing utilities, as acceptable to the City of New York.
- Disconnect and seal any abandoned utilities before starting demolition operations. Coordinate all work with the City of New York.

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

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 from occupied adjacent occupied buildings and areas. Maintain free, safe passage to and
- 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 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 shall repair promptly at no cost to the 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.

- 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. H.
 - 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.
 - 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.
 - 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 I. 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.
 - Provide and maintain temporary protection of the existing structure designated to remain where demolition, removal, and new work are being done, connections made, J. materials handled, or equipment moved.
 - 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 K. dustproof partitions and other adequate means.
 - Provide adequate fire protection in accordance with FDNY requirements. L.
 - 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.
 - Be responsible for any damage to the existing structure or contents by reason of the N. insufficiency of protection provided.
 - Promptly repair damages caused to adjacent facilities by demolition operations at no O. cost to the City of New York.
 - 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 P. new construction.

INSPECTION 3.2

Verify that areas of demolition work are protected and temporary dustproof partitions A. have been installed.

- Verify that construction to be removed is not load bearing or has been properly braced, B.
- Inspect existing conditions of the project, including elements subject to damage or to movement during demolition and cutting.
- After uncovering work, inspect the conditions affecting the installation or performance D.
 - 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

- Provide adequate temporary support as necessary to ensure the structural value or integrity of the affected portion of the work
- Provide devices and methods to protect other portions of the project from damage. В. C.

Pollution Controls

- 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 NYC DEP regulations.
 - Do not use water when it may create hazardous or objectionable conditions a.
- Clean adjacent structures and improvements of dust, dirt and debris caused by demolition operations. Return adjacent areas to condition existing prior to the start
- Provide drainage for temporary water use.

3.4 DEMOLITION AND CUTTING

- Selectively demolish existing construction in conformance with the drawings and these A.
 - 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
 - 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.
 - 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
 - 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.
- 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.
- 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.
- Proceed with demolition in a systematic manner.
- 10. Demolish concrete and masonry in small sections.

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. 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.
- G. Cut out embedded anchorage and attachment items as required to properly provide for patching and repair of the respective finishes.
- H. 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.
- Where utilities are removed, relocated or abandoned, cap, valve, plug, or by-pass to make complete and working installation.

- J. Restore existing pipe and duct coverings damaged by work under this Contract to original undamaged condition.
- K. Immediately restore to service and repair any damage caused by Contractor's 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.
- L. Upon completion of contract, deliver work complete. Damage that may be caused by Contractor or Contractor's workmen to existing structures designated to remain, existed prior to damaging.
- M. Restore finish work of floors, walls, and ceilings remaining in place but damaged or defaced because of demolition or alteration work to condition equal that which existed at beginning of work under this Contract.
- N. Where alteration or removals expose damaged or unfinished surfaces or materials, refinish such surfaces or materials, or remove them and provide new or salvaged materials to make continuous surfaces uniform.
- O. Perform new work and restore and refinish existing work in conformance with applicable requirements of the specifications, except as follows:
 - 1. Materials for use in repair of existing surfaces, but not otherwise specified, shall conform to the highest standards of the trade involved, and be in accordance with approved industry standards, and shall be as required to match existing surfaces.
 - 2. Workmanship for repair of existing materials shall, unless otherwise specified, be equal to similar workmanship existing in or adjacent to the space where the work is being done.
 - 3. Installation of salvaged items where no similar items exist shall be done in accordance with the highest standards of the trade involved and in accordance with approved shop drawings.
- P. Materials or items designated to become the property of the City of New York 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.
- Q. 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
- R. The existing building shall not be used as a work shop. Neither shall the furnishings or equipment in any room be used as work benches. Should any damage occur during the progress of the work to any furniture, fixtures, equipment, or appurtenances therein, such damage shall be repaired, replaced or made good by the Contractor without extra cost to the City of New York.

- Where removing existing floor finish and base, remove all adhesive and leave floors and walls smooth and flush, ready to receive new finish. S.
- Finish new and adjacent existing surfaces as specified for new work. Clean existing surfaces of dirt, grease and loose paint before refinishing.

DISPOSAL OF DEMOLISHED MATERIALS 3.6

A.

- Remove from the site debris, rubbish and other materials resulting from work of General
- Burning of removed materials from demolished structures will not be permitted on
- 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 B. orderly condition to the approval of the Commissioner.

3.7

Remove debris at the end of each work day. Maintain existing premises in a neat and CLEANING UP A. clean condition.

END OF SECTION

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SECTION 028013 - GENERAL CONTRACTOR WORK

ALLOWANCE FOR INCIDENTAL ASBESTOS ABATEMENT

SCOPE FOR ASBESTOS ABATEMENT WORK 1.01

- The "General Conditions" apply to the work of this Section. A.
- 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 B. 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.
 - 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 C. 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.
 - ALL DISPOSAL OF ASBESTOS CONTAMINATED MATERIAL SHALL BE PER LOCAL LAW 70/85. D.
 - ATTENTION IS ASBESTOS ABATEMENT CONTRACTOR'S DIRECTED TO THE FACT THAT CERTAIN METHODS OF ASBESTOS ABATEMENT ARE PROTECTED BY PATENTS. TO DATE, PATENTS E. HAVE BEEN ISSUED WITH RESPECT TO "NEGATIVE PRESSURE ENCLOSURE" OR "NEGATIVE-AIR" OR "REDUCED PRESSURE" AND "GLOVE BAG".
 - 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 F. 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.
 - "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 G. actinolite.

H. Prior to starting, the Asbestos abatement contractor must notify the Commissioner of the Department of Design and Construction if he/she anticipates any difficulty in performing the Work as required by these Specifications. The Asbestos abatement contractor is responsible to prepare and submit all filings, notifications, etc. required by all City, State and Federal regulatory agencies having jurisdiction.

The Asbestos abatement contractor is responsible for submitting the Asbestos Project Notification Form (ACP-7 Form) to the Department of Environmental Protection, Asbestos Control Program, as per Title 15, Chapter I of RCNY and to the NYSDOL as per Industrial Code Rule 56.

The Asbestos abatement contractor is responsible for preparing, and submitting Asbestos Variance Application (ACP-9). If a Variance is required, the Asbestos abatement contractor is responsible to retain a NYSDOL Asbestos Project Designer, as defined in Title 15, Chapter 1 of the RCNY to prepare and submit the required variance.

The General contractor is responsible for preparing and submitting an Asbestos Abatement Permit and/or Work Place Safety Plans (WPSP) that may be required for the completion of the Contract or incidental work. If such plans are required, the 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.

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 done, is customarily open and functioning, normally between the hours of 8:00 Commissioner, the work shall be done at no additional cost to the City.

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 J. 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.

QUALIFICATIONS OF ASBESTOS ABATEMENT CONTRACTOR 1.02

- 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 A. demonstrating compliance with all listed requirements. Such documentation shall include without limitation, all required licenses, certificates, and documentation.
 - 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 1. licensed by the New York State Department of Labor, as an "Asbestos abatement contractor".
 - The asbestos abatement contractor must, for the three year period prior to the work, have been in the business of providing asbestos abatement 2. services as a routine part of its daily operations.
 - 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 3. 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.
 - 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 4. 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.
 - 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, 5. 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.

ASBESTOS ABATEMENT CONTRACTOR RESPONSIBILITIES 1.03

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

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

The following information must be included in the notification:

- Α. Name and address of building City or operator;
- В. Project description:
 - 1. Size - square feet, number of linear feet, etc;
 - Age date of construction and renovations (if known); 2.
 - 3. Use - i.e., office, school, industrial, etc.
 - 4. Scope - repair, demolition, cleaning, etc.
- Amount of asbestos involved in work and an explanation of techniques used to C. determine the amount;

- Building location/address, including Block and Lot numbers; D.
- Work schedule including the starting and completion dates; Ε.
- Abatement methods to be employed; F.
- Procedures for removal of asbestos-containing material; G.
- Name, title and authority of governmental representative sponsoring project. H.

WORK INCLUDED IN UNIT PRICE 1.04

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 <u>AIR MONITORING – ASBESTOS ABATEMENT CONTRACTOR</u>

- "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.
 - Air monitoring of Asbestos abatement contractor's personnel will be performed in conformance with OSHA requirements, (All costs associated with this work are В. deemed included in the unit price.).
 - Qualifications of Testing Laboratory: C.

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 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:
 - 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.

- Attach a copy of valid workmen compensation insurance. 10.
- Valid asbestos insurance per occurrence. 11.
- General liability insurance when required.
- 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, C. review the cost and approve or disapprove requests for payment.
- 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 D. summary showing each part of the abatement work in which the employee was engaged and the dates thereof.

QUANTITY CALCULATIONS 1.08

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. iΕ

insulation that might be er	TARE FOOTAGE	
Madation	PART CITE	SQUARE FOOTAGE
PIPE INSULATION	PIPE SIZE	PER LINEAR FOOT
SIZE O.D.	O.D	0.65
SIZE O.D.	1/2"	0.72
2-1/2"	3/4"	0.79
2-3/4"	1"	0.85
3"	1-1/4"	0.92
3-1/4"	1-1/2"	
3-1/2"	2"	1.05
4"		1.18
4-1/2"	2-1/2"	1.31
	3"	1.57
5"	3-1/4"	1.83
6"	3-1/2"	2.09
7"	4"	2.36
8"	5"	2.62
9"	6"	
10"	8"	3.14
12"	10"	3.67
14"		4.19
16"	12"	4.71
	14"	
18"	•	

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

Α. REMOVAL, DISPOSAL CONTAINING PIPE INSULATION: Actual linear footage, multiplied by the square footage factor listed for the respective pipe size in Section 1.08, multiplied

EXAMPLE: 100 lin.ft. of 1/2" pipe and 100 lin.ft. of 6" pipe, including elbows, tees. Flanges, etc.

 $100 \times 0.65 = 65 \text{ sq.ft.}$

65 x unit price = Payment

 $100 \times 2.62 = 262 \text{ sq.ft.}$

262 x unit price = Payment

B. REMOVAL, DISPOSAL 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

- REMOVAL, DISPOSAL AND REPLACEMENT OF TANK INSULATION: C. (all types including removal/replacement of metal jacketing) Payment shall be made at 1.5 times the unit price per square foot.
- REMOVAL, DISPOSAL AND REPLACEMENT OF BOILER UPTAKE, & D. BREACHING INSULATION: (all types including stiffening angles and wire lath) Payment shall be made at 2.0 times the unit price per square foot.
- REMOVAL, DISPOSAL AND REPLACEMENT OF DUCT INSULATION: E. Payment shall be made at 1.0 times the unit price per square foot.
- REMOVAL, DISPOSAL AND REPLACEMENT OF SOFT ASBESTOS F. 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
- ACOUSTIC PLASTER REPAIR AND/OR ENCAPSULATION: Payment G. shall be made at 0.5 times the unit price per square foot. 028013-8

- PATCHING OR REPAIR of items listed in A through F will be paid at 0.33 H. times the unit price per square foot.
- REMOVAL, DISPOSAL AND REPLACEMENT OF WATERPROOFING ASBESTOS CONTAINING MATERIAL: (including friable and non-friable waterproofing material from interior and exterior walls, floors, foundations, I. 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. OF
- DISPOSAL AND REPLACEMENT CONTAINING ELECTRICAL WIRING INSULATION: (including friable and non-friable wiring insulation) Payment shall be made at 0.33 times the unit J. price per square foot.
- **PAINTING:** Payment shall be made at 0.05 times the unit price per square foot.
- REMOVAL AND DISPOSAL OF ASBESTOS-CONTAINING PLASTER: K. 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 L.
- 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. M. 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.
- 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 N. 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
 - 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 O. 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.
 - 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 P. contaminated waste. This cost includes all labor and material cost associated with work.

- REMOVAL OF ASBESTOS-CONTAINING BRICK, BLOCK, MORTAR, Q. 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 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 SCAFFOLDING 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. **GUARANTEE**

1.10

- Work performed in compliance with each task shall be guaranteed for a period of Α. one year from the date the completed work is accepted by the Department of
- The Commissioner of The Department of Design and Construction will notify the B. Asbestos abatement contractor in writing regarding defects in work under the

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.

SUBMITTALS 1.12

Pre-Construction Submittals: A.

- 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 1. 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:
 - Asbestos abatement contractor's scope of work, work plan and schedule.
 - Asbestos project notifications, approved variances and plans to b. Government Agencies.
 - Copies of Permits, clearance and licenses if required. c.
 - 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 . d. as received. Asbestos abatement contractor shall post a copy of all schedules at the site:
 - A construction schedule stating critical dates of the project including, but not limited to, mobilization, Work Area (1) 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.
 - A schedule of staffing stating number of workers per shift per activity, name and number of supervisor(s) per shift, shifts per (2) day, and total days to be worked.
 - Submit all changes in schedule or staffing to the Construction Project Manager prior to implementation. (3)
 - 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 e.

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 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 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 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 handling of ACM, understands the health implications and risks

involved; and understands the use and limitations of the respiratory equipment to be used.

B.

- Security and safety logs showing names of person entering workspace, date During Construction Submittals: and time of entry and exit, record of any accident, emergency evacuation, 1. and any other safety and/or health incident.
- Progress logs showing the number of workers, supervisors, hours of work and tasks completed shall be submitted daily to the Construction Project 2. Manager.
- Floor plans indicating Asbestos abatement contractor's current work progress shall be submitted for review by the Construction Project 3. Manager.
- All Asbestos abatement contractors' air monitoring and inspection results. 4.

Project Closeout Submittals: C.

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:

- Lien Waivers from Asbestos abatement contractor, Sub-Asbestos abatement contractors and Suppliers, 1.
- Daily OSHA air monitoring results,
- All Waste Manifests (Asbestos and Construction Debris), seals and 2. 3. disposal logs,
- Field Sign-In/Sign-Out Logs for every shift, 4.
- Copies of all Building Department Forms and Permits, 5.
- A Letter of Compliance stating that all the work on this project was performed in accordance with the Specifications and all applicable Federal, 6. State and Local regulations,
- All Warranties as stated in the Specifications, 7.
 - Fully executed disposal certificates and transportation manifest.
- Project Record: The Asbestos abatement contractor shall maintain a project record for all small and large asbestos projects. During the project, the 8.

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
- 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 equipment and reinstall furniture and equipment. He shall remove and store all sheaths, curtains and drapes, and reinstall same following final clean up.

UTILITIES 1.14

A.

All temporary facilities shall be subject to the approval of the Commissioner. General: Prior to starting work at any site, locations and/or sketches (if required) of temporary facilities must be submitted to the Construction Project Manager for the required approval.

В.

The Department of Design and Construction will furnish all water needed for construction, at no cost to the Asbestos abatement contractor in buildings under their jurisdiction. However, it is the responsibility of the Asbestos abatement contractor to ensure that hot water is provided for showering in the decontamination unit. The Asbestos abatement contractor shall furnish, install and maintain any needed equipment to meet these requirements at his own expense.

C.

The Department of Design and Construction will furnish all electricity needed for Electricity: construction, at no cost to the Asbestos abatement contractor in a building, under their jurisdiction. The Asbestos abatement contractor is responsible for routing the electric power to the abatement Work Area.

All temporary lighting and temporary electrical service for Work Area shall be in weatherproof enclosures and be ground fault protected.

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 D. 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.

FEES 1.15

The Asbestos abatement contractor shall be responsible for any and all fees or charges imposed by Local, State or Federal Law, Rule and Regulation applicable to the work specified herein, including fees or charges which may be imposed subsequent to the date of the Bid opening.

END OF SECTION

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SECTION 028213

ASBESTOS ABATEMENT

PART 1 - GENERAL

DESCRIPTION 1.01

- The Contract Documents are as defined in the "Agreement". The General Conditions shall apply to all Work of this Section. A.
- 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 Zoo located at 614 Broadway, Staten Island, New York 10310. B.
- The following documents were reviewed and utilized to generate this abatement design specification which serves to locate and quantify the amount of ACM, and C. asbestos contaminated material, to be abated in support of this project.
 - Set of 100% CD drawings labeled "Staten Island Zoo, Aquarium Reconstruction," dated 9/26/14, prepared by Leeser Architecture PLLCP; 1.
 - Asbestos Survey Reports performed by Louis Berger & Assoc., P.C. (LBA) dated 08/22/14 and Limited Asbestos Report dated 10/21/14. 2.
 - 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 D. determination on all issues under this Contract covered by this Specification.

SCOPE OF WORK 1.02

- 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. A. 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.
 - The intent of this Specification section is to ensure that the asbestos abatement contractor is responsible for the following: В.
 - Abatement of all ACM. 1.
 - Cleaning and decontamination of the entire affected area. 2.

- 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.
- Removal and disposal of all ACM found within these areas such as floor tiles and associated mastic, aircell pipe insulation and chimney materials.
- 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 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 actual total quantities of the Work.
 1. Drawing 1902 on The Contractor is responsible for the confirmation of t

1. Drawing H002.00: First Floor Partial Plan

a. Remove and dispose of asbestos-containing 12"x12" floor tiles, brown & associated mastic; Aircell pipe insulation within Work Area 1. Asbestos-containing floor tiles shall be removed utilizing NYCDEP Title 15, Chapter 1, § 1-108 Procedures for Foam/Viscous Liquid Use in Flooring Removal. Asbestos-containing aircell pipe insulation shall be removed utilizing NYCDEP Title 15, Chapter 1, § 1-105 Tent and Glove-bag Procedures. In areas where VAT is to be removed, the contractor shall be responsible to remove all layers of floor tile and associated mastic to the substrate surface. Multiple layers of floor tile will not be cause for additional compensation to the contractor. All layers of VAT and its associated mastics as well as any plywood and/ or particle board in-between layers shall be disposed of as asbestos contaminated waste.

T. J. Augg	Removal Procedure	Approximate Square Feet (Sq. Ft.)	Approximate Linear Feet (Ln. Ft.)
Work Area	NYCDEP Section § 1-108 Foam/Viscous Liquid Use in Flooring	200 Sq. Ft. of 12"x12" Floor Tiles, Brown & Associated Mastic	
1	Removal NYCDEP Section § 1-105 Tent and Glove-bag Procedures		15 Ln. Ft. of Aircell Pipe Insulation
	Procedures	D . C Partial Plan	

2. Drawing H003.00: Roof Partial Plan

a. Remove and dispose of assumed asbestos-containing chimney materials (lining, mortar, caulking) within Work Area 2. Asbestos-containing chimney materials (lining, mortar, caulking) shall be removed utilizing NYCDEP Title 15, Chapter 1, § 1-106 Tent Containment Procedures.

	Containn	nent rioccaars	
Work Area	Removal Procedure	Approximate Square Feet (Sq. Ft.)	Approximate Linear Feet (Ln. Ft.)
	NYCDEP Section § 1-106	8 Sq. Ft. of Assumed Chimney Materials (Lining, Mortar,	-
2	Tent Containment Procedures	Caulking)	La come Unit
	110-0-1	. Cabo New York	City Cultural Programs Unit.

- D. The facility is under the jurisdiction of the New York City Cultural Programs Unit.

 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.

- Prior to starting, the asbestos abatement contractor must notify the Commissioner G. 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
- The asbestos abatement contractor shall retain a certified Project Designer for the Н. 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.
- The general contractor shall retain a Registered Design Professional (person J. 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
- K. The general contractor shall retain a Registered Design Professional (person licensed and registered to practice the professions of architecture or engineering under the Education-Law of the State of New York) to perform final inspections required pursuant to Title 28 of the Administrative Code, including but not limited to special inspections required under Chapter 17 of the Building Code. Such special inspections and A-TR1 forms shall be completed by the Registered Design professional.
- For coordination with other Asbestos abatement contractors, see the General L.
- Related Asbestos Removal Work Under Other Contracts: Μ.
 - Each asbestos abatement contractor shall be responsible for the removal of 1. incidental asbestos not identified in this section and found prior to or during
 - Incidental asbestos is defined as ACM that is discovered during the course 2. of their work that must be abated to enable them to perform the work of their Contract.

N. Work Hours:

The asbestos abatement contractor shall establish his work schedule in a 1. 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) demonstrating compliance with all listed requirements. Such documentation 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 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 \$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 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, abatement contractor must submit such documentation as may be required by the Department of Design and Construction to demonstrate that it has the carry out the work and to comply with the required services of this contract.

- 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 B. materials or workmanship that meet or exceed the specifically named codes or standards where required by these specifications.
- Site Investigation: Asbestos abatement contractor shall inspect all the specifications and related drawings, and will investigate and confirm the site C. conditions affecting the work, including, but not limited to:
 - Physical considerations and conditions of both the material and structure. These considerations include any obstacles or obstructions encountered in 1. accessing or removing the material.
 - Handling, storage, transportation and disposal of the material. 2.
 - Availability of qualified and skilled labor. 3.
 - Availability of utilities. 4.
 - Exact quantities of all materials to be disturbed and/or removed. 5.

WORK BY OTHERS 1.04

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.

DEFINITIONS 1.05

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 A. are not stated more explicitly in another element of the Contract Documents.

Definitions in General Use: B.

- 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 1. 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.
 - Directed, Requested, etc.: Where not otherwise explained, terms such as "directed," "requested," "authorized," "selected," "approved," "required," 2.

- "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 "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, 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, 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 and to report and (if required) interpret results of those inspections or tests.
- C. Definitions Relative to Asbestos Abatement:
 - 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 wetting agent in order to amended water penetration, wetting agent shall be 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
- 13. Asbestos-Containing Material (ACM): Asbestos or any material containing more than one-percent asbestos.
- Asbestos-Containing Waste Material: ACM, asbestos-contaminated objects
 Asbestos Containing Waste Material: ACM, asbestos-contaminated objects
- 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-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:
- Asbestos Handler Supervisor: Individual who supervises the handlers during an asbestos project and ensures that proper asbestos abatement procedures shall have completed approved training course(s) and be in possession of Asbestos, Invent.
- 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.
- Ourtained 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 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 asbestoscontaining material.
- 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 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 long sleeve gloves, one inward-projecting waterwand sleeve, an internal tool 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 of the community.
- 57. Industrial Hygienist: Individual having a college or university degree or degrees in Engineering, Chemistry, Physics or Medicine, or related acquired competence in industrial hygiene. Such special studies and training 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.
- Large Asbestos Project: Asbestos project involving the disturbances (e.g., 160 square feet or more of ACM.
 Log: Ap agg . . .
- 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 certificate numbers of asbestos handler supervisors and asbestos handlers; pressure ventilation equipment; summary of corrective actions and repairs; per work shift; daily checks of emergency and fire exits and any unusual

- 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 of 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.
- Personal Protective Equipment (PPE): Appropriate protective clothing,
 Phase Court
- 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 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

- 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.

TELEPHONE PAGING DEVICE B.

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.

The standard operating procedure shall ensure: C.

- Tight security from unauthorized entry into the workspace. 1.
- Restriction of asbestos abatement contractor's personnel to the immediate Work Area and access/egress routes. 2.
- Donning of proper protective clothing and respiratory protection prior to 3. entering the Work Area.
- Safe work practices in the work place, including provisions for inter-room communications, exclusion of eating, drinking, smoking, or in any way 4. breaking the respiratory protection.
- Proper exit practices from the work space to the outside through the showering and decontamination facilities. 5.
- Removing asbestos in a way that minimizes release of fibers. 6.
- Packing, labeling, loading, transporting, and disposing of contaminated material in a way that minimizes exposure and contamination. 7.
- Emergency evacuation procedures, for medical or safety situations, to minimize the potential exposure to airborne asbestos fibers for emergency 8. personnel, building occupants, and building environment.
- Safety from accidents in the workspace, especially from electrical shocks, fall hazards associated with scaffolding, slippery 9. entanglements in loose hoses and equipment.
- Provisions for effective supervision, air monitoring and personnel monitoring for exposure during the work. 10.
- Engineering controls that minimize exposure to fibers within the workspace. 11.

- 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 Area for regular inspections.
- Provide an Asbestos Handler Supervisor to provide continuous supervision of all
 Ensure that it is
 - 1. Ensure that individuals are using proper personal protective equipment, are trained in its use and hold valid NYCDEP and NYSDOL Asbestos Handler certificates
 - 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.
 Surveillance of the records.
 - 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 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 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 connected in series. The area receiving the exhaust shall have sufficient, 10. In the avertable 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 registered design professional shall obtain an asbestos abatement permit authorizing the performance of construction work as required for asbestos projects involving one or more of the following activities:
 - 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;
 - 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;
 - 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 notice stating the location within the building of the negative air cutoff switch, if applicable.
- D. The general 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 contractor is responsible for submitting, with an asbestos project notification, a work place safety plan (WPSP) and any other registered design professional.
- E. A WPSP is not required for projects requiring an asbestos abatement permit due to one or more of the activities listed in 1.07 (B) (9-12) of this specification. The asbestos abatement contractor shall submit, together with the asbestos project notification, all applicable asbestos abatement permit construction documents.
- F. The general contractor shall retain a Registered Design Professional to perform the inspections required pursuant to Title 28 of the Administrative Code, including but 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 Building Code or approved asbestos abatement permit and shall promptly 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 general 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 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
- 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 Transportation regulations.

 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 latest applicable regulations from OSHA, EPA, NIOSH, State of New York and aforementioned regulations.

 K. Furnish all normals
- 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 airborne fiber concentrations (i.e., misting of the air with water) until the injured
 D. Notify has
- 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.
 - 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.
- 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: 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 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.

- 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.
 - 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.
 - 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,
- All Waste Manifests (Asbestos and Construction Debris), seals and disposal logs,
- 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 record shall be maintained by the building owner. The 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;
 - 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).
- 1. 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 Construction Project Manager. Throughout the Specification, reference by the codes and standards which establish qualities, levels or types of workmanship 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 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 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 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:
 - 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
 - American Society for Testing and Materials (ASTM) 100 Bar Harbor Drive West Conshohocken, PA 19428-2959 610-832-9500
 - National Institute for Occupational Safety and Health (NIOSH)
 Robert A. Taft Laboratory
 4676 Columbia Pkwy
 Mailstop R12 Cincinnati, Ohio 45226
 513-841-4428
 - National Electrical Code (NEC) See NFPA
 - 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
- New York City Department of Sanitation125 Worth Street, Room 714New York, New York 10013212-566-1066
- 12. Occupational Safety and Health Administration (OSHA)
 Region II Regional Office
 201 Varick 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.

CITY/ASBESTOS ABATEMENT CONTRACTOR RESPONSIBILITIES 1.11

- 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 A. 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.
 - 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 В. asbestos contaminated waste.
 - Facility to provide asbestos abatement contractor with a list of items that cannot be removed and need special attention. C.
 - Facility to stop all deliveries that may be scheduled to the Work Area while work D. is in progress.
 - 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 E. 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.
 - City will not occupy the portions of the building, in which work is being performed during the entire asbestos removal operation, including completion of F. clean up.
 - 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 G. into Work Areas.
 - 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 H. emergency, in accordance with the WPSP.
 - 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. I.
 - 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 J. interruptions in the negative air pressure systems. STATEN ISLAND ZOO

- 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 continuously for the duration of the project:

 1. Monitor the
 - 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 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 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 adequately protected, enclosed and ventilated. The Facility will identify all electric lines.

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 C. 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.

Utilities: D.

1.

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.

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.

The Department of Design and Construction will furnish all electricity Electricity: needed for construction, at no cost to the asbestos abatement contractor in All temporary electrical work or adaptations to supply the needs of the Work Area shall be installed and buildings under their jurisdiction. 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 codes. Existing light sources (e.g., house lights) shall not be utilized. All power to interrupter at the source.

 1. If electrical area.
 - 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 upprotests to the state of
 - 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 intervals. These signs shall be posted in sufficient numbers to warn 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 path markings.
- F. Asbestos abatement contractor shall provide a separate temporary electric panel board to power asbestos abatement contractor's equipment. The Facility will abatement contractor's licensed electrician shall provide temporary tie-in via cable, outlet boxes, junction boxes, receptacles and lights, all with ground fault allowed. All temporary electrical installation shall be in accordance with OSHA must be coordinated with the Facility. Asbestos abatement contractor shall provide construction meeting.

- 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 G. contractor's expense.
- Asbestos abatement contractor shall provide fire protection in accordance with all H. State and Local fire codes.
- Sprinklers, standpipes, and other fire suppression systems shall remain in service I. and shall not be plasticized.
- 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 J. 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.
 - Asbestos abatement contractor shall supply hot shower water necessary for use in K. the decontamination unit.

USE OF THE PREMISES 1.13

- 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 A. Facility. All flammable or combustible materials shall be properly stored to obviate fire and in areas approved by the Facility.
- Asbestos abatement contractor shall assure that no exits from the building are obstructed, that appropriate safety barriers are established to prevent access, and В. that Work Areas are kept neat, clean, and safe.
- 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 C. shift against blockage or impediments to exiting.
- 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 D. 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 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 shall not have exclusive rights to any site of his work and shall fully cooperate and may be on (or are on) any site of the work of this Contract. Regulated area
- 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 covering from the walls, floors, furniture, equipment and reinstall furniture and 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, are prohibited.
 C. Use rubber time to the control of the proposed work areas shall be pre-cleaned using HEPA such as sweeping or vacuuming with equipment not equipped with HEPA filters,
- 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 Factors⁵

Type of Possis 12				
13pc of Respirator ^{1,2}	Half mask		T	
1. Air-Purifying Respirator		Full facepiece	Helmet/hood	
2. Powered Air-Purifying Respirator (PAPR)	310	50		
3. Supplied-Air Respirator (SAR) or Airline Respirator	50	1,000	425/1,000	
 Demand mode Continuous flow mode Pressure-demand or other positive-pressure mode 	10 50 50	50 1,000 1,000	⁴ 25/1,000	
 4. Self-Contained Breathing Apparatus (SCBA) Demand mode Pressure-demand or other positive-pressure mode (e.g., open/closed circuit) 		50 10,000	50 10,000	
Notes:				

¹Employers 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

²The 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

³This APF category includes filtering facepieces, and half masks with elastomeric facepieces.

⁴The 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.

⁵These 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).

- Selection of high efficiency filters: G.
 - All high efficiency filters shall have a nominal efficiency rating of 100 (99.97-percent effective) when tested against 0.3-micrometer monodisperse 1. diethyl-hexyl phthalate (DOP) particles.
 - Choose N-, R-, or P-series filters based upon the presence or absence of oil 2. particles.
 - N-series filters shall only be used for non-oil solid and water based a. aerosols or fumes.
 - 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 b. filters are oil resistant and the P-series filters are oil proof.
 - Follow filter manufacture recommendations.
 - If a vapor hazard exists, use an organic vapor cartridge in combination with 3. the high efficiency filter.
 - 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 H. 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.
 - 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 I. 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.
 - 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 J. used.
 - Asbestos abatement contractor shall ensure that the workers are qualitatively or quantitatively fit tested by an Industrial Hygienist initially and every 12 months K. thereafter with the type of respirator he/she will be using.

- 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 M.
 No facial being the content of the con
- 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.
- O. Respiratory protection maintenance and decontamination procedures shall meet the

 1. Respiratory
 - 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 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 facepiece 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 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 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 to respiratory masks for work day, at least four (4) masks each with two sets 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 clean room) 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 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 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 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, 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

- Air monitoring and inspection shall be conducted by the Asbestos abatement contractor's competent person (as defined in OSHA 1926.1101). F.
- 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 G. decontamination unit clean room samples.
- 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 H. two liters per minute. This must be demonstrated at the job site.
- Sampling and analysis methods shall be per NIOSH 7400A. I.

Test Reports: J.

- Promptly process and distribute one copy of the test results, to the 1. Commissioner.
- Prompt reports are necessary so that if required, modifications to work methods and/or practices may be implemented as soon as possible. 2.
- Asbestos abatement contractor shall by facsimile notify the Commissioner within 24 hours of the results of each test, followed by written notification 3. within three days.
- 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 K. and disposal of asbestos waste, and any other aspects of the project which may affect the health and safety of the people and environment.
- All costs for required air monitoring by the asbestos abatement contractor's competent person shall be borne by the asbestos abatement contractor. L.
- 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 M. Assurance.
- All samples shall be accompanied by a Chain of Custody Record that shall be submitted to the Construction Project Manager upon completion of analysis. N.

THIRD PARTY MONITORING AND LABORATORY 1.18

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 A. 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 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 due to limits exceeded during initial testing shall be paid for by the Asbestos
- F. At a minimum, air sampling shall be conducted in accordance with the following schedule:

Abatement Activity Equal to or greater than 10,000	Pre- Abatement	During Abatement	Post- Abatement
square feet or 10,000 linear feet of ACM Less than 10,000 square feet or 10,000 linear	РСМ	РСМ	TEM
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:

1	E.II.O	Pre-Abatement Large Asbestos Pro-	During Abatement	Post Abatement
2. 3.	Glovebag inside Tent Exterior Foam and Vertical	10 5 ^a	5 5 ^a	10 5 ^a
4.	Surfaces Interior Foam	- 10	5°	5 ^d
			3	10 ^d

		Pre-Abatement	During Abatement	Post Abatement
	S	Small Asbestos Pr	ojects	6
1. 2.	Full Containment Glovebag inside Tent	6 3 ^b	$\begin{array}{c c} & 3 \\ \hline & 3^b \\ \hline & 3^b \end{array}$	3 ^b 3 ^b
$\frac{2.}{3.}$	Tent	3	3 ^c	3 ^d
4.	Exterior Foam and Vertical Surfaces	-	3°	6 ^d
5.	Interior Foam	6		
	· · · · · · · · · · · · · · · · · · ·	Minor Proje	cts	1 ^d
1.	Glovebag inside Tent	-	-	1 ^d
$\frac{1.}{2.}$	Tent	<u>-</u>		1 ^d
_ 3.	Exterior Foam and Vertical Surfaces	-	-	1 ^d
4.	Interior Foam			

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.
- Prior to commencement of abatement activities, the Third Party Air Monitoring Firm will collect a minimum number of area samples inside each homogeneous H. work area.
 - Samples will be taken during normal occupancy activities and circumstances 1. at the work site.
 - Samplers shall be located within the proposed work area and at all proposed 2. isolation barrier locations.
 - Samples shall be analyzed using PCM. 3.
 - The number of samples to be collected will be determined by the size of the project and the abatement methods to be utilized. 4.

- 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.
 - 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.
 - 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.
 - 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 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 followed. The events requiring post-abatement clearance air monitoring procedures shall be
 - 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:
 - 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;
 - 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:

Conta or = E		
	Minimum Volume	Flow Rate
Area Samples for Analysis by	560 liters	5 to 15 liters/minute
PCM, 25mm cassettes	560 liters	1 to 10 liters/minute
TEM, 25mm cassettes	1,250 liters	1 to 10 liters/minute
TEM, 37mm cassettes	1,230 mers	

- 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.
 - 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	74:	·
PCM TEM	Minimum Volume 1,800 liters 1,250 liters	Flow Rate 5 to 15 liters/minute 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.
- 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.
- 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 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 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 the store of the store 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 oncenter.
- (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:
 - Equipment Room: The equipment room shall have a curtain doorway to separate it from the Work Area, and share a (1) 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.
 - Shower Room: The shower room shall have two airlocks (one that separates it from the equipment room and one that (2) 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 manufacturer's with accordance in recommendations. Filtered water shall be discharged in utilized and 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 oncenter.
- 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.
- 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 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 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 lockedout;
- 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:
 - 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 restarting 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.
- I. 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.
- 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 reoccupancy. 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.
- 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.
- I. 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 that 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.
- 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 Floor Tile and Mastic utilizing NYCDEP Title 15, Chapter 1 §1-108 Foam/Viscous Liquid Use in Flooring Removal procedures shall be as follows:
 - 1. Preparation of the Work Area:
 - a. These procedures only apply to the removal of vinyl asbestos floor tiles (VAT), ACM floor coverings and associated mastics and adhesives, where only the ACM being abated in the work area is flooring material.
 - b. Request that the Third-Party Air Monitor perform area monitoring and establish a background count prior to the preparatory operations for each removal area.
 - c. Provide and install decontamination enclosure systems in accordance with PART 3 EXECUTION, Sections 3.01 and 3.02 of these Specifications and NYCDEP Title 15, Chapter 1. Decontamination facilities may be remote from the Work Areas upon approval from NYCDEP.

- d. 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 contaminated waste.
- e. 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.
- f. Seal floor drains, sumps and other collection devices with two layers of fire retardant 6-mil 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.
- g. Separate by means of airtight barriers (isolation barriers) parts of the building that are not included in the Work Area(s) from parts of the building that will undergo asbestos abatement.
- h. Seal with isolation barriers: open doorways, cased openings, and corridors that will not be used for passage during work.
- i. Isolation barriers shall extend from the floor to the ceiling and form an airtight seal. They shall be built using 2-inch by 4-inch wood or metal framing placed 16 inch on center and shall be braced as necessary. Cover the work sides of the studding with two layers of 6-mil fire retardant, reinforced polyethylene sheeting. Install barriers to form a leaktight seal between the Work Area and adjacent areas. Install isolation barriers in a manner to endure "negative air pressure" within the Work Area.
- j. Completely seal airtight and isolate the Work Area. All openings, including but not limited to doorways, tunnels, ducts, grilles, cracks, diffusers, openings through which pipe conduit passes, and any other penetrations of the Work Area, shall be covered with polyethylene sheeting taped or caulked airtight.
- k. 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 fluorescent 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.

- Temporary lighting within the Work Area and decontamination system shall be provided as required to achieve minimum illumination levels.
- m. After isolating the area, install and initiate operation of air filtration devices (AFDs) to provide a negative pressure of at least -0.02 inches of water and four air changes per hour within the Work Area relative to surrounding non-Work Areas. In areas where negative air units cannot be exhausted to the exterior of the station, units shall be installed in series. When installing units in series, the exhaust from an AFD shall be exhausted into the intake of a second AFD of equal or greater capacity. The exhaust from the second unit shall be directed to the exterior of the Work Area in an area that is not accessible to the public. Both units shall be located inside the Work Area. Exhaust and connect AFD using spiral-reinforced tubing manufactured for this purpose. Do not shut down AFDs until the Work Area is released to the City following final clearance procedures.
- n. Hand power tools used to drill, cut into, or otherwise disturb ACM shall be manufacturer-equipped with HEPA filtered local exhaust ventilation.
- o. Scaffolds shall be provided for workers engaged in work that cannot safely be performed from the ground or other solid Work Area surface.
- p. Work Area Pre-cleaning Procedures: After establishing the decontamination enclosure systems, prepare and pre-clean the Work Area as specified below:
 - (1) Movable and loose items not removed by the City shall be cleaned using HEPA vacuum equipment and/or wet cleaning methods as appropriate and shall be removed from the Work Area and stored at the City's direction.
 - (2) Movable and loose items contaminated with asbestos shall be removed from the Work Areas and properly discarded as asbestos contaminated waste.
 - (3) Fixed objects within the Work Area shall be pre-cleaned using HEPA-vacuum equipment and/or wet cleaning methods as appropriate. Joints of covers or casings shall be sealed with tape and fixed objects enclosed with a minimum of two layers of 6-mil fire retardant polyethylene sheeting sealed airtight with tape. Disassembly of these fixed objects is not required unless otherwise noted. Fixed objects shall include, but not be

- limited to, light fixtures, junction boxes, hangers and black carrying channels.
- (4) 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.
- q. Plasticize the area after pre-cleaning, using the following procedure:
 - (1) Floor surfaces shall be sealed with a minimum of two layers of fire retardant 6-mil plastic sheeting, except where the only ACM being abated in the project is vinyl asbestos floor tile or other flooring material, in which case the floor need not be sealed;
 - (2) Baseboards and wall surfaces shall be sealed with a minimum of two layers of fire retardant 6-mil plastic sheeting up to a minimum height of four feet above the floor. If hand power tools are used during abatement, wall surfaces shall be covered with a layer of fire retardant 6-mil polyethylene sheeting to minimum height of six feet.

r. 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 Floor Tile and Mastic:

a. Prior to actual removal, the floor tiles and associated mastic shall be blanketed and wetted with a minimum 1-inch to 3-inch coating of the acceptable foam or viscous liquid that shall leave an identifiable colored residue when it dissipates and shall be maintained for the duration of the removal until the material is bagged.

- b. The foam or viscous liquid shall be non-toxic, shall not require special respiratory protection from handling, and shall not affect the handling and disposal of the waste.
- c. The foam or viscous liquid shall coat and wet the ACM. The ACM shall be kept wet through the bagging process.
- d. Persons entering the work area shall wear correctly-fitting, good-traction rubber boots.
- e. Remove floor tile and all underlying layers using a flat hoe or scraper. Remove adhesive backing using approved mastic removal solvent. Do not grind or sand floor.
- f. Completely remove floor tile and adhesive backing using appropriate tools and materials. As material is removed, wrap it in two layers of plastic and place it in labeled containers for transport.
- g. Completely remove bulk mastic using an approved mastic solvent. Product application shall be in accordance with the manufacturer's instructions and the Material Safety Data Sheet (MSDS) for the product. Do not allow solvent to stand or to be absorbed by sub-floor. Use diatomaceous earth to prevent the flow of solvent under walls or into other areas from which it would be difficult to recover. Absorb spent solvent and associated mastic immediately after use with diatomaceous earth and place in drums dedicated for the disposal of floor tile mastic waste.
- h. After completion of mastic removal, thoroughly wash the floor with detergent and rinse clean. Use sufficient quantities of diatomaceous earth to soak up water and detergent so that the waste is completely solid. Place waste in sealed drums dedicated for the disposal of floor tile mastic waste. No bulk mastic residue and traces of foam/viscous liquid shall remain on the floor surface following removal and cleaning. It is not necessary to remove stain from pores of concrete.
- Spent mastic removal agents must be properly stored, categorized and disposed. Refer to "ACM Waste Packing and Load Out Procedures".
- j. On completion of floor mastic removal, the floor shall be smooth, free from ridges and bumps, and suitable to receive replacement flooring.
- 3. Additional Removal Requirements: The Third-Party Air Monitor shall issue a stop work order if visible emissions are detected outside the Work Areas and/or should the airborne fiber concentrations meet or exceed 0.01 f/cc of

air or the background count (use the greater of these two values as the reference). Work shall not resume until the condition(s) causing the increase are corrected, surfaces are decontaminated using HEPA vacuums or wet cleaning techniques and the Asbestos abatement contractor receives notice from the Third-Party Air Monitor.

- 4. Following Removal of ACM Floor Tile and Mastic:
 - a. All surfaces shall be wet cleaned.
 - b. HEPA-vacuum all surfaces.
 - 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.
 - d. The Third-Party Air Monitor will conduct a visual observation of the Work Area to verify the absence of asbestos-containing waste materials.
 - e. If the Work is not approved, the Third-Party Air Monitor will inform asbestos abatement contractor who will then wet-clean and HEPA-vacuum 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.
 - f. Remove polyethylene barriers from the walls of the Work Area. Isolation barriers shall remain in place.
 - g. Perform a thorough HEPA-vacuuming of the Work Area.
 - h. The Third-Party Air Monitor will conduct a visual observation of the Work Area to verify the absence of asbestos-containing waste materials.
 - i. If the Work is not approved, the Third-Party Air Monitor will inform asbestos abatement contractor who will then HEPA-vacuum 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. If results of air sampling performed during abatement activities indicate airborne fiber concentrations of less than 0.01 fibers per cubic centimeter, or the background level, whichever is greater, final clearance air sampling is not required. The abatement action may be considered complete.

k. Isolation 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.
- I. The Third-Party Air Monitor will conduct final visual inspection. Approval must be granted prior to break down of decontamination facility and asbestos abatement contractor demobilization. Other Information: Extra time required to clean Work Areas in order to achieve clearance criteria shall not be considered grounds for an extension of time for contract completion.

4.02 MAINTENANCE OF CONTAINED WORK AREA AND DECONTAMINATION ENCLOSURE SYSTEMS

- A. Ensure that barriers are installed in a manner appropriate to the expected weather conditions during the project and for its duration. Repair damaged barriers and 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.
 - 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.
 - 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.
 - 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.

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- X. At the site asbestos abatement contractors or Waste Hauler trucks shall approach the dump location as close as possible for unloading asbestos waste. Containers shall be carefully placed in the ground. Do not throw containers from truck.
- Y. Asbestos abatement contractor or Waste Hauler shall inspect containers as they are unloaded at the disposal site. Material in damaged containers shall be repacked in empty containers, as necessary.
- Z. Asbestos abatement contractor or Waste Hauler shall not remove asbestos-containing waste Material from drums unless required to do so by the disposal site City. Used drums shall be disposed of as asbestos-asbestos contaminated waste.
- AA. All personnel engaged in unloading of the containers at the waste site shall wear protective clothing. The disposable clothing shall include head, body and foot protection. Minimum respiratory protection shall be half face, dual cartridge, air purifying respirators with HEPA-filters. Workers shall remove their protective clothing at the disposal site, place it in labeled disposal bags and leave them with the deposited waste shipment.
- BB. For the compaction operation, the asbestos abatement contractor shall ensure that disposal sites personnel have been provided with personal protective equipment by the disposal operator. If the disposal site City has not provided this protective equipment, the asbestos abatement contractor shall supply protective clothing and respiratory protection for the duration of this operation (PAPR respirators are mandatory).
- CC. If containers are broken or damaged, the asbestos abatement contractor or Waste Hauler shall, using personnel who are properly trained and wearing proper protective equipment, shall repackage the waste in properly labeled containers. Asbestos abatement contractor shall then clean the entire truck and its contents using HEPA-vacuums and wet cleaning techniques until no visible residue is observed.
- DD. Following the removal of all containerized waste, the asbestos abatement contractor shall decontaminate the truck cargo area using HEPA-vacuums and/or wet cleaning techniques until no residue is observed. All 6-mil polyethylene sheeting shall be removed and discarded as asbestos-containing waste material along with contaminated cleaning material and protective clothing, in containers at the disposal site.
- EE. The transporter(s) of all asbestos waste shall not back-haul any items on his return from landfill/disposal site.
- FF. All asbestos waste shall be disposed of in an approved Asbestos Landfill site only.

- NO PERSON UNDER ANY CIRCUMSTANCES SHALL ABANDON ACW. The same shall be disposed of only by certified persons in approved landfills.
- 2. A manifest form will be signed by the Landfill documenting receipt and acceptance of the asbestos-containing waste. This manifest will be furnished to the City of New York within thirty calendar days from the project completion date.
- 3. It is the responsibility of the Asbestos abatement contractor to determine current waste handling, transportation and disposal regulations for the work site and for each waste disposal landfill. The Asbestos abatement contractor must comply fully with these regulations and all appropriate U.S. Department of Transportation, EPA and other Federal, State and Local entities' regulations and all other current legal requirements.
- 4. The asbestos abatement contractor shall obtain an agreement from the transporter (s) that the practice of "Back-Hauling" will not be engaged in, with respect to any and all waste loads taken from this site during the work.
- 5. The asbestos abatement contractor will document actual disposal of the waste at the designated landfill by having completed a Disposal Certificate and will provide a copy of the same to the Department of Design and Construction.

PART 6 – ACCEPTANCE

6.01 ACCEPTANCE

Upon satisfactory completion of all decontamination procedures, a certificate will be issued by the Construction Project Manager with copies to all parties.

- A. A letter of Compliance stating that all the work on the project was performed in accordance with the Specifications and all applicable Federal, State and Local regulations.
- B. All warranties as stated in the Specifications.

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SECTION 033000

CAST IN PLACE CONCRETE

PART 1 - GENERAL

RELATED DOCUMENTS 1.1

The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City A. of New York Standard Construction Contract].

SUMMARY 1.2

- Section includes but is not limited to the following as shown on the drawings and as specified A. herein:
 - Slabs on grade. 1.
 - Structural slabs on grade. 2.
 - Cast-in-place slabs, beams, walls, and columns. 3.
 - Topping slabs 4.
 - Stair pan fills. 5.
 - Furnishing and installing all required anchors and inserts. 6.
 - Placing in the forms all inserts, anchors, anchor bolts, bearing plates and the like furnished by other trades for casting into the concrete and cleaning of same after 7.
 - Protection of all inserts, anchors, hangers, sleeves and supports furnished and set by others for the attachment of other work to the concrete, or required to permit the passage 8. of other work through the concrete.
 - Supply, fabricate and place all required reinforcing bars, mesh and other reinforcement for concrete where shown, called for, and/or required complete with proper supporting 9.
 - Erection and removal of all formwork and waffle slab forms required to properly 10. complete the work.
 - Finishing of all concrete work as hereinafter specified. 11.
 - Curing and protection of all concrete work. 12.
 - Site concrete consisting of curbs, walks, pads, boxes and the like as shown on the 13.
 - Floor sealers and dust-proofing of all areas exposed and/or covered with carpet.
 - Cutting, patching, grouting, repairing and pointing up as required. 14. 15.
 - Vapor barrier system below slabs on grade. 16.
 - Under slab drainage course. 17.
 - Waterproofing. 18.
 - Grouting of all beam bearing plates and column base plates. 19.
 - 20.
 - All other work and materials as may be reasonably inferred and needed to make the work 21. of this section complete.

- В. Related Requirements:
 - Division 04 Section "Unit Masonry" 1.
 - Division 05 Section "Structural Steel" 2.
 - 3. Division 05 Section "Miscellaneous Metals"
 - 4. Division 06 Section "Carpentry"
 - 5. Division 07 Section "Joint Sealants"

1.3 **SUBMITTALS**

- A. Product Data: Submit data for materials and items, including the following:
 - 1. Reinforcement
 - Supports for reinforcement 2.
 - Forming accessories 3.
 - 4. Admixtures
 - 5. Patching compounds
 - 6. Joint systems
 - 7. Curing compounds
 - 8. Dry-shake finish materials
 - 9. Others items as requested by Commissioner.
- Shop Drawings; Reinforcement: Submit original shop drawings for fabrication, bending, and B. placement of concrete reinforcement. Comply with ACI 315 "Details and Detailing of Concrete Reinforcement" showing bar schedules, stirrup spacing, diagrams of bent bars, arrangement of concrete reinforcement. Include special reinforcement required for openings through concrete structures. The shop drawings shall be prepared only by competent detailers, checked by the
 - The shop drawings shall show construction, contraction and isolation joint locations and 1. the added reinforcement required at same.
 - Obtain and coordinate information for sleeves and openings in concrete, which are 2. required for the work of other trades. Make coordinated drawings showing size and location of openings and sleeves and incorporate this information on the reinforcing 3.
 - Only those splices indicated on the approved shop drawings will be permitted. 4.
 - Provide elevations of all foundation walls and other structural elements to a minimum
- Shop Drawings Formwork: Submit shop drawings for fabrication and erection of specific C. finished concrete surfaces. Show form construction including jointing, special form joint or reveals, location and pattern of form tie placement, and other items which affect exposed concrete visually. Commissioner's review is for general architectural applications and features only. Design of formwork for structural stability and efficiency is Contractor's responsibility, prepared by or under the supervision of a qualified professional engineer detailing fabrication,
 - Shoring and Reshoring: 1. Indicate proposed schedule and sequence of stripping formwork, shoring removal, and reshoring installation and removal.

- D. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
 - 1. Location of construction joints is subject to approval of the Architect.
- E. Contraction Joint Layout: Indicate proposed contraction joints required per applicable codes and drawings.
 - 1. Location of contraction joints is subject to approval of the Architect.
- F. Scaling of the Commissioner's drawings is not permitted. This applies to hard paper, electronic, and all other versions.
- G. Samples: Submit samples of materials as requested by Architect, including names, sources and descriptions.
- H. Laboratory Test Reports: Submit laboratory test reports for concrete materials, mix design test and microwave test.
- I. Material Certificates: Provide materials certificates in lieu of materials laboratory test reports when permitted by Commissioner. Manufacturer and Contractor, certifying that each material item complies with, or exceeds, specified requirements shall sign material certificates. Provide certification from admixture manufacturers that chloride content complies with specification requirements.
- J. Cold Weather and Hot Weather Concreting Procedures: Submit written descriptions of contractor's proposed cold weather and hot weather concreting procedures, when applicable.
- K. Certification that pozzolanic materials conforms to ASTM C 618-01 (noting class C or class F), ASTM C 989 or ASTM C1240.
- L. Certified recycled steel content. Provide cut sheets clearly indicating whether the rebar used meets the minimums for post-consumer OR post-industrial recycled contents. Or, if cut sheets are not available, obtain a written affidavit from the manufacturer stating the recycled content percentage and if the recycled content is post-consumer or post-industrial.
- M. Formwork: Specify whether reusable, permanent, salvaged or new wood forms are to be used.
- N. Recycled Aggregate: Provide laboratory reports indicating that aggregate conforms to ASTM C33 for structural concrete or ASTM D1241-00 for sub-base material. Provide cut sheets clearly indicating the source, total weight and volume of the recycled aggregate. If aggregate provided is a mix of virgin and recycled aggregates obtain a written affidavit from the manufacturer stating the recycled content percentage
- O. VOC content for curing compounds, sealants and release agents: Provide a cut sheet and a Material Safety Data Sheet (MSDS) for each curing compound, sealant, hardener and release agent used highlighting VOC contents. VOC content must be less than or equal to limits stated under "PRODUCTS".

1.4 QUALITY ASSURANCE

- Installer Qualifications: A qualified installer who employs on Project personnel qualified as A. ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified
- Source Limitations: Obtain each type or class of cementitious material of the same brand from В. the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from
- Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M, C. "Structural Welding Code - Reinforcing Steel."
- Codes and Standards: Comply with provisions of following codes, specifications, and D. standards, except where more stringent requirements are shown or specified:
 - 1. New York City Building Code, Latest Edition
 - ACI 117 "Standard Specifications for Tolerances for Concrete Construction and 2. Materials and Commentary."
 - ACI 211.1 "Standard Practice for Selecting Proportions for Normal, Heavyweight and 3. 4.
 - ACI 211.2, "Standard Practice for Selecting Proportions for Structural Lightweight 5.
 - ACI 214R, "Evaluation of Strength Test Results of Concrete." 6.
 - ACI 232.2R, "Use of Fly Ash in Concrete."
 - 7. ACI 233R, "Guide to Use of Slag Cement in Concrete and Mortar." 8.
 - ACI 234, "Guide for the Use of Silica Fume in Concrete."
 - ACI 301 "Specifications for Structural Concrete." 9. 10.
 - ACI 302.1R "Guide for Concrete Floor and Slab Construction." 11.
 - ACI 304R, "Guide for Measuring, Mixing, Transporting and Placing Concrete."
 - ACI 305R "Hot Weather Concreting." 12.
 - 13. ACI 306.1-90 "Standard Specification for Cold Weather Concreting." 14.
 - ACI 308.1 "Standard Specification for Curing Concrete."
 - ACI 309R, "Guide for Consolidation of Concrete." 15.
 - ACI 311.4R, "Guide for Concrete Inspections." 16.
 - ACI 315, "Details and Detailing of Concrete Reinforcement." 17. 18.
 - ACI 318 "Building Code Requirements for Structural Concrete and Commentary." 19.
 - ACI 347 "Guide to Formwork of Concrete."
 - 20. Concrete Reinforcing Steel Institute, (CRSI) "Manual of Standard Practice." 21.
 - CRSI-WCRSI, "Placing Reinforcing Bars."
 - AWS D1.4, "Structural Welding Code Reinforcing Steel." 22. 23.
 - The ACI Field Reference Manual, SP-15 shall be kept at the job site, and the practices set forth therein shall be strictly adhered to.
 - ASTM Standards as applicable in the building code of the local jurisdiction and as noted 24.
- Concrete Testing Service: The Contractor will engage a testing laboratory acceptable to the E. Commissioner to perform material evaluation tests and to design concrete

Materials and installed work may require testing and retesting at anytime during progress of work. Tests, including retesting of rejected materials for installed work, shall be done at F. Contractor's expense.

Preconstruction Meeting: G.

- At least 35 days prior to the start of the concrete construction schedule, the Contractor shall conduct a meeting to review the proposed mix designs and to discuss the required 1. methods and procedures to achieve the required concrete construction. The Contractor shall send a pre-concrete conference agenda to all attendees 20 days prior to the scheduled date of the conference.
- The Contractor shall require responsible representatives of every party who is concerned with the concrete work to attend the conference, including but not limited to the 2. following:
 - Contractor's superintendent a.
 - Laboratory responsible for the concrete design mix b.
 - Laboratory responsible for field quality control c.
 - Concrete subcontractor d.
 - Ready-mix concrete producer e.
 - Admixture manufacturer(s) f.
 - Concrete pumping equipment manufacturer. g.
- Minutes of the meeting shall be recorded, typed and printed by the contractor and distributed by him to all parties concerned within 5 days of the meeting. One copy of the 3. minutes shall also be transmitted to the following for information purposes: Commissioner.
- The minutes shall include a statement by the concrete contractor indicating that the proposed mix design and placing can produce the concrete quality required by these 4. specifications.
- A minimum of a 4 cubic yard trial mixture containing all required admixtures shall be placed at the job site using the accepted methods of placing, finishing and curing. All 5. applicable tests including slump, strengthen, air content, permeability, and air content will be performed. This shall occur at least four weeks before actual concreting operations with particular admixture begins. The admixture manufacturer(s) and inspectors shall be present. The same testing should be done in the laboratory at the same time for comparison. A test sample should be done for each condition that is to be
- The Commissioner will be present at the conference. The Contractor shall notify the Commissioner at least 10 days prior to the scheduled date of the conference. 6.

PROJECT CONDITIONS 1.5

- The Contractor, before commencing work, shall examine all adjoining work on which this work is in any way dependent for proper installation and workmanship according to the intent of this A. specification, and shall report to the Commissioner any condition which prevents this contractor from performing first class work.
- Protection of Footings Against Freezing: Cover completed work at footing level with sufficient temporary or permanent cover as required to protect footings and adjacent subgrade against B. possibility of freezing; maintain cover for time period as necessary.

033000-5

- C. Protect adjacent finish materials against spatter during concrete placement.
- D. Provide all barricades and safeguards at all pits, holes, shaft and stairway openings, etc., to prevent injury to workmen and others within and about the premises. Also provide all safeguards as required by the Building Code, OSHA, or any other departments having jurisdiction. Take full responsibility for all safety precautions and methods.
- E. Procedure of Work: The contractor shall keep himself constantly informed as to the progress of the work in the field, materials and men ready to start work immediately when conditions of preceding work are available or ready, wholly or in part, so as not to delay the progress of building work or to interfere with the progress of work of other contractors, and in any event he shall, within 24 hours after notice from the Commissioner, proceed with such work as directed to maintain the uninterrupted progress of the work.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.
- B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

- A. Forms for Exposed Finish Concrete: Unless otherwise indicated, construct of plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings. Provide form material with sufficient strength and thickness to withstand pressure of newly placed concrete without bow or deflection.
 - Use plywood complying with U.S. Product Standard PS-1 "B-B (Concrete Form)
 Plywood", Class I, Exterior Grade or better mill oiled and edge-sealed, with each piece bearing legible inspection trademark.
- B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or other acceptable material. Provide lumber dressed on at least 2 edges and one side for tight fit.
- C. Form Coatings: Provide VOC compliant commercial formulation form- coating compounds that will not bond with, stain nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces. Use biodegradable form release agent listed below or equivalent made from soy or rapeseed oil.

1. "Bio-Release EF"

Dayton Superior

2. "Soy Form Away"

Cure & Seal by Natural Soy Products

3. "Bio-Form"

Leahy-Wolf Company

4. "Duogard II"

W. R. Meadows, Inc.

5. "Atlas Bio-Guard"

Atlas Construction Supply, Inc.

- Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads. D.
- Form Ties: Form ties and spreaders: prefabricated assemblies by Richmond; Superior, Dayton or approved equal. Wire ties shall not be used. Ties for foundation work shall be of snap E. design with removal cones and water seal washer.
 - Furnish units that will leave no corrodible metal closer than 1 inch to the plane of 1.
 - Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in 2.
 - Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing 3. or waterproofing.

REINFORCING MATERIALS 2.2

- Reinforcing Bars: ASTM A 615, Grade 60. A.
- Galvanized Reinforcing Bars: ASTM A 767, Class II (2.0 oz. zinc psf) Class I (3.0 oz. zinc psf) hot-dip galvanized, after fabrication and bending. В.
- Epoxy-Coated Reinforcing Bars and Wire Welded Fabric: ASTM A 775 (as noted on plan C. and/or in section).
- Steel Wire: ASTM A 82, plain, cold-drawn steel. D.
- Welded Wire Fabric: ASTM A 185, welded steel wire fabric. Galvanized at exterior locations, conditions permanently exposed to weather and/or water, and where noted on drawings. E.
- Welded Deformed Steel Wire Fabric: ASTM A 497, Galvanized. F.
- Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut true to length with G. ends square and free of burrs.
- ASTM A 615/A 615M, Grade 60 , plain-steel bars, Epoxy-Coated Joint Dowel Bars: H. ASTM A 775/A 775M epoxy coated.
- Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A 775/A 775M. I.
- Zinc Repair Material: ASTM A 780, zinc-based solder, paint containing zinc dust, or sprayed J. zinc.
- Supports for Reinforcement: Bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Use wire bar type supports K. complying with CRSI specifications.
 - For epoxy coated reinforcement provide plastic protected chairs and plastic ties. All imperfections in the epoxy coating are to be repaired prior to placement of concrete. 1.
 - Use recycled plastic rebar supports (give preference to local supplier if available). Subject to compliance with requirements, provide one of the following: a.

- b. International Plastics Group
- c. Eclipse Plastic
- 2. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are plastic protected (CRSI, Class I) or stainless steel protected (CRSI, Class 2), at a spacing not to exceed 4'-0" on center in either direction.

2.3 CONCRETE MATERIALS

- A. Portland cement: ASTM C 150, Type I. Total percentage of Portland Cement is NOT to exceed 75% of the cementitious mix. Use one brand of cement throughout project, unless otherwise acceptable to Commissioner. Provide either fly ash or GGBF in mix per sections below.
 - Fly Ash: Cast-in-place concrete shall incorporate fly ash as a replacement for at least 25% (by weight) of the Portland cement. All design mixes must be reviewed and approved by the Commissioner. Fly Ash shall not be used in conjunction with Granulated Blast Furnace Slag.
 Ground Granulated Blast Furnace Slag.
 - Ground Granulated Blast Furnace Slag (GGBF): Cast-in-place concrete shall incorporate GGBF as a replacement for at least 40% (by weight) of the Portland cement. All design mixes must be reviewed and approved by the Commissioner of Record. GGBF shall not be used in conjunction with Fly Ash.
 Pozzolans and Slags: These must be reviewed as the provided of the Portland Record.
 - 3. Pozzolans and Slags: These must be completely accounted for in the design mix. Mix design must meet minimum design requirements set in the contract documents. Additional admixtures may be required to meet early strength requirements and alternative cementitious material goals. If a "blended cement" is used which already contains a certain percentage of Pozzolans or Slags this content may offset or entirely satisfy the minimum percentage required.
 - a. Coal Fly Ash: ASTM C 618 (Class C or Class F): ASTM C 618 (Note: Class F fly Ash will require higher amounts or air entraining ad-mixtures than class C).
 - b. Blast Furnace Slag: ASTM C989
 - c. Silica Fume: ASTM C 1240
 - d. Rice Hull (or "husk") Ash: ASTM C 618 Blended hydraulic cement, as defined by ASTM C 595 or ASTM C 1157
- B. Normal Weight Aggregates: ASTM C 33, and as herein specified. Provide aggregates from a single source for exposed concrete.
 - Local aggregates not complying with ASTM C 33 but which have shown by special test or actual service to produce concrete of adequate strength and durability may be used when acceptable to Commissioner.
 - Normal weight Fine Aggregate: washed, inert, natural or manufactured or combination thereof, sand conforming ASTM C33 gradation.
 Normal weight Coarse Aggregate.
 - Normal weight Coarse Aggregate: well graded crushed stone or washed gravel conforming to ASTM C33, sizes 57 for foundations and 67 for slabs and structure.
 - Recycled crushed concrete aggregate in concrete mixes is only to be used with approval of Commissioner. Recycled aggregate shall be used only as a substitute

- for coarse aggregate and must also be washed and well-graded, conforming to ASTM C33.
- For sub-base, slabs on grade and non-structural applications and Recycled Aggregate Materials are NOT required to meet the ASTM C 33 standard. In b. addition to concrete rubble, glass, porcelain, and tire chips can be used as filler material. Any inert material conforming to ASTM D1241 is acceptable for the applications described in this paragraph.
- Lightweight Aggregates: Well-graded crushed expanded shale produced by rotary kiln method. C. Solite or equal, conforming to ASTM C330.
- Water: Free from oils, acids, alkali, organic matter and other deleterious material to conform to ASTM C94. ASTM C94 for gray water use in the production of ready mixed concrete per D. approval by the Commissioner.
- Air-Entraining Admixture: Any material proposed for use as an air-entraining admixture should be tested in conformance with ASTM C 260. E.
 - Liquid air-entrainment: Use only agents derived from salts of wood resins. Select from products listed below or approved equal conforming to ASTM C-260.

		Euclid Chemical
a.	"Airmix" "Darex AEA"	W. R. Grace
b. с.	"MB-VR"	Master Builders

- Water-Reducing Admixture: ASTM C 494. F.
 - Products: Subject to compliance with requirements, provide one of the following or approved equal:

a. b.	"Polyheed 997" "Euclid MR"	Master Builders Euclid Chemical W. R. Grace.
c.	"WRDA 64"	*****

- High-Range Water-Reducing Admixture (Superplasticizer): ASTM C 494, Type F or Type G and containing not more than 0.05 percent chloride ions. G.
 - Products: Subject to compliance with requirements, provide one of the following or 1. approved equal:

a. "Eucon 37, 1037 or Plastol 5000"b. "Rheobuild 1000"c. "Glenium 7500"d. "Daracem-100"	Euclid Chemical Co. Master Builders Master Builders W. R. Grace
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Water Reducing, Non-Corrosive Accelerating Admixture: The admixture shall conform to ASTM C 494, Type C or E, and not contain more chloride ions than are present in municipal Н. drinking water. The admixture manufacturer must have long-term non- corrosive test data from an independent testing laboratory (of at least a year's duration) using an acceptable accelerated corrosion test method such as that using electrical potential measures. Accelerating admixtures are not to be used as antifreeze agents. Accelerating admixtures are permitted only upon review by Commissioner.

- Products: Subject to compliance with requirements, provide the following or approved 1.
 - a. "Accelguard 80"

Euclid Chemical Co.

b. "Daraset"

W. R. Grace

c. "Pozzutec 20"

Master Builders.

- Water-Reducing, Retarding Admixture: ASTM C 494, Type D, and contain not more than 0.05 I.
 - Products: Subject to compliance with requirements, provide one of the following or 1.

a. "Eucon Retarder 75"

Euclid Chemical Co.

"Pozzolith 100XR" b.

Master Builders.

c. "Plastiment"

Sika Chemical Co.

d. "Daratard"

W.R. Grace.

- Microsilica Admixture shall be dry densified or slurry formed. Microsilica shall come from the J. same source throughout the project. If a single source cannot be maintained, laboratory testing of each new source shall be required before acceptance by the Commissioner at no cost to the
 - Products: Subject to compliance with requirements, provide one of the following or 1.

a. "Emsac F 100"

Elkem Chemical, Inc.

b. "Eucon MSA"

Euclid Chemical Co.

c. "Force 10,000"

W. R. Grace

- Prohibited Admixtures: Calcium chloride, thyocyanates or admixtures containing more than K. 0.05 percent chloride ions are not permitted.
- Certification: Written conformance to the above-mentioned requirements and the chloride ion L. content of admixtures will be required from the admixture manufacturer prior to mix design review by the Commissioner.
- Macro-Fibers: Engineered macro-synthetic fibers. M.
 - Products: Subject to compliance with requirements, provide one of the following or 1.

"Tuf-Strand SF" a.

Euclid Chemical Co.

b. "Fibermesh 650" "Forta-Ferro"

Propex Concrete Systems

Forta

c.

- N. Micro-Fibers: Engineered micro-synthetic fibers.
 - Products: Subject to compliance with requirements, provide the following or approved equal:

a. "Fiberstrand N":

Euclid Chemical Co.

b. "Fibermesh 150":

Propex Concrete Systems

"Ultra-Net"

Forta

- O. Natural Fiber Reinforced Concrete: Natural fiber reinforced concrete is permitted only upon review by Commissioner. Refer to ACI 544.1R, chapter 5.
- P. Corrosion Inhibitor: 30% calcium nitrite (where called for in the specifications or on the drawings). Subject to compliance with requirements, provide the following at 3 gal/cy:

1. "Eucon CIA

Euclid Chemical

2. "DCI"

c.

W. R. Grace

3. "Rheocrete CNI"

Master Builders.

Q. Contractor will be required to provide information demonstrating successful use in prior placement involving all admixtures.

2.4 RELATED MATERIALS

- A. Granular Fill: Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D 1241, Size 57, with 100 percent passing a 1-1/2 inch sieve and 0 to 5 percent passing a No. 8 sieve.
- B. Fine-Graded Granular Material: Clean mixture of crushed stone, crushed gravel, and manufactured or natural sand; ASTM D 1241, Size 10, with 100 percent passing a 3/8 inch sieve, 10 to 30 percent passing a No. 100 sieve, and at least 5 percent passing No. 200 sieve; complying with deleterious substance limits of ASTM C 33 for fine aggregates.
- C. Non-slip Aggregate Finish: Provide fused aluminum oxide grits, or crushed emery, as abrasive aggregate for non-slip finish with emery aggregate containing not less than 40% aluminum oxide and not less than 25% ferric oxide. Use material that is factory-graded, packaged, rustproof and non-glazing, and is unaffected by freezing, moisture, and cleaning materials.
- D. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.
- E. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.
 - Products: Subject to compliance with requirements, provide one of the following or approved equal:
 - a. Waterproof paper
 - b. Polyethylene film
 - c. Polyethylene-coated burlap
- F. Curing Compounds: The compound shall conform to ASTM C 309. Limit VOC content to 130 g/L. Use water-based curing compound. For surfaces receiving both a curing compound and additional flooring, verify that the curing compound and additional flooring are compatible.

1. Products: Subject to compliance with requirements, provide one of the following or approved equal:

a. SealTight 1100b. Kurez W VOX

c. Luster Seal WB STD

d. VOCOMP-25

W.R. Meadows

Euclid Chemical Co. Euclid Chemical Co.

W.R. Meadows

- G. Curing & Sealing Compounds: Only specify for slabs that will remain exposed, i.e. will not receive additional flooring. The compound shall conform to ASTM C1315. Limit VOC content to 130 g/L. Use water-based curing compound.
 - 1. Products: Subject to compliance with requirements, provide one of the following or approved equal:

a. Luster Seal WB STD

b. VOCOMP-25

c. Decra-Seal OTC

Euclid Chemical Co.

W.R. Meadows

W.R. Meadows

- H. Sealers/Hardeners: For use on concrete surfaces that will remain exposed. Slabs that will receive additional flooring do not require sealing or hardening. Sealers and hardeners must conform to ASTM D1546, not yellow under ultra violet light after 500 hours of test in accordance with and have a maximum moisture loss of 0.039 grams per sq. cm. when applied at a coverage rate of 250 sq. ft. per gallon. Limit VOC content to 130 g/L. Use water- or vegetable-based product.
 - 1. Products: Subject to compliance with requirements, provide one of the following or approved equal:

a. Kure-N-Harden

b. Liqui-Hard

c. Surfhard

BASF

W.R. Meadows

Euclid Chemical Co.

- I. For concrete floors subjected to heavy vehicular traffic use a Liquid Sealer/Densifier: The product must be a high performance, deeply penetrating concrete densifier conforming to ASTMC836; odorless, colorless, VOC compliant, non-yellowing siliconate based solution designed to harden, dustproof and protect and to resist black rubber tire marks on concrete surfaces. The compound must contain a minimum of 20% solids content of which 50% is siliconate.
- J. Evaporation Retardant:
 - 1. Products Subject to compliance with requirements, provide one of the following or approved equal:

a. "Eucobar"

Euclid Chemical Co.

b. "Confilm"

BASF

c. Evapre

W.R. Meadows

K. Certify that all curing compounds, sealers and hardeners are compatible with all adhesive products intended for attaching co-lateral floor material. In conformance with ASTM F 710, coordination with flooring manufacturer is required to insure concrete coatings will not obstruct the bond between the concrete and the adhesive. Insure coatings and adhesives are "benignly compatible" -- in other words, do not combine substances whose constituents are reactive. Reactivity releases VOCs and /or other toxic fumes.

- Crack Sealer: Elastomeric liquid crack sealer resistant to water, gasoline, oil and salts. L.
 - Products: Subject to compliance with requirements, provide one of the following or approved equal:

Euclid Chemical Co. "Plasti-seal" W.R. Meadows a. Deck-O-Seal b. **BASF** MasterSeal 630 c.

- Underlayment Compound: Free flowing, self-leveling, pumpable cementitious base compound. M.
 - Products: Subject to compliance with requirements, provide the following or approved 1. equal:

Euclid Chemical Co. "Flo-Top 90 or Super Flo-Top" Ardex Co. a. "Ardex" Master Builders b. "Underlayment 110" c.

- Bonding Admixture: The compound shall be a latex, non-rewettable type. N.
 - Products: Subject to compliance with requirements, provide one of the following or 1. approved equal:

Euclid Chemical Co. "Flex-Con" W.R. Grace a. "Daraweld C" Euclid Chemical Co. b. "SBR Latex" c.

- High Strength Polymer Repair Mortar: For form and pouring or large horizontal repairs, provide the flowable on-part, high strength repair mortar. O.
 - Products: subject to compliance with requirements, provide the following or approved 1. equal:

The Euclid Chemical Co. The Euclid Chemical Co. "Eucocrete" a. "Euco Speed MP" (Cold Weather) Master Builders. b. "Emaco R" c.

- Bonding Agent: ASTM C 1059/C 1059M, Type II, non-redispersible, acrylic emulsion or P. styrene butadiene.
- Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit Q. requirements, and as follows:
 - Type IV for bonding hardened concrete to hardened concrete, and Type V for bonding freshly mixed concrete to hardened concrete. 1.
- Fabricate reglets of not less than 0.022 inch thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris. Staten Island Zoo Aquarium Reconstruction Cast In Place Concrete

- S. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than 0.034 inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.
- T. Vapor Barrier: Provide vapor barrier which conforms to ASTM E 1745, Class A or B. The membrane shall have a water-vapor permeance rate no greater than 0.012 perms when tested in accordance with ASTM E 154, Section 7. The vapor barrier shall be placed over prepared base in accordance with ACI 302.1R. Preferred vapor barriers will be manufactured from post-consumer recycled polymers.
 - 1. Products: Subject to compliance with requirements, provide one of the following or approved equal:

a. "Stego Wrap (15 mil) Vapor Barrier"

Stego Industries LLC

b. "Griffolyn Vaporguard"

Reef Industries

c. "Premoulded Membrane with

Plastmatic Core"

W.R. Meadows.

- U. Expansion Joint Filler: ASTM D 1751.
 - 1. Products: Subject to compliance with requirements, provide one of the following or approved equal:

a. "Homex 300"

Homasote Company

b. "Standard Cork Expansion Joint Filler"

A.P.S. Cork

c. "Fibre Expansion Joint"

W.R. Meadows

V. Water: Potable.

2.5 PROPORTIONING AND DESIGN OF MIXES

- A. Preparation of Design Mixes
 - 1. All mix designs shall be proportioned in accordance with Section 5.3, "Proportioning on the Basis of Field Experience and/or Trial Mixtures" of ACI 318 and prepared by a licensed testing laboratory approved by the City of New York, but paid for by the contractor. Submit mix designs on each class of concrete for review.
 - 2. If previously used mixes are submitted, all materials shall be from the same sources and with the same brand names as the previously utilized mix.
 - 3. If trial batches are used, the mix design shall be prepared by an independent testing laboratory and shall achieve an average compressive strength 1200 psi higher than the strengths greater than 5000 psi are used.
 - 4. The proposed mix designs shall be accompanied by complete standard deviation analysis or trial mixture test data.

- B. Submit each proposed mix to the Commissioner for review at least 5 days prior to the preconcrete conference. Do not begin concrete production until Commissioner has reviewed and approved mixes.
 - 1. 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.
 - 2. Submit Test reports for any pozzolans or slags indicating compliance with ASTM C 618 or ASTM C 989, respectively.
 - 3. Provide cut sheets clearly indicating the percentages of pozzolans or slags used in the mix design as replacement for Portland cement. Or, if cut sheets are not available, obtain a written affidavit from the manufacturer stating the percentage.
 - 4. Test reports for recycled aggregate indicating compliance with ASTM C 33. Provide cut sheets clearly indicating the percentage of aggregates used that are recycled. Or, if cut sheets are not available, obtain a written affidavit from the manufacturer stating the recycled content percentage and source or sources of the material.
 - 5. Provide cut sheets clearly indicating the percentage of sub-base and filler aggregate materials that are recycled. Or, if cut sheets are not available, obtain a written affidavit from the manufacturer stating the recycled content percentage and source or sources of the material.
 - Design mixes to provide concrete with strength as indicated on drawings and schedules.
 - D. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant; at no additional cost to City of New York and as accepted by the Commissioner. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Commissioner before using in work.

E. Admixtures:

- 1. Use water-reducing admixture or high range water-reducing admixture (superplasticizer) in all concrete as required for placement and workability.
- Use non-corrosive, non-chloride accelerating admixture in concrete slabs placed at ambient temperatures below 50°F (10°C).
 Use high-range water-reducing admixture in pumped concrete, architectural concrete, parking structure slabs, fiber concrete, concrete required to be watertight, concrete with ultimate strength of 5,000 psi or more, and concrete with water/cement ratios below 0.50.
- 3. Use air-entraining admixture in exterior exposed concrete, unless otherwise indicated. Exposure category for exterior concrete is F1. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus-or-minus 1-1/2 percent within following limits:
 - 1. Concrete structures and slabs exposed to freezing and thawing or deicer chemicals.
 - a. 4.5 percent (exposure class F1, moderate exposure); 5.5 percent (exposure class F2 and F3, severe exposure): 1-1/2" maximum aggregate
 - b. 4.5 percent (exposure class F1, moderate exposure); 6 percent (exposure class F2 and F3, severe exposure): 1" maximum aggregate

- 5 percent (exposure class F1, moderate exposure); 6 percent (exposure c. class F2 and F3, severe exposure): 3/4" maximum aggregate d.
- 5.5 percent (exposure class F1, moderate exposure); 7 percent (exposure class F2 and F3, severe exposure): 1/2" maximum aggregate
- 6 percent (exposure class F1, moderate exposure); 7.5 percent (exposure e. class F2 and F3, severe exposure) – 3/8" maximum aggregate
- Other Concrete: (not exposed to freezing, thawing, or hydraulic pressure): 2 2.
- 4. Use admixtures for water-reducing and set-control in strict compliance with manufacturer's directions.
- Water-Cement Ratio: Provide concrete for following conditions with maximum water-cement F.
 - Concrete for precast slabs, precast beams, structural topping slab, caisson caps, caissons, 1. poured in place slabs and grade beams, columns and walls, over water, on ground or exposed to weather: W/C 0.40. 2. Concrete on metal deck:
 - With specified minimum compressive strength not greater than 5,000 psi: 0.40. a.
 - With specified minimum compressive strength not greater than 7,000 psi: 0.35. b.
 - "Quick Dry" Concrete: 0.40. 3.
 - Subjected to freezing and thawing; W/C 0.45. 4.
 - Subjected to deicers/watertight: W/C 0.45. 5.
 - Reinforced concrete subjected to brackish water, salt spray or deicers; W/C 0.40. 6.
- Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as G.
 - 1. Ramp slabs and sloping surfaces: Not more than 3".
 - Reinforced foundation systems, including mud slabs below hydrostatic slabs: Not less 2.
 - Concrete containing HRWR admixture (superplasticizer): Not more than 9" unless 3. otherwise approved by the architect. The concrete shall arrive at the job site at a slump of 2" to 3" (3" to 4" for concrete receiving a "shake-on" hardener or lightweight concrete), be verified, then the high-range water-reducing admixture added to increase
 - Other Concrete: Not less than 1" or more than 4". 4.
- Chloride Ion Level: Chloride ion content of aggregate shall be tested by the laboratory making H. the trial mixes. The total chloride ion content of the mix including all constituents shall not exceed the limitations set forth in Table 4.4.1 of ACI 318 for concrete subjected to deicers or exposed to chloride in service (0.15% chloride ions by weight of cement).

2.6 CONCRETE MIXING

Ready-Mix Concrete: Comply with requirements of ASTM C 94, and as herein specified.

- B. Provide batch ticket for each batch discharged and used in work, indicating project identification name and number, date, mix type, mix time, quantity, and amount of water introduced.
- C. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C 94 may be required. When air temperature is between 85°F (30°C) and 90°F (32°C), reduce maximum mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90°F (32°C), reduce maximum mixing and delivery time to 60 minutes.
- D. No water shall be added after mixing to concrete containing HRWR (Superplasticizer). If loss of slump occurs, the concrete treated with HRWR may be redosed as long as a "flash set" has not occurred. Redosage procedures must be discussed and approved by the Commissioner and the manufacturer.

PART 3 - EXECUTION

3.1 GENERAL

A. Coordinate the installation of joint materials and vapor retarders with placement of forms and reinforcing steel.

3.2 INSPECTION

A. Examine all work prepared by others to receive work of this section and report any defects affecting installation to the Contractor for correction. Commencement of work will be construed as complete acceptance of preparatory work by others.

3.3 CONCRETE

- A. Concrete shall develop the minimum compressive strengths shown on drawings at 28 days when sampled and tested in accordance with ASTM C 31 and C 39 with the maximum slump in accordance with the approved mix design.
- B. Concrete shall be in accordance with the requirements and specifications of "Building Code Requirements for Structural Concrete" as modified by the building code noted above.
- C. Fly Ash Concrete & Slag Concrete: Concrete mixes containing high volumes of fly ash or Slag have slower set times and may take up to 56 days to reach full strength. The Commissioner, agency responsible for concrete mix design, and the concrete subcontractor must coordinate to ensure that the form stripping schedule is consistent with the ability of the structure to support itself and all imposed construction loads.

3.4 FORMS

- A. Design formwork to maximize its reusability, reduce resources devoted to formwork construction and minimize waste generated. Where appropriate choose alternative formwork systems (refer to sections listed above).
- B. Design, erect, support, brace and maintain formwork to support vertical and lateral, static, and dynamic loads that might be applied until such loads can be supported by concrete structure. Construct formwork so concrete members and structures are of correct size, shapes, alignment, elevation and position. Maintain formwork construction tolerances complying with ACI 347. Provide Class A tolerances for concrete exposed to view. Provide Class C tolerances for other concrete surfaces.
- C. Design formwork to be readily removable without impact, shocks or damage to cast-in-place concrete surfaces and adjacent materials.
- D. Construct forms to size shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide back- up at joints to prevent leakage of cement paste.
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, recesses, and the like, to prevent swelling and for easy removal.
- F. Provide-temporary openings where interior area of formwork is inaccessible for cleanout, forinspection before concrete placement, and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings on forms at inconspicuous locations.
- G. Chamfer exposed corners and edges as indicated, using wood, metal, PVC or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
- H. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses and chases from trades providing such items. Accurately place and securely support items built into forms.
- I. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is placed. Retightening forms and bracing after concrete placement is required to eliminate mortar leaks and maintain proper alignment.

3.5 VAPOR BARRIER INSTALLATION

- A. Examine the condition of porous fill and remedy any unsatisfactory portions prior to installing vapor barriers.
- B. Sub-base material to be per above sections.

- C. Following leveling and tamping of sub-base for slabs on grade, place vapor barrier sheeting with longest dimension parallel with direction of pour.
- D. Lap joints 6" and seal with appropriate tape.
- E. After placement of moisture barrier, cover with granular material and compact to depth as shown on drawings.
- F. Avoid cutting or puncturing vapor barrier during reinforcement placement and concreting operations.

3.6 PLACING REINFORCEMENT

- A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials, which reduce or destroy bond with concrete.
- C. Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as required.
- D. Place reinforcement to obtain at least minimum coverage's for concrete protection. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.
- F. Micro-Fibers: All concrete where indicated on the drawings shall contain the specified micro-fibers. Length shall be per the manufacturer's specification. The dosage rate shall be 1.0 1.6 lbs per cubic yard per the manufacturer's specification. Submit proposed dosage rate to Commissioner for review prior to concrete placement.
- G. Macro-Fibers: All concrete where indicated on the drawings shall contain the specified macro-fibers. Length shall be per the manufacturer's specification. The dosage rate shall be 3.0 5.0 lbs per cubic yard per the manufacturer's specification. Submit proposed dosage rate to Commissioner for review prior to concrete placement.
- H. Epoxy-coated reinforcing bars supported from formwork shall rest on coated wire bar supports. Reinforcing bars used as support bars shall be epoxy-coated. In walls having epoxy-coated reinforcing bars, spreader bars where specified by the Commissioner, shall be epoxy-coated. Proprietary combination bar clips and spreaders used in walls with epoxy-coated reinforcing bars shall be made of corrosion-resistant material.
- I. Epoxy-coated reinforcing bars shall be fastened with nylon-, epoxy-, or plastic-coated tie wire, or other acceptable materials.

- J. Repair of damaged epoxy-coating: When required, damaged epoxy-coating shall be repaired with patching material conforming to ASTM A775. Repair shall be done in accordance with the patching material manufacturer's recommendations.
- K. Unless permitted by the Commissioner, epoxy-coated reinforcing bars shall not be cut in the field. When epoxy-coated reinforcing bars are cut in the field, the ends of the bars shall be coated with the same material used for repair of coating damage.

3.7 JOINTS

- A. Construction Joints: Locate and install construction joints as indicated, or if not indicated, locate so as not to impair strength and appearance of the structure, as acceptable to Architect.
- B. Provide keyways at least 1-1/2" deep in construction joints in walls, slabs and between walls and footings; accepted bulkheads designed for this purpose may be used for slabs.
- C. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints, except as otherwise indicated.
- D. Waterstops: Provide waterstops in construction joints as indicated. Install waterstops to form continuous diaphragm in each joint. Make provisions to support and protect exposed waterstops during progress of work. Fabricate field joints in waterstops in accordance with manufacturer's printed instructions, using manufacturer's specified welding irons.
- E. Isolation Joints in Slabs-on-Ground: Construct isolation joints in slabs-on-ground at points of contact between slabs-on-ground and vertical surfaces, such as column pedestals and elsewhere as indicated.
 - 1. Joint filler and sealant materials are specified in the section for "Related Materials"
- F. Contraction (Control) Joints in Slabs-on-Ground: Maximum joint spacing shall be 36 times the slab thickness unless otherwise noted on the drawings. The dry cut saw shall be used immediately after final finishing and to a depth of 1-1/4". A conventional saw shall be used as soon as possible without dislodging aggregate and to a depth of 1/4 slab thickness.
 - 1. Joint sealant material is specified in the section for "Related Materials".

3.8 INSTALLATION OF EMBEDDED ITEMS

- A. General: Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions and directions provided by suppliers of items to be attached thereto.
- B. Edge Forms and Screed Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Provide and secure units sufficiently strong to support types of screed strips by use of strike-off templates or accepted compacting type screeds.
- C. Embedded Plates at Foundation Walls: Install plate at top of forms so that exterior face of steel plate is level and plumb. Use construction documents for locations, sizes and elevations.

3.9 PREPARATION OF FORM SURFACES

- A. Clean re-used forms of concrete matrix residue, repair and patch as required to return forms to acceptable surface condition.
- B. If form-release compound is required, coat contact surfaces of forms with a form-coating compound *before* reinforcement is placed.
- C. Thin form-coating compounds only with thinning agent of type, and amount, and under conditions of form-coating compound manufacturer's directions. Do not allow excess form-coating material to accumulate in forms or to come into contact with in- place concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.
- Coat steel forms with a non-staining, rust-preventative form oil or otherwise protect against rusting. Rust-stained steel formwork is not acceptable.

3.10 CONCRETE PLACEMENT

- A. Ready-mix concrete shall comply with the requirements of ASTM C 94 and ACI 304. All plant and transporting equipment shall comply with the concrete plant standards and truck mixer and agitator standards of the National Ready Mix Concrete Association.
- B. Cold weather mixing procedures shall be submitted to the architect for approval.
- C. Notify Commissioner and City of New York's Inspector at least 36 hours (1 1/2 regular working days) before each pour so that forms and reinforcing may be examined. Do not place concrete until inspection has been made or waived.
- D. Preplacement Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast-in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work. Moisten wood forms immediately before placing concrete where form coatings are not used.
 - Apply temporary protective covering to lower 2' of finished walls adjacent to poured floor slabs and similar conditions, and guard against spattering during placement.
- E. General: Comply with ACI 304 "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete," and as herein specified.
 - Deposit concrete continuously or in layers of such thickness that no concrete will be
 placed on concrete which has hardened sufficiently to cause the formation of seams or
 planes of weakness. If a section cannot be placed continuously, provide construction
 joints as herein specified. Deposit concrete as nearly as practicable to its final location
 to avoid segregation.

- F. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 18" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints. Use internal vibrators penetrating both the top and preceding layers.
- G. Consolidate placed concrete by mechanical vibrating equipment supplemented by handspading, rodding or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI recommended practices.
- H. Use and type of vibrators shall conform to ACI 309 "Recommended Practice for Consolidation of Concrete." Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least 6" into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.
- Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.
- J. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.
- K. Slabs: Bring slab surfaces to correct level with straightedge and strikeoff. Use highway straightedge, bull floats or darbies to smooth surface free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations. See also "MONOLITHIC SLAB FINISHES" below
- L. Maintain reinforcing in proper position during concrete placement operations.
- M. Cold Weather Placing: Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified.
 - 1. When air temperature has fallen to or is expected to fall below 40°F (4°C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50°F (10°C), and not more than 80°F (27°C) at point of placement.
 - Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 Use only a non-corresive non-object in the containing frozen materials.
 - 3. Use only a non-corrosive, non-chloride accelerator. Calcium chloride, thiocyanates or admixtures containing more than 0.05% chloride ions are NOT permitted.
 - 4. Care must be taken to store water-based curing and sealing compounds where they will not freeze. In most cases, they cannot be reconstituted after thawing.
- N. Hot Weather Placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.
 - 1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90°F (32°C). Mixing water may be chilled, or chopped ice may be used to control

- temperature provided water equivalent of ice is calculated to total amount of mixing water. Use of liquid nitrogen to cool concrete is Contractor's option.
- 2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.
- 3. Fog spray forms, reinforcing steel and subgrade just before concrete is placed.

3.11 FINISH OF FORMED SURFACES

- A. Concrete mixes containing pozzolans or slags do not set at the same rate or with the same bleed water characteristic as plain Portland cement. Therefore attention must be directed to the proper procedures. Refer to ACI 232.2R and ACI 301.
- B. Rough Form Finish: For formed concrete surface not exposed-to- view in the finish work or by other construction, unless otherwise indicated. This is the concrete surface having texture imparted by form facing material used, with the holes and defective areas repaired and patched and fins and other projections exceeding 1/4" in height rubbed down or chipped off.
- C. Smooth Form Finish: For formed concrete surfaces exposed-to-view, or that are to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, damp-proofing, painting or other similar system. This is ascast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smoothed. Follow all requirements in ACI 301, Chapter 10 for smooth form finish. Surface preparation for surfaces receiving waterproofing must be approved by the waterproofing manufacturer prior to construction.

3.12 MONOLITHIC SLAB FINISHES

- A. Float Finish: Apply float finish to slabs at crawl spaces, unless otherwise noted. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture. Surface shall achieve an FF 20 FL 17 tolerance.
- B. Trowel Finish: Apply trowel finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or other thin film finish coating system, unless otherwise noted. After floating, begin first trowel finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance and with a surface leveled to an FF 25/FL 20 tolerance (FL17 for elevated slabs). Grind smooth surface defects, which would telegraph through applied floor covering system.
- C. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, and slab surfaces which are to be covered with membrane or elastic waterproofing, or sand-bed terrazzo, and as otherwise indicated, apply single trowel finish as specified, then

immediately follow with slightly scarifying surface by fine brooming. Surface preparation for surfaces receiving waterproofing must be approved by the waterproofing manufacturer prior to construction

D. Sealers, Hardeners and Liquid Densifiers: Apply a coat of the specified compound to all EXPOSED interior concrete floors where indicated on the drawings. This surface must be continuously moist cured by a method satisfactory to the Commissioner. Apply and mechanically scrub compound into the floor in strict accordance with the manufacturer's printed instructions.

3.13 CONCRETE CURING AND PROTECTION

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
 - Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.
 - 2. Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.
 - 3. In order to avoid plastic or drying shrinkage cracks during warm, dry or windy weather, ACI 302 and ACI 308 shall be followed using wind breaks and sun shades when recommended. Evaporation retardant shall be as specified in Section 2.04.
 - 4. Care must be taken to store water based curing and sealing compounds where they will not freeze. In most cases, they cannot be reconstituted after thawing.
- B. Curing Methods: Perform curing of concrete by moisture curing, moisture-retaining cover curing, curing and sealing compound, and by combinations thereof, as herein specified.
 - 1. Provide moisture curing by following methods.
 - a. Keep concrete surface continuously wet by covering with water.
 - b. Continuous water-fog spray.
 - c. Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.
 - 2. Provide moisture-retaining cover curing as follows:
 - a. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 - Provide curing and sealing compound to exposed interior slabs not receiving additional flooring. A clear curing and sealing compound shall be used on exterior slabs, sidewalks and curbs not receiving a penetrating sealer.

- 4. Use the specified curing compound on surfaces to be covered with finish or coating material applied directly to concrete, such as liquid densifier/sealer, waterproofing, dampproofing, membrane roofing, flooring, painting, and other coatings and finish materials. Apply compound in accordance with manufacturer's direction.
- C. Curing Formed Surfaces: Cure formed concrete surfaces, including undersides of beams, supported slabs and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.
- D. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by application of the specified curing compound or a continuous moist curing method approved by the commissioner.
- E. Certify that all curing compounds, sealers and hardeners are compatible with all adhesive products intended for attaching co-lateral floor material. In conformance with ASTM F710, coordination with flooring manufacturer is required to insure concrete coatings will not obstruct the bond between the concrete and the adhesive. In addition, insure coatings and adhesives are "benignly compatible" -- in other words, do not combine substances whose constituents are reactive.
- F. Sealer and Dustproofer: Apply a second coat of the specified curing and sealing compound to exposed interior slabs not subjected to vehicular traffic, noted on the drawings. These slabs must have received an initial coat of the curing and sealing compound.

3.14 SHORES AND SUPPORTS

- A. Comply with ACI 347 for shoring and reshoring in multistory construction, and as herein specified.
- B. Extend shoring from ground to roof for structures 4 stories or less, unless otherwise permitted.
- C. Extend shoring generally at least 4 floors under floor or roof being placed for structures over 5 stories. Shore floor directly under floor or roof being placed, so that loads from construction above will transfer directly to these shores. Space shoring in stories below this levels in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members where no reinforcing steel is provided. Extend shores beyond minimums to ensure proper distribution of loads throughout structure. Contractor shall provide the services of a registered Professional Engineer to design the shoring, and determine timing of removal.
- D. Remove shores and reshore in a planned sequence to avoid damage to partially cured concrete. Locate and provide adequate reshoring to safely support work without excessive stress or deflection.
- E. Keep reshores in place a minimum of 15 days after placing upper tier, and longer if required, until concrete has attained its required 28-day strength and heavy loads due to construction operations have been removed.

3.15 REMOVAL OF FORMS

- A. Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50°F (10°C) for 12 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided curing and protection operations are maintained.
- B. Formwork supporting weight of concrete, such as beam soffits, joints, slabs and other structural elements, may not be removed in less than 14 days and until concrete has attained design minimum compressive strength at 28-days. Determine potential compressive strength of inplace concrete by testing field-cured specimens representative of concrete location or members.
- C. Form facing material may be removed 4 days after placement, only if shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and supports.

3.16 RE-USE OF FORMS

- A. Clean and repair surfaces of forms to be re-used in work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable for exposed surfaces. Apply new form coating compound as specified for new formwork.
- B. When forms are intended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces, except as acceptable to Commissioner.

3.17 MISCELLANEOUS CONCRETE ITEMS

- A. Filling-In: Fill-in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place and cure concrete as herein specified, to blend with in- place construction. Provide other miscellaneous concrete filling shown or required to complete work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners, intersections and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.
- D. Grout base plates and foundations as indicated using specified free-flowing non-shrink grout. Use non-metallic grout for exposed conditions, unless otherwise indicated.
- E. Where high fluidity and/or increased placing time is required use the specified high flow grout. This grout shall be used for all base plates larger than 10 square feet.
- F. Steel Pan Stairs: Provide concrete fill for steel pan stair treads and landings and associated items. Cast-in safety inserts and accessories as shown on drawings. Screeds, tamp, and finish

G. Reinforced Masonry: Provide concrete grout for reinforced masonry lintels and bond beams where indicated on drawings and as scheduled. Maintain accurate location of reinforcing steel during concrete placement.

3.18 CONCRETE SURFACE REPAIRS

- A. Prior to all repairs, an as-built condition sketch and method of repair must be submitted to the Commissioner for review and approval.
- B. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to the Commissioner.
- C. Cut out honeycomb, rock pockets, voids over 1/4" in any dimension, and holes left by tie rods and bolts, down to solid concrete but, in no case to a depth of less than 1". Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with a bonding grout containing the specified bonding admixture. Place patching mortar after while bonding grout is still tacky.
- D. For exposed-to-view surfaces, blend white Portland cement and standard Portland cement so that, when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
- E. Repair of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of the Commissioner. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets; fins and other projections on surface; and stains and other discoloration's that cannot be removed by cleaning. Flush out form tie holes, fill with dry pack mortar, or pre-cast cement cone plugs secured in place with bonding agent.
- F. Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.
- G. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for tureens of slope, in addition to smoothness, using a template having required slope.
- H. Repair finished unformed surfaces that contain defects, which affect durability of concrete. Surface defects, as such, include crazing, cracks in excess of 0.01" wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, popouts, honeycomb, rock pockets, and other objectionable conditions.
- Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days, except at hydrostatic slabs.
- J. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired

- areas to blend into adjacent concrete. The specified underlayment compound or repair toping may be used when acceptable to Commissioner.
- K. Repair defective areas, except random cracks and single holes not exceeding 1" diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4" clearance all around. Dampen patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact and finish to blend with adjacent finished concrete. Cure in the same manner as adjacent concrete.
- L. Repair isolated random cracks and single holes not over 1" in diameter by dry-pack method. Groove top of cracks and cutout holes to sound concrete and clean of dust, dirt and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Mix dry-pack, consisting of one part Portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Place dry-pack after bonding compound has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.
- M. Structural Repair: All structural repairs shall be made with prior approval of the Commissioner as to method and procedure, using the specified polymer repair mortar and/or specified epoxy adhesive. Where epoxy injection procedures must be used, an approved low viscosity epoxy made by the manufacturers previously specified shall be used. In addition, all cracks shall be garage slabs shall be repaired prior to the slab being treated with the specified penetrating antispalling sealer.
- N. Underlayment Application: Leveling of floors for subsequent finishes may be achieved by use of specified underlayment material. Underlayment application shall achieve the tolerances specified in "MONOLITHIC SLAB FINISHES" above.
- O. Specified Polymer Horizontal Repair Mortar: All exposed floors shall be leveled, where required, with the specified self-leveling repair topping.
- P. Repair Methods not specified above may be used, subject to acceptance of Commissioner.

3.19 WORK IN CONNECTION WITH OTHER TRADES

- A. Sleeves, pockets, openings, etc., shall be set in the concrete walls and arches as required for the mechanical trades as shown on approved shop drawings; these shall be encased or built into the concrete work and shall be properly placed and secured in position in the forms before concrete is placed.
- B. Provide all chases, pipe slots, etc., required for the mechanical trades (see mechanical drawings), constructed as shown on the approved shop drawings.
- C. Leave temporary access panels where required to install mechanical equipment as required by trade affected. Panels shall be formed with construction joints as specified. Details for such panels shall be submitted to Commissioner for approval.
- D. Coordinate all penetrations, cutting, and patching with waterproofing contractor.

3.20 CUTTING AND PATCHING

- A. Contractor for concrete work shall be responsible for all cutting, removing and patching work where concrete surfaces are not installed within the limits shown on the drawings or specified herein. All such work shall meet with the approval of the Commissioner.
- B. Where cutting and patching is required to accommodate the work of other subcontractors, such cutting shall be done at the expense of said subcontractors but shall be performed by the contractor for concrete work.
- C. The location and extent of cutting in completed concrete work and the patching thereof shall meet with the approval of the Commissioner.

3.21 QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. The Contractor will employ a testing laboratory to perform tests and to submit test reports.
- B. Provide special inspections per the applicable Building Code and the requirements of all applicable ACI standards.
- C. At locations previously indicated in this specification and on the contract drawings, verify the use of non-magnetic materials. No magnetic materials are permitted in locations where prohibited by this specification or the contract drawings.
- D. Sampling and testing for quality control during placement of concrete may include the following, as directed by Architect.
 - 1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
 - 2. Slump: ASTM C 143; one test at point of discharge for each truck; additional tests when concrete consistency seems to have changed.
 - 3. Concrete Temperature: Test hourly when air temperature is 40°F (4°C) and below, and when 80°F (27°C) and above; and each time a set of compression test specimens made.
 - 4. Compression Test Specimen: ASTM C 31; one set of 5 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.
 - 5. Compressive Strength Tests: ASTM C 39; one set for each day's pour exceeding 25 cu. yds. plus additional sets for each 50 cu. yds. over and above the first 25 cu. yds. of each concrete class placed in any one day; one specimens tested at 7 days, three specimens tested at 28 days, and one specimens retained in reserve for later testing if required.
 - a. When frequency of testing will provide less than 5 strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.
 - b. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
 - Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive

strength, and no individual strength test result falls below specified compressive strength by more than 500 psi.

- 6. Water Cement Ratio Test: Check water content of concrete in accordance with 'Standard Method of Test for Water Content of Freshly Mixed Concrete Using Microwave Oven Drying, AASHTO DESIGNATION:TP 23, SHRP DESIGNATION: 2027' for testing procedure. Frequency of this test shall be the same as that of compressive strength tests, noted above.
- 7. Test results will be reported in writing to Commissioner and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7-day tests and 28-day tests.
 - a. Non Compliance: All test reports indicating non-compliance shall be faxed immediately to all parties on the test report distribution list and the hard copies submitted on different colored paper.
 - b. Nondestructive Testing: Windsor probes, sonoscope, or other non-destructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.
- 8. Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. Contractor shall pay for such tests when unacceptable

END OF SECTION

SECTION 040100

MASONRY RESTORATION AND CLEANING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract (City of New York Standard Contract).

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the masonry restoration and cleaning at rear façade where windows are removed and new ones installed as shown on the drawing A300 and/or specified herein, including, but not limited to, the following:
 - 1. Cleaning existing face brick walls.
 - Re-pointing existing face brick walls.
 - Replacing existing damaged face brick.

1.3 RELATED SECTIONS

- A. Unit Masonry Section 042000.
- B. Joint Sealers Section 079200.

1.4 CODES

- A. ASTM C 618, Standard Specification for Fly Ash and Raw or Calcined Natural Pozzolan for Uses as a Mineral Admixture in Portland Cement Concrete
- B. ASTM C 311, Standard Methods of Sampling and Testing Fly Ash and Natural Pozzolans for Use as a Mineral Admixture in Portland Cement Concrete
- C. ASTM C 989, Ground Granulated Blast-Furnace Slag for Use in Concrete Mortars
- D. Standard Practice ACI 226.R1, Ground Granulated Blast-Furnace Slag as a Cementitious Constituent in Concrete

1.5 QUALITY ASSURANCE

- A. Special Experience Requirements
 - 1. Installer: The contractor or subcontractor performing the work of this Section must, within the last three (3) consecutive years prior to the bid opening, have

successfully completed in a timely fashion projects similar in scope and type to the required work.

- B. Field-Constructed Mock-Ups: Prior to start of general masonry restoration, prepare the following sample panels on the building where directed by Commissioner. Obtain Commissioner's acceptance of visual qualities before proceeding with the work. Retain acceptable panels in undisturbed condition, suitably marked, during construction as a standard for judging completed work.
 - 1. Cleaning: Demonstrate materials and methods to be used for cleaning each type of masonry surface and condition on sample panels of approximately 25 sq. ft. in area.
 - a. Test adjacent non-masonry materials for possible reaction with cleaning materials.
 - b. Allow waiting period not less than seven (7) calendar days, after completion of sample cleaning to permit study of sample panels for negative reactions.
 - 2. Repointing: Prepare two (2) separate sample areas of approximately 3' high by 6' wide for each type of repointing required, one for demonstrating methods and quality of workmanship expected in removal of mortar from joints and the other for demonstrating quality of materials and workmanship expected in pointing mortar joints.

1.6 SUBMITTALS

- A. Product Data: Submit manufacturers' technical data for each product indicated including recommendations for their application and use and VOC compliance. Include test reports and certifications substantiating that products comply with requirements.
- B. Restoration Program: Submit written program for each phase of restoration process including protection of surrounding materials on building and site during operations. Describe in detail materials, methods and equipment to be used for each phase of restoration work.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Carefully pack, handle, and ship masonry units and accessories strapped together in suitable packs or pallets or in heavy cartons. Unload and handle to prevent chipping and breakage.
- B. Deliver other materials to site in manufacturer's original and unopened containers and packaging, bearing labels as to type and names of products and manufacturers.
- C. Protect masonry restoration materials during storage and construction from wetting by rain, snow or ground water, and from staining or intermixture with earth or other types of materials.
- D. Protect grout, mortar and other materials from deterioration by moisture and temperature. Store in a dry location or in waterproof containers. Keep containers tightly closed and away from open flames. Protect liquid components from freezing.

Comply with manufacturer's recommendations for minimum and maximum temperature requirements for storage.

1.8 PROJECT CONDITIONS

- A. Clean masonry surfaces only when air temperatures are 40 deg. F. and above and will remain so until masonry has dried out, but for not less than seven (7) days after completion of cleaning.
- B. Do not repoint mortar joints or repair masonry unless air temperatures are between 40 deg. F. and 80 deg. F. and will remain so for at least forty-eight (48) hours after completion of work.
- C. Prevent grout or mortar used in repointing and repair work from staining face of surrounding masonry and other surfaces. Remove immediately grout and mortar in contact with exposed masonry and other surfaces.
- D. Protect sills, ledges and projections from mortar droppings.

1.9 SEQUENCING/SCHEDULING

- A. Perform masonry restoration work in the following sequence:
 - Repair existing masonry including replacing existing masonry with new masonry materials.
 - 2. Rake-out existing mortar from joints indicated to be repointed.
 - 3. Repoint existing mortar joints of masonry indicated to be restored.
 - 4. Clean existing masonry surfaces.

PART 2 PRODUCTS

2.1 MASONRY MATERIALS

- A. Provide face brick conforming to the requirements of Section 042000.
- B. For mortar materials, conform to the requirements of Section 042000.

2.2 CLEANING MATERIALS AND EQUIPMENT

- A. Water for Cleaning: Clean, potable, free of oils, acids, alkalis, salts, and organic matter.
- B. Alkaline Prewash Cleaner: Manufacturer's standard alkaline cleaner for prewash applications only which are followed by acidic cleaner of type indicated for afterwash.
 - Product: Subject to compliance with requirements, provide "Sure Klean 766 Prewash," ProSoCo, Inc., or approved equal.
- C. Acidic Cleaner: Manufacturer's standard strength acidic masonry restoration cleaner composed of hydrofluoric acid blended with other acids including trace of phosphoric acid and combined with special wetting systems and inhibitors.

- Products: Subject to compliance with requirements, provide one of the following:
 - "Diedrich 101 Masonry Restorer," Diedrich Chemicals. a.
 - "Sure Klean Restoration Cleaner," ProSoCo, Inc. b.
 - c. or approved equal.
- Liquid Strippable Masking Agent: Manufacturer's standard liquid, film forming, strippable masking material for protecting glass, metal and polished stone surfaces from damaging effect of acidic and alkaline masonry cleaners.
 - Products: Subject to compliance with requirements provide one of the following:
 - "Diedrich Acid Guard," Diedrich Chemicals.
 - "Sure Klean Acid Stop," ProSoCo, Inc. b.
 - Or approved equal. c.
- Spray Equipment: Provide equipment for controlled spray application of water and chemical cleaners, at rates required by the manufacturer, measured at spray tip, and for
 - 1. For spray application of chemical cleaners provide low-pressure tank or chemical pump suitable for chemical cleaner indicated, equipped with cone-shaped spray-
 - For spray application of water provide fan-shaped spray-tip which disperses water at angle of not less than 15 degrees.

2.3 MORTAR MIXES

- Measuring and Mixing: Measure cementitious and aggregate material in a dry condition by volume or equivalent weight. Do not measure by shovel, use known measure. Mix materials in a clean mechanical batch mixer.
 - Mixing Pointing Mortar: Thoroughly mix cementitious and aggregate materials together before adding any water. Then mix again adding only enough water to produce a damp, unworkable mix which will retain its form when pressed into a ball. Maintain mortar in this dampened condition for 1-to-2 hours. Add remaining water in small portions until mortar of desired consistency is reached. Use mortar within thirty (30) minutes of final mixing; do not retemper or use partially
- Colored Mortar: Produce mortar of color required by use of selected coloring agent. B.
- Do not use admixtures of any kind in mortar, other than colorant. C.
- D. **Mortar Proportions**
 - Pointing Mortar for Brick: One part white Portland cement, 2 parts lime and 6 parts colored mortar aggregate. Add colored mortar pigment to product mortar colors required to match.

 Rebuilding Mortar: Comply with ASTM C 270, Proportion Specification, Type N, with cementitious material content limited to Portland cement-lime and coloring agent.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where masonry restoration and cleaning are to be performed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected by the Contractor in a manner acceptable to the Commissioner.

3.2 PROTECTION

- A. General: Comply with recommendations of manufacturers of chemical cleaners for protecting building surfaces against damage from exposure to their products.
- B. Protect persons, motor vehicles, surrounding surfaces of building whose masonry surfaces are being restored, building site, and surrounding buildings from injury resulting from masonry restoration work.
 - Prevent chemical cleaning solutions from coming into contact with pedestrians, motor vehicles, landscaping, buildings and other surfaces which could be injured by such contact.
 - 2. Do not clean masonry during winds of sufficient force to spread cleaning solutions to unprotected surfaces.
 - Dispose of run-off from cleaning operations by legal means and in manner which
 prevents soil erosion, undermining of paving and foundations, damage to
 landscaping, and water penetration into building interiors.
 - 4. Erect temporary protection covers over pedestrian walkways and at points of entrance and exit for persons and vehicles which must remain in operation during course of masonry restoration work.
 - C. Protect glass, unpainted metal trim and polished stone from contact with acidic chemical cleaners by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape. Apply masking agent to comply with manufacturer's recommendations. Do not apply liquid masking agent to painted or porous surfaces.

3.3 CLEANING EXISTING MASONRY, GENERAL

- A. Proceed with cleaning in an orderly manner; work from top to bottom of each scaffold width and from one end of each elevation to the other.
- B. Use only those cleaning methods indicated for each masonry material and location.

- C. Perform each cleaning method indicated in a manner which results in uniform coverage of all surfaces, including corners, moldings, interstices and which produces an even effect without streaking or damage to masonry surfaces.
- D. Rinse off chemical residue and soil by working upwards from bottom to top of each treated area at each stage or scaffold setting.
- E. Water Application Methods: Prior to chemical cleaning, apply water application to mock-ups by spray at various pressures to determine if masonry surfaces can be cleaned adequately and to the Commissioner's satisfaction in this manner. If water applications prove ineffective, proceed with chemical cleaners.
- F. Chemical Cleaner Application Methods: Apply chemical cleaners to masonry surfaces to comply with chemical manufacturer's recommendations. Do not allow chemicals to remain on surface for periods longer than that indicated or recommended by manufacturer.
 - For hard to remove dirt or grime, apply pre-wash cleaner prior to application of chemical cleaner; follow manufacturer's instructions.

3.4 BRICK REMOVAL AND REBUILDING

A. Brick Removal

- 1. Carefully remove by hand any brick which are damaged, spalled or deteriorated. Cut out full units from joint to joint and in manner to permit replacement with full size units:
- 2. Support and protect masonry indicated to remain which surrounds removal area.
- Salvage as many whole, undamaged bricks as possible.
- Remove mortar, loose particles and soil from salvaged brick by cleaning with brushes and water. Store brick for reuse.
- 5. Clean remaining brick at edges of removal areas by removing mortar, dust, and loose debris in preparation for rebuilding.

B. Brick Rebuilding

- Install new or salvaged brick to replace removed brick. Fit replacement units into bonding and coursing pattern of existing brick. If cutting is required use motor driven saw designed to cut masonry with clean, sharp unchipped edges.
- 2. Lay replacement brick with completely filled bed, head and collar joints. Butter ends with sufficient mortar to fill head joints and shove into place. Wet clay brick which have ASTM C 67 initial rates of absorption (suction) of more than 30 grams per 30 sq. in. per minute. Use wetting methods which ensure that units are nearly saturated but surface dry when laid. Maintain joint width for replacement units to match existing.

Tool exposed mortar joints in repaired areas to match joints of surrounding existing brickwork.

REPOINTING EXISTING MASONRY 3.5

Joint Raking A.

- Rake out mortar from joints to depths equal to 2-1/2 times their widths but not less than 1/2" nor less than that required to expose sound, unweathered mortar.
- Remove mortar from masonry surfaces within raked-out joints to provide reveals with square backs and to expose masonry for contact with pointing mortar. Brush, vacuum or flush joints to remove dirt and loose debris.
- Do not spall edges of masonry units or widen joints. Replace any masonry units which become damaged.
 - Cut out old mortar by hand with chisel and mallet.
 - Power operated rotary hand saws and grinders will be permitted but only on specific written approval of Commissioner based on submission by b. Contractor of a satisfactory quality control program and demonstrated ability of operators to use tools without damage to masonry. Quality control program shall include provisions for supervising performance and preventing damage due to worker fatigue.

Joint Pointing В.

- Rinse masonry joint surfaces with water to remove any dust and mortar particles. Time application of rinsing so that, at time of pointing, excess water has evaporated or run off, and joint surfaces are damp but free of standing water.
- Apply first layer of pointing mortar to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8" until a uniform depth is formed. Compact each layer thoroughly and allow to become thumbprint-hard before applying next layer.
- After joints have been filled to a uniform depth, place remaining pointing mortar in three (3) layers with each of first and second layers filling approximately 2/5 of joint depth and third layer the remaining 1/5. Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing bricks have rounded edges recess final layer slightly from face. Take care not to spread mortar over edges onto exposed masonry surfaces, or to featheredge mortar.
- When mortar is thumbprint hard, tool joints to match original appearance of joints, unless otherwise indicated. Remove excess mortar from edge of joint by brushing.
- Cure mortar by maintaining in a damp condition for not less than seventy-two (72) hours.

6. Where repointing work precedes cleaning of existing masonry allow mortar to harden not less than thirty (30) days before beginning cleaning work.

END OF SECTION

SECTION 042000

UNIT MASONRY

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract (City of New York Standard Contract).

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the unit masonry work as shown on the drawings and/or specified herein, including but not necessarily limited to the following:
 - 1. Concrete block walls and partitions.
 - 2. Brick masonry to match existing at areas to be modified.
 - Metal joint reinforcing, anchors, ties, weeps, closures and related accessories for masonry.
 - 4. Control and expansion joints in masonry, filled with joint fillers.
 - Chases, recesses, pockets and openings in masonry as required for installation of work by others.
 - Building in of items furnished by others into masonry, including access doors, door frames, anchors, sleeves and inserts, and other similar items to be embedded in masonry.
 - Grouting in of metal items built into masonry work.
 - Protection, pointing and cleaning of masonry.

1.3 RELATED SECTIONS

- A. Firestops and Smokeseals Section 078413.
- B. Joint Sealers Section 079200.

1.4 SUBMITTALS

- A. Submit Shop Drawings for the following:
 - 1. Anchoring details.
 - 2. Control and expansion joint locations and details.

- Submit Samples for the following: B.
 - Joint reinforcing, each type, width and proposed location (labeled).
 - Anchors, wedges and ties, each type, width and proposed location (labeled). 2.
 - 3. Joint filler, each type.
- Submit technical and installation information for the following: C.
 - Mortar materials, each material and mortar type. 1.
 - Certification of mortar mix. 2.
 - Flashing material, descriptive literature. 3.
 - Concrete block, joint reinforcing, anchors, ties and joint filler; submit manufacturer's technical and descriptive literature.
 - Block manufacturer shall submit certifications of compliance with ASTM C 90, C 331 and UL 618 prior to any job site delivery. Field sampling of concrete block may be tested by an Independent Testing Laboratory retained by the City of New York according to the requirements of ASTM C 140.
- Construction Procedures (Submit the following) D.
 - Procedures and materials for cleaning masonry work; including certification that cleaner will not adversely affect stone, gaskets, sealants, etc.

1.5 QUALITY ASSURANCE

- Conform to the following non-cumulative tolerances (any masonry work not meeting A. these standards shall be re-built as directed by the Commissioner).
 - Variation from the plumb:
 - In lines and surfaces of columns, walls and arrises: a.
 - 1). In 10 feet

1/8"

2). In any story of 25 feet maximum

1/4"

- For external corners, expansion joints and other conspicuous lines: b. 1).
 - In any story of 25 feet maximum

1/4"

- Variation from the level or the grades indicated on the drawings; for exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines:
 - In any bay or 20 feet maximum

1/4"

- Variation of the linear building lines from established position in plan related portion of columns and partitions:
 - In any bay or 20 feet maximum

1/4"

Variation in cross-sectional dimensions of columns and in thickness of walls:

a. Minus 1/8"
b. Plus

Variation in dimensions of masonry openings:

a. Horizontal dimension

b. Vertical dimension

-0" + 1/16"

+0" - 1/16"

- B. Work of this Section shall conform to the requirements of the following:
 - 2005 ACI 530/ASCE 5/TMS 402 Building Code Requirements for Masonry Structures.
 - 2. 2005 ACI 530-1/ASCE 6/TMS 602 Specifications for Masonry Structures.
- C. 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.
 - Coordinate work with air/vapor barrier membrane and related flashing, review details to avoid conflicts.

1.6 PRODUCT HANDLING

- A. General: Deliver, store, handle and protect all materials from damage, moisture, dirt and intrusion of foreign matter. Store all masonry units and mortar materials on raised platforms and under ventilated and waterproof cover. Store packaged materials in manufacturer's unopened containers, marked with manufacturer's name and product brand name. Immediately reseal containers after partial use. Remove and replace damaged materials.
- B. Masonry Units: Pack, deliver and store to prevent breakage, cracking, chipping, spalling or other damage. Store, protect and ventilate units at project site.
- C. Aggregate: Store with provisions for good drainage.

D. Reinforcement and Anchors: Store and protect so that when placed, joint reinforcement and anchors will be free of soil, dirt, ice, loose rust, scale, or other coatings which would destroy or reduce bond with mortar, and will not be disfigured or bent out of shape.

1.7 CODE REQUIREMENTS

- A. Work of this Section shall conform to all applicable requirements of the New York City Building Code.
 - 1. Concrete block shall comply with Reference Standard RS-10.
 - 2. Concrete blocks shall be type approved by the Board of Standards and Appeals.
 - a. Concrete blocks used for fireproofing shall conform to New York City Building Code requirements and shall provide ratings required by the Contract Documents.
- B. Fire rated masonry partitions shall have MEA number.
- C. Conform to New York City Local Law 17-95 for Seismic Requirements.
- D. Comply with New York City Section 32-05 of Chapter 32 of Title 1 of the Official Compilation of the Rules of the City of New York regarding "Impact Resistant Stair and Elevator Enclosures" when such enclosures are of masonry construction.

1.8 JOB CONDITIONS

- A. In cold weather, when the outside temperature is below forty (40) degrees F., conform to the requirements of "Cold Weather Masonry Construction and Protection Recommendations" publication by Brick Industry Association (BIA). No anti-freeze admixtures are permitted.
- B. Hot-Weather Requirements: Protect unit masonry work when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Provide artificial shade and wind breaks and use cooled materials as required. Do not apply mortar to substrates with temperatures of 100 deg. F. and above.
- C. Protection of Masonry: During erection, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 - 1. Extend cover a minimum of 24" down both sides and hold cover securely in place.
 - 2. Where one wythe of multi-wythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24" down face next to unconstructed wythe and hold cover in place.
- D. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 - 1. Protect base of walls from rain-splashed mud and mortar splatter by coverings spread on ground and over wall surface.

- 2. Protect sills, ledges, and projections from mortar droppings.
- 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
- Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt on completed masonry.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Brick: Match Existing, including all attachments and anchors. All anchors for brick hot dip galvanized.
- B. Standard Concrete Block
 - 1. Portland cement, ASTM C 150, Type 1, low alkali (less than 65) one source.
 - Aggregates, ASTM C 331, lightweight expanded shale, clay or slate aggregates, manufactured by the rotary kiln process equal to "Solite," "Norlite," or "Haydite."
 - a. All block shall be from one aggregate type and from one manufacturer.
 - Concrete Masonry Units: Load bearing lightweight aggregate concrete masonry units conforming to the requirements of ASTM C 90.
 - Block for rated walls shall be 75% solid units.
 - b. All other block may be hollow units.
 - 4. 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.
 - 5. Sizes and Shapes: Nominal face size 8" x 16" by thickness as indicated on drawings, with stretcher units, jamb units, header units, square corner units (at ends and corners of exposed or painted work), sash units (at control joints within masonry wall), lintel units and other special shapes and sizes required to complete the work.
 - 6. Finish: For exposed or painted block surfaces, in addition to ASTM requirements, block shall have uniformly dense, flat, fine grain texture, with no cracks, chips, spalls, or other defects which would impair appearance. For concealed CMU, surfaces shall be free from deleterious materials that would stain plaster or corrode metal.
 - 7. Curing: All concrete block shall be steam cured, and air dried for not less than thirty (30) days before delivery.

- Density of concrete block shall not exceed one hundred and five (105) lbs. per
- Shrinkage: Shrinkage of concrete blocks shall not exceed 0.065% when tested in 9. accordance with ASTM C 426-99.

10. Water Content

- At the time of delivery to the job site, concrete masonry units shall have a a. value, in weight of contained water, of not more than thirty (30) percent of the fully saturated content for the unit tested.
- Ship all units from the factory, and store at the job site, with all necessary b. protection to prevent increase of water content from rain and other sources.

Joint Reinforcing for Masonry Walls C.

- For block walls forming part of exterior wall construction, provide super heavy duty reinforcing fabricated of 3/16" dia. side and cross rods, truss or ladder design, ties, spaced every block course. Provide prefabricated pieces at corners and intersections of walls or partitions.
 - Reinforcing assembly shall be hot dip galvanized steel finish conforming to ASTM A 153 with zinc coating of 1.5 oz. of zinc per sq. ft., after fabrication.
- For interior block walls and partitions, provide standard reinforcing fabricated of 9 ga. side and cross rods, truss or ladder design, no ties, spaced every other block course. Provide prefabricated pieces at corners and intersections of walls or partitions. Reinforcing shall be mill galvanized conforming to ASTM A 641, Class B-1, applied after fabrication.
- Wire used in assemblies noted above shall be cold drawn steel wire conforming to
- Approved Joint Reinforcing Manufacturers
 - Hohmann & Barnard a.
 - Wire-Bond b.
 - Heckmann Building Products c.
 - National Wire Products Industries, Inc. d.

D. Anchors and Ties

- For anchoring masonry to structural steel, provide hot-dip galvanized steel, as listed, or approved equal by manufacturer noted above in Para. C.4:
 - Made by Heckmann Building Products. Galvanizing shall conform to ASTM a. A 153, with zinc coating of 1.5 oz. of zinc per sq. ft. 1).
 - No. 195 Column Anchors
 - 2). No. 197 Column Anchors
 - No. 315 Weld-On Anchor Rods with No. 316 Triangle Ties 3).
 - No. 315-B Weld-On Anchor Straps with No. 316 Triangle Ties 4).
 - Made by Hohmann & Barnard or approved equal. Galvanizing shall conform to ASTM A 153, with zinc coating of 1.5 oz. of zinc per sq. ft.

- No. 355 Column Anchors 1).
- No. 356 Column Anchors 2).
- No. 357 Beam Anchors 3).
- No. 359 F anchor straps with VWT tie. 4).
- For anchoring CMU interior partitions to underside of steel beams, provide hot dip galvanized steel tube anchors equal to No. 419 and No. 421 made by Heckmann Building Products, No. PTA-420 made by Hohmann & Barnard, or approved equal by manufacturer noted above in Para. C.4.
- For anchoring CMU interior partitions to underside of structural deck, provide 4" x 4" x 1/4" galvanized steel angles (ASTM A 36), 3'-0" long spaced 3'-0" o.c. alternately on each side of partition. Anchor partition securely to structural deck.
- Reinforcing Bars and Rods: ASTM A 615, Grade 60. See Drawings for size. E.
- Control and Expansion Joint Fillers F.
 - Extruded high grade Vertical Installation Within Concrete Masonry Wall: neoprene rubber, cross shape, for use with concrete masonry sash units, which shall provide a force fit in the grooves of the sash block, and shall have 1/2" diameter tubular ends (compressed 25% when installed in 3/8" wide joint).
 - Provide the following sizes:
 - 2-5/8" wide control joint fillers for 4" block walls.
 - 4-5/8" wide for 6" block walls. 2).
 - 6-5/8" wide for 8", 10" and 12" block walls. 3).
 - Provide backer rod and sealant joint over joint filler as per drawings and b. Section 079200 of these specifications.
 - Isolation Joint Filler at Abutting Construction and at Intersecting CMU Walls: Compressible and resilient closed cell neoprene gasket with pressure sensitive adhesive backing, thickness 30% greater than thickness of joint. Acceptable joint filler shall be "Everlastic, Type NN-1" by Williams Products, Inc., or approved equal. Recess joint filler and install backer rod and sealant as per drawings and Section 079200 of these specifications.

MORTAR MATERIALS 2.2

- Portland Cement: ASTM C 150, Type 1, standard color, one source. A.
- Hydrated Lime: ASTM C 207, Type S, as manufactured by Corsons, or approved B. equal.
- Sand: Clean, washed, buff colored sand, graded per ASTM C 144. C.
- Water: Clean, fresh and suitable for drinking. D.

MORTAR MIX 2.3

Exterior Block Construction: Provide Portland cement/lime mortar as noted above A. conforming to ASTM C 270, Type N.

- B. Interior Masonry Construction: Provide Portland cement/lime mortar conforming to ASTM C 270, Type N, for load bearing conditions, mortar shall conform to ASTM C 270, Type M.
- C. Reinforced Concrete Block: Provide Portland cement/lime mortar conforming to ASTM C 270, Type S.
- D. Grout for Unit Masonry: Comply with ASTM C 476 for grout for use in construction of unit masonry. Use grout of consistency (fine or coarse) at time of placement which will completely fill all spaces intended to receive grout.

E. Mixing

- General: Add cement just before mixing and mix dry. Use sufficient amount of water as necessary to produce workable mix. Mix in small batches to make plastic mass.
- 2. Mixing: Machine mix all mortars in approved type mixer with device to accurately and uniformly control water. Add hydrated lime dry. Mix dry materials not less than two (2) minutes. Add water, then mix not less than three (3) minutes. Mix only amount of mortar that can be used before initial set. Do not use mortar which has reached its initial set or two (2) hours after initial mixing, whichever comes earlier. Mortar may not be re-tempered. Clean mixer for each batch, whenever mortar type is changed, and at end of each day's work.
- 3. Acceleration or other admixtures not permitted.
- 4. Mortar shall have a flow after suction of not less than seventy-five (75) percent of that immediately after mixing as determined by ASTM C 91.

F. Admixtures

- 1. No air-entraining admixtures or cementitious materials containing air-entraining admixtures shall be used in the mortar.
- 2. No antifreeze compounds or other substances shall be used in the mortar to lower the freezing point.
- Calcium chloride or admixtures containing calcium chloride shall not be used in mortar.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection

- 1. Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
- 2. Verify that masonry may be completed in accordance with all pertinent codes and regulations, the referenced standards, and the original design.

3. Do not start any work until mock-ups are approved by the Commissioner.

B. Discrepancies

- 1. In the event of discrepancy, immediately notify the Commissioner in writing.
- Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.
- Starting of work by the Contractor means acceptance by the Contractor of the substrate.

3.2 COORDINATION

A. Carefully coordinate with all other trades to ensure proper and adequate interface of the work of other trades with the work of this Section.

3.3 PREPARATION

A. Concrete Block: Do not wet concrete block units.

3.4 INSTALLATION

A. General

- 1. Build walls to the full thickness shown. Build single wythe walls to the actual thickness of the masonry units, using units of nominal thickness shown.
- 2. Build chases and recesses as shown or required for the work of other trades.
- 3. Leave openings for equipment to be installed before completion of masonry work. After installation of equipment, complete masonry work to match work immediately adjacent to the opening.
- 4. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint widths and to properly locate openings, movement type joints, returns and off-sets. Avoid the use of less than half size units at corners, jambs and wherever possible.
- Lay up walls plumb and true with courses level, accurately spaced and coordinated with other work.
- Provide templates made of steel studs for plumbing of two story masonry openings.
- 7. Pattern Bond: Lay exposed masonry patterns as noted on drawings. If not shown, provide running bond. Lay concealed concrete block with all units in a wythe bonded by lapping not less than two (2) inches. Bond and interlock each course of each wythe at corners. Do not use units of less than four (4) inches horizontal face dimensions at corners or jambs.
 - Where possible, masonry walls and partitions shall be built after all overhead ducts, pipes and conduits are in place and tested. Masonry shall be neatly built around the items above. Walls and partitions shall be plumb, true to line and free

from defects such as open cells, voids, dry joints and other similar defects. In rooms and spaces scheduled to have concrete block finish, all such surfaces including upper wall surfaces up to termination of structural ceiling in spaces without suspended ceilings, shall be made suitable for paint application. Cutting of openings in walls and partitions in place shall be done only with the approval of the Commissioner.

B. Mortar Bedding and Jointing

- 1. Lay concrete masonry units with full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course on exterior walls and in all courses of piers, columns and pilasters, where solid CMU is used and where adjacent to cells or cavities to be reinforced or filled with concrete or grout.
- 2. Lay masonry walls with 3/8" joints unless otherwise shown on drawings.
- 3. Tool exposed joints slightly concave. Concealed joints shall be struck flush.
- 4. Remove masonry units disturbed after laying; clean and reset in fresh mortar. Do not pound corners at jambs to fit stretcher units which have been set in position. If adjustments are required, remove units, clean off mortar and reset in fresh mortar.
- C. Stopping and Resuming Work: Rake back 1/2 block length in each course; do not remove loose masonry units and mortar prior to laying fresh masonry.

D. Built-In Work

- 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.
- 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.
- 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.
- 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 stopped for one (1) hour or longer, the grout pour shall be accurately placed and 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.

E. Cutting and Patching

- 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.
- 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.
- F. Solid Wall Construction: Fill the vertical longitudinal joint between wythes solidly with mortar by parging the in-place wythe and shoving units into the parging. Tie wythes with continuous horizontal reinforcement embedded in mortar joints sixteen (16) inches o.c. vertically.
- G. Interior Block Partitions: Build to full height unless otherwise shown on drawings. At non-rated partitions fill void between CMU and structural deck with continuous neoprene filler. At fire rated partitions, fill void with fire stop material meeting the requirements of Section 078413. Fasten to structure at top of partition using steel angles as specified herein.
 - 1. 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.
 - 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.

- Corners: Provide interlocking masonry unit bond in each course at corners. Provide continuity at corners with prefabricated "L" reinforcement units, in
- Intersecting and Abutting Walls
 - 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.
 - In addition to masonry bonding, provide horizontal reinforcement using b. prefabricated "T" units at interior partitions.
- Ties and Anchors for Masonry Construction: Provide ties and anchors as shown or specified, but not less than one metal tie, spaced not to exceed sixteen (16) inches o.c. horizontally and/or vertically. Provide additional ties within 1'-0" of all openings and spaced not more than 24" apart around perimeter of openings.
 - Anchoring Masonry to Structure: Provide an open space not less than 1/2" in width between masonry and structural member, unless otherwise shown. Keep open space free of mortar or other rigid materials.
- Control and Expansion Joints: Provide vertical expansion, control and isolation joints I. in masonry as shown. Build in related items as the masonry work progresses.
 - CMU Control Joint Spacing: If location of control joints is not shown, place vertical joints spaced not to exceed 40'-0" o.c. In addition, locate joints at points of natural weakness in the masonry work, including the following:
 - At structural column or joint between bay. a.
 - Above control joints in the supporting structure. b.
 - Above major openings at end of lintels upward and below at ends of sills downward. Place at one side of jamb for openings not less than 7'-0" wide and at both sides for openings over 6'-0" wide. At reduction of wall thickness. d.

 - Where masonry abuts supporting structure. e. f.
 - If additional joints are required, indicate same on approved shop drawings.

J. Lintels

- Install loose steel lintels furnished by Section 055000, allowing eight (8) inch
- For concrete block walls, use specially formed U-shaped concrete block lintel units with reinforcing bars in accordance with the following table, filled with grout.

	***************************************	s table, fined with grout
Numb Requ	er and Size of Reinforcing B ired at Concrete Block Linte	ars
Maximum Clearance Span		Rebar
2'-0" to 6'-0" 6'-0" to 8'-0"	6"	No Size 2 - #3
<u> </u>		2 - #4

;		2 - #3
2'-0" to 6'-0"	8"	2 - #4
6'-0" to 8'-0"		
6'-0" to 8'-0"		3 - #3
2'-0" to 6'-0"	12"	3- #4
0 0 00		

3.5 CANTS

A. Provide specified mortar for cement cants at beams and other projections in elevator shafts, where adjoining wall is of masonry construction. Cants shall slope seventy (70) degrees from the horizontal.

3.6 CLEANING, PROTECTION, ADJUSTMENT

A. Protection

- The Contractor shall take adequate precautions for the protection of all surfaces against mortar spatter, and shall immediately remove any such spatter should it inadvertently occur, leaving no stain or discoloration.
- 2. Excess mortar shall be wiped off the masonry surfaces as the work progresses.
- Wood coverings shall be placed over all such masonry surfaces as are likely to be damaged during the progress of the entire project.
- 4. Protective measures shall be performed in a manner satisfactory to the Commissioner.
- 5. Damaged masonry units shall be replaced to satisfaction of the Commissioner.
- Exterior masonry walls shall be draped with waterproof covering until copings are in place, to prevent water penetration in cavity.
- B. Cleaning of Masonry: Upon completion, all exposed masonry shall be thoroughly cleaned following recommendations of the BMI Technical Note No. 20. Before applying any cleaning agent to the entire wall, it shall be applied to a sample wall area of approximately 4' x 4' in a location approved by the Commissioner. No further cleaning work may proceed until the sample area has been approved by the Commissioner, after which time the same cleaning materials and method shall be used on the remaining wall area. If stiff brushes and water do not suffice, the surface shall be thoroughly saturated with clear water and then scrubbed with a solution of an approved detergent masonry cleaner, equal to "Vana Trol" made by ProSoCo Inc. or equal made by Diedrich or approved equal, mixed as per manufacturer's directions, followed immediately by a thorough rinsing with clear water. All lintels and other corrodible parts shall be thoroughly protected during cleaning.
 - C. Pointing: Point any defective joint with mortar identical with that specified for that joint.

END OF SECTION

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SECTION 051200

STRUCTURAL STEEL

PART 1 - GENERAL

RELATED DOCUMENTS 1.1

The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City A. of New York Standard Construction Contract].

SUMMARY 1.2

- Section includes but is not limited to the following as shown on the drawings and as specified A. herein:
 - Furnish and deliver for installation by others, anchor bolts, bearing plates and loose lintels with complete instructions and templates to facilitate installation. 1.
 - Furnish and erect all struts, columns, bearing plates, beams, steel trusses, girders, bracing, 2. hangers and all related connections (bolted and welded).
 - Openings (unreinforced and reinforced) in structural steel to accommodate mechanical 3. and electrical work.
 - Shop painting and field touch-up painting. 4.
 - Erection bracing and supports, including steel wedges, shims or nuts required for leveling 5. base plates.
 - Lintels and angles attached to structural steel as shown on drawings. 6.
 - Unless specifically excluded, furnish and install all other items for structural steel work indicated on the drawings, specified, or obviously needed to make the work of this 7. Section complete.

Related Requirements: B.

- Division 03 Section "Cast in Place Concrete" 1.
- Division 04 Section "Unit Masonry" 2.
- Division 05 Section "Miscellaneous Metals." 3.
- Division 06 Section "Carpentry." 4.
- Division 07 Section "Joint Sealants." 5.

Related Work Specified Elsewhere C.

- Installation of anchor bolts furnished under this section. 1.
- Grout under base and bearing plates. 2.
- Installation of loose lintels furnished under this section.
- Miscellaneous metal work 4.
- Light gage metal roof trusses. 5.
- Stair framing and hangers. 6.
- Field painting of structural steel, except as specified herein. 7.
- Fireproofing systems. 8.

1.3 PERFORMANCE REQUIREMENTS

- Connections: Provide details of all connections required by the drawings to be completed by A. structural steel fabricator (including comprehensive engineering analysis by a qualified professional engineer) to withstand loads indicated and comply with other information and restrictions indicated, unless noted otherwise.
 - 1. Select and complete connections using schematic details indicated and AISC 360. 2.
 - Use design method indicated on structural drawings.
 - Moment Connections: Fully restrained unless otherwise noted on drawings. 3.
- Lateral Framing Resisting System: Type used is indicated on structural drawings. B.

1.4 **SUBMITTALS**

- Product Data: Submit data for each type of product indicated in the contract documents. A.
- Shop Drawings: Submit shop drawings in accordance with the specifications as follows: B.
 - Show clearly all work, including relationship of structural steel to the adjacent work of 1. other trades and to significant lines of finishes of other trades. 2.
 - Do not fabricate or deliver work to the site before drawings reviewed by the Commissioner have been returned. 3.
 - Before preparing steel shop drawings, submit proposed submittal schedule for review by
 - 4. Before preparing steel shop drawings, submit for review a set of job standards showing all necessary joint details with full particulars of connection pieces, shop and field welds, and holes for erection bolts and permanent bolts. These shall include any moment and shear connections. Appropriate marks for designating all types and sizes of joint details shall be included. After approval of these job standards, the erection plans are to be submitted and shall be marked to indicate unmistakably the type and size of joint to be used for every beam connection. Do not order steel in advance of approval of the job standards and the erection plans with joint marks, except at own risk 5.
 - Submit calculations for design of connections on job standards and all other connections such as moment and brace frames. Calculations shall be signed and sealed by a Professional Engineer licensed in the state in which the project is located.
 - Prepare remainder of steel shop drawings after approval of job standards and erection 6. plans. Drawings submitted prior to approval of job standards will be returned without
 - 7. Prepare shop drawings in conformance with the applicable procedures shown in "Detailing for Steel Construction," latest edition, published by AISC. Prepare shop drawings under the supervision of competent engineering personnel, licensed by the state in which the construction is to take place. During the preparation of shop drawings, and prior to submittal, coordinate and cross check all shop drawings, including those prepared by subcontractors, for compliance with the Contract Documents. 8.
 - Indicate clearly the size and grade of steel for each component. Identify rolled shapes, tubes and plates by using the standard designations used in "Steel Construction Manual" Latest Edition, by AISC.
 - Indicate welds and nondestructive tests by using the symbols conforming to AWS A2.4 9. "Symbols for Welding and Nondestructive Testing." Where necessary for clarity,

- indicate welding procedure designations or other data in the tail of the welding symbol. Show explicitly the type of connection used in each location, the grade, size, and number of bolts; the type, number, position, designation and orientation of each washer; and the 10. size of each hole, whether slotted or round. Ensure that adequate wrench clearance for correct bolt tightening is provided and note special bolt tightening sequences where
- applicable and necessary. Show all camber dimensions in the shop drawings. Where specific camber is not shown in the drawings, note on each affected shop drawing that such members are to be 11. fabricated with the natural camber up.
- Show holes required for securing work specified in other sections to structural steelwork, as well as all holes required for passage through structural steelwork of work of other 12. trades. Provide field work drawings for all such holes not shown in shop or erection drawings. Addition of, or change in size or location of openings will not be permitted without prior approval.
- Use bolted connections wherever possible; avoid field welding unless otherwise noted on 13.
- Make details in such a way as to avoid having steel, connections, bracing, bolts, etc., interfere with architectural details or in any way reduce the areas of shafts, openings, 14. clearances, etc.
- Detail and schedule cleaning and painting data and requirements, including specific 15. indication of "no-paint" areas.
- Scaling of the Commissioner's drawings is not permitted. This applies to hard paper, 16. electronic, and all other versions.
- Show clearly the size and location of each member and the erection mark assigned to each member. Show each field connection with all data and details necessary for 17. assembling the structure. Direct special attention to the possible need for special guying, bracing, or shoring to prevent deformation of existing or new structure due to stresses caused by erection procedures and equipment, by construction loadings, and by forces of natural phenomena.
- Prepare, keep up-to-date, and submit a complete drawing index cross-referencing each assigned piece mark with the drawing number in which the piece is detailed. Detail 18. drawings submitted without an up-to-date index and the applicable erection drawing(s) showing the location of each piece will be deemed an incomplete submission and will not be accepted as subject to any agreed shop drawing review schedule.
- Prepare anchor bolt and base plate erection drawings containing complete location and placing details, including details of all templates. Provide anchor bolt erection drawings 19. to the concrete trade in advance of applicable concrete work and in coordination with concrete construction sequence.
- Submit, in writing, any proposed deviations from the Contract Documents, prior to the submission of shop drawings showing the proposed deviation. Submit requests for 20. deviations on the steelwork subcontractor's letterhead. Deviations not identified, or identified only in letters of transmittal or in shop drawings or both, without the required written request, may not be accepted, and shall be sufficient cause for the commissioner to return each shop drawing containing such deviations without further action. Acceptance of shop drawings containing deviations not detected by the commissioner during shop drawing review shall not relieve the steelwork subcontractor from responsibility to conform strictly to the Contract Documents.
- Prior to resubmission of shop drawings with additions or corrections, circle or bubble and identify all changes. Drawings submitted without each change being clearly identified 21. are subject to return for resubmission.
- Prior to making shop drawings for any portion of the work involving alterations to an 22.

existing structure, make all necessary field observations, measurements and surveys of existing conditions. If probes are required to accomplish such measurements, give timely notice where probes will be required.

C. Submit certified copies of each survey conducted by a surveyor licensed by the state in which the construction is to take place and employed by the structural steel subcontractor. Survey shall show elevations and locations of base plates and anchor bolts to receive structural steel, and final elevations and locations for major members. Indicate discrepancies between actual installation and Contract Documents.

D. Reports:

- Submit certified copies of mill test reports for all steel furnished. Perform mechanical 1. and chemical tests for all material regardless of thickness or use.
- Submit certification of recycled steel content. Certification shall clearly indicate post-2. consumer AND post-industrial recycled steel content for the particular member or 3.
- Submit mill and fabricator certification of compliance with ISO14001.
- Submit anchor bolt checking certification as required. 4.
- Submit qualification certificates of all welders who will perform work on the project. 5. 6.
- Submit survey of erected steelwork as required.

1.5 **QUALITY ASSURANCE**

- Except as modified by this specification, comply with the applicable provisions and A. recommendations of the following codes and standards:
 - New York-City Building Code, Latest Edition 1.
 - AISC "Specification for the Design, Fabrication and Erection of Structural Steel for 2. 3.
 - AISC "Code of Standard Practice for Steel Buildings and Bridges" latest edition.
 - AISC "Seismic Provisions for Structural Steel Buildings", latest edition. 4. 5.
 - Industrial Fasteners Institute "Handbook of Bolt and Bolted Joints" latest edition. 6.
 - RCSC "Specifications for Structural Joints Using ASTM A 325 or A 490 Bolts."
 - 7. ASTM A 6 "General requirements for rolled steel plates, shapes, sheet piling and bars for 8.
 - AWS D1.1, "Structural Welding Code."
 - AWS A5.18 & A5.28, Structural Welding Code for GMAW 9.
 - SSPC "Painting Manual, Volume 2, Systems and Specifications.", Latest edition. 10.
- B. Qualifications for welding work shall be as follows:
 - Qualify welding procedures and welding operators in accordance with the AWS "Standard Qualification Procedure."
 - Include amended requirements of the building code as noted above. a.

- Submit certification that all welders to be employed in work are AWS qualified. If recertification of welders is required, retesting will be responsibility of structural steel subcontractor.
 - Include licensing requirements as per the NYC Building Code.

TESTING AND INSPECTION 1.6

Special Inspection as required by the applicable Building Code of all structural steelwork in the shop and field will be performed by an inspection agency retained by the City of NY. A.

The inspection agency shall work under the direction of the Commissioner. Contractor shall provide the inspection agency with the following:

- Schedule of all work in both shop and field with at least ten days' written notice before 1. commencement of either activity.
- A complete set of approved shop and erection drawings.
- Cutting lists, order sheets, material bills, shipping bills and mill test reports. 2. 3.
- Information as to time and place of all rollings and shipment of material to shops.
- 4. Representative sample pieces as requested by the testing agency. 5.
- Full and ample means and assistance for testing all material.
- Proper facilities, including scaffolding, temporary work platforms, etc., for inspection of 6. 7. the work in the mills, shop and field.
- Each person installing connections shall be assigned an identifying symbol or mark and all shop and field connections shall be so identified so that the inspector can refer back to the В. person making the connection.
- The following minimum criteria shall be adhered to in testing of welds and bolts: C.
 - All welds and bolts shall be examined by visual means. 1.
 - 25% of all welds, selected randomly, shall be measured.
 - 25% of all bolts, selected randomly, shall be checked with calibrated torque wench. 2. 3.
 - In addition, all welds subject to tensile stress shall be examined by the Ultrasonic Method 4. for 100% of their length.
 - 10% of all manual fillet welds shall be tested by the magnetic particle method.
 - 1'-0" at each end of automatic fillet welds shall be tested by the magnetic particle method. 5. 6.
 - 100% of groove welds shall be tested by the ultrasonic method. 7.
- Shop inspection will include examination of steel for straightness and alignment, fissures, mill scale, and other defects and deformities, as described in ASTM A6, examination of fabricated D. pieces for conforming to approved shop drawings, testing of bolts and welds, and inspection of shop painting. All shop welds shall be visually inspected and spot tested using Ultrasonic Method ASTM E 114 and AWS, Chapter 6, Part C. All inspected welds shall be identified by the inspector.
- Field inspection will include examination of erected steel for welding, proper fitting and tensioning of bolts, alignment, trueness and plumbness, touching-up of shop coat, level of E. billets and base plates.
- Inspection of welding will be such as to assure that the work is within the quality requirements F.

specified below and elsewhere in this section of the specifications and will include:

- Ascertainment that the electrodes and flux used for the SAW, GMAW and FCAW 1. welding processes conform to the requirements of this section of the specifications. 2.
- Ascertainment that the approved welding procedures and sequence are followed without deviation, unless specific approval for change is obtained from the Commissioner. 3.
- The testing agency shall be prepared to utilize the following approved methods of testing:
 - Liquid penetrant inspection: ASTM E 165. a.
 - Magnetic particle: ASTM E 1444. b.
 - Radiographic inspection: ASTM E 94 and E 1032. c.
 - Ultrasonic inspection: ASTM E 114 and AWS, Chapter 6, Section C. d.
- When defects are revealed, additional inspection by whatever method is deemed necessary by G. the inspector, shall be performed to the extent necessary to assure that the full amount of defect has been located. No further work shall be done on the assembly or sub-assembly in question until all the necessary corrections have been made. Defects shall be repaired, using the same welding procedure that was used initially in making the weld, unless otherwise approved by the Commissioner. Inspection of the repaired weld shall be by the same method that was used to reveal the defect. A second repair of a defective area shall not be made without approval of the
- H. Apparatus and procedure for measuring torque and tension in high strength bolts and for calibrating wrenches shall be furnished and maintained by steel contractor, and shall be approved by the inspection agency. Wrenches shall be calibrated each day at the beginning of the work, each time the bolt size or length of pressure hose is changed, and at such other times as the inspection agency may direct. Periodic checks of high strength steel bolt connections will be made in the field by the inspection agency. The steel contractor shall maintain at all times during erection a manual torque wrench, and shall próvide a laborer and scaffolding as required for the testing of connections by the inspection agency, and shall at his own expense, furnish such facilities and provide such assistance as may be required for proper inspection.
- A distinguishing mark will be placed on all work that has been inspected and approved. I. Material or work that is not acceptable will be designated by words such as "REJECT" or "REPAIR" marked directly on the material or work.
- J. Inspection of Shop Painting:
 - Visually evaluate surface preparation by comparison with pictorial standards in 1. accordance with SSPC-Vis 1.
 - Measure dry film thickness of each coat with a magnetic film thickness gauge in 2. accordance with SSPC-PA 2. 3.
 - Visually inspect dried film for runs, sags, dry spray, overspray and missed areas.
 - Repair defective or damaged areas in accordance with painting requirements specified. Architecturally exposed structural steel shall be free of runs and holidays. Make repairs to shop or field coat as directed.

1.7 DELIVERY, STORAGE AND HANDLING

Deliver materials to site at such intervals to ensure uninterrupted progress of work. Minimize Α.

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the disturbances to site and soil conditions.

- B. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete, in ample time not to delay work.
- C. Store materials to permit easy access for inspection and identification. Keep steel members in a safe, dry, off ground location, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration, discoloration or staining.
- Do not store materials on structure in a manner that might cause distortion or damage to members of supporting structures. Repair or replace damaged materials or structures as directed.

1.8 PROJECT CONDITIONS

- A. The structural steel contractor shall coordinate the structural steel work with the work of other Contracts. Verify all dimensions and details of this Contract and those of other Contracts that affect the work before proceeding. Any discrepancies shall be immediately reported to the Commissioner.
- B. Be fully responsible for the accurate installation of the work. Any discrepancy which arises from his failure to execute the work in conformity to the drawings and specifications shall be properly remedied at the contractor's own expense and in a manner acceptable to the Commissioner.
- C. Locate dimensionally on setting plans all anchor bolts, inserts, bearing and base plates, etc., and prepare and deliver all required templates and fully dimensioned setting plans in time for the proper execution of the work. Anchor bolts shall be set by another subcontractor. The structural steel contractor shall check all such settings for correctness after they have been cast in place, and before proceeding with erection work.
- D. Report to the Commissioner and certify compliance with the above checking requirements in writing and indicate any inaccuracies found in the location of anchor bolts or inserts, and corrections which must be made to their installation. Any inaccuracies not included in the report and found during or after steel erection shall be the responsibility of the structural steel contractor and the cost of corrective measures shall be borne by him.
- E. Use base lines, bench marks, or other standards for survey work that have been provided or verified by others. If permanent building bench marks have been established, these will be used for field checking.
- F. Coordinate with all other trades to insure that work of this section does not cause undue conflict. Insure that location of erection devices such as cranes, derricks, booms or hoists, does not cause over-stresses to steel frame to work previously placed by other trades or to existing structures. When required, retain the services of a licensed professional engineer to ascertain that erection devices do not create unsafe conditions or cause overstresses.
- G. Ensure full co-ordination with other related trades and professions.

1.9 **SUBSTITUTION**

Commissioner reserves the right to require substitute shapes of other sizes than those indicated A. on the drawings when it is apparent that the shapes specified cannot be furnished within the time required for the progress of construction. Make said substitutions without additional cost to the City of New York.

PART 2 - PRODUCTS

2.1 **MATERIALS**

- A. Steel shapes, including structural steel wide flange and structural tee rolled shapes, channels, angles, plates, pipe, and hollow structural sections: As noted on structural drawings.
- B. High Strength Bolts:
 - Slip-critical bolts as noted on structural drawings, with hardened washers 1.
- C. Anchor Bolts: As noted on structural drawings
- Filler metal for welding electrodes. As noted on structural drawings. D.
- Structural steel primer paint: rust inhibitive primer conforms to the following criteria E.
 - Demonstrate a minimum of adhesion as classified by 4B of ASTM D 3359 method A 1.
 - Demonstrate a minimum opacity as determined by ASTM D 2805 2.
 - Demonstrate corrosion resistance per standards ASTM B 117 & ASTM D 5894 3. 4.
 - "Slip Critical" compatible rating where applicable
 - The product shall not contain any of the prohibited compounds as listed in Green Seal 5. Standard for Paintings and Coatings, GS-11, latest edition and in Master Painters Institute (MPI) Green Performance Standard, GPS-1-08.
 - The product shall meet all the requirements of MPI Standards: 23, 26, 76, 79, 95, 107, 6. 135, 173, 275. Products not listed with MPI are acceptable if and only if they meet the same environmental criteria for the same product category.
 - Exterior exposed steel, normal conditions: Use alkyd or polyamide solvent based a. paints (MPI #'s 76, 79 & 101)
 - Interior exposed steel: Use water based paint (MPI # 107) b.
 - Special Applications, highly corrosive environments: Use zinc rich paints (MPI #'s c.
- Structural steel field paint for exposed members: rust inhibitive primer conforms to the F. following criteria
 - 1. Demonstrate a minimum of adhesion as classified by 4B of ASTM D 3359 method A
 - Demonstrate a minimum opacity as determined by ASTM D 2805 2. 3.
 - Demonstrate corrosion resistance per standards ASTM B 117 & ASTM D 5894 4.
 - "Slip Critical" compatible rating where applicable.
 - The product shall not contain any of the prohibited compounds as listed in Green Seal 5.

Standard for Paintings and Coatings, GS-11, latest edition and in the Master Painters Institute Green Performance Standard, GPS-1-08.

- 6. The product shall meet all the requirements of MPI Standards: 23, 26, 76, 79, 95, 107, 135, 173, 275. Products not listed with MPI are acceptable if and only if they meet the same environmental criteria for the same product category. Products not listed with MPI are acceptable if and only if they meet the same environmental criteria for the same product category.
 - a. Exterior exposed steel, normal conditions: Use alkyd or polyamide solvent based paints (MPI #'s 23, 79)
 - b. Interior exposed steel: Use water based paint (MPI # 107)

PART 3 - EXECUTION

3.1 FABRICATION

- A. All shop connections shall be high strength bolted unless specifically shown otherwise. Fabricate work in shop in as large assemblies as practicable. Use welded connections ONLY where shown on drawings. If a bolted connection is not possible obtain written approval from the Commissioner for the welded connection.
- B. Camber: As indicated on drawings.
- C. Mill column ends and bearing stiffeners to give full bearing over the cross section. Plane contact surfaces of bearing plates when required by the AISC Specifications. It is not necessary to plane bottom surfaces of plates on grout beds.
- D. Drill or punch holes at right angles to the surface of the metal, not more than 1/16" larger than the connector diameter. Do not make or enlarge holes by burning. Drill material having a thickness in excess of the connector diameter and material thicker than 7/8". Holes shall be clean-cut without torn or ragged edges. Remove outside burrs resulting from drilling operations.
- E. Provide holes in members to permit connection of the work of other trades. Use suitable templates for proper location of these holes. Steel requiring adjustment or accurate alignment shall be provided with slotted holes or full bearing shims as shown.
- F. Provide holes, slots and openings required by other trades together with necessary reinforcing required. Use suitable templates for proper location of these openings. All such openings shall be shown on the shop drawings. No change in size or location will be permitted without prior approval.
- G. Manual flame cutting shall be done only with a mechanically guided torch. An unguided torch may be used provided the cut is within 1/8" of the required line

3.2 SHOP CONNECTIONS

A. Provide connections as shown on the drawing exactly as detailed. Where connections are not

- detailed, the minimum connections shall comply with appropriate tables headed, "Framed Beam Connections" shown in the AISC "Manual of Steel Construction" unless otherwise noted on the drawings. Use high strength bolts unless otherwise shown.
- B. Do not use welded connections unless shown on details. Filed welding is not allowed without written instruction from the Commissioner.
- C. Proportion and detail all connections on shop drawings to resist forces shown on design drawings. If no reactions are indicated on design drawings, design connections for non-composite beams to resist the end reaction shown in the AISC tables for Uniform Load Constants for Beams. Connections for composite beams shall be proportioned to resist 150% of the above mentioned tabulated load.

D. Bolting

- 1. Bolts shall be of a length that will extend not less than 1/4" beyond the nuts. Enter bolts into holes without damaging the thread.
- 2. Use high-strength bolts in friction as shown. Make high-strength bolted joints without the use of erection bolts. Bolt heads and nuts shall rest squarely against the metal. Where structural members have sloping surface, bolted connections shall be provided with beveled washers to afford square seating or framing for bolt heads or nuts. Bring members tightly together with sufficient high-strength "fitting-up" bolts which shall be retightened as all the bolts are finally tightened. Manual torque wrenches will not be accepted for final tightening. Protect bolt heads from damage during placing. Final tightening of high-strength bolts shall be by properly calibrated power torque wrenches. Bolts that have been completely tightened shall be marked for identification.

E. Welding

- 1. The following environmentally preferable welding processes shall be used as described for the related application without exception:
 - a. Submerged Arc Welding (SAW): Plate girders, fillet and butt joints in pipes, cylinders, columns and beams, and welds where 'downhand' or horizontal b.
 b. Gas Metal Arc Welding (CMAN): 1 111.
 - b. Gas Metal Arc Welding (GMAW) shall be used where SAW is not applicable (such as for angled connections and anything irregular or short).
 - c. Field welding shall be allowed only in special circumstances; in such cases Flux Core Arc welding (FCAW) shall be specified
- 2. Do not begin structural welding until joint elements are inspected for surface preparation, fit-up, and cleanliness of surface to be welded and are then bolted or tacked in intimate contact and adjusted to dimensions shown on drawings, or both, with allowance for any the Commissioner.
 - a. Containment surface preparation debris must meet SSPC-Guide 6 guidelines.
- 3. Pre-heat and interpass temperature shall be in accordance with Table 4.2 (including footnotes) of the AWS Code for Welding in Building Construction. The temperature shall be measured from the side opposite to that which the pre-heat is applied, where

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Structural Steel

All groove welds shall be continuous and full penetration welds unless otherwise shown possible. on the design drawings. Welds made without the aid of a back-up bar shall have their 4. roots chipped, ground or roughened out to sound metal from the second side, before welding is done from the second side.

All welds shall be sound throughout. There shall be no crack in any weld or weld pass. Weld may be considered sound if it contains only slight porosity or fusion defects which 5.

The heat, input, length of weld and sequence of weld shall be controlled to prevent distortions. The surfaces to be welded and the filler metals to be used shall be subject to 6. inspection before any welding is performed.

SHOP PAINTING AND CLEANING 3.3

Finishing, coating, plating A.

- Shop painting and factory finishing shall be preferred to field painting whenever possible. Where applicable, finishes and surface preparations based on a physical process such as 1. abrasive blasting, grinding, buffing and polishing are preferred to coatings and solvent based cleaning. Where coatings are necessary powder-coated fabrication is preferred to painting and plating. Avoid plated metals especially those using cadmium and chromium as plate material or cyanide or copper/formaldehyde based electroless copper as the plating solution.
- Remove all rust, scale, grease and other detrimental foreign matter in accordance with SSPC-SP 3, Power Tool Cleaning, unless conditions/opportunities listed below apply. B.
 - Use surface preparation classification recommended by paint manufacturer, SSPC or Master Painters Institute (MPI) for paint product used.
 - SSPC-Guide 6, Guide for Containing Debris Generated During Paint Removal Operations, must be followed for all applicable surface preparation techniques. a.
- Immediately after surface preparation, apply structural steel primer paint where specified, in accordance with manufacturer's instructions and at a rate to provide dry film thickness of not C. less that 2.0 mils. Use painting methods which result in full coverage of joints, corners, edges and exposed surfaces. Use type of primer paint as specified in "Materials" article above. Apply two coats to surfaces that will be inaccessible after erection
- Paint all structural steel in accordance with the foregoing specification, except as follows: D.
 - Steel which is to receive spray-on fireproofing.
 - Within 2" of field welds or welds made after paint is applied. 1. 2.
 - Within 3" of high strength friction bolts. 3.
 - Machined surfaces and threaded parts required for adjustment of the structure. Protect these with suitable rust inhibiting coating which may be removed after final installation 4. of the work so that proper finished coatings may be applied.

3.4 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/A 123M.
 - Fill vent and drain holes that will be exposed in the finished Work unless they will function as weep holes, by plugging with zinc solder and filing off smooth.

3.5 SOURCE QUALITY CONTROL

A. Refer to testing and inspection requirements specified above.

3.6 EXAMINATION

- A. Verify field measurements prior to start of erection. Check the alignment and elevation of all column supports and location of all anchor bolts with transit and level instruments before starting erection. Notify Commissioner of any errors. Obtain Commissioner's approval of methods proposed for correcting errors prior to proceeding with corrections and erection.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.7 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.

3.8 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.
- B. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."
- C. Column billets and bearing plates shall be supported and aligned on steel wedges, shims, or leveling nuts. After the supported members have been plumbed and properly positioned by instrument and anchor nuts tightened, the entire bearing area under the plate shall be packed solidly with grout specified in another Section. Wedges and shims shall be set back a minimum of 3/4" from the edges of plates and shall be left in place. Leveling plates are not permitted.

D. Plumbing, Leveling and Bracing

1. Structural steel shall be erected true and level, and temporary bracing shall be introduced wherever necessary to provide for all loads to which the structure may be subjected, including equipment and the operation thereof. Such bracing shall be left in place as long as may be required for safety. No welding shall be done or bolts drawn up tight until

structural steel has been properly aligned. Obtain approval for guy locations to assure lack of interference with operations of other trades.

E. Drifting

Light drifting necessary to draw holes together will be permitted, but drifting of unfair
holes will not be permitted. Twist drills shall be used to enlarge holes as necessary to the
next larger size; use next larger size bolts as required. Reaming that weakens the
members, or make it impossible to fill the holes properly or to adjust accurately after
reaming, will not be allowed.

3.9 FIELD CONNECTIONS

- A. In addition to the requirements for shop connections comply with the following:
 - 1. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - 2. Joint Type: As noted on structural drawings.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
 - 1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
 - 2. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

3.10 REPAIRS AND PROTECTION

- A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780.
- B. Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Clean and prepare surfaces by SSPC-SP 3, Power Tool Cleaning.
- C. Touchup Painting: Cleaning and touchup painting are specified in Division 9.
- D. After erection, all damaged areas in shop coat, exposed surfaces of bolt heads, nuts and washers, and all field welds and unpainted areas adjacent to field welds and high strength bolts shall be painted with a "touch-up" application of same paint used in the shop coat and then painted with same paint used for shop coat tinted another color. Retouch in field, any scraped, abraded, and unpainted surfaces. Painting shall be as specified for shop coats.

E. Structural steel which is to support mechanical equipment and will be left exposed to the weather in the finished project shall be field painted with one coat of anti-corrosive paint as described in Part 2 for Paint Materials.

END OF SECTION

SECTION 055000

MISCELLANEOUS METALS

PART 1 GENERAL

RELATED DOCUMENTS 1.1

The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract (City of New York Standard Contract).

SECTION INCLUDES 1.2

- 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 A. herein, including, but not limited to, the following:
 - Rough hardware. 1.
 - Steel pipe handrails and railings. 2.
 - Steel plate stair. 3.
 - Watertight access door. 4.
 - Aluminum honeycomb panels at tanks. 5.
 - Light steel framing and supports, not included as part of work of other trades. 6.
 - Steel framing, bracing, supports, anchors, bolts, shims, fastenings, and all other supplementary parts indicated on drawings or as required to complete each item of 7. work of this Section.
 - Prime painting, touch-up painting, galvanizing and separation of dissimilar metals for work of this Section.
 - 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.

RELATED SECTIONS 1.3

Painting and Finishing - Section 099000. A.

QUALITY ASSURANCE 1.4

Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and A. 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.
 - 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 (3) 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.
- 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 PERFORMANCE STANDARDS

A. Railings shall be designed to resist loads per 2008 NYC Building Code.

1.6 SUBMITTALS

A. 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.

B. 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.

C. Engineering Data

- Before any stairs and railings are fabricated, submit engineering data drawings to the Commissioner for review indicating how performance standards specified here shall be met. The Contractor is responsible for the structural design and supports for these systems and must show his proposed systems on these drawings.
- 2. These drawings must show all load conditions and design calculations relative to connections, fastening devices and anchorage, as well as size and gauge of members. Calculations and drawings must be prepared by a Structural Engineer licensed in the State of New York and shall be signed and sealed by this Engineer.
- D. 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.
- E. Certification: For items to be hot-dip galvanized, identify each item galvanized and to show compliance of application. The Certificate shall be signed by the galvanizer and shall contain a detailed description of the material processed and the ASTM standard used for the coating and, the weight of the coating. In addition, and as attachment to Certification, submit reports of testing and inspections indicating compliance with the provisions of this Section.

PART 2 PRODUCTS

2.1 MATERIALS

A. Metals

- 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.
- Structural Steel Sheet: Hot rolled, ASTM A 570; or cold rolled, ASTM A 611, Class 1; of grade required for design loading.
- Galvanized Structural Steel Sheet: ASTM A 924, of grade required for design loading. Coating designation G90.

- Steel Pipe: ASTM A 53, type and grade as selected by fabricator and as required for design loading; black finish unless galvanizing is indicated; standard weight (Schedule 40), unless otherwise indicated.
- 8. Gray Iron Castings: ASTM A 48, Class 30, unless another class is indicated or required by structural loads.
- 9. Malleable Iron Castings: ASTM A 47, grade as selected by fabricator.
- 10. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.
- 11. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A 47, or cast steel, ASTM A 27. Provide bolts, washers and shims as required, hot-dip galvanized, ASTM A 153.
- B. Grout: Non-shrink, non-metallic grout conforming to the requirements of Section 033000.

C. Fasteners

- 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 made by Tnemec, ICI Devoe "Rust Guard" quick dry alkyd shop coat No. 41403, or "Interlac 393" by International Protection Coatings.
 - 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.
 - Steel to get high performance coating as noted in Section 099000 shall be cleaned as per SSPC SP.6 "Commercial Blast Cleaning."

C. Application

- 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.
- 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 as provided by Duncan Galvanizing or approved equal.
- B. Avoid fabrication techniques that could cause distortion or embrittlement of steel items to be hot-dip galvanized. Fabricator shall consult with hot-dip galvanizer regarding potential warpage problems or handling problems during the galvanizing process that may require adjustment of fabrication techniques or design before finalizing shop drawings and beginning of fabrication.
- C. Cleaning: Thoroughly clean metal surfaces of all mill scale, rust, dirt, grease, oil, moisture and other contaminants prior to galvanizing.

- D. Application: Hot-dip galvanizing shall conform to the following:
 - 1. ASTM A 143: Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel.
 - ASTM A 123: Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - 3. ASTM A 153: Galvanized Coating on Iron and Steel Hardware Table 1.
 - 4. ASTM A 384: Practice for Safeguarding Against Warpage and Distortion During Hot-Dip Galvanizing of Steel Assemblies.
 - 5. ASTM A 385: Practice for Providing High Quality Zinc Coatings.
 - 6. ASTM A 924: Galvanized Coating on Steel Sheets.
 - 7. Minimum weight of galvanized coating shall be two (2) oz. per square foot of surface.
- E. Fabricate joints which will be exposed to weather in a manner to exclude water or provide weep holes where water may accumulate.
- F. All galvanized materials must be inspected for compliance with these specifications and marked with a stamp indicating the name of the galvanizer, the weight of the coating, and the appropriate ASTM number.
- G. To minimize surface imperfection (e.g.: flux inclusions), material to be galvanized shall be dipped into a solution of Zinc Ammonium Chloride (pre-flux) immediately prior to galvanizing. The type of galvanizing process utilizing a flux blanket overlaying the molten zinc will not be permitted.
- H. After galvanizing all materials not exposed to view must be chromated by dipping material in a 0.2% chromic acid solution.
- I. Galvanized surfaces, where exposed to view, must have a smooth, level surface finish. Where this does not occur, piece shall be rejected and replaced to the acceptance of the Commissioner.

2.4 PROTECTIVE COATINGS

A. Whenever dissimilar metals will be in contact, separate contact surfaces by coating each contact surface prior to assembly or installation with one coat of specified bituminous paint, which shall be in addition to the specified shop prime paint. Mask off those surfaces not required to receive protective coating.

2.5 WORKMANSHIP

A. General

 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.
- 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

- 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.
- 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.
 - Drill appropriate vent holes and provide for drainage in inconspicuous locations of hollow sections and semi-enclosed elements. After galvanizing, plug vent holes with shaped lead and grind smooth.

2.6 MISCELLANEOUS METALS ITEMS

A. Rough Hardware

1. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Division 6 Sections.

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. Steel Pipe Handrails

- Steel pipe of size shown on Drawings, Schedule 40. Fittings shall be flush type, malleable of cast iron. Brackets shall be malleable iron, design as selected by the Commissioner.
- Construction: Form direction changes in rails using solid bar stock or elbows.
 Connections shall be shop welded and ground smooth and flush, except where field connections and expansion joints are required. Field connections may be welded, internal sleeve and plug weld, or internal sleeve and set screw.
- 3. Secure handrails to walls with wall brackets. Provide brackets of malleable iron castings, with not more than three (3) inches clearance from inside face of handrail to wall surface. Neatly drill wall plate portion of the bracket into concrete or masonry to receive bolts for concealed anchorage. For installation at drywall, Drywall trades shall provide plate to receive wall plate portion of bracket and anchor or bolt wall plate through drywall to supporting steel plate. Locate brackets at not more than 5'-0" o.c. unless otherwise shown.
- Provide wall return fittings of cast iron, flush type, with the same projection as that specified for wall brackets.
- 5. Longitudinal members shall be parallel with each other and with floor surface or shape of stair to a tolerance of 1/8" in 10'-0" linear feet. Center line of members within each run of railing shall be in the plane.
- 6. For steel pipe posts where indicated, anchor posts in concrete by means of pipe sleeves set and anchored into concrete. Provide sleeves of galvanized steel pipe, not less than six (6) inches long and having an inside diameter not less than 1/2" greater than outside diameter of the inserted pipe. Provide steel plate closure secure to bottom of sleeve and of width and length not less than one (1) inch greater than outside diameter of sleeve. After posts have been inserted into sleeves, fill annular space between post and sleeve solid with non-shrink, non-ferrous grout. Cover anchorage joint with a round steel flange welded to post. Posts shall be set plumb within 1/8" vertical tolerance.
- 7. Steel pipe handrails shall be capable of resisting a two hundred (200) lb. force applied to rail from any direction and a uniformly distributed load of fifty (50) lbs. per linear foot applied downward or horizontally, loads not to act simultaneously.

C. Miscellaneous Light Steel Framing

 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.
- D. Watertight Access Door: Stainless steel ADWT by Acudor, or approved equal.
- E. Aluminum Honeycomb Panels: Provide 1/2" thick lightweight, corrosion-resistant aluminum honeycomb panels used in aluminum track for maintenance of tanks, as detailed on the drawings. Panels shall have 0.040" aluminum faces and backs over aluminum honeycomb core. Provide "Marine Panels" as manufactured by Portafab, or equivalent product of Pacific Panels, Flatiron Panel, or approved equal.
- F. Steel Plate Stair: Construct stairs to conform to sizes and arrangements shown; joint pieces together by welding. Provide complete stair assemblies, including metal framing, hangers, railings, newels, balusters, struts, clips, brackets, bearing plates and other components necessary for the support of stairs and platforms and as required to anchor and contain the stairs on the supporting structure.
 - 1. Stair Framing: Fabricate stringers of structural steel channels, or plates, or a combination thereof. Provide closures for exposed ends of stringers. Construct platforms of structural steel channel headers and miscellaneous framing members as shown. Bolt or weld headers to strings and newels and framing members to strings and headers; fabricate and join so that bolts, if used, do not appear on finish surfaces.
 - Attach treads to stringers by means of brackets made of steel and angles or bars. Weld brackets to strings and attach metal treads to brackets by welding, riveting or bolting.
 - Provide platforms of same metal as treads and in thicknesses required to support design loading. Attach platform to platform framing members with welds.
 - 4. Steel Floor Plate Treads and Platforms: Provide raised pattern steel floor plate complying with FS QQ-F-461, Class I. Provide diamond pattern.
 - a. Form treads of 1/4" thick steel floor plate with integral nosing and back edge stiffener. Weld steel supporting brackets to strings and treads to brackets.
 b. Fabricate platforms of steel floor plate with integral nosing and back edge.
 - b. Fabricate platforms of steel floor plate. Provide nosing matching that on treads at all landings. Secure to platform framing members with welds.

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.

ERECTION 3.2

- 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, throughbolts, lag bolts, wood screws, and other connectors as required.
- Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set work accurately in location, B. 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.
- 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 C. 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.
- 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.
- 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.
- Field Touch-Up of Galvanized Surfaces: Touch-up shop applied galvanized coatings damaged during handling and installation. Use galvanizing repair coating specified F. herein for galvanized surfaces.

END OF SECTION

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SECTION 062000

CARPENTRY

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract (City of New York Standard Contract).

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. MDF panels.
 - 2. Blocking and miscellaneous wood, including plywood wall lining for telephone and electric closets.
 - 3. Rough hardware.
 - 4. Coat closet pole and shelving.
 - 5. Installation only of finish hardware.
 - Installation only of doors and hollow metal frames.

1.3 RELATED SECTIONS

- A. Existing Roof Work Section 075000.
- B. Steel Doors and Frames Section 081113.
- C. 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.
 - 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
- 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. Pressure Treatment: Include certification by treating plant stating chemicals and process used, net amount of salts retained and conformance with applicable standards.
- B. 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 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.

1.7 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

- All wood shall be sound, flat, straight, well seasoned, thoroughly dry and free from all defects. Warped or twisted wood shall not be used.
- 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.
- B. Medium-Density Fiberboard: ANSI A208.2, Grade 130.

C. 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., Koppers or approved equal.

- 3. Treated wood which is cut or otherwise damaged shall be further treated in accordance with the AWPA Standard M-4.
- D. Fire-Retardant Fiberboard: Medium-density fiberboard panels complying with ANSI A208.2, made from softwood fibers, synthetic resins, and fire-retardant chemicals mixed together at time of panel manufacture to achieve flame-spread index of 25 or less and smoke-developed index of 200 or less per ASTM E 84.
- E. Paneling Requirements, General
 - Panel type shall be AWS, Premium Grade construction.
 - 2. Panel joints shall be flush type unless otherwise shown.
 - Provide concealed wood blocking and framing, anchors, clips, splines, supporting and attaching devices.
 - 4. Provide cut-outs to receive attachments, mechanical and electrical work as required.

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.
 - Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
 - 2. Material for Treated Woods and Exterior Use: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.
- E. Wood Screws: ASME B 18.6.1.

F. Concrete and Masonry Anchors: Standard expansion-shield self-drilling type concrete anchors where so shown or noted on the drawings, or where approved by the Commissioner.

PART 3 EXECUTION

3.1 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. Hardware shall be carefully fitted and securely attached, in accordance with these specifications and the instructions of the various manufacturers.
- B. Unless otherwise noted, mount hardware units at heights established in Section 081113.
- C. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, install each item completely and then remove and store in a secure place during the finish application. After completion of the finishes, re-install each item. Do not install surface-mounted items until finishes have been completed on the substrate.
- D. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- E. Drill and countersink units which are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- F. Cut and fit threshold and floor covers to profile of door frames, with mitered corners and hair-line joints. Join units with concealed welds or concealed mechanical joints. Cut smooth openings for spindles, bolts and similar items, if any.
- G. All keys used shall be construction keys which are to be tagged with fiber discs as approved, clearly labeled with identifying inscriptions and then neatly arranged in a temporary cabinet. All construction keys shall be returned to the City of New York.

H. Adjusting and Cleaning

- 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

INSTALLATION OF DOORS AND FRAMES 3.3

A. Preparation

- Remove welded-in shipping spreaders installed at factory. 1.
- 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:
 - Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 a. 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.
- Drill and tap doors and frames to receive non-templated mortised and surfacemounted door hardware.

В. Installation

- 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.
- 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.
 - Install frames in accordance with ANSI 250.11-20001, Recommended Erection Instructions for Steel Frames, unless more stringent requirements are specified herein.
 - At fire-protection-rated openings, install frames according to NFPA 80. b.
 - 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
 - Frames set in masonry walls shall have door silencers installed in frames e. before grouting.
 - Remove temporary braces necessary for installation only after frames have f. 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.
- Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor and secure with post-installed expansion anchors.
 - Floor anchors may be set with powder-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
- 4. Metal-Stud Partitions: Solidly pack mineral-fiber insulation behind frames.
- 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.
- In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
- 7. In-Place Gypsum Board Partitions: Secure frames in place with post-installed expansion anchors through floor anchors at each jamb. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
- 8. Ceiling Struts: Extend struts vertically from top of frame at each jamb to supporting construction above, unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction above. Provide adjustable wedged or bolted anchorage to frame jamb members.
- Installation Tolerances: Adjust steel door frames for squareness, alignment, twist, and plumb to the tolerance given in HMMA 841 of ANSI/NAAMM, current edition.
- Steel Doors: Fit hollow metal doors accurately in frames to the tolerances given in HMMA 841 of ANSI/NAAMM, current edition.
 - a. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
- 11. Glazing: Comply with installation requirements in 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

- 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.
- 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 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.

3.6 INSTALLATION OF WALL PANELS

- A. Provide a system of concealed panel hanger clips, shims and corresponding wall clips to support the panel system. Face nailing shall not be permitted.
- B. Hang the panels in the designated locations. Panels shall be straight, level, flat and flush with adjoining panels.
- C. Where reveals are indicated, keep panels spaced so that reveals are parallel and of widths shown.

3.7 CLEANING UP

A. General: Keep the premises in a neat, safe and orderly condition at all times during execution of this portion of the work, free from accumulation of sawdust, cut-ends and debris.

B. Sweeping

- 1. At the end of each working day, or more often if necessary, thoroughly sweep all surfaces where refuse from this portion of the work has settled.
- 2. Remove the refuse to the area of the job site set aside for its storage.
- 3. Upon completion of this portion of the work, thoroughly broom clean all surfaces.

END OF SECTION

SECTION 071420

ELASTOMERIC COATING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract (City of New York Standard Contract).

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment and services necessary to complete the elastomeric coating on exposed CMU as shown on the drawings and/or specified herein.

1.3 RELATED SECTIONS

A. Concrete - Section 033000.

1.4 DELIVERY AND STORAGE OF MATERIALS

A. All manufactured materials shall be delivered in their original packages, containers and bundles bearing name of manufacturer and brand. Store all materials off the ground under watertight cover and away from sweating walls and other damp surfaces until ready for use. Damaged or deteriorated materials must be removed from premises immediately.

1.5 PROTECTION

A. During operation of coating, protect work of other trades against undue soilage and damage by the exercise of reasonable care and precaution. Repair and/or replace any work so damaged or soiled as to be unsightly in Commissioner's judgment at no additional cost to City of New York or Contract Sum.

1.6 SUBMITTALS

- A. Submit 12" x 12" sample for approval of color, texture and assembly.
- B. Submit product literature and installation instructions.
- C. Upon completion of project submit guarantee/warranty certificates as necessary.

1.7 JOB CONDITIONS

- A. All coatings shall be applied when temperatures are 45 deg. F. and rising, and no threat of rain is forecast for 4 6 hours. All surfaces must be sound, clean and dry. Products must be protected from freezing during storage.
- B. Protect surrounding areas from overspray. Seal off any vents, ducts, etc. while making application.

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C. Protect plants, animals, and vegetation that may be affected by the coatings, and use spray masks as required when working with the products.

1.8 WARRANTY

- A. The warranty for this coating work shall be material warranty supported by the manufacturer.
- B. The warranty under this technical specification shall be a guarantee that the coating membrane system will perform as a protective coating membrane system for a ten (10) year period of time from the date of project completion without blistering, delaminating or suffering significant cosmetic deterioration.

PART 2 PRODUCTS

2.1 SILICONE ELASTOMERIC COATING

- A. Block Filler: As recommended by elastomeric waterproof coating manufacturer.
- B. Primer: As recommended by elastomeric waterproof coating manufacturer.
- C. Elastomeric Waterproof Coating: Allguard Elastomeric Waterproof Coating as manufactured by Dow Corning Corporation, Sonolastic by BASF, Vulkem TREMGard E or TREMGard HB by Tremco, or approved equal.
- D. Color as selected by Commissioner.

2.2 SEALANT

A. Dow Corning 790 or Dow Corning 795 Silicone Building Sealant by Dow Corning Corporation, Spectrem 1 or Spectrem 3 by Tremco, Sikasil WS-295 or Sikasil WS-290 by Sika, or approved equal.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that wall surfaces to be coated are clean and free of dirt, dust, oil, grease, mildew, fungus, frost, efflorescence, laitance, peeling coating, chalking coating and any other foreign materials.
- B. Verify that cracks and damage to wall surfaces have been repaired prior to coating application.
- C. Verify that sealant work around windows, doors and other wall penetrations has been completed prior to coating application.
- D. Apply a test patch of elastomeric waterproof coating for adhesion test and color approval.

3.2 SURFACE PREPARATION

- A. All surfaces must be clean and free of dirt, dust, oil, grease, mildew, fungus, frost, efflorescence, laitance, peeling coating, chalking coating and any other foreign material.
- B. Pressure clean, wire brush or grind the wall surface to remove all of the materials listed above.
- C. Repair all cracks larger than 1/16" with a material that is compatible with the substrate and elastomeric waterproof coating. Silicone building sealant can be used for crack repairs. Mound the sealant over the crack and beyond the edges of the crack. The patch must then be feathered out at the edges using a brush. This should be done in such a way to reduce telegraphing of the repair through the elastomeric waterproof coating.
- D. Sealing or resealing of building joints, windows and other penetrations must be done to ensure a complete waterproofing job on the building walls.

3.3 PRIME APPLICATION

- A. Mask any windows and other wall penetrations to provide a neat, finished appearance.
- B. Apply Primer to the prepared wall surface at a rate of approximately 350 sq. ft. per gallon. The actual application rate will depend on the porosity and texture of the surface. Allow the primer approximately 30 minutes to 2 hours to dry. The actual dry time will depend on temperature and humidity.
- The primer application is a one-coat process.
- D. The primer can be applied with a roller (1/2-inch to 1-inch nap), power roller, brush (nylon) or spray (airless).

3.4 SILICONE ELASTOMERIC WATERPROOF COATING APPLICATION

- A. Gently hand-stir elastomeric waterproof coating before use to ensure uniformity. Product should be used as supplied. Do not add water.
- B. Mask any windows and other wall penetrations to provide a neat, finished appearance.
- C. Apply the coating when the primer is dry to the touch.
- D. The coating can be applied with a roller (1/2-inch to 1-1/2 inch nap), power roller, brush (nylon bristles) or spray (airless or air-assisted).
- E. Apply two coats of elastomeric waterproof coating at a combined rate of approximately 80 sq. ft. per gallon. The actual application rate will vary depending on the substrate texture and porosity. Perform a mock-up on the job site to more accurately estimate material usage requirements. Allow 2 to 4 hours drying time between coats.
- F. Apply elastomeric waterproof coating at an ambient temperature above 4.4 deg. C (40 deg. F).
- G. Do not apply elastomeric waterproof coating by spray application when wind conditions exist that cause overspray to be deposited on surfaces that are beyond

- masking protection and are not intended for coverage by the coating in the finished application.
- H. Do not apply elastomeric waterproof coating in rain, snow, fog, mist or when the relative humidity is in excess of 90 percent.
- I. Apply elastomeric waterproof coating in a fan pattern to achieve uniform thickness. Finish each roller stroke in the same direction so that the stipple texture is uniform.
- J. The finished coating surface must be pinhole-free and completely covering the wall surface with a minimum dry film thickness of 10 mils in order to qualify for the manufacturer's 10-year Performance Limited Warranty.

3.5 FINAL INSPECTION

A. Final inspections shall be done by manufacturers representative and the Contractor, and Contractor shall attain warranty.

END OF SECTION

SECTION 075000

EXISTING ROOF WORK

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract (City of New York Standard Contract).

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete roof work, including, but not limited to, the following:
 - Cutting and patching existing membrane roofing system to accommodate new work.
 - 2. Roof insulation as required.

1.3 RELATED SECTIONS

A. Mechanical penetrations - Division 23.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's specifications, installation instructions, and general recommendations.
- B. Shop Drawings: Prepare and submit drawings for all work of this Section, including large scale details of typical sections and connections.
- C. Samples: To verify compliance with requirements of the Contract Documents, submit complete sets of the following:
 - 1. Roof membrane, 12" x 12".
 - 2. Flashing membrane, 12" x 12".
 - 3. Metal flashing sheet, 12" x 12".
 - 4. Insulation, 12" x 12".
 - 5. Sealant.

1.5 QUALITY ASSURANCE

A. 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.

- The contractor or subcontractor must be licensed or approved by the manufacturer of the roofing system/.
- B. Before starting work, test proposed materials for compatibility with existing materials by installing each in a small area in location of roof opening. Do not proceed until Commissioner approves tests.
- C. Do all work so that existing in force warranty shall remain in effect; coordinate work with the City of New York and roof membrane manufacturers.

1.6 PROJECT CONDITIONS

- A. Protect existing finishes. Do not hoist materials against building faces without adequate approved protection from grade to parapet. Protect vegetation and paving from damage due to roofing and flashing work. Completely remove bituminous materials from surfaces other than built-up roofing and bituminous flashings.
- B. Do not use incompatible materials or materials that are not compatible with existing materials.
- C. Do not uncover existing insulation until ready to do repair Work and install new insulation and covering Work.
- D. Avoid unnecessary traffic over roof areas. Use roof areas to perform Work only where unavoidable. When roof areas must be used, protect roof and flashing from damage; use temporary plywood sheets where traffic is mandatory; lay continuously at every traffic pattern and Work area.
- E. Should field conditions differ significantly from those shown on drawings, notify Commissioner in writing and do not proceed without instructions from the Commissioner.

1.7 WARRANTY

A. Work shall be done to maintain warranty that is in effect. Provide continuity of the warranty.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Contractor shall be advised of the following existing roof systems, related components and work required.
- B. Roof Materials: New materials to match and be compatible with existing materials; coordinate with the City of New York and roof membrane manufacturers. Contractor shall coordinate work with roof membrane manufacturers to insure continuity of warranty and shall submit written authorization from the roof manufacturers stating that all work has been done in accordance with procedures that allow warranty to remain in effect.
- C. Roof Insulation: Flat and tapered, type to match existing.

- D. Penetration Seal: As recommended by roofing manufacturer.
- E. Penetration Flashing and Low Flashing: As recommended by roofing manufacturer.
- F. Stainless Steel Flashing: ASTM A 167, 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.
 - 1. Concealed Flashings: 0.012" thick, thirty (30) gauge (U.S. Standard).
 - 2. Exposed Flashings: 0.015" thick, twenty-eight (28) gauge (U.S. Standard).
 - 3. Edge Strips: 0.025" thick, twenty-four (24) gauge (U.S. Standard).

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where roof work is to be installed and notify the Commissioner of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 ROOF INSTALLATION

- A. Repair roofing and associated insulation and flashings on the roofing where new cutting and patching is required.
- B. Where existing roofing, insulation, or flashings, are damaged during the Work, satisfactorily repair, flash, and otherwise make watertight at least equal to condition when Work began. If damage cannot be satisfactorily repaired, remove damaged portion and provide new materials as appropriate. Do such Work and repairs at no additional cost. Materials, methods, and completed Work are subject to approval of the City of New York, Commissioner, and roof membrane manufacturer.
- C. Protect edges, incomplete flashings, and cut existing roofing against water entry at all times.
- D. Where practicable, unless otherwise recommended by roofing specialist or materials manufacturers, use materials, systems, quantities, and methods that exactly match existing and keep existing warranty (if any) in effect. Materials used shall be compatible with each other and with existing materials.
- E. Make all repairs watertight.
- F. Do not remove materials to the extent that the building is subject to water intrusion without providing approved protection. Do not remove more area of existing surfaces that can be repaired in the same working day.

END OF SECTION

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SECTION 078413

FIRESTOPS AND SMOKESEALS

PART 1 GENERAL

RELATED DOCUMENTS 1.1

The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) A. the Contract (City of New York Standard Contract).

SECTION INCLUDES 1.2

- 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 A. herein, including, but not limited to, the following:
 - Penetrations through fire-resistance-rated floor and roof construction including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.
 - Penetrations through fire-resistance-rated walls and partitions including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.
 - Penetrations through smoke barriers and construction enclosing compartmentalized areas involving both empty openings and openings containing penetrating items.
 - Sealant joints in fire-resistance-rated construction.
 - Construction joints, including those between top of fire rated walls and underside of floors above.

RELATED SECTIONS 1.3

- Unit Masonry Section 042000. A.
- Joint Sealers Section 079200. В.
- Gypsum Drywall Section 092900. C.
- Piping penetrations Division 22. D.
- Duct penetrations Division 23. E.
- Cable and conduit penetrations Division 26. F.

REFERENCES 1.4

"Standard Method of Fire Tests of Through-Penetration **ASTM E 814** A. Firestops."

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- 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.
- I. Material must have BSA and/or MEA approval for use in New York City.

1.5 SUBMITTALS

- A. 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.
- B. 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.
- C. Material Safety Data Sheets: Submit MSDS for each firestop product.
- D. 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.
- E. 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 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 the City of New York, 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 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.
- For firestopping exposed to view, traffic, moisture, and physical damage, provide products that do not deteriorate when exposed to these conditions.
 - For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
 - 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.

1.7 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.

1.8 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.

1.9 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 City of New York.

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.

- Nelson
- Hilti, Inc.
- Grace Flame Safe

FIRESTOPPING, GENERAL 2.2

- 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 A. firestopping manufacturer based on testing and field experience.
- Accessories: Provide components for each firestopping system that are needed to install fill materials. Use only components specified by the firestopping manufacturer В. and approved by the qualified testing and inspecting agency for the designated fireresistance-rated systems. Accessories include but are not limited to the following
 - Permanent forming/damming/backing materials including the following: 1.
 - Semirefractory fiber (mineral wool) insulation.
 - Sealants used in combination with other forming/damming materials to prevent leakage of fill materials in liquid state. b.
 - Fire-rated form board. c.
 - Joint fillers for joint sealants. d.
 - Temporary forming materials. 2.
 - Substrate primers. 3.
 - Collars.
 - Steel sleeves. 5.
 - Applications: Provide firestopping systems composed of materials specified in this Section that comply with system performance and other requirements. C.
 - Smokeseals at top of partitions shall be flexible to allow for partition deflection. D.

FILL MATERIALS FOR THROUGH-PENETRATION FIRESTOP SYSTEMS 2.3

- Single-component, endothermic, latex Endothermic, Latex Compound Sealant: A. formulation.
- Intumescent, Latex Sealant: Single-component, Intumescent, latex formulation. В.
- Intumescent Putty: Non-hardening, dielectric, water-resistant putty containing no solvents, inorganic fibers, or silicone compounds. C.
- Intumescent Wrap Strips: Single-component, elastomeric sheet with aluminum or D. 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; to joint substrates indicated) O.
 - 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.

MINERAL FIBER/CERAMIC WOOL NON-COMBUSTIBLE INSULATION (FIRE 2.5

- Provide min. 4 pcf Thermafiber as manufactured by Thermafiber Co., min. 4 pcf FBX Safing Insulation as manufactured by Fibrex, MinWool Safing as manufactured by Johns Manville or approved equal to suit conditions and to comply with fire resistance and firestop manufacturer's requirements.
- Material shall be classified non-combustible per ASTM E 119. В.

MIXING 2.6

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, A. and other procedures needed to produce firestopping products of uniform quality with optimum performance characteristics for application indicated.

PART 3 EXECUTION

EXAMINATION 3.1

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 Α. unsatisfactory conditions have been corrected.

PREPARATION 3.2

- Surface Cleaning: Clean out openings and joints immediately prior to installing firestopping to comply with recommendations of firestopping manufacturer and the A. following requirements:
 - Remove all foreign materials from surfaces of opening and joint substrates and from penetrating items that could interfere with adhesion of firestopping.
 - 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.
 - Remove laitance and form release agents from concrete.
 - Priming: Prime substrates where recommended by firestopping manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; В. do not allow spillage and migration onto exposed surfaces.
 - 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

- 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 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-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.
 - Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 - 3. For fill materials that will remain exposed after completing work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.5 INSTALLING FIRE RESISTIVE JOINT SEALANTS

- A. General: Comply with ASTM C 1193, and with the sealant manufacturer's installation instructions and drawings pertaining to products and applications indicated.
- B. Install joint fillers to provide support of sealants during application and at position required to produce the cross sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability and develop fire resistance rating required.
- C. Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross sectional shapes and depths relative to joint width that optimum sealant movement capability. Install sealants at the same time joint fillers are installed.
- D. Tool no sag sealants immediately after sealant application and prior to the time skinning or curing begins. Form smooth, uniform beads of configuration indicated or required to produce fire resistance rating, as well as to eliminate air pockets, and to ensure contact and adhesion of sealants with sides of joint. Remove excess sealant from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

3.6 INSTALLING FIRESAFING INSULATION

- A. Install fire safing insulation utilizing welded or screw applied galvanized steel impaling pins and retaining clips; space clips or pins 24" o.c. maximum.
- B. Completely fill voids in areas where safing insulation is required. At spandrel conditions/floor edges, depth of insulation top to bottom shall be at least four (4) inches.
- C. Cover top of all safing insulation with firestop sealant or spray.

3.7 FIELD QUALITY CONTROL

- A. Special Inspecting agency 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

SECTION 079200

JOINT SEALERS

PART 1 GENERAL

RELATED DOCUMENTS 1.1

The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) A. the Contract (City of New York Standard Contract).

SECTION INCLUDES 1.2

- 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:
 - Exterior wall joints not specified to be sealed in other Sections of work.
 - 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.
 - Control and expansion joints in walls.
 - Joints at wall penetrations. 4.
 - Joints between items of equipment and other construction.
 - All other joints required to be sealed to provide a positive barrier against penetration of air and moisture.

RELATED SECTIONS 1.3

- Roofing Division 7. A.
- Firestop sealants Section 078413. В.
- Sealant within drywall construction Section 092900. C.
- Sealant at tile work Section 093013. D.

QUALITY ASSURANCE 1.4

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 A. with the published recommendations of the sealant manufacturer.

- Pre-Construction Field Adhesion Testing: Before installing elastomeric sealants, field B. 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.
- Perform testing per ASTM C 1248 on interior and exterior sealants to determine if C. 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**

- 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.
 - Submit joint sizing calculations certifying that movement capability of sealant is
- Samples: Submit the following: B.
 - Color samples of sealants, submit physical samples (not color chart).
 - Sealant bond breaker and joint backing.
- Product Data: Submit manufacturer's technical information and installation instructions C.
 - Sealant materials, indicating that material meets standards specified herein. 1.
 - Backing rods.
- Submit manufacturer's certification as required by Article 1.6 herein. D.
- Submit results of testing required in Article 1.4 herein. E.

1.6 MANUFACTURER'S RESPONSIBILITY AND CERTIFICATION

Contractor shall require sealant manufacturer to review the Project joint conditions and Α. details for this Section of the work. Contractor shall submit to the Commissioner written certification from the sealant manufacturer that joints are of the proper size and design, that the materials supplied are compatible with adjacent materials and backing, that the materials will properly perform to provide permanent watertight, airtight or vaportight seals (as applicable), and that materials supplied meet specified performance

1.7 ENVIRONMENTAL CONDITIONS

- Temperature: Install all work of this Section when air temperature is above forty (40) A. degrees F. and below eighty (80) degrees F., unless manufacturer submits written instructions permitting sealant use outside of this temperature range.
- Moisture: Do not apply work of this Section on surfaces which are wet, damp, or have B.

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

- Store sealant materials and equipment under conditions recommended by their manufacturer.
- 2. Do not use materials stored for a period of time exceeding the maximum recommended shelf life of the material.
- 3. Material shall be stored in unopened containers with manufacturers' name, batch number and date when shelf life expires.

1.9 GUARANTEE

- A. Provide a written, notarized guarantee from the manufacturer stating that the applied sealants shall show no material failure for a period of ten (10) years.
- B. Contractor to provide a written, notarized, guarantee stating that the applied sealants shall show no failure due to improper installation for a period of two (2) years.
- C. Guarantee shall be in a form acceptable to the City of New York and executed by an authorized individual.
- D. Include in guarantee provision, agreement to repair and/or replace, at Contractor's expense, 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 made by Dow Corning, "Silpruf SCS 2000" or "LM SCS 2700" made by G.E. or "Spectrem 1" or "Spectrem 3" made by Tremco or "Sonolastic 150" by Sonneborn 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" made by Pecora or equal made by Tremco.
- C. 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 "BHR" made 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. Comply, at minimum, with sealant and sealant primer manufacturer recommendations for space ventilation during and after installation. Where feasible, the following ventilation conditions shall be maintained during the sealant/sealant primer curing period or for 72 hours after installation: 1) supply 100% outside air 24 hours a day; 2) supply airflow at a rate of 6 air changes per hour, when outside temperatures are between 55 degrees F and 85 degrees F and humidity is between 30% and 60%; and 3) supply airflow at a rate of 1.5 air changes per hour, when outside air conditions are not within the range stipulated in item 2 above.
- B. To the extent practical, allow sealant and sealant primer installations to cure *prior to* the installation of materials that adsorb VOCs. Materials that adsorb VOCs include carpets, textiles, unprimed gwb, and acoustical ceiling panels.
- C. Sealant Installation Standard: Comply with instructions and recommendations of the manufacturer and in accordance with ASTM C 1193 for use of joint sealants as applicable to materials, applications and conditions required by this Project where more stringent installation requirements are specified herein, such requirements shall apply.

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Sample Section of Sealant D.

- 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.
- 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.
- Accepted control section shall be standard to which all other sealant work must conform.
- Supervision: The Contractor shall submit to the Commissioner written certification from the sealant manufacturer that the applicators have been instructed in the proper E. application of their materials. The Contractor shall use only skilled and experienced workmen for installation of sealant.
- 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.

Preparation and Application G.

- 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.
- 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.
 - Do not use any acid or other material which might stain surfaces. a.
 - Remove laitance by grinding or mechanical abrading.
 - Remove loose particles present or resulting from grinding, abrading, or blast b. cleaning by blowing out joints with compressed air, oil and water free, or vacuuming joints prior to application of primer or sealant.
 - 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.
 - 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. Apply primer with clean brush and only when temperature is above 45 deg. F.
- 7. Joint Backing: In joints where depth of joint exceeds required depth of sealant, install joint backing (after primer is dry) in joints to provide backing and proper joint shape for sealant. Proper shape for sealant is a very slight "hourglass" shape, with back and front face having slight concave curvature. Use special blunt T-shaped tool or roller to install joint backing to the proper and uniform depth required for the sealant. 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 4A 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 081113

STEEL DOORS AND FRAMES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract (City of New York Standard Contract).

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:
 - Interior and exterior hollow metal doors and frames for fire rated and unrated door openings.
 - 2. Preparation of metal doors and frames to receive finish hardware, including reinforcements, drilling and tapping necessary.
 - 3. Preparation of hollow metal doors to receive glazing where required.
 - 4. Furnishing anchors for building into masonry and drywall.
 - 5. Factory prime painting of work of this Section.

1.3 RELATED SECTIONS

- A. Unit Masonry Section 042000.
- Installation of doors and frames Section 062000.
- C. Finish Hardware Section 087100.
- D. Gypsum Drywall Section 092900.
- E. Painting and Finishing Section 099000.

1.4 SUBMITTALS

- A. 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.
- B. 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.

- C. 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.
- D. 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 the City of New York that each door and frame assembly has been constructed to comply with design, materials, and construction equivalent to requirements for labeled construction.

1.5 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 inservice 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 the City of New York, 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.
 - Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a testing agency acceptable to the City of New York 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 the City of New York, 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.

G. For projects located in New York City, fire rated assemblies must have M.E.A. approval with UL label.

1.6 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

 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

- All frames shall be welded units with integral trim, of the sizes and shapes shown on approved shop drawings. Unless otherwise noted, knocked-down frames will not accepted.
- 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.
 - 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".
- 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.
 - 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

Reinforcements for surface mounted hardware - twelve (12) gauge. 5).

Floor Anchors

- Provide adjustable floor anchors, providing not less than two (2) inch height adjustment.
- Minimum thickness of floor anchors shall be fourteen (14) gauge. b.

Jamb Anchors 9.

- 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
 - Frames up to 7'-6" height three (3) anchors. 1).
 - Frames 7'-6" to 8'-0" height four (4) anchors.
 - Frames over 8'-0" height one (1) anchor for each 2'-0" or fraction 2). 3). thereof in height.
- Frames for installation in stud partitions shall be provided with steel anchors of suitable design, not less than eighteen (18) gauge thickness, securely b. welded inside each jamb as follows:
 - Frames up to 7'-6" height four (4) anchors.
 - Frames 7'-6" to 8'-0" height five (5) anchors. 2).
 - Frames over 8'-0" height five (5) anchors plus one additional for 3). each 2'-0" or fraction thereof over 8'-0".
- 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. 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.
- 13. Ceiling Struts: Minimum 3/8" thick x 2" wide steel.
- 14. 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.
- 15. 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.
- 16. Except on weatherstripped frames, drill stops to receive three (3) silencers on strike jambs of single door frames and two (2) silencers on heads of double-door frames.
- C. Finish: After fabrication, 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".
- 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.

- Edge profiles shall be provided on both vertical edges of doors as follows:
 - Single-acting swing doors beveled 1/8" in two (2) inches.
 - Double acting swing doors rounded on 2-1/8" radius. b.
 - No square edge doors permitted.

Hardware Reinforcements 7.

- Doors shall be mortised, reinforced, drilled and tapped at the factory for fully templated hardware only in accord with the approved hardware schedule and a. 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.
- Minimum gauges for hardware reinforcing plates shall be as follows:
 - Hinge and pivot reinforcement seven (7) gauge. 1).
 - Reinforcement for lock face, flush bolts, concealed holders, 2). concealed or surface mounted closers - twelve (12) gauge.
 - Reinforcements for all other surface mounted hardware sixteen (16) 3). gauge.

Glass Moldings and Stops

- 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.
- Fixed moldings shall be securely welded to the door on the security side. b.
- 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 C. countersunk screws spaced eight (8) inches o.c. Snap-on attachments will not be permitted. Stops shall be flush with face of door.
- 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.
- Flatness: Doors shall maintain a flatness tolerance of 1/16" maximum, in any direction, D. including in a diagonal direction.

LABELED DOORS AND FRAMES 2.5

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 A.

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 limits given in HMMA 841 of ANSI/NAAMM, current edition.

2.9 PREPARATION FOR FINISH HARDWARE

- A. Prepare door and frames to receive hardware:
 - 1. Hardware supplier 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 083113

ACCESS DOORS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract (City of New York Standard Contract).

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:
 - GFRG access panels.

1.3 RELATED SECTIONS

A. Gypsum Drywall - Section 092900.

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.
 - Provide UL label on each access panel.
 - 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. 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.

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 GFRG ACCESS PANELS

- A. Provide GFRG access panels with concealed frames, shell thickness of 1/8" to 3/16", equal to "Stealth" ceiling access panels by Wind-Lock, or equivalent product made by Intax Forms Inc., Stylemark, or approved equal.
 - 1. Glass Content: 5 to 6 percent by weight.
 - 2. Density: 103 to 112 pcf.
 - 3. Shell Thickness: 1/8 to 3/16 inch (3 to 5 mm) nominal.
 - 4. Flammability
 - a. Flame Spread Index of 0.
 - b. Smoke Development Index of 0 5.
 - 5. Flexural Strength: 300-4000 PSI.
 - 6. Compressive Strength: 7600 PSI 7.
 - 7. Hardness: (Barcol) 50 8.
 - 8. Impact Resistance: 8.0 ft.-lb./in.².

B. Tolerances

- 1. Dimensional, All Directions: +/- 1/8".
- 2. Thickness, Skin: +/- 1/16"/-0.
- 3. Thickness, Total Unit: +/- 1/8".
- 4. Warpage or Bowing: +/- 1/16" per foot.

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

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SECTION 083323

ROLL UP DOORS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract (City of New York Standard Contract).

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the roll up doors as shown on the drawings and/or specified herein, including, but not limited to, the following:
 - 1. Roll up doors.
 - Hardware and accessories.
 - 3. Motor operation.

1.3 RELATED SECTIONS

- A. Finish Hardware Section 087100.
- B. Painting and Finishing Section 099000.
- C. Electrical Division 26.

1.4 QUALITY ASSURANCE

- A. Furnish each roll up door as a complete unit produced by one manufacturer, including hardware, accessories, mounting and installation components.
- B. Provide each type of roll up door by one manufacturer for entire project.

1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's product data, roughing-in diagrams, and installation instructions for each type and size of overhead coiling door. Include operating instructions and maintenance information.
- B. Shop Drawings: Submit shop drawings for special components and installations which are not fully dimensioned or detailed on manufacturer's data sheets.

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.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Provide roll up doors manufactured by Atlas, Overhead Door Corp., Cornell Iron Works Inc., or approved equal meeting these specifications.

2.2 DOOR CURTAIN MATERIALS AND CONSTRUCTION

- A. Shutter Curtain: Fabricate roll up door curtains of interlocking flat slats designed to withstand required wind loading, of continuous length for width of doors, without splices. Provide slats of structural quality, minimum twenty (20) gauge cold-rolled galvanized steel sheets complying with ASTM A 924, Grade A, with G90 zinc coating, complying with ASTM A 653, and phosphate treated before fabrication.
- B. Endlocks: Malleable iron castings galvanized after fabrication, secured to curtain slats with galvanized rivets. Provide locks on alternate curtain slats for curtain alignment and resistance against lateral movement.
- C. Windlocks: Malleable iron castings secured to curtain slats with galvanized rivets. Provide windlocks on roll-up doors approximately twenty-four (24) inches o.c. on both edges of curtain.
- D. Bottom Bar: Consisting of two (2) angles, each not less than 1-1/2" x 1-1/2" x 1/8" thick, either galvanized or stainless steel or aluminum extrusions to suit type of curtain slats.
- E. Curtain Jamb Guides: Fabricate curtain jamb guides of steel angles, or channels and angles with sufficient depth and strength to retain curtain loading. Build up units with minimum 3/16" thick steel sections, galvanized after fabrication. Slot bolt holes for track adjustment.
 - 1. Secure continuous wall angle to wall framing by 3/8" minimum bolts at not more than twenty-four (24) inches o.c. Extend wall angles above roll up door opening head to support coil brackets, unless otherwise shown. Place anchor bolts on exterior wall guides so they are concealed when roll up door is in closed position. Provide removable stops on guides to prevent over-travel of curtain, and continuous bar for holding windlocks.
- F. Weather Seals: Provide vinyl or neoprene weatherstripping for exterior doors. At door heads, use 1/8" thick continuous sheet secured to inside of curtain coil hood. At door jambs, use 1/8" thick continuous strip secured to exterior side of jamb guide.

2.3 COUNTERBALANCING MECHANISM

- A. Counterbalance doors by means of adjustable steel helical torsion spring, mounted around a steel shaft and mounted in a spring barrel and connected to door curtain with required barrel rings. Use grease sealed bearings or self-lubricating graphite bearings for rotating members.
- B. Counterbalance Barrel: Fabricate spring barrel of hot-formed structural quality carbon steel, welded or seamless pipe, of sufficient diameter and wall thickness to support curtain without distortion of slats and limit barrel deflection to not more than 0.03" per foot of span under full load.
- C. Provide spring balance of one or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Provide cast steel barrel plugs to secure ends of springs to barrel and shaft.
- D. Fabricate torsion rod for counterbalance shaft of cast-hardened steel, of required size to hold fixed springs ends and carry torsion load.
- E. Brackets: Provide mounting brackets of manufacturer's standards design, either cast iron or cold-rolled steel plate with bell mouth guide groove for curtain.
- F. Hood: Form to entirely enclose coiled curtain and operating mechanism at opening head, and act as weather seal. Contour to suit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Provide closed ends for surface-mounted hoods, and any portion of between-jamb mounting projecting beyond wall face. Provide intermediate support brackets as required to prevent sag.
 - 1. Fabricate steel hoods for doors of not less than twenty (20) gauge hot-dip galvanized steel sheet with G90 zinc coating, complying with ASTM A 525. Phosphate treat before fabrication.

2.4 INSERTS AND ANCHORAGES

- A. Furnish inserts and anchoring devices which must be set in concrete or built into masonry for installation of units. Provide setting drawings, templates, instructions and directions for installation of anchorage devices. Coordinate delivery with other work to avoid delay.
- B. Refer to concrete and masonry Sections of these specifications for installation of inserts and anchorage devices.

2.5 PAINTING

A. Shop clean and prime ferrous metal and galvanized surfaces, exposed and unexposed, except faying and lubricated surfaces, with door manufacturer's standard rust inhibitive primer.

2.6 ELECTRIC DOOR OPERATORS

- A. Furnish electric door operator assembly of size and capacity recommended and provided by door manufacturer; complete with electric motor and factory pre-wired motor controls, gear reduction unit, solenoid operated brake, remote control stations, control devices, conduit and wiring from controls to motor and control stations, and accessories required for proper operation.
- B. Provide hand operated disconnect or a mechanism for automatically engaging a sprocket and chain operator and releasing brake for emergency manual operation. Mount disconnect and operator so they are accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.
- C. Design operator so that motor may be removed without disturbing limit switch adjustment and without affecting emergency auxiliary operator.
- D. Door Operator Type: Provide wall or bracket mounted door operator units consisting of electric motor, worm gear drive from motor to reduction gear box, chain or worm gear drive from reduction box to gear wheel mounted on counterbalance shaft, and a disconnect-release for manual operation. Provide motor and drive assembly of horsepower and design as determined by door manufacturer for size of door required.
- E. Electric Motors: Provide high starting torque, reversible, constant duty, Class A insulated electric motors with overload protection, sized to move roll up door in either direction, from any position, at not less than 2/3 foot nor more than one (1) foot per second.
 - 1. Coordinate wiring requirements and current characteristics of motors with building electrical system.
 - 2. Furnish totally enclosed, non-ventilated type motors, fitted with plugged drain, and controller with NEMA Type 4 enclosure.
- F. Remote Control Station: Provide momentary contact, 3-button control station with push button controls labeled "open," "close," and "stop."
 - Provide interior units, full-guarded, surface mounted, heavy duty, with NEMA Type 4 enclosure.
- G. Automatic Reversing Control: Furnish each door with automatic safety switch, extending full width of door bottom, and located within neoprene or rubber astragal mounted to bottom door rail. Contact with switch before fully closing will immediately stop downward travel and reverse direction to fully opened position. Connect to control circuit through retracting safety cord and reel, or self-coiling cable.
 - 1. Provide electrically actuated automatic bottom bar.
- H. Locking Device: Curtain shall have cylinder locking device, including cylinder and 2 deadbolts, one at each end. Provide electric interlocks that prevent motor from operating when lock is engaged.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where roll up 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 roll up door and operating equipment complete with necessary hardware, jamb and head mold strips, anchors, inserts, hangers, and equipment supports in accordance with final shop drawings, manufacturer's instructions, and as specified herein.
- B. Upon completion of installation, including work by other trades, lubricate, test and adjust roll up doors to operate easily, free from warp, twist or distortion and fitting weather-tight for entire perimeter.

END OF SECTION

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SECTION 087000

FINISH HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 RELATED WORK

- A. Installation of finish hardware Section 062000
- B. Steel doors and frames Section 081113
- C. Painting & Finishing Section 099000

1.3 SUBMITTALS

- A. General: Submit the following in accordance with the provisions of the general contract documents.
- B. Hardware Schedule: Submit three (3) copies of the hardware schedule. Follow Door and Hardware Institute (DHI) guide lines for scheduling. At the beginning of the schedule furnish an index, which list each door number with appropriate heading number and hardware set number. Furnish initial draft of schedule at the earliest possible date, in order to facilitate the fabrication of other work. Furnish final schedule after samples, manufacturer's data sheets have been approved. HORIZONTAL SCHEDULES WILL NOT BE ACCEPTED.
- C. Product Data: Submit three (3) copies of the manufacturer's data for each item of hardware. Include whatever information may be necessary to show compliance with requirements. Submission shall clearly identify item submitted. Facsimile documents or copies of facsimile documents will not be accepted.
- D. Keying Schedule: A key schedule showing all key numbers and spaces to which each permits entry, shall be provided. Consult with City Of New York and provide necessary assistance required for development of the schedule before submitting final key schedule. After final approval has been received, the schedule along with the key gathering envelopes containing keys for each lock endorsed with lock number and space designation shall be turned over to the City Of New York.
- E. Samples: Prior to submittal of the final hardware schedule and prior to delivery of hardware, submit one (1) sample of each exposed hardware unit. Sample will be

reviewed by the Commissioner for design, color and texture only. Compliance with other requirements is the exclusive responsibility of the Contractor. Samples approved by the Commissioner shall be turned over to the City Of New York for attic stock.

F. Wiring Diagrams: Supplier shall furnish riser diagrams, wiring diagrams and point to point diagrams for all electrical hardware specified herein. These diagrams shall be included with the initial draft of the hardware schedule.

1.4 QUALITY ASSURANCE

- A. Standards: All finish hardware shall conform to all of the following standards:
 - 1. Testing Laboratories: Underwriters Laboratory (UL) and or Warnock Hersey Fire Laboratories Division: All fire rated doors shall have hardware assemblies approved by one of the listed laboratories. Panic hardware UL Listed only.
 - 2. National Fire Protection Association: NFPA 80 and NFPA 101.
 - 3. Builders Hardware Manufacturers Association (BHMA).
 - 4. American National Standards Institute (ANSI).
 - 5. American Disabilities Act (ADA).
 - 6. Where required, products shall have MEA approval.
- B. Supplier: Finish hardware shall be furnished by those having a minimum of 3 years of builders hardware experience and shall have in their employ at least one AHC to interpret plans, detailed drawings and specifications.

1.5 PRODUCT HANDLING

- A. Handle, store, distribute, protect and install in accordance with the manufacturers instructions. Deliver packaged material in original containers with seals unbroken and labels intact. Deliver assemblies completely identified and with adequate protection for storage, handling and installation.
- B. Provide secure lock-up for hardware delivered to the project, but not yet installed. Control the handling and installation of hardware which are not immediately replaceable, so that completion of the work will not be delayed by hardware losses; both before and after installation

1.6 PROJECT CONDITIONS

A. Coordinate hardware with other work. Tag each item or package separately, with identification related to the final hardware schedule, and include basic installation instructions in the package. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated

and as necessary for proper installation and function. Deliver packaged hardware items to the proper locations for installation.

B. Furnish hardware templates to each fabricator of doors, frames and other work to be factory prepared for the installation of hardware.

1.7 WARRANTIES

A. The hardware manufacturers shall provide full replacement warranty as listed below. Replacement warranty shall not include any labor cost.

1.	Surface Closers	25 years.
2.	Locksets etc.	1 year
3.	Exit Devices	3 years
4.	Balance of hardware	1 year

PART 2 - PRODUCTS

2.1 MATERIALS AND FABRICATION

- A. Hand of Door: The drawings show the swing or hand of each door leaf. Furnish each item of hardware for proper installation and operation of the door swing shown.
- B. Base Metals: Produce hardware units of the basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper and hardness but in no case of lesser quality material.
- C. Fasteners: Manufacture hardware to conform to published templates, generally prepared for machine screw installation. Do not provide hardware, which has been prepared for selftapping sheet metal screws.
- D. Screws: Furnish screws for installation, with each hardware item. Finish exposed screws to match the hardware finish.
- E. Tools for Maintenance: Furnish a complete set of specialized tools as needed, for the City Of New York continued maintenance, removal and replacement of hardware.
- F. Concealed Fasteners: Provide concealed fasteners for hardware units which are exposed when the door is closed except to the extent no standard manufacturer's units are available with concealed fasteners. Use thru bolts only where necessary to adequately fasten hardware to the door.

2.2 HINGES

A. All hinges shall be full mortise five knuckle ball bearing type, template, with non-rising loose pins. All outswing doors shall have non-removable pins (NRP).

- All hinges for 1-3/4" thick doors shall be 4-1/2" wide in the open position. For other B. thickness doors, and trim projections, hinges shall be of a width to permit unobstructed swing of the doors.
- Size and weight of hinges shall conform to the following: C.

```
Up to 36" -----4-1/2" Standard Weight
Over 36" to 46" -----5" Heavy Weight
Over 46" ----- Continuous Hinge 910DBAA
```

Quantity of hinges shall be provided to conform to the following: D.

```
Doors up to 60" in height -----2 hinges
Doors 60" to 90" in height -----3 hinges
Doors 90" and over -----l hinge every 30" in height
```

All hinges shall be the products of one manufacturer. E.

2.3 LOCKSETS, LATCHSETS ETC.

- Unless otherwise noted, all locksets and latchsets shall be heavy duty mortise type, and shall A. have the following features:
 - Curved lip strikes with proper lip lengths as required (SA114). 1.
 - 2. Wrought steel box strike (M17).
 - 3. Auxiliary deadlatching.

2.4 KEYS, KEYING AND CYLINDERS

- Keys: All keys shall be nickel silver. Furnish a quantity of keys as follows. A.
 - 1. Great Grand Master
 - 2. Grandmaster Keys 2 each per group 3. Master Keys 6 each per group 4.
 - Change Keys 3 each per cylinder
 - 5. Control Keys
- Keying: All locks shall be construction keyed and great grand master keyed to a new B. Corbin High Security Pyramid great grand master key system or approved equal. The hardware supplier shall meet with the City of New York to establish the keying requirements. All master keys shall be hand delivered to the City of New York by the manufacturer or his representative.
- C. Cylinders: All cylinders shall be interchangeable core furnished with visual key control.

2.5 DOOR CLOSING DEVICES

All door closers shall meet ANSI A156.4 Grade 1 requirements. All closers shall be barrier A. free. Furnish all required brackets, filler plates and any others items required to insure proper installation and operation.

B. All closers shall be installed so that closer bodies are positioned on room side of doors to and from corridors, i.e., in-swing doors shall be regular arm. Out-swing doors shall have a parallel arm. Regular arm shall be used in connecting doors between rooms.

2.6 EXIT DEVICES

- A. All exit devices shall be as specified, and shall conform to ANSI A156.3 Grade 1.
- B. Where lever trim is specified, lever design shall match balance of project.
- C. All exit devices shall be the products of one manufacturer.

2.7 FLUSH BOLTS AND COORDINATORS

- A. Manual Flush Bolts: Shall be Trimco W3917 series, furnish 3910 dustproof strikes for all bottom bolts or approved equal. Top bolts shall be furnished with proper extensions to allow for easy operation.
- B. Self Latching Flush Bolts: Shall be Trimco 3810/3815 series, furnish 3910 dustproof strikes for all bottom bolts or approved equal. Furnish wear plates as required.
- C. Automatic Flush Bolts: Shall be Trimco 3820/3825 series, furnish 3910 dustproof strikes for all bottom bolts or approved equal. Furnish wear plates as required.
- Coordinators: Shall be Trimco 3094 series or approved equal. Furnish all fillers, mounting brackets, carry bars and special cutouts for use with exit devices, as required.
- E. All flush bolts and coordinators shall be the products of one manufacturer.

PART 3 - EXECUTION

3.1 GENERAL

- A. Approval: As soon as practical after award of Contract and before a hardware schedule is prepared, and before any hardware is ordered or delivered to the project, the Contractor shall submit to the Commissioner for his written approval, copies of sample list, listing each of the different items of builders hardware and catalog cuts of each item.
- B. Templates: As soon as the hardware schedule is approved the hardware supplier shall furnish to the various fabricators, required templates for fabrication purposes. Templates shall be made available not more than (10) days after receipt of the approved hardware schedule.
- C. Packaging and Marking: All hardware shall be shipped with proper fastenings for secure application. Each package of hardware shall be legibly marked indicating the part of the work for which it is intended. Markings shall correspond with the item numbers shown on the approved hardware schedule. Keys shall be tagged within each package set and plainly marked on the face of the envelope with the key control number, door designation and all identification as necessary.

Delivery: Delivery shall be made to the project site to the attention of the Contractor. D. Where delivery of special hardware is required at any fabricator's plant, the hardware supplier shall make such delivery.

3.2 INSTALLATION

- Mount hardware units at heights recommended in "Recommended Locations for Builders A. Hardware" by BHMA, unless otherwise noted or directed by the Commissioner.
- Install each hardware unit in compliance with the manufacturer's recommendations. B.

3.3 ADJUST AND CLEAN

- Adjust and check each operating item of hardware and each door to ensure proper operation A. or function of every unit. Lubricate moving parts with type lubrication recommended by manufacturer. Replace units that cannot be adjusted.
- Wherever hardware installation is made more than one (1) month prior to acceptance or B. occupancy of a space or area, return to the work during the week prior to acceptance make a final check, and adjust all hardware items in such space or area. Adjust door control devices and compensate for final operation of heating and ventilating equipment.
- C. Instruct City Of New York personnel in proper adjustment and maintenance of hardware and hardware finishes, during the final adjustment of hardware.

3.4 HARDWARE SETS

- The following is a general listing of hardware requirements and is not intended for use as a A. final hardware schedule. Any items of hardware required by established standards or practices, or to meet state and local codes or proper door operation shall be furnished whether or not specifically called out in the following listed groups.
- The following hardware products are the basis of design and may be substituted by an B.

1. HARDWARE SET #1

Each to have:

Hinges 1 Classroom Lock 1 Door Closer

1 Floor Stop 3 Silencers

PBB (see description) x US32D Corbin ML2055 x RWA x US32D Dorma 8916AF series x Alum

Trimco W1211 x US32D

Trimco 1229A

2. HARDWARE SET #2 Each to have:

Hinges

1 Passage Lock

1 Door Closer/Stop

PBB (see description) x US32D Corbin ML2010 x RWA x US32D

Dorma 8916DS x Alum

3 Silencers

Trimco 1229A

3. HARDWARE SET #3

Each to have:

1 Hinges

M180 Top Pivot x 1 ½" offset x US32D M190 Intermediate Pivot x 1 ½" offset x

2 Hinges

US32D

1 Storeroom Lock

Corbin ML2057 x M30 x RWA x US32D

1 Recessed Pull

Jako EM134-128-UCRAN

1 Door Closer/Stop/Hold Open Dorma 8916DSxFH x Alum

Trimco 1229A

3 Silencers

4. HARDWARE SET #4

Each to have:

Hinges

PBB (see description) x US32D Corbin ED5860B x R955 x US32D

1 Exit Device 1 Door Closer/Stop

Dorma 8916DS x Alum

2 Flush Bolts

Trimco (see description) x US26D

3 Silencers

Trimco 1229A

5. HARDWARE SET #5

Each to have:

Hinges

PBB (see description) x US32D Corbin ML2055 x RWA x US32D

1 Classroom Lock 1 Floor Stop

Trimco W1211 x US32D

1 Flush Bolt

Trimco (see description) x US26D

3 Silencers

Trimco 1229A

6. HARDWARE SET #6

Each to have:

1 Hinges

M147 Top & Bottom Pivot x 1 $\frac{1}{2}$ " offset x

US32D

1 Hinges

M190 Intermediate Pivot x 1 1/2" offset x

US32D

1 Classroom Lock

Corbin ML2055 x RWA x US32D

1 Door Closer

Dorma 8916AF series x Alum

1 Floor Stop

Trimco W1211 x US32D

3 Silencers

Trimco 1229A

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SECTION 088000

GLASS AND GLAZING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract (City of New York Standard Contract).

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:
 - Interior glass.

1.3 RELATED SECTIONS

A. Steel Doors and Frames - Section 081113.

1.4 REFERENCES

- A. Comply with the recommendations of the following references unless more stringent requirements are indicated herein.
 - FGMA Publications: FGMA Glazing Manual.

1.5 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:
 - 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:

- 8 lites per 1000 for lites set vertically or not more than 15 degrees off vertical a. and under wind action. b.
- 1 lite per 1000 for lites installed 15 degrees from the vertical land and under
- Load Duration: 60 seconds or less. c.
- Maximum Lateral Deflection: For glass supported on all four edges, provide thickness required that limits center deflection at design wind pressure to 1/100 times the short side length or 0.5", whichever is less.
- 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.
 - Temperature Change (Range): 120 deg. F ambient; 180 deg F, material a.
- Thermal Solar Performance: See Article 2.2 herein.
- 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

1.6 **SUBMITTALS**

- 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.
- Submit compatibility and adhesion test reports from sealant manufacturer indicating В. materials were tested for compatibility and adhesion with glazing sealant, as well as other glazing materials including insulation units.
- Initial Selection Samples: Submit samples of each glass and glazing material showing complete range of colors, textures, and finishes available for each material used.
- D. 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.
- Calculations: Provide wind load charts, calculations, thermal stress analysis, and certification of performance of this work. Indicate how design requirements for loading and other performance criteria have been satisfied. Document shall be signed and sealed by a Professional Engineer licensed in the State of New York

- F. Test Reports: Provide certified reports for specified tests.
- G. Warranties: Provide written warranties as specified herein.

1.7 QUALITY ASSURANCE

- A. 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.
- B. Installer: A firm with a minimum of three years' experience in type of work required by this Section and which is properly trained by manufacturers of primary materials; and with a successful record of in-service installations similar in size and scope to this Project.
- 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.
 - GANA Publications: GANA's "Glazing Manual" and "Laminated Glass Design Guide."
 - 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.
 - 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. 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 Laminated Glass: Manufacturer's standard form, made out to the City of New York and signed by laminated glass manufacturer agreeing to replace laminated glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
 - 1. Warranty period five (5) years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS/FABRICATORS

- A. Acceptable manufacturers include the following:
 - 1. PPG Industries.
 - 2. Guardian Industries.

- 3. Pilkington.
- 4. 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.
 - 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.
 - 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.
 - 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 $\frac{1}{4}$ " (6mm) thick glass.
 - b. Bow and Warp: The bow and warp tolerances shall not exceed 1/32" per linear foot.
 - Fully tempered glass shall be heat soaked to EN 14179-1:2005-European Heat Soaking Standard.
 - C. Laminated Safety Glass: Provide two glass panes of equal thickness, laminated together with a polyvinyl butyl interlayer, conform to ASTM C 1172, and as follows:
 - 1. Interlayer Color: Clear.
 - 2. Interlayer Material: Provide Monsanto "Saflex" or DuPont "Butacite," 0.030" thick at vertical applications, and 0.060" thick at sloped or horizontal applications.
 - 3. Minimum thickness of 1/4".

 Provide ¾" laminated low iron glass complying with above; Starphire by PPG, Ultrawhite by Guardian, Optiwhite by Pilkington, or approved equal.

2.3 GLAZING MATERIALS AND PRODUCTS

- A. General: Provide sealants and gaskets with performance characteristics suitable for applications indicated. Ensure compatibility of glazing sealants with insulating glass sealants, with laminated glass interlayers, and with any other surfaces in contact.
- B. General Glazing and Cap Bead Sealant: Provide sealant with maximum Shore A hardness of 50. Provide one of the following:
 - 1. Dow Corning 795.
 - 2. General Electric Silglaze N 2500 or Contractors SCS-1000.
 - 3. Tremco Spectrem 2.
 - 4. or approved equal.
- C. Backer Rod: Closed cell non-gassing polyethylene rod with rod diameter 25% wider than joint width.
- D. Dense Elastomeric Compression Seal Gaskets: Provide molded or extruded neoprene or EPDM gaskets, Shore A hardness of 75±5 for hollow profile, and 60±5 for solid profiles, ASTM C 864.
- E. Cellular, Elastomeric Preformed Gaskets: Provide extruded or molded closed cell, integral-skinned neoprene, Shore A 40±5, and 20% to 35% compression, ASTM C 509; Type II.
- 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 by Norton, Dow Corning, 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.

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:
 - Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
 - 2. Presence and functioning of weep system.
 - 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. Install glass in prepared glazing channels and other framing members.
- C. Provide bite on glass, minimum edge and face clearances and glazing material tolerances recommended by "GANA Glazing Manual".
- D. Provide weep system as recommended by "GANA Glazing Manual".

- E. Set glass lites in each series with uniform pattern, draw, bow and similar characteristics.
- F. Distribute the weight of glass unit along the edge rather than the corner.
- G. 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.
- H. Protect glass edge damage during handling and installation.
- I. Prevent glass from contact with contaminating substances that result from construction operations, such as weld spatter, fireproofing or plaster.
- J. 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. Install setting blocks at the one greater points of each lite along the horizontal mullion.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. Provide spacers for glass lites where the length plus width is larger than 50 inches as follows:
 - 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.
- 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.
- 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.

- 1. Exterior glazing gasket shall be set a minimum of 1/8" below exterior glazing stop to create a channel for sealant installation.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.8 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:
 - GANA Glass Information Bulletin GANA 01-0300 "Proper Procedure for Cleaning Architectural Glass Products."
 - 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.

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SECTION 092713

GLASS-FIBER-REINFORCED GYPSUM (GFRG) FABRICATIONS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract (City of New York Standard Contract).

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete interior glass-fiber-reinforced gypsum fabrications as shown on drawings and/or specified herein including, but not limited to, the following
 - Factory-molded, glass-fiber-reinforced gypsum fabrications for interior use; ceilings.
 - Steel framing for direct support of glass-fiber-reinforced gypsum fabrications.

1.3 RELATED SECTIONS

- A. Carpentry Section 062000.
- B. Gypsum Drywall Section 092900.
- C. Painting and Finishing Section 099000.

1.4 SUBMITTALS

- A. Product Data: For each type of glass-fiber-reinforced gypsum fabrication indicated. Include construction details, material descriptions, weights, dimensions of individual components, profiles, and finishes.
- B. Shop Drawings: Show profiles, thicknesses, finishes, joints, ornamentation, installation tolerances, and anchorage details. Indicate attachment methods, embedded supports, reinforcement, fabrication methods, joint treatments, clearances, and supports.
 - 1. Show connection to suspension system and cutouts for sprinklers, diffusers, grilles, speakers, and lighting fixtures.
- C. Coordination Drawings: Reflected ceiling plans drawn to scale and coordinating penetrations and ceiling-mounted items. Show the following:
 - 1. Ceiling suspension assembly members.
 - Method of attaching hangers to glass-fiber-reinforced gypsum fabrications and to building structure.

- Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and moldings.
- D. Samples: For each exposed product in each profile and size required, and as follows:
 - 1. Linear Moldings: 2-foot long section with finished joint. Show complete pattern.
 - 2. Nonlinear Shapes: Full-size unit.
- E. Installer Qualification Data: To demonstrate capabilities and experience of Installer. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- F. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, indicating current glass-fiber-reinforced gypsum fabrications comply with ASTM C 1355 requirements.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed glass-fiberreinforced gypsum fabrication installations similar in material, design, and extent to those indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.
- C. Fire-Test-Response Characteristics: Provide glass-fiber-reinforced gypsum fabrications with the following surface-burning characteristics as determined by testing identical products per ASTM E 84 by UL or another independent testing and inspecting agency acceptable to the City of New York:
 - 1. Flame Spread: 25 or less.
 - 2. Smoke Developed: 450 or less.
- D. Mockups: Before installing glass-fiber-reinforced gypsum fabrications, build mockups for each form of construction and finish required to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Build mockups in the location and of the size 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. Demonstrate the proposed range of aesthetic effects and workmanship.
 - Obtain Commissioner's approval of mockups before starting glass-fiber-reinforced gypsum fabrication.

- Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
- Demolish and remove mockups when directed.
- Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Ship and store glass-fiber-reinforced gypsum fabrications in factory-wrapped crates, packaged to keep units dry. Avoid cracking, warping, or staining the units.
- B. Comply with manufacturer's written instructions for storage, temperature, and humidity requirements.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install glass-fiber-reinforced gypsum fabrications until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Acclimatize glass-fiber-reinforced gypsum fabrications to ambient temperature and humidity of spaces in which they will be installed. Remove packaging and move units into installation spaces not less than 48 hours before installing them.
- C. Field Measurements: Where glass-fiber-reinforced gypsum fabrications are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating products without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.8 COORDINATION

A. Coordinate layout and installation of glass-fiber-reinforced gypsum fabrications and suspension system components with other construction, including ceilings, light fixtures, HVAC equipment, fire-suppression-system components, and partition assemblies.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by Formglas Inc., Plastrglas, Casting Designs, Inc., or approved equal.

2.2 STEEL FRAMING COMPONENTS

- A. Framing Components: As indicated and that comply with steel framing components specified in Section 092900, "Gypsum Drywall."
- B. Cast-in-Place and Postinstalled Anchors in Concrete: Anchors of type indicated below, fabricated from corrosion-resistant materials, with holes or loops for attaching hanger wires and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing according to ASTM E 488 conducted by a qualified independent testing agency.
 - 1. Cast-in-place type designed for attachment to concrete forms.
 - 2. Chemical anchor.
 - 3. Expansion anchor.
- C. Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E 1190 conducted by a qualified independent testing agency.
- D. Wire Ties: ASTM A 641, Class 1 zinc coating, soft temper, 0.062 inch thick.
- E. Wire Hangers: ASTM A 641, Class 1 zinc coating, soft temper, 0.162-inch diameter.
- F. Hanger Rods: Mild steel and zinc coated or protected with rust-inhibitive paint.
- G. Flat Hangers: Mild steel and zinc coated or protected with rust-inhibitive paint.
- H. Channels: Cold-rolled steel, 0.0598-inch minimum thickness of base (uncoated) metal and 7/16-inch- wide flanges, and as follows:
 - 1. Carrying Channels: 2 inches deep, 590 lb./1000 feet, unless otherwise indicated.
 - 2. Furring Channels: 3/4 inch deep, 300 lb./1000 feet, unless otherwise indicated.
 - 3. Finish: ASTM A 653, G60 hot-dip galvanized coating.
- I. Steel Studs and Runners: ASTM C 645, with flange edges of studs bent back 90 degrees and doubled over to form 3/16-inch-wide minimum lip (return), and complying with the following requirements for minimum thickness of base (uncoated) metal and for denth:
 - 1. Thickness: 0.0329 inch, unless otherwise indicated.
 - 2. Depth: As indicated, or required to support assemblies and as shown on approved shop drawings.
 - 3. Protective Coating: ASTM A 653, G40 hot-dip galvanized coating.

J. Fasteners for Metal Framing: Provide fasteners of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel framing members securely to substrates.

2.3 GLASS-FIBER-REINFORCED GYPSUM FABRICATION MATERIALS

- A. Glass-Fiber-Reinforced Gypsum Fabrications: ASTM C 1355.
- B. Embedments: Cold-rolled steel channels with ASTM A 653, G60, hot-dip galvanized coating, or as standard with glass-fiber-reinforced gypsum fabrication manufacturer and as required for reinforcement and for anchorage to substrates and framing.

2.4 AUXILIARY MATERIALS

- A. Adhesives: As recommended in manufacturer's written instructions.
- B. Steel Drill Screws: Provide fasteners, complying with the following requirements, that are of sufficient length and size to securely fasten gypsum-reinforced fabrications to framing members:
 - Screws complying with ASTM C 1002 for fastening glass-fiber-reinforced gypsum fabrications to steel members less than 0.033 inch thick.
 - 2. Screws complying with ASTM C 1002 for fastening glass-fiber-reinforced gypsum fabrications to wood members.
 - Screws complying with ASTM C 954 for fastening glass-fiber-reinforced gypsum fabrications to steel members from 0.033 to 0.112 inch thick.
- C. Joint Treatment Materials: Provide materials complying with ASTM C 475 and with the recommendations of the manufacturers of both glass-fiber-reinforced gypsum fabrications and joint treatment materials for each application indicated.
- D. Control Joints: One-piece control joint with V-shaped slot and removable strip covering slot opening, formed from steel sheet zinc-coated by hot-dip process or from rolled zinc, and complying with ASTM C 1047.

2.5 FABRICATION

- A. Fabricate glass-fiber-reinforced gypsum units from molds constructed of rigid materials that will result in smooth-finished surfaces conforming to profiles, dimensions, and tolerances indicated, minimum shell thickness shall be 1/4". Provide units as large as practical to minimize joints.
- B. Remove units from molds and repair hollows, voids, scratches, and other surface imperfections.
- C. Material Compatibility: Fabricate glass-fiber-reinforced gypsum fabrications with surface characteristics required for a high-gloss paint finish.
- D. Embedments: Incorporate embedments so they develop the full strength of glass-fiber-reinforced gypsum fabrications. Cover embedments with glass-fiber-reinforced gypsum composite not less than 3/16 inch thick.

- E. Connection Hardware: Custom designed and fabricated to support and connect glass-fiber-reinforced gypsum fabrications to hangers, support framing, and substrates.
- F. Dimensional Tolerances of Units: As follows:
 - 1. Factory-Finished Edge Straightness: Plus or minus 1/8 inch.
 - 2. Plane Surface Straightness: Plus or minus 1/8 inch.
 - 3. Overall Assembled Length and Width: Plus or minus 1/8 inch per 10 feet.
 - 4. Chords, Radii, and Diameters: Plus or minus 1/8 inch.
 - 5. Squareness: Not more than 1/4-inch difference between diagonals in 16 sq. ft.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for environmental conditions, installation tolerances, and other conditions affecting performance of glass-fiber-reinforced gypsum fabrications.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 STEEL FRAMING INSTALLATION

- A. Steel Framing Installation Standard: Install steel framing to comply with ASTM C 754 and with details indicated. Select framing components of type, size, and spacing needed to support weight of glass-fiber-reinforced gypsum fabrications and to maintain erection tolerances.
- B. Supplementary Framing, Blocking, and Bracing: Install supplementary framing as required not only to support glass-fiber-reinforced gypsum fabrications but also fixtures and other items penetrating glass-fiber-reinforced gypsum fabrications.

3.3 GLASS-FIBER-REINFORCED GYPSUM FABRICATION INSTALLATION

- A. Install glass-fiber-reinforced gypsum fabrications level, plumb, true, and aligned with adjacent materials. Use concealed shims where required for alignment.
- B. Predrill fastener holes in glass-fiber-reinforced gypsum fabrications. Clean fastener holes to remove dirt and oil.
- C. Attach glass-fiber-reinforced gypsum fabrications to framing and substrates with steel drill screws. Do not use pneumatic staple guns. Countersink screw heads below adjoining finished surface.
- D. Fasten as required to comply with dimensional tolerances and not less than 5/16 inch from edge to end.
- E. Cover screw heads with joint compound to produce flush, smooth, and level finished surfaces.

- F. Attach glass-fiber-reinforced gypsum fabrications at joints with adhesive, and band or brace together until adhesive is cured. Cure adhesive according to glass-fiber-reinforced gypsum fabrication manufacturer's written instructions.
- Install control joints where indicated.
- H. Joint Finishing: Comply with ASTM C 840 for Level 5 finish.

3.4 ERECTION AND LOCATION TOLERANCES

- A. Erection Tolerances: Install glass-fiber-reinforced gypsum fabrications so each unit complies with the following dimensional requirements:
 - 1. Plane Alignment (Panel to Panel): 1/16 inch.
 - 2. Variation from Plumb: Plus or minus 1/8 inch per 10 feet.
 - 3. Variation from Straightness: Plus or minus 1/4 inch per 25 feet.
 - 4. Assembly Deflection: Not greater than the length of the assembly divided by 240.
 - 5. Joint Alignment: Not more than 1/8 inch.
 - 6. Joint Width: Not more than 3/8 inch.

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SECTION 092900

GYPSUM DRYWALL

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract (City of New York Standard Contract).

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:
 - Gypsum board work for partitions, ceilings, column enclosures, furring, and elsewhere where gypsum drywall work is shown on drawings.
 - Perforated gypsum board for acoustical ceiling.
 - 3. Metal supports for gypsum drywall construction.
 - 4. Acoustical insulation for gypsum drywall work.
 - 5. Sealant for gypsum drywall work.
 - Concealed metal reinforcing for attachment of railings, toilet partitions and other items supported on drywall partitions and walls.
 - Taping and finishing of drywall joints.
 - 8. Installing rings and frames in drywall surfaces for grilles, registers and lighting fixtures.
 - 9. Bracing and connections.

1.3 RELATED SECTIONS

- A. Steel Doors and Frames Section 081113.
- B. Access Doors Section 083113.
- C. Painting and Finishing Section 099000.
- D. Rings for grilles, registers and light fixtures Division 23 and 26.

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 drywall shaft systems for elevators designed and tested by manufacturer to withstand a lateral loading (air pressure) of 10 lbs. per sq. ft. for the maximum wall height required, and with deflection limited to L/240 of partition height.
- 2. Provide standard drywall wall assemblies designed and tested by manufacturer to withstand a lateral load of 5 lbs. per sq. ft. for the maximum wall height required, and with deflection limited to L/240 of partition height.
 - a. Drywall assemblies with tile finish shall have a deflection limit of L/360.
- 3. Provide drywall ceiling assemblies designed, fabricated and installed to have a deflection not to exceed L/360.
- 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 3 years of successful experience in the installation of specified materials.

1.5 SUBMITTALS

- A. Submit shop drawing for each drywall partition, furring and ceiling system showing size and gauges of framing members, hanger and anchorage devices, wallboard types, insulation, sealant, methods of assembly and fastening, control joints indicating column lines, corner details, joint finishing and relationship of drywall work to adjacent work.
- B. Samples: Each material specified herein, 12" x 12", or 12" long, or in manufacturer's container, as applicable for type of material submitted.
- C. Manufacturer's Literature: Submit technical and installation instructions for each drywall partition, furring and ceiling system specified herein, and for each fire-rated and sound-rated gypsum board assembly. Submit other data as required to show compliance with these specifications, including data for mold resistant joint compound.

D. 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 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.

1.7 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, or National Gypsum Co. meeting specification requirements are acceptable.
- 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.
 - FireTrak (including stud clips) by FireTrak Corp. or equal made by Metal-Lite Inc.

B. Metal Studs, Framing and Furring

- Channel Type Studs: Channel type with holes for passage of conduit formed from minimum 20 U.S. Std. gauge (unless heavier gauge is required to meet deflection limits) galvanized steel, width as shown on drawings.
- 2. Furring Channels: Hat shaped, formed from galvanized steel, 25 U.S. Std. gauge.
- 3. Continuous 16 gauge x 8" wide steel wall plate screwed to studs as required for support of railings, toilet partitions and other items supported on drywall partitions

C. Suspended Ceiling and Fascia Supports

- 1. Main Runners: 1-1/2" steel channels, cold rolled at 0.475 lbs. per ft., rust-inhibitive paint finish.
- 2. Furring Members: Screw-type hat-shaped furring channels of 25 ga. zinc-coated steel; comply with ASTM C 645.
- 3. Hangers: Galvanized, 1" x 3/16" flat steel slats capable of supporting 5x calculated load supported.
- 4. Hanger Anchorages: Provide inserts, clips, bolts, screws and other devices applicable to the required method of structural anchorage for ceiling hangers. Size devices for 5x calculated load supported.
- Furring Anchorages: 16 ga. galvanized wire ties, manufacturer's standard clips, bolts or screws as recommended by furring manufacturer.
- D. All galvanized steel members shall have coating conforming to ASTM A 653, G60.

2.3 GYPSUM WALLBOARD TYPES

- A. Moisture/Mold Resistant Gypsum Wall Board: 1/2" thick and 5/8" thick as indicated on drawings, "Mold Tough" or "Mold Tough FR" by U.S. Gypsum, "DensArmor Plus" by Georgia Pacific, "Mold Defense" and/or "Mold Defense Type X" by Lafarge/Continental, or "Gold Bond EXP Interior Extreme Gypsum Board" by National Gypsum, 48" wide, in maximum lengths available to minimize end-to-end butt joints.
 - Board must have a rating of 10 per ASTM D 3273 with a core that meets ASTM C 1396, Section 6 or ASTM C 1658.
- B. Water Resistant Backing Board for Tile Finish: 5/8" thick, "Fiberock Aqua-Tough" by USG, "Dens-Shield Tile Backer Board" by Georgia Pacific, or "EXP Tile Backer Board" by National Gypsum. Cover joints with a pressure sensitive woven glass fiber tape equal to Imperial Type P Tape.
- C. Perforated Wallboard: Provide perforated gypsum wallboard for ceiling panels as manufactured by GypSorb, Gyproc Saint Gobain, CertainTeed, or approved equal,

- 12.5mm thickness; high-density gypsum board with continuous sound-absorbing perforations. Provide acoustical backer as indicated.
- Perforation Pattern: See Finish Schedule on Drawings.
- Provide system elements and accessories required by manufacturer for complete acoustic ceiling installation per manufacturer's system requirements.

2.4 ACCESSORIES

- A. Acoustical Insulation: Paper-less, non-combustible, semi-rigid mineral fiber mat, 2" thick, in walls (unless otherwise indicated), 3 lb./cu. ft. maximum density; Thermafiber LLC "Thermafiber," or approved equal.
- B. Fasteners for Wall Board: USG Brand Screws; Type S Bugle Head for fastening wallboard to lighter gauge interior metal framing (up to 20 ga.). Type S-12 Bugle Head for fastening wallboard to heavier gauge interior metal framing (20 ga. to 12 ga.); Type S and Type S-12 Pan Head for attaching metal studs to door frames and runners; and Type G Bugle Head for fastening wallboard to wall board. Lengths specified below under "Part 3 Execution" Articles and as recommended by drywall manufacturer.
 - For Portland cement base boards, fasteners shall be equal to Durock Steel Screws by U.S. Gypsum.
- C. Laminating Adhesive: "Sheetrock Brand Joint Compound."
- D. 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.
- E. Metal Trim Edge Beads: "Sheetrock Brand Paper Faced Metal Bead and Trim."
- F. 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.
 - For mold-resistant drywall, water resistant drywall, and tile backer board, use glass mesh tape with setting joint compound that is rated 10 when tested in accordance with ASTM D 3273 and evaluated in accordance with ASTM D 3274. Acceptable joint compound is "Rapid Set One Pass" made by CTS Cement Manufacturing Corp. or "Rapid Joint" manufactured by Lafarge North America or approved equal meeting standards noted herein.
- G. Control Joints: No. 0.093, USG.
- H. Acoustical Sealant: USG "Acoustical Sealant" or "Tremco Acoustical Caulking" of Tremco Mfg. Co., or approved equal.
- 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. Where feasible, one or both of the following procedures shall be used to minimize the exposure of gypsum wallboard to materials or finishes which have high short-term emissions of VOC's, formaldehyde, particulates, or other air-borne compounds:
 - 1. The gypsum wall board shall be taped, spackled and primed *before* the installation of the highly-emitting materials.
 - 2. The gypsum wallboard shall be installed *after* the installation of the highly-emitting materials.
- B. Materials with high short-term emissions include, but are not limited to: adhesives, sealants and glazing compounds (specifically those with petrochemical vehicles or carriers); paint, 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.

C. General

- 1. Install drywall work in accordance with drywall manufacturer's printed instructions and as indicated on drawings and specified herein.
- 2. All metal framing for drywall partitions shall extend from floor to underside of structural deck above. Provide for vertical deflection with positive mechanical connections of framing members to structure.
- 3. Provide concealed reinforcement, 16 ga. thick by eight (8) inches wide or as detailed or as recommended by manufacturer, for attachment of railings, toilet partitions, and other items to be supported on the partitions which cannot be attached to the metal framing members. Concealed reinforcement shall span between metal studs and be attached thereto using two (2) self-tapping pan head screws at each stud.
 - Back of drywall shall be scored or notched to prevent bulging out where reinforcement plate occurs.
- D. 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.

Acoustic Assemblies: Install acoustic rated assemblies to achieve a minimum STC as noted on drawings, in accordance with test results obtained and published by the drywall manufacturer, for the drywall assembly type indicated on the drawings.

Cementitious Backer Board F.

- General: Furnish cementitious backer board in maximum available lengths. Install horizontally, with end joints over framing members.
- Fastening: Secure cementitious backer board to each framing member with screws spaced not more than 12 inches on center and not closer than 1/2" from the edge. Install screws with a conventional screw gun so that the screw heads are flush with the surface of the board.
- Joint Treatment: Fill space between edge of backer and receptor with dry-set Portland cement or latex-Portland cement mortar. Fill all horizontal and vertical joints and corners with dry-set Portland cement or latex-Portland cement mortar. Apply fiberglass tape over joints and corners and embed with same mortar.
- Install in accordance with Perforated Wallboard for Acoustical Ceilings: manufacturer's installation procedures.
 - Install boards with manufacturer's recommended screws, spaced at 1" off the edges and 6" apart. Do not stagger boards; install the first board in the center of the ceiling, with the short edge parallel to the window (main light source). Work the boards outwards toward the edges leaving any cuts to be performed in the outer perimeter.
 - Install screws centered in between the perforations, 1" off the edges. Space screws approximately 8"-10".
 - Install next sheet in similar fashion.
 - Joint Treatment: Lightly sand the board joints only in the direction of the joint. Wipe clean with a moist sponge. Treat joints with manufacturer's joint kit. Rollapply adhesive and set strip tape into the adhesive. Roll-apply another coat of adhesive on top of the first coat, after the first coat is set (1-2 hours). After overnight drying, lightly sand the joints to a finish.
 - Sand in direction of joint. a.
 - Lightly sand screw piercings. b.
 - Fill the screw heads with the filler and not the perforations.
 - Then wipe clean with trowel. A second coat may be needed if shrinking c. d. occurs.
 - Roll on adhesive.
 - Apply the tape by pushing the tape into the adhesive with your thumb. e. f.
 - **Painting** g.
- After overnight drying, lightly sand the joints and screw heads to a 1).
 - Roll apply three coats of paint (1 coat primer + 2 coats paint) with a 2). fine nap roller.

H. 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.

I. Wall Board Application

- Do <u>not</u> install wallboard panels until steel door frames are in place; coordinate work with Section 081113, "Steel Doors and Frames."
- See drawings for all board types. Use fire-rated wallboard for fire-rated assemblies. Use water-resistant wallboard where indicated on drawings and where wallboard would be subject to moisture. Install water-resistant wallboard in full, large sheets (no scraps) to limit number of butt joints.
- 3. Apply wallboard with long dimension parallel to stud framing members, and with abutting edges occurring over stud flanges.
- 4. Install wallboard for partitions from floor to underside of structure above and secure rigidly in place by screw attachment, unless otherwise indicated.
- 5. Provide fire safing insulation meeting standards of Section 078413 at flutes of metal deck where partitions carry up to bottom of metal deck.
- 6. Neatly cut wallboard to fit around outlets, switch boxes, framed openings, piping, ducts, and other items which penetrate wallboard; fill gaps with acoustic sealant.
- 7. Where wallboard is to be applied to curved surfaces, dampen wallboard on back side as required to obtain required curve. Finish surface shall present smooth, even curve without fluting or other imperfections.
- 8. Screw fasten wallboard with power-driven electric screw driver, screw heads to slightly depress surface of wallboard without cutting paper, screws not closer than 3/8" from ends and edges of wallboard.
- 9. Where studs are doubled-up, screw fasten wallboard to both studs in a staggered pattern.
- J. 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.

- 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.
- 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.
- K. 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. Partition or furring abuts a structural element or dissimilar wall or ceiling.
 - 8. Partition or furring runs exceed 30' without interruption.
 - 9. 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.

L. Joint Treatment and Spackling

- Joints between face wallboards in the same plane, joints at internal corners of intersecting partitions and joints at internal corners of intersections between ceilings and walls or partitions shall be filled with joint compound.
- 2. Screw heads and other depressions shall be filled with joint compound. Joint compound shall be applied in three (3) coats, feathered and finish surface sanded smooth with adjacent wallboard surface, in accordance with manufacturer's instructions. Treatment of joints and screw heads with joint compound is also required where wallboard will be covered by finish materials which require a smooth surface, such as vinyl wall coverings.

3.3 FURRED WALLS AND PARTITIONS

- A. Use specified metal furring channels. Run metal furring channel framing members vertically, space sixteen (16) inches o.c. maximum. Fasten furring channels to concrete or masonry surfaces with power-driven fasteners or concrete stub nails spaced sixteen (16) inches o.c. maximum through alternate wing flanges (staggered) of furring channel. Furring channels shall be shimmed as necessary to provide a plumb and level backing for wallboard. At inside of exterior walls, an asphalt felt protection strip shall be installed between each furring channel and the wall. Furring channel and splices shall be provided by nesting channels at least eight (8) inches and securely anchoring to concrete or masonry with two (2) fasteners in each wing.
- B. Wallboard Installation: Same as specified under Article 3.4 "Metal Stud Partitions."

3.4 METAL STUD PARTITIONS

A. 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 the Commissioner.

I. Control Joints

- 1. Leave a 1/2" continuous opening between gypsum boards for insertion of surface mounted joint.
- Back by double framing members.
- 3. Attach control joint to face layer with 9/16" galvanized staples six (6) inches o.c. at both flanges along entire length of joint.
- 4. Provide two (2) inch wide gypsum panel strip or other adequate seal behind control joint in fire rated partitions and partitions with safing insulation.

3.5 DRYWALL FASCIAS AND CEILINGS

- A. Furnish and install inserts, hanger clips and similar devices in coordination with other work.
- B. Secure hangers to inserts and clips. Clamp or bolt hangers to main runners.

- C. Space main runners 4'-0" o.c. and space hangers 4'-0" o.c. along runners, except as otherwise shown.
- D. Level main runners to a tolerance of 1/4" in 12'-0", measured both lengthwise on each runner and transversely between parallel runners.
- E. Metal Furring Channels: Space sixteen (16) inches o.c. maximum. Attach to 1-1/2" main runner channels with furring channel clips (on alternate sides of main runner channels). Furring channels shall not be let into or come in contact with abutting masonry walls. End splices shall be provided by nesting furring channels no less than eight (8) inches and securely wire tying. At any openings that interrupt the furring channels, install additional cross reinforcing to restore lateral stability.
- F. Mechanical accessories, hangers, splices, runner channels and other members used in suspension system shall be of metal, zinc coated, or coated with rust inhibitive paint, of suitable design and of adequate strength to support units securely without sagging, and such as to bring unit faces to finished indicated lines and levels.
 - 1. Provide special furring where ducts are over two (2) feet wide.
- G. Apply board with its long dimension at right angles to channels. Locate board butt joints over center of furring channels. Attach board with one (1) inch self-drilling drywall screws twelve (12) inches o.c. in field of board at each furring channel; eight (8) inches o.c. at butt joints located not less than 3/8" from edges.

3.6 ERECTION AT COLUMN ENCLOSURES

- A. Metal furring supports shall be provided under work of this Section, and shall be cut to lengths as necessary for tight fit such that spacing is not more than sixteen (16) inches o.c.
- B. Board shall be fastened securely to supports with screws as specified. Place boards in position with minimum amount of joints. Where free ends occur between supports, back-blocking or furring shall be required. Center abutting ends over supports. Correct work as necessary so that faces of boards are flush, smooth and true. Provide clips or cross furring for attachment as required.
- C. All layers shall be screw attached to furring.
- D. When column finish called for on drawings to be in the same plane as drywall finish layer, maintain even, level plane.

3.7 FINISHING

- A. Taping: A thin, uniform layer of compound shall be applied to all joints and angles to be reinforced. Reinforcing tape shall be applied immediately, centered over the joint, seated into the compound. A skim coat shall follow immediately, but shall not function as a fill or second coat. Tape shall be properly folded and embedded in all angles to provide a true angle.
- B. Filling: After initial coat of compound has hardened, additional compound shall be applied, filling the board taper flush with the surface. The fill coat shall cover the tape

- and feather out slightly beyond the tape. On joints with no taper, the fill coat shall cover the tape and feather out at least four (4) inches on either side of the tape. No fill coat is necessary on interior angles.
- C. After compound has hardened, a finishing coat of compound shall be spread evenly over and extending slightly beyond the fill coat on all joints and feathered to a smooth, uniform finish. Over tapered edges, the finished joint shall not protrude beyond the plane of the surface. All taped angles shall receive a finish coat to cover the tape and taping compound, and provide a true angle. Where necessary, sanding shall be done between coats and following the final application of compound to provide a smooth surface, ready for painting.
- D. Fastener Depressions: Compound shall be applied to all fastener depressions followed, when hardened by at least two (2) coats of compound, leaving all depressions level with the plane of the surface.
- E. Finishing Beads and Trim: Compound shall be applied to all bead and trim and shall be feathered out from the ground to the plane of the surface. When hardened, this shall be followed by two (2) coats of compound each extending slightly beyond the previous coat. The finish coat shall be feathered from the ground to the plane of the surface and sanded as necessary to provide a flat, smooth surface ready for decoration.
- F. Level of finish for surface exposed to view shall conform to Level 5 "skim coat" 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.

3.8 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 the 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.

3.9 PROTECTION OF WORK

A. Installer shall advise Contractor of required procedures for protecting drywall work from damage and deterioration during remainder of construction period.

3.10 WASTE MANAGEMENT

A. Identify manufacturer's policy for collection or return of construction scrap, unused material, demolition scrap, and/or packaging material. Where feasible, institute

demolition and construction waste separation and recycling to take advantage of manufacturer's programs.

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SECTION 093013

CERAMIC TILING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract (City of New York Standard Construction Contract).

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the ceramic tiling work as shown on the drawings and/or specified herein, including, but not limited to, the following:
 - 1. Ceramic mosaic floor tile.
 - 2. Ceramic wall tile and matching base.
 - Setting beds, grout, sealant and waterproofing membrane.

1.3 RELATED SECTIONS

A. Gypsum Drywall - Section 092900, for tile backing board.

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:
 - Manufacture all ceramic tile in accordance with Standard Grade Requirements of ANSI A-137.1.
 - 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. Samples

- 1. Before any ceramic tile is delivered to the job site, submit to the Commissioner sample panels, approx. 12" x 12", mounted on hardboard back-up with selected grout color for each color and pattern of ceramic tile and grout specified.
- 2. Submit 12" x 12" samples of waterproofing membrane.
- B. 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.
- C. Manufacturer's certification of recycled content per section 2.1 of this specification.
- D. Manufacturer's certification of lead-free glazings (for glazed tiles) per section 2.1 of this specification.
- E. Manufacturer's certification of product compliance with adhesive standards per section
 2.1 of this specification (for mastic-set applications).
- F. Manufacturer's certification of product compliance with VOC limits for mortars and grouts per section 2.1 of this specification.
- G. Material Safety Data Sheets.
- H. Manufacturer's maintenance and cleaning instructions.
- I. Manufacturer's policy statement on ceramic tile recycling programs.
- J. Mock-Ups
 - 1. At an area on the site where approved by the Commissioner, provide a mock-up ceramic tile installation.
 - a. Make the mock-up approximately 36" x 36" in dimension.
 - b. Provide one mock-up for each type, class, and color of installation required under this Section.
 - c. The mock-ups may be used as part of the Work, and may be included in the finished Work when so approved by the Commissioner.
 - d. Revise as necessary to secure the Commissioner's approval.
 - The mock-ups, when approved by the Commissioner, will be used as datum for comparison with the remainder of the work of this Section for the purposes of acceptance or rejection.
 - 3. If the mock-up panels are not permitted to be part of the finished Work, completely demolish and remove them from the job site upon completion and acceptance of the work of this Section.

1.6 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.

1.7 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 as indicated on Finish Schedule, or equal by Dal-Tile Corp., American Olean, United States Ceramic Tile Co., Summitville Tiles Inc., or approved equal meeting these specifications.

2.2 TRIM AND SPECIAL SHAPES

A. Provide external and internal corners, trim shapes at openings, and all other trim and special shapes to match the tile specified herein, as required by field conditions and drawing details.

2.3 SETTING BEDS AND GROUT

- A. Portland Cement: ASTM C 150, Type 1.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Sand: ASTM C 144, clean and graded natural sand.
- D. Reinforcing for Mud Set Systems: 2" x 2" x 16/16 ga. welded wire mesh.
- E. Latex Admixture for Mortar Bed

- 1. MAPEI, Planicrete AC, blended with a 3:1 site mix.
- 2. Laticrete 333.
- ProSpec Acrylic Additive.
- 4. Custom Building Products Flex Thin Set Additive.
- F. Latex Portland Cement Bond Coat, complying with ANSI A118.4 and ISO 13007, C2ES2P2.
 - 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. ProSpec Permalastic System consisting of Permalastic Dryset Mortar and Permalastic Admixture
 - 4. Custom Building Products Mega Flex Crack Prevention Mortar.

G. Wall and Base Tile

- Over cement board use a Latex Portland cement mortar bond coat, MAPEI, Kerabond/Keralastic System, Custom Building Products Mega Flex or equal by Laticrete or ProSpec, conforming to ANSI A118.4, ISO 13007-C2ES2P2, and TCA Detail W-244; coat back of board with waterproof membrane as specified below.
- Over glass mat water resistant gypsum backer board use a Latex Portland cement mortar bond coat, MAPEI, Kerabond/Keralastic System, conforming to ANSI A118.4, ISO 13007-C2ES2P2, and TCA Detail W-245.
- H. Floor Tile Thin Set with Waterproof Setting Bed: Set floor tile and stone saddle using thin set latex Portland cement bond coat, Basis of Design, MAPEI, Kerabond/Keralastic System, conforming to ANSI A118.4, ISO 13007-C2ES2P2, and waterproofing membrane conforming to TCA Detail F-122. Use this system where toilet room occurs over occupied space other than another toilet room and wherever else noted on drawings.
- I. Floor Tile Mud Set: Set floor tile using Portland Cement mortar setting bed conforming to ANSI A108.1A and latex modified Portland cement bond coat, Basis of Design, MAPEI, Kerabond/Keralastic System, conforming to ANSI A118.4, ISO 13007-C2ES2P2, and TCA Detail F-112.
- J. Waterproofing Membrane complying with ANSI A118.10 and ANSI A118.12; and having IAPMO certification as a shower pan liner: "Mapelastic AquaDefense" by MAPEI with factory blended "Bio-Block Antimicrobial", "Laticrete 9235 with Microban" made by Laticrete International, ProSpec B6000 or Custom Building Products 9240.
 - 1. Reinforce membrane with polyester fabric.

- K. Water: Clean, fresh and suitable for drinking.
- L. Grout complying with A118.7; and ISO 13007, CG2WAF: For grouting ceramic tile, provide a commercial Portland cement grout "Ultracolor Plus" (additive not required) made by MAPEI or Laticrete Sanded Grout with required Latex Additive or Custom Building Products Prism Sure Color Grout. Add latex additive to grout made by same manufacturer as grout.
 - 1. Basis of Design, Color: Laticrete 78, sterling silver.
- M. Physical Properties: The setting beds and grouts must meet the following physical requirements:
 - 1. Compressive Strength: 3000 psi min.
 - Shear Bond Strength: 500 psi min.
 - 3. Water Absorption: 4.0% max.
 - 4. Service Rating (ASTM C 627): Extra Heavy Duty.
- N. Sealer: Seal all grout joints and all unglazed tile using No. 004 "Keraseal Penetrating Sealer for Unglazed Grout and Tile" as manufactured by Mapei Corp., "Sealer's Choice 15 Gold" by Aqua Mix Inc., or approved equal.
- O. Temporary Protective Coating: Either product indicated below that is 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, 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.
 - 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.
- P. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

2.4 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 Pecora, Tremco, 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 in 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. 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. Seal substrate with sealer as recommended by manufacturer of mortar or adhesive.

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
 - Wall tile over cement board or glass mat backer board using dry set mortar with latex additive - ANSI A118.4 and ISO 13007, C2ES2P2.
 - 2. Floor tile over waterproofing membrane.- ANSI A118.4 and ISO 13007, C2ES2P2.
 - 3. Floor tile using full mud set mortar ANSI A118.4 and ISO 13007, C2ES2P2.
- B. All setting beds and/or adhesives shall provide for an average contact area of not less than 95% coverage.
- C. Allowable Variations in Finished Work: Do not exceed the following deviations from level and plumb, and from elevations, locations, slopes and alignment shown.
 - 1. 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. Waterproofing Membrane

- 1. Install the membrane in strict accordance with manufacturer's written recommendations.
- Upon completion of work, test horizontal membrane for leaks by plugging the drain or damming areas and filling with water. Inspect for leakage. Make necessary adjustments to stop all leakage and retest until watertight. If membrane is not covered by another surface immediately, provide protection until membrane is covered.
- E. Handle, store, mix and apply setting and grouting materials in compliance with the manufacturer's instructions.
- F. 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.
- G. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or builtin items for straight, aligned joints. Fit tile closely to electrical outlets, piping and fixtures so that plates, collars, or covers overlap tile.

H. Lay tile in grid pattern. Align joints when adjoining tiles on floor, base, walls and trim are the same size. Lay out tile work and center tile fields both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths.

3.6 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.

3.7 WASTE MANAGEMENT

A. Identify manufacturer's policy for collection or return of construction scrap, unused material, demolition scrap, and/or packaging material. Where feasible, institute demolition and construction waste separation and recycling to take advantage of manufacturer's programs.

END OF SECTION

SECTION 095113

ACOUSTIC PANEL CEILINGS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract (City of New York Standard Contract).

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the acoustic panel ceilings as shown on the drawings and/or specified herein, including but not limited to, the following:
 - 1. Acoustical panel units.
 - 2. Exposed "T" suspension system, including hangers and inserts.
 - 3. Provisions for the installation of lighting fixtures, diffusers, grilles and similar items provided under other Sections.
 - 4. Cutting, drilling, scribing and fitting as required for electro-mechanical penetrations.
 - Perimeter and column moldings, trim and accessories for acoustical ceilings.

1.3 RELATED SECTIONS

- A. Drywall ceilings Section 092900.
- B. Diffusers, grilles and related frames Division 23.
- C. Lighting fixtures Division 26.

1.4 QUALITY ASSURANCE

- A. Codes and Standards: In addition to complying with all pertinent codes and regulations, comply with all pertinent recommendations published by the Ceilings and Interior Systems Contractor's Association.
- B. Qualifications of Installers
 - The suspended ceiling subcontractor shall have a record of successful installation of similar ceilings acceptable to Commissioner and shall be currently properly trained by the manufacturer of the ceiling suspension system.

- 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.
- C. The work is subject to the following standards:
 - 1. ASTM C 635 "Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings," American Society for Testing and Materials.
 - ASTM C 636 "Standard Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels," American Society for Testing and Materials.
- D. In addition to suspension system specified, provide seismic struts and seismic clips to meet seismic standards as required by the NYC Building Code.

1.5 SUBMITTALS

- A. Shop Drawings: Submit completely dimensioned ceiling layouts for all areas where acoustical ceilings are required, showing:
 - 1. Any deviations from reflected ceiling plan layouts on drawings, especially lighting fixture and dimensions. Also indicate if any light fixtures will not fit into ceiling layout due to dimensional restrictions of field conditions.
 - 2. Direction and spacing of suspension members and location of hangers for carrying suspension members.
 - 3. Direction, sizes and types of acoustical units, showing suspension grid members, and starting point for each individual ceiling area.
 - 4. Moldings at perimeter of ceiling, at columns and elsewhere as required due to penetrations or exposure at edge of ceiling tiles.
 - 5. Location and direction of lights, air diffusers, air slots, and similar items in the ceiling plane.
 - 6. Details of construction and installation at all conditions.
 - 7. Materials, gauges, thickness and finishes.
- B. Samples and Product Literature: Submit the following samples and related manufacturer's descriptive literature.
 - 1. Twelve (12) inch long sample of each components of suspension systems, including moldings.
 - 2. Acoustical units full size.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver acoustical ceiling 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. Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical ceiling units carefully to avoid chipping edges or damaging units in any way.

1.7 PROJECT CONDITIONS

A. Do not install acoustical ceilings until wet-work in space is completed and nominally dry, work above ceilings has been completed, and ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.

1.8 COORDINATION

A. Coordinate layout and installation of acoustical ceiling units and suspension system components with other work supported by or penetrating through ceilings, including light fixtures, HVAC equipment, fire suppression system components, and partition system.

1.9 EXTRA STOCK

- A. Extra Stock: Deliver stock of maintenance material to the City of New York. Furnish maintenance material matching products installed, packaged with protective covering for storage and identified with appropriate labels.
 - 1. Acoustical Ceiling Units: Furnish quantity of full size units equal to 2.0% of amount installed.

PART 2 PRODUCTS

2.1 ACOUSTICAL UNITS

A. Provide unit to match existing, or equal by Armstrong World Industries, USG Interiors, Inc. or Chicago Metallic Corp. or approved equal.

2.2 SUSPENSION SYSTEM

- A. Provide exposed "T" suspension system, steel, to match existing exposed tee 2-way grid system made by Armstrong World Industries, USG Interiors, Inc., Chicago Metallic Corp. or approved equal.
- 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.
- G. Provide manufacturer's standard wall moldings with off-white baked enamel finish to match suspension systems. For circular penetrations of ceilings, provide edge moldings fabricated to diameter required to fit penetration exactly.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas where acoustic panel ceilings 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 layout.

3.2 PREPARATION

- A. Coordination: Furnish layouts for inserts, clips, or other supports required to be installed by other trades for support of acoustical ceilings.
- B. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less-than-half width units at borders, and comply with reflected ceiling plans.

3.3 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 wire 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 edge moldings at edges of each acoustical ceiling area, and at locations where edge of acoustical units would otherwise be exposed after completion of the work.
 - Secure moldings to building construction by fastening through vertical leg. Space holes not more than 3" from each end and not more than sixteen (16) inches o.c. between end holes. Fasten tight against vertical surfaces.
 - 2. Level moldings with ceiling suspension system, to a level tolerance of 1/8" in 12'-0".
- F. Install acoustical units in coordination with suspension system, with edges concealed by support of suspension members. Scribe and cut panels to fit accurately at borders and at penetrations.
- G. Light fixtures or other ceiling apparatus shall not be supported from main beams or cross tees if their weight causes the total load to exceed the deflection capability of the ceiling suspension system. In such cases the load shall be supported by supplemental hangers furnished and installed by this Section of work.
- H. Where fixture or ceiling apparatus installation causes eccentric loading on runners, provide stabilizer bars to prevent rotation.

3.4 ADJUST AND CLEAN

A. Clean exposed surfaces of acoustical ceilings, including trim, edge molding, and suspension members; 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 096623

THIN SET EPOXY TERRAZZO

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract (City of New York Standard Contract).

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the thin set epoxy terrazzo as shown on the drawings and/or specified herein, including, but not necessarily limited to, the following:
 - 1. Thin set epoxy terrazzo floor.
 - 2. Divider strips, expansion strips, and accessory strips.

1.3 RELATED SECTIONS

- A. Concrete Section 033000.
- B. Gypsum Drywall Section 092900.

1.4 QUALITY ASSURANCE

- A. Qualification 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 and have a minimum of three (3) years' experience in this type of floor system and are members in good standing of the National Terrazzo and Mosaic Association (NTMA).
- B. Comply with applicable specifications and recommendations of the National Terrazzo and Mosaic Association, Inc. (NTMA).
- C. The Installer shall meet with the Commissioner for a pre-installation meeting prior to commencement of the work. The Commissioner shall review installation and position of all divider strips prior to installation of terrazzo.
- D. Manufacturer shall be a member of NTMA.

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's technical information and installation instructions for each type of terrazzo, accessory item, and material required.

B. Certifications

- 1. Submit supplier's/manufacturer's written certification that terrazzo materials meet or exceed specified NTMA properties.
- 2. Submit supplier's/manufacturer's written certification that the concrete substrates have been tested and that the moisture vapor transmission rate does not exceed the supplier's/manufacturer's recommendations. All tests shall be performed according to ASTM F 1869 "Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride Moisture Emissions Test," or ASTM F 2170 "Standard Test Method for Determining Relative Humidity on Concrete Floor Slabs Using In-Situ Probes," or ASTM F 710 "Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring (Tramex Meter)."
 - a. If moisture vapor transmission levels exceed the manufacturer's recommended levels, the Contractor shall submit the terrazzo manufacturer's recommended remediation method for the Commissioner's approval.
 - 1). Manufacturer shall provide to the City of New York a three-year warranty, starting from the date of Substantial Completion, stating that the moisture vapor barrier shall protect the epoxy terrazzo installation from moisture-related blistering or disbondment, and that in the event of any defects related to moisture vapor transmission within the stipulated period, the manufacturer shall effect all repairs or replacement necessary to remedy defects. A copy of the warranty shall be submitted to the Commissioner for approval during submittal process.
- C. Shop Drawings: Submit shop drawings showing layout of divider strips, control joint strips, abrasive strips and base and border strips.
 - Submit shop drawings of precast work showing large scale details of jointing and edge conditions and showing elevations and plans for layout of work. Include details of anchorage and other special features required.
- D. Samples: Submit twelve (12) inch square samples of each pattern, color and type of terrazzo required, together with minimum twelve (12) inch long samples of each type of accessory item. Submit full set of sample colors for abrasive strips, and, once color is selected, 12" sample of the strip in selected color. Contractor should anticipate multiple submissions as required to obtain color to Commissioner's satisfaction. All samples must be submitted two (2) of each.
- E. Maintenance Instructions: Submit two (2) copies of written instructions for recommended periodic maintenance of terrazzo.

1.6 MOCK-UP

A. Construct 100 sq. ft. mock-up of terrazzo floor and base for Commissioner's approval. Do not proceed with any other terrazzo work until mock-up is adjusted and approved by the Commissioner. Approved mock-up may be incorporated into final work and shall become the standard to which all other terrazzo work must conform. Rejected mock-up must be removed completely and the substrate returned to its original condition.

PART 2 PRODUCTS

2.1 MATERIALS

A. Manufacturer/System

- 1. The Epoxy Thin-Set Terrazzo Flooring System shall consist of a primer coat; 100% solids epoxy terrazzo matrix binder mixed with marble fines and #0, #1, and #1 marble chips (as selected by the Commissioner); 100% solids epoxy terrazzo matrix grout coat; and maintenance sealer. The total system thickness shall be 3/8" nominal.
 - a. Subject to compliance with the requirements of this Specification, the following are approved manufacturers:

1). Sika Flooring, "Sikafloor 195."

2). General Polymers, "Thin-Set Epoxy Terrazzo #1100."

3). Key Resins, "Key Epoxy Terrazzo #108."

- 2. Apply Epoxy Thin-Set Terrazzo Flooring System over 40 mils thick Flexible Epoxy Membrane as manufactured by epoxy terrazzo resin manufacturer on all concrete floors to receive epoxy terrazzo as shown on drawings.
- B. Epoxy Thin-Set Terrazzo Typical Physical Properties at 73 deg. F.

1. Fungus and Bacteria Resistance, MIL-F-5250, Sec. 4.4.2.11

Will not support the growth of fungus or bacteria when subjected to mildew and bacteria tests specified in TT-P-34.

2. Impact Resistance, Sec. 4.7.3

Withstands 16 ft. lbs. without cracking, delamination or chipping.

3. Indentation, MIL-D3134F, Sec. 4.7.4

Withstands 2,000 psi for 30 min. without indentation.

4. Resistance to Elevated Temperature, MIL-D-3134F, Sec. 4.7.5

No slip or flow at required temperature of 158 deg. F.

5. Abrasion Resistance, ASTM D 4060, CS-17 Wheel 0.1 grams lost

6. Water Absorption, ASTM D 570-

10% max. (24 hr. immersion)

7. Bond Strength to Concrete, 7 days

350 psi (100% concrete failure)

8. Water Immersion, ACI Comm. #403, Bulletin 59-43

9. Flammability, ASTM D 635

Self-extinguishing

10. Critical Radiant Flux, ASTM E 0.95 W/cm² 648

11. Compressive Strength, psi, 10,000 min. ASTM D 695

12. Tensile Strength, psi, ASTM C 2,500 307

13. Flexural Strength, psi, ASTM C 3,000 min 580

14. Thermal Coefficient of 20 x 10⁻⁶ in/in/deg. F. Expansion, ASTM C 531

C. Terrazzo Membrane Typical Physical Properties at 73 deg. F.

1. Adhesion, psi, ACI 503R 350 (100% concrete failure)

2. Hardness, Shore D, ASTM D 23

3. Tensile Strength, psi, ASTM D 1050 412

4. Elongation, ASTM D 412 125%

5. Thermal Cycling, ASTM C 884 No cracking (24 hr., -21 deg. C. to 225 deg. C.)

6. Flammability, ASTM D 635 Self-extinguishing over concrete

7. Heat Aging, Exposure to 140 deg. F for:

2 days
No change in elongation
No change in elongation

8. Primary Glass Transition, deg. F 70 to 80

9. Lower Glass Transition, deg. F -13 to -22

10. VOC Zero

11. The epoxy elastomer must be free of solvent, external plasticizers, coal tar, known carcinogens, rubber compounds or nitrile butadienes.

D. Accessory Materials

- 1. Divider Strips: Depth and style as required for type and thickness of terrazzo.
 - a. Provide exposed top in widths as indicated on drawings unless otherwise indicated. Comply with NTMA recommendations.
 - b. Material shall be "White" metal, zinc or aluminum per NTMA standards.
 - c. Space strips in patterns shown on drawings.

- d. Divider strip adhesive shall be mixture of fine sand and bonding agent, specially compounded by manufacturer for this use.
- 2. Control or Expansion Strips: Double or split units, 1/8" wide, of same materials and color as the divider strips. Provide epoxy terrazzo manufacturer's recommended flexible joint filler in color to match terrazzo formulation.
- 3. Accessory Strips: Match width, material and color of divider strips. Provide the following accessory strips as required for a complete installation:
 - a. Base beads.
 - b. Cove base dividers.
- 4. Cleaner: "4505 Best Yet Neutral Cleaner" by General Polymers, or approved equal.
- 5. Sealer: Colorless, slip- and stain-resistant, non-yellowing, penetrating sealer which will not disturb the color or physical properties of the terrazzo surface. Provide "4401 Terrazzo Wet Look Sealer" by General Polymers, or approved equal.
- 6. Leveling Compound: Epoxy base material as recommended by terrazzo flooring manufacturer, applied over properly prepared substrate.
- 7. Fill: Epoxy base mortar as recommended by terrazzo flooring manufacturer.

2.2 MIXES

- A. Matrix color and chip size to match approved samples.
- B. Marble Chips
 - 1. Size to conform to NTMA gradation standards.
 - 2. Hardness to conform to ASTM C 241, Ha-10 minimum.
 - 3. 24-hour absorption rate not to exceed 0.75%.
 - 4. Chips shall contain no deleterious or foreign matter.
 - 5. Dust content less than 1% by weight.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where terrazzo 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.
- B. Do not start work of this Section until all HVAC systems and environmental controls are in place and operating.

3.2 CONDITION OF SURFACES

- A. Allowable Variations in Substrate Levels: Refer to Section 033000, "Cast-in-Place Concrete," for required tolerances of concrete sub-slab.
- B. Grind or fill concrete substrates as required to comply with allowable variations.

3.3 PREPARATION

- A. Clean substrates of substances, including oil, grease, and curing compounds, that might impair terrazzo bond. Provide clean, dry, and neutral substrate for terrazzo application.
- B. Concrete Slabs: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with terrazzo.
 - 1. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
 - 2. Repair damaged and deteriorated concrete according to terrazzo manufacturer's written recommendations.
 - 3. Use patching and fill material to fill holes and depressions in substrates according to terrazzo manufacturer's written instructions.
- C. Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.
 - 1. Moisture Testing: Perform tests indicated below.
 - a. Calcium Chloride Test: Perform anhydrous calcium chloride test per ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb. of water/1000 sq. ft. in 24 hours.
 - 1). Perform tests so that each test area does not exceed 200 sq. ft, and perform not less than two tests in each installation area and with test areas evenly spaced in installation areas.
 - b. In-Situ Probe Test: Perform relative-humidity test using in-situ probes per ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative-humidity-level measurement.
 - c. Test Method: Test for moisture content following ASTM F 1869. Proceed with installation only after substrates have a moisture vapor emission rate of 3 lbs. of water/1000 sq. ft. in 24 hours. Proceed with installation only after substrates pass testing.
- D. Protect other work from water and dust generated by grinding operations. Control water and dust to comply with environmental protection regulations.
 - 1. Erect and maintain temporary enclosures and other suitable methods to limit water damage and dust migration and to ensure adequate ambient temperatures and ventilation conditions during installation.

3.4 INSTALLATION

A. General

- Comply with NTMA specifications and manufacturer's recommendations for preparation of substrate, installation of metal strips, and for placing, grinding, grouting and finishing.
- 2. Complete terrazzo installation before the application of other items that might be damaged by this work.
- B. Expansion Joints: Where expansion joints are shown, install two (2) divider strips, separated by the joint width shown with removable strips, extending the full depth of the topping and under bed. Do not bridge expansion joints with reinforcement or cross strips.
 - 1. Expansion joints shall not exceed 30'-0" o.c. unless otherwise noted on drawings.

C. Flooring

- 1. Work shall be done only under optimum conditions as recommended by manufacturing firm and NTMA recommendations. Surfaces over which matrix is to be applied shall be completely dry and thoroughly clean. Atmospheric and substrate temperature shall be sixty (60) degrees F. or above.
 - a. Moisture testing of concrete slab must be performed following terrazzo manufacturer's recommendations. If slab contains moisture above recommended levels of the terrazzo manufacturer, the Contractor must provide a moisture barrier that can reduce the vapor emissions level to acceptable limits. Manufacturer's representative must submit written conformation to the Commissioner verifying that the concrete slab has been properly prepared to receive epoxy terrazzo.
- Apply primer over entire area to receive floor surfacing. Spread uniformly over surfaces using clean rubber squeegee, or clean steel trowels. Do not allow primer to collect in depressions. Porous areas may require double application of primer.
- 3. Apply flexible epoxy membrane at 40 mils thick over primer.
- 4. Terrazzo matrix and chips shall be mixed and applied according to manufacturer's instructions.
- 5. Allow surfacing to set undisturbed for minimum period of twelve (12) hours or until surfaces are hard and sure. Temperatures throughout curing time shall be maintained at minimum of fifty (50) degrees F. It shall be the complete responsibility of the Contractor to protect and maintain system until such cure is attained.
- 6. Grind using #24-120 grit stone by wet process method utilizing standard terrazzo grinding equipment. Dry grinding using diamond stones is acceptable for rough grind only. Use vacuums adequate to control grinding dust. Finish grind with #120 grit stone or finer as specified.

- 7. Grout as required using resin as recommended by the manufacturer. Apply grout according to manufacturer's instructions. After curing for a minimum of twelve (12) hours, grind using #120 grit stone using same method and equipment as used for initial grinding operation.
- 8. After completion of grinding operation, clean floor of all dirt and abrasive particles by washing with a neutral cleaner and mopping down and rinsing with clean water. When floor is perfectly clean and dry, treat surfaces with terrazzo sealer. Do not apply waxes.
- 9. Finished surfaces shall be approximately 3/8" thick, true to plane and line, and shall conform to the tolerances specified for the concrete substrate; refer to Section 033000 for concrete slab tolerances.
- 10. Contractor to coordinate location and proper setting of all items to be installed in floor (i.e. drains, electrical outlets, door closers, etc.).
- 11. Install terrazzo at floor closer pans as required to match adjacent floor. Grind and seal to align with adjacent floor.

3.5 CLEANING AND SEALING

A. Clean and seal terrazzo in accordance with the instructions of the terrazzo sealer manufacturer after installation and finishing operations are completed.

3.6 PROTECTION

A. Contractor shall protect terrazzo flooring from damage until Project completion; any damage that does occur shall be the responsibility of the Contractor to repair or replace to the satisfaction of the Commissioner.

3.7 INSTRUCTIONAL SEMINAR

A. The manufacturer and installer shall jointly provide a seminar to City of New York's maintenance staff describing the procedures, methods and materials required to maintain the terrazzo surfaces in excellent condition for the life of the facility. Included in this seminar shall be any hands-on instruction for maintenance of finish.

END OF SECTION

SECTION 096723

EPOXY RESIN COMPOSITION FLOORING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract (City of New York Standard Contract).

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 as scheduled on the drawings and/or specified herein.

1.3 RELATED SECTIONS

- A. Concrete Section 033000.
- B. Floor drains Division 22.

1.4 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product Data: Submit manufacturer's technical data application instructions and general recommendations for the epoxy resin composition flooring specified herein.
- C. Samples for initial selection purposes in form of manufacturer's color charts showing full range of colors and finishes available.
 - Submit 3" x 3" samples of color chips from color chart selection designated by the Commissioner.
- D. Material certificates signed by manufacturer certifying that the epoxy resin composition flooring complies with requirements specified herein.
- E. Maintenance Instructions: Submit manufacturer's written instructions for recommended maintenance practices.

1.5 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 properly trained by 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.

Staten Island Zoo Aquarium Reconstruction
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1.6 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.

1.7 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. Troweled epoxy resin composition flooring shall be Dex-O-Tex Cheminert "K" with Posi-Tred "O" top finish as manufactured by Crossfield Products Corp or approved equal by Stonhard, Sika or approved equal.

2.2 PROPERTIES

- A. Colors: As indicated, or if not otherwise indicated, as selected by Commissioner from manufacturer's standard colors.
- B. 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 x 10⁶ 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/cm²
- 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

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.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where the epoxy resin composition flooring is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected by the Contractor in a manner acceptable to the Commissioner.
- B. Coordinate work with other trades to insure that concrete substrate has been "wet" cured only.

3.2 PREPARATION

- A. Substrate: Perform preparation and cleaning procedures according to flooring manufacturer's instructions for particular substrate conditions involved, and as specified. Provide clean, dry, and neutral substrate for flooring application.
- B. Concrete Surfaces: Shot-blast, acid etch or power scarify as required to obtain optimum bond of flooring to concrete. Remove sufficient material to provide a sound surface free of laitance, glaze, efflorescence, and any 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 APPLICATION

- 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.

3.4 CURING, PROTECTION AND CLEANING

- 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 097200

WALL COVERING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 QUALITY ASSURANCE

- A. Supplier: Obtain all products in this section from a single supplier.
- B. Regulatory Requirements: Products shall meet requirements of the Americans With Disabilities Act Accessibility Guidelines (ADAAG) and local amendments and modifications.
- C. Installer: Installation shall be performed by installer specialized and experienced in work similar to that required for this project.

1.3 SUBMITTALS

- A. Product Data: Submit product data for specified products. Include material details and manufacturer's product literature.
- B. Samples: Full width sample, not less than 36 inches (914 mm) long, from dye lot used for the Work. Mark top and face of material.
- C. Installation: Submit supplier's installation instructions.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of DDC General Conditions.
 - 1. Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
 - 2. Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact.
 - 3. Store products protected from weather, temperature, and other harmful conditions as recommended by supplier.
 - 4. Handle products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 SIGNAGE SYSTEMS

- A. Acceptable Manufacturers: Engage an experienced installer who has completed projects similar in material, design, and extent to that indicated for this Project and with a record of successful in service performance.
 - 1. Flavor Paper, 216 Pacific Street, Brooklyn, NY 11201; T: 718.422.0230.
 - 2. Kamhi Kolor, 29 W 23rd St, New York, NY 10010; T: (212) 867-6154.

- 3. Duggal, 29 W 23rd St, New York, NY 10010; T:(212) 242-7000.
- B. Basis of Design Product: Terralon by DreamScape or approve equal.
- C. Material: PVC-free printable wallcovering for regular solvent, eco solvent and UV curable inks; Proprietary Polyester/Natural Fiber Technology.
- D. Adhesives: Use water base low VOC commercial heavy duty clear adhesive. Primers may be used to improve stripability and adhesion. Use only breathable primers prior to installation on wallcovering that is microvented. Provide materials which are mildew resistant and nonstaining to wallcovering.
- E. Post-installation protective coating: a post installation layer of clear-coat basis of design: Dream Guard

PART 3 EXECUTION

3.1 EXAMINATION

- A. Site Verification of Conditions: Examine substrates for compliance with requirements for moisture content and other conditions affecting performance. Do not proceed with installation until unsatisfactory conditions have been corrected.
- B. Scheduling of installation by City of New York or it's representative implies that substrate and conditions are prepared and ready for product installation. Proceeding with installation implies installer's acceptance of substrate and conditions.

3.2 INSTALLATION

- A. Install product in accordance with supplier's instructions.
- B. Comply with manufacturer's written instructions for surface preparation.
- C. Clean substrates of substances that could impair wall covering's bond, including mold, mildew, oil, grease, incompatible primers, and dirt.
- D. Verify that colors and patterns of wall coverings are those specified before beginning installation.
- E. Remove air bubbles, wrinkles, blisters, and other defects.
- F. Install 3 strips and inspect. Notify manufacturer if defects and pattern effect are not acceptable prior to continuation.

3.3 CLEANING, PROTECTION, AND REPAIR

A. Remove excess adhesive at finished seams, perimeter edges, and adjacent surfaces. Use cleaning methods recommended by wall covering manufacturer.

3.4 SIGN SCHEDULE

A. Schedule: Refer to signage schedule and Drawings for sizes, locations and layout of signage types, sign text copy, and graphics.

END OF SECTION

SECTION 097800

REINFORCED PLASTIC PANELING SYSTEM

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract (City of New York Standard Construction Contract).

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the reinforced plastic paneling system as shown on the drawings and/or specified herein, including, but not limited to, the following:
 - 1. Reinforced plastic paneling system.
 - 2. Moldings.

1.3 RELATED SECTIONS

A. Gypsum Drywall - Section 092900.

1.4 QUALITY ASSURANCE

- A. Installer: A firm which has at least three years' experience in work of the type required by this section and which is properly trained by the manufacturers of the primary materials.
- B. Source: Provide plastic panels which are the products of one manufacturer. Provide secondary materials, moldings and accessories which are acceptable to the panel manufacturer.
- C. In-Place Samples: Before beginning primary work of this section, provide typical inplace samples of each item and type of work at locations acceptable to Commissioner and obtain Commissioner's acceptance of visual qualities.
 - 1. Size of Sample: Not less than 32 square feet.
 - Intent of Sample: The intent of the in-place sample is to obtain approval of a
 typical installation as early as possible so that problems, if any, can be corrected
 before the problem is repeated.
 - 3. Sample Disposition: Acceptable in-place samples may be incorporated into the finished work. Protect and maintain acceptable in-place samples throughout the work of this section to serve as criteria for acceptance of the work
- D. Burning Characteristics: Provide materials whose surface burning characteristics, when tested in compliance with ASTM E 84 are classified as Class A or Class 1.

1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's product data, installation instructions, use limitations and recommendations for each material used. Provide certifications stating that materials comply with requirements.
- B. Initial Selection Samples: Submit minimum 3" x 3" samples showing complete range of colors, textures, and finishes available for each material used.

1.6 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. Protect from all possible damage. Sequence deliveries to avoid delays, but minimize on-site storage.

PART 2 PRODUCTS

2.1 FIBERGLASS PLASTIC PANEL SYSTEM

- A. Products: Provide one of the following products:
 - 1. "Fiber-Lite Liner Panels," Nudo Products, Inc.
 - 2. "Fire-X Glasbord," Crane Composites, Inc
 - 3. "Induro FRP," Marlite.
 - 4. "Glasliner FRP Wall Panels," Glasteel Fiberglass Reinforced Panels, Division of Stabilit America, Inc.
- B. Panel Characteristics: Provide one of the specified products having the following characteristics:
 - 1. Thickness: Not less than 0.09" thick.
 - 2. Texture: Manufacturer's standard pebble texture.
 - 3. Panel Size: Provide largest sizes available to minimize joints and seams.
 - 4. Colors: Provide panels and matching moldings and rivets as selected by Commissioner from manufacturer's standard colors.
- C. Moldings: Provide vinyl moldings as recommended and approved by panel manufacturer.
- D. Panel Fasteners: Provide nylon rivets recommended by manufacturer for installing reinforced plastic panels to gypsum drywall and metal stud substrates. Do not use any metal in rivets.
- E. Accessories: Provide all necessary sealants, components and accessories as recommended by panel manufacturer for a complete, sanitary, easy-to-clean installation. Use only sanitary, mold inhibiting USDA approved silicone sealant.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Pre-Installation Examination Required: The Installer shall examine previous work, related work, and conditions under which this work is to be performed and notify Contractor in writing of all deficiencies and conditions detrimental to the proper completion of this work. Beginning work means Installer accepts substrates, previous work, and conditions.
- B. Manufacturer's Instructions: Strictly comply with manufacturer's instructions and recommendations, except where more restrictive requirements are specified in this section.
- C. Installation: Mechanically attach panels to substrates indicated using non-metallic rivets at spacing recommended by panel manufacturer. Provide expansion clearance at all panel edges as required by manufacturer, but make sure moldings cover panel edges. Gaps are not permitted.
 - Trim and Molding: Provide moldings at all edges, joints, seams and corners.
 Provide moldings having the easiest to clean shapes and profiles available.
 - 2. Sealing: Seal all edges, joints, seams, and corners as the work progresses.
- D. Tolerances: The following allowable installed tolerances are allowable variations from locations and dimensions indicated by the Contract Documents and shall not be added to allowable tolerances indicated for other work.
 - 1. Allowable Variation from True Plumb, Level, and Line: $\pm 1/8$ " in 20'-0".
 - 2. Allowable Variation from True Plane: 1/8" in 10'-0".

3.2 CLEANING AND PROTECTION

- A. Cleaning: Clean exposed surfaces using non-abrasive materials and methods recommended by manufacturer of material or product being cleaned. Remove and replace work that cannot be successfully cleaned or repaired.
- B. Protection: Provide temporary protection to ensure work is without damage or deterioration at time of final acceptance. Remove protections and re-clean as necessary immediately before final acceptance.

END OF SECTION

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SECTION 099000

PAINTING AND FINISHING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract (City of New York Standard Contract).

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.
 - Painting all galvanized ferrous metals exposed to view.
 - 5. Painting interior concrete block exposed to view.
 - 6. Painting gypsum drywall exposed to view.
 - 7. Exterior wood surfaces.
 - 8. Painting pipes, pipe coverings, conduit, ducts, insulation, hangers, supports and other mechanical and electrical items and equipment exposed to view.
 - 9. Painting surfaces above, behind or below grilles, gratings, diffusers, louvers, lighting fixtures, and the like, which are exposed to view through these items.
 - 10. Incidental painting and touching up as required to produce proper finish for painted surfaces, including touching up of factory finished items.
 - 11. Painting of any surface not specifically mentioned to be painted herein or on drawings, but for which painting is obviously necessary to complete the job, or work which comes within the intent of these specifications, shall be included as though specified.

1.3 RELATED SECTIONS

A. 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.

- B. 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.
- Color Coding of Mechanical Piping and Electrical Conduits Divisions 23 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. Factory-finished toilet partitions.
- C. Non-ferrous metals, except for items specified and/or indicated to be painted.
- D. Finished hardware, excepting hardware that is factory primed.
- E. Surfaces not to be painted shall be left completely free of droppings and accidentally applied materials resulting from the work of this Section.

1.5 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. Materials List

- 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.

B. Samples

- 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.
- C. 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 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

- 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.
- 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.
- Replacements: In the event of damage, immediately make all repairs and replacements necessary.

1.8 EXTRA STOCK

A. Upon completion of this portion of the Work, deliver to the City of New York an extra stock of paint of each color and gloss used and each coating material used, with all such extra stock tightly sealed in clearly labeled containers.

1.9 JOB CONDITIONS

- A. Apply water-based paints only when the temperature of surfaces to be painted and the surrounding air temperatures are between 50 degrees F. and 90 degrees F., unless otherwise permitted by the paint manufacturer's printed instructions.
- B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and the surrounding air temperatures are between 45 degrees F. and 95 degrees F. unless otherwise permitted by the paint manufacturer's printed instructions.
- C. Do not apply paint in snow, rain, fog or mist; or when the relative humidity exceeds eighty-five (85) percent; or to damp or wet surfaces; unless otherwise permitted by the paint manufacturer's printed instructions.
- D. Painting may be continued during inclement weather only if the areas and surfaces to be painted are enclosed and heated within the temperature limits specified by the paint manufacturer during application and drying periods.

PART 2 PRODUCTS

2.1 PAINT MANUFACTURERS

A. Except as otherwise noted, provide the painting products listed for all required painting made by one of the manufacturers listed in the paint schedule (Section 2.4). These companies are Benjamin Moore, Akzo Nobel Paint (Glidden Professional) 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.

- Shellac: Pure gum shellac (white or orange) cut in pure denatured alcohol using not F. less than four (4) lbs. of gum per gallon of alcohol.
- Driers, Putty, Spackling Compound, Patching Plaster, etc.: Best quality, of approved manufacture.
- Heat Resistant Paint: Where required, use heat resistant paint when applying paint to H. heating lines and equipment.

GENERAL STANDARDS 2.3

- 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 Á. of flat, semi-gloss or gloss, without additional cost to the City of New York.
- 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 В. manufacturer's instructions printed thereon.
- All painting materials shall bear identifying labels on the containers with the manufacturer's instructions printed thereon.
- 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.
- Paint shall arrive on the job color-mixed except for tinting of under-coats and possible E. thinning.
- All thinning and tinting materials shall be as recommended by the manufacturer for the particular material thinned or tinted.
- 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. G.

BASIS OF DESIGN SCHEDULE OF FINISHES 2.4

Exterior Painted Wood A.

Flat Finish

1 coat Moore's Fresh Start Moorwhite Primer (100) Primer:

1 coat S-W A-100 Exterior Latex Primer B42

1 coat MoorLife Flat Fortified Acrylic House Paint (105) First Coat:

1 coat S-W A-100 Exterior Latex Flat A6

1 coat MoorLife Flat Fortified Acrylic House Paint (105) Second Coat:

1 coat S-W A-100 Exterior Latex Flat A6 Total DFT not less than: 3.8 mils

Semi-Gloss Finish/Latex

1 coat Moore's Fresh Start Moorwhite Primer (100) Primer:

1 coat S-W A-100 Exterior Latex Primer B42

1 coat MoorGlo Soft Gloss Fortified Acrylic House Paint (096) First Coat:

Staten Island Zoo Aquarium Reconstruction Capital Project Number: PV175AQUA 099000-5 1 coat S-W A-100 Exterior Latex Gloss A8

Second Coat:

1 coat MoorGlo Soft Gloss Fortified Acrylic House Paint (096)

1 coat S-W A-100 Exterior Latex Gloss A8 Total DFT not less than: 4.0 mils

High Performance Coating On Exterior Galvanized Ferrous Metals В.

First Coat: "27 Typoxy" or "N69 Epoxoline II" by Tnemec; "Intergard 345" by International Protective Coatings; "Carboguard 893 SG"

"Carboguard 888" by Carboline; "Devran 203 WB Epoxy Primer" by Akzo; or "Recoatable Epoxy Primer 867-45" by Sherwin Williams.

"V73 Endura Shield" or "1074/1075" by Tnemec; "Interthane Second Coat:

870UHS" or "990 UHS" by International Protective Coatings; "Carbothane 133 LH" by Carboline; "Devthane 379H Aliphatic Vizethne" by Akzo; or "Hi-Solids Urethane B65-300/350" by Sherwin

Williams.

High Performance Coating On Exterior Non-Galvanized Ferrous Metals C.

Prime Coat: "Tneme-Zinc 90/97" by Tnemec; "Interzinc 52" or "315" by

International Protective Coatings; "Carbozinc 859, Class B" by Carboline; "Cathacoat 302V Reinforced Inorganic Zinc Primer" by Akzo; or "Zinc Clad II Plus Inorganic Zinc Rich Coating B69V212" by

Sherwin Williams.

"27 Typoxy" or "N69 Epoxoline II" by Tnemec; "Intergard 345" by Second Coat:

International Protective Coatings; "Carboguard 893 SG" "Carboguard 888" by Carboline; "Bar-Rust 231V Multi Purpose Epoxy Mastic" by Akzo; or "Macropoxy G46 I.C. Epoxy B58-600" by

Sherwin Williams.

Third Coat: "V73 Endura Shield" or "1074/1075" by Tnemec; "Interthane

870UHS" or "990 UHS" by International Protective Coatings; "Carbothane 133 LH" by Carboline; "Devthane 379H Aliphatic Urethane" by Akzo; or "Hi-Solids Polyuethane B65-300/350" by

Sherwin Williams.

D. Interior Ferrous Metal

1. Satin Finish/Latex

Primer: 1 coat Pro Industrial Pro-Cryl Universal Primer (B66-310) S-W First Coat: 1 coat AURA Satin Waterborne Interior Paint (522)

1 coat ULTRA-WALL latex Satin Interior Wall Paint (1230) BM ICI

1 coat AURA Satin Waterborne Interior Paint (522) Second Coat: BM

1 coat ULTRA-WALL Latex Satin Interior Wall Paint (1230) ICI

Semi-Gloss Finish/Latex

Second Coat:

Primer: 1 coat Pro Industrial Pro-Cryl Universal Primer (B66-310) S-W

First Coat: 1 coat AURA Semi Gloss Waterborne Interior Paint (528) BM

1 coat Pro Classic Waterborne Acrylic Semi-Gloss (B-31) 1 coat AURA Semi Gloss Waterborne Interior Paint (528) S-W

BM 1 coat Pro Classic Waterborne Acrylic Semi-Gloss (B-31) S-W

E. Interior Concrete Block

1.	Flat Finish/Vinyl Act	rylic Latex over Filler
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Block Filler:	1 coat Moorcraft Super Craft Latex Block Filler (285) 1 coat S-W Preprite Block Filler White, B25W25	BM S-W
First Coat:	1 coat S-W Preprite Block Files White, Block Files	BM ICI
Second Coat:	1 coat AURA Matte Waterborne Interior Paint (522) 1 coat ULTRA-WALL Latex Flat Interior Wall Paint (1230)	DIAT

2. Eggshell Finish/Vinyl Acrylic Latex over Filler

First Coat:	1 coat Moorcraft Super Craft Latex Block Filler (285) 1 coat S-W Preprite Block Filler White, B25W25 1 coat AURA Eggshell Waterborne Interior Paint (524) 1 coat CUSTOM HOME Latex Flat Eggshell Enamel (1493) 1 coat AURA Eggshell Waterborne Interior Paint (524) 1 coat CUSTOM HOME Latex Flat Eggshell Enamel (1493)	DIVI
	1 coat CUSTOM HOME Latex Flat Eggsheri Enamer (1999)	

3. Semi-Gloss Finish/Vinyl Acrylic Latex over Filler

	1 coat Moorcraft Super Craft Latex Block Filler (285)	BM
Block Filler:	1 coat Mooretait Super Craft Each Date (101) 1 coat Seal-Crete Waterproofing Sealer – Zero VOC (101)	MAB
	1 coat S-W Preprite Block Filler White, B25W25	S-W
	1 coat S-W Preprite Block Filter Winter, December 1 coat AURA Semi Gloss Waterborne Interior Paint (528)	BM
First Coat:	1 coat AURA Seini Gloss Waterborne Indoor 1 coat Enviro-Pure Semi-Gloss - Zero VOC (047)	MAB
	1 coat CUSTOM HOME Latex Flat Semi-Gloss Enamel (14	193 ICI
	1 coat AURA Semi Gloss Waterborne Interior Paint (528)	BM
Second Coat:	1 coat AURA Semi Gloss Waterborne Merce 1 1 coat Enviro-Pure Semi-Gloss - Zero VOC (047)	MAB
	1 coat CUSTOM HOME Latex Flat Semi-Gloss Enamel (14	493 ICI

F. Interior Drywall

1. Flat Finish/Vinyl Acrylic Latex

	1 coat Pristine Eco Spec Interior Latex Primer (231)	BM
Primer:	1 coat HARMONY Interior Latex Primer (B11W900)	S-W
	1 coat AURA Matte Waterborne Interior Paint (522)	BM
First Coat:	1 coat AURA Matte Waterborne Interior Wall Paint 1230)	ICI
	1 coat ULTRA-WALL Latex Flat Interior Vall Latex Flat (R5)	S-W
	1 coat HARMONY Interior Latex Flat (B5) 1 coat HARMONY Interior Latex Flat (B5)	BM
Second Coat:	1 coat AURA Matte Waterborne Interior Paint (522) 1 coat ULTRA-WALL Latex Flat Interior Wall Paint 1230)	ICI
	1 coat ULTRA-WALL Latex Flat Interior Value 1	S-W
	1 coat HARMONY Interior Latex Flat (B5)	

2. Eggshell Finish/Vinyl Acrylic Latex

Primer:	1 coat Pristine Eco Spec Interior Latex Primer (231)	BM S-W
_	1 coat Pristine Eco Spec Interior Education 1 coat PREP & PRIME AQUACRYLIC GRIPPER (3210) 1 coat AURA Eggshell Waterborne Interior Paint (524)	BM
First Coat:	1 coat HARMONY Interior Latex EG-SHEL (B9)	S-W

Second Coat: 1 coat AURA Eggshell Waterborne Interior Paint (524)

1 coat HARMONY Interior Latex EG-SHEL (B9)

BMS-W

- In Wet areas and areas calling for epoxy wall surfaces provide the following G.
 - 1. Drywall Surfaces

1 coat 201 "Epoxoprime", 5-7 mils d.f.t. 1 coat Series 280 "Tneme Glaze, 6-10 mils d.f.t. 1 coat 1080/1081 "Endura-Shield WB" 2-3 mils d.f.t.

Masonry Surfaces

1 coat 130 "Envirofill," 60-80 sq. ft./gallon 1 coat Series 280 "Tneme Glaze," 6-10 mils/d.f.t. 1 coat "Endura-Shield WB" 2-3 mils d.f.t.

2.5 EXISTING SURFACES TO BE PAINTED

Existing surfaces shall be painted in accordance with schedule given in Article 2.4 A. herein except that first or prime coat may be eliminated where existing paint is sound. Where existing paint must be removed down to base material, provide first or prime coat as specified.

2.6 PIPING AND MECHANICAL EQUIPMENT EXPOSED TO VIEW

- 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.
- Exposed Uncovered Ductwork, Piping, Hangers and Equipment: Latex Enamel Undercoater and one (1) coat Acrylic Latex Flat.
- 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.
- Equipment or Apparatus with Factory-Applied Paint: Refinish any damaged surfaces to E. match original finish. Do not paint over name plates and labels.
- All surfaces of insulation and all other work to be painted shall be wiped or washed F. clean before any painting is started.
- All conduit, boxes, distribution boxes, light and power panels, hangers, clamps, etc., are G. included where painting is required.
- All items of Mechanical and Electrical trades which are furnished painted under their H. respective trades 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. Comply, at minimum, with paint manufacturer recommendations for space ventilation during and after installation. Where feasible, the following ventilation conditions shall be maintained during the paint curing period, or for 72 hours after application: 1) supply 100% outside air 24 hours a day; 2) supply airflow at a rate of 6 air changes per hour, when outside temperatures are between 55 degrees F and 85 degrees F and humidity is between 30% and 60%; and 3) supply airflow at a rate of 1.5 air changes per hour, when outside air conditions are not within the range stipulated in item 2 above.
- B. To the extent practical, allow paint installations to cure *prior to* the installation of materials that adsorb VOCs. Materials that adsorb VOCs include carpets, textiles, and acoustical ceiling panels.
- C. Only skilled mechanics shall be employed. Application may be by brush or roller. Spray application only upon acceptance from the Commissioner in writing.
- D. 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.
- E. 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.
- F. 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.
- G. Remove electrical panel box covers and doors before painting walls. Paint separately and re-install after all paint is dry.
- H. 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.
- 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.
- J. All coats shall be dry to manufacturer's recommendations before applying succeeding coats.
- K. 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 builtin 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

- 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 104400

DIMENSIONAL LETTERS - CUT ACRYLIC

PART 1 GENERAL

1.1 SUMMARY

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].
- B. Section Includes:
 - 1. Interior/exterior dimensional letters of cut acrylic composition.

1.2 QUALITY ASSURANCE

- A. Supplier: Obtain all products in this section from a single supplier.
- B. Regulatory Requirements: Products shall meet requirements of the Americans with Disabilities Act Accessibility Guidelines (ADAAG) and local amendments and modifications.
- C. Installer: Installation shall be performed by installer specialized and experienced in work similar to that required for this project.

1.3 SUBMITTALS

- A. Product Data: Submit product data for specified products. Include material details for each sign specified and manufacturer's product literature.
- B. Samples: Submit supplier's standard color chart for selection purposes and selected colors for verification purposes.
- C. Installation: Submit supplier's installation instructions.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of DDC General Conditions.
 - 1. Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
 - 2. Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact.
 - Store products protected from weather, temperature, and other harmful conditions as recommended by supplier.
 - 4. Handle products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 SIGNAGE SYSTEMS

- A. Acceptable Manufacturers:
 - 1. ASI, 3860 W. Northwest Highway, Suite 350, Dallas, TX 75220; (214) 352-9140 telephone; (214) 352-9741 facsimile; (800) ASI-SPEC [274-7732]

- Precision Signs, 243 Dixon Avenue, Amityville, NY 11701; T: 631-841-2. 7500; F: 631-841-4345
- IdentiCom Sign Solutions, 42705 Grand River Ave., Suite 201, Novi, 3. MI. 48375; T: 248-344-9590 x221.
- Acceptable Product: Series LPP, Cut Acrylic Dimensional Letters or approve B.
- C. Material: Cut acrylic.
- Finish: Standard integral color finish from manufacturer's color chart. D.
- E. Fabricated Letters:
 - 1. Letterstyle: sans serif.
 - 2. Letter Height: 3-5" (TBD).
 - Letter Depth: ½"-3/4" (TBD).
- Mounting Method: Full Coverage Tape Mount or Tape Strip Mount (TBD). F.

2.2 FABRICATION - GENERAL

- General: Comply with requirements indicated for materials, thicknesses, A. finishes, colors, designs, shapes, sizes, and details of construction.
- Design, fabricate, and install sign assemblies to prevent buckling, opening up of B. joints, and over-stressing of welds and fasteners.
- Mill joints to a tight, hairline fit. Form joints exposed to the weather to exclude C. water penetration.
- Conceal fasteners if possible; otherwise, locate fasteners where they will be D. inconspicuous.
- Create signage to required sizes and layout. Comply with requirements indicated E. for design, dimensions, finish, color, and details of construction.

PART 3 EXECUTION

3.1 **EXAMINATION**

- Site Verification of Conditions: Verify installation conditions previously A. established under other sections are acceptable for product installation in accordance with manufacturer's instructions.
- Scheduling of installation by City of New York or it's representative implies that В. substrate and conditions are prepared and ready for product installation. Proceeding with installation implies installer's acceptance of substrate and conditions.

3.2 **INSTALLATION**

- Install product in accordance with supplier's instructions. A.
- Install product in locations indicated using mounting methods recommended by B. sign manufacturer and free from distortion, warp, or defect adversely affecting appearance.
- Install product level, plumb, and at heights indicated. C.
- Install product at heights to conform to Americans with Disabilities Act D. Accessibility Guidelines (ADAAG) and applicable local amendments and regulations.
- E. Install signs within the following tolerances and in accordance with manufacturer's recommendations:

- 1. Interior Signs: Within 1/4 inch vertically and horizontally of intended location.
- 2. Exterior Signs: Within 1 inch vertically and horizontally of intended location.

3.3 CLEANING, PROTECTION, AND REPAIR

- A. Repair scratches and other damage which might have occurred during installation. Replace components where repairs were made but are still visible to the unaided eye from a distance of 10 feet.
- B. Remove temporary coverings and protection to adjacent work areas. Clean installed products in accordance with manufacturer's instructions prior to City of New York's acceptance. Remove construction debris from project in accordance with provisions in DDC General Conditions.

3.4 SIGN SCHEDULE

A. Schedule: Refer to signage schedule and Drawings for sizes, locations, and layout of signage types, sign text copy, and graphics.

END OF SECTION

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SECTION 114580

DISAPPEARING STAIRWAY

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract (City of New York Standard Construction Contract).

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the disappearing stairway as shown on the drawings and/or specified herein, including but not limited to the following:
 - Metal folding disappearing stairway, frame and door

1.3 RELATED SECTIONS

A. Carpentry - Section 062000.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's product information for disappearing stairway, showing all parts, material thicknesses, finishes, etc.
- B. Shop Drawings: Submit detailed drawings showing coordination with adjacent construction, installation details, certified loading characteristics, and all other pertinent data.

1.5 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.

1.6 DELIVERY AND STORAGE

- A. Deliver products to project site in manufacturer's undamaged protective containers.
- B. Delay delivery until spaces to receive them have been fully enclosed and utility roughins are complete.

PART 2 PRODUCTS

2.1 MANUFACTURER

- Provide Super Simplex Disappearing Stairway by Precision Ladders LLC, or approved A. equal by The Williams Bros. Corp. of America, Werner Ladder Co. or approved equal.
 - Product (Basis for Project Design): Precision Model SS-AL-114 with #AGRS-XX Aluminum Guard Rail System - PNRH (Curb Mounted).

2.2 **MATERIALS**

A. Door

- 1/8" aluminum door panel. 1.
- 2. Steel piano hinge.
- Door overlaps bottom flange of frame. 3.
- Eye bolt accommodates pole for opening and closing.

B. Stairway

1. Stringers

- 6005-T5 Extruded aluminum channel 5" x 1" x 1/8".
- Tri-fold design. b.
- Steel blade type hinges. c.
- Adjustable foot with plastic Mar-guard. d.
- Pitch 63 degrees, unless otherwise shown. e.

2. Treads

- 6005-T5 Extruded aluminum channel 5-3/16" x 1-1/4" x 1/8". a.
- Depth 5-3/16".
- Width 21-1/4" minimum, unless otherwise noted. c.
- đ. Deeply serrated top surface.
- 9-1/2" riser height, unless otherwise noted. e.
- f. 500 lbs load rating.
- Frame: Custom fabricated from 1/8" steel with factory-installed tread(s) to cover the C. distance from finished ceiling to finished floor above. Frame shall be on a 63 degree angle on the hinge end in order to continue the climb from ceiling and beyond on the same incline as the folding portion of the unit. The frame shall have pre-drilled and mounted brackets to allow for hanging from and fastening to the floor above.

D. Hardware

Steel blade type hinge connecting stringer sections, zinc-plated and chromatesealed, bolted to stringers.

- 2. Steel operating arms, both sides, zinc-plated and chromate-sealed.
- 3. Double-acting steel springs and spring cables, both sides.
- 4. Rivets rating at 1100# shear.

E. Safety

- 1. Steel bar handrail riveted to stringers, upper section, right side standard.
- 2. Steel section alignment clips at stringer section joints.
- 3. Molded rubber guards at corners of aluminum door panel.

F. Accessories

- 1. Steel pole to aid opening and closing stairways. The pole is equipped with a hook on one end to engage the eyebolt in door panel.
- 2. Keyed lock for door.
- 3. Acoustical seal: Zero International, Krieger Specialty Products, Pemko Manufacturing Co. or approved equal.

G. Finishes

- 1. Mill finish on aluminum stairway components.
- 2. Prime coat on frame.
- 3. Primed and painted handrail.

H. Aluminum Guard Rail System

- 1. 1-1/4" diameter Schedule 40 aluminum pipe posts and rails.
- 2. 1/4" x 4" toe boards.
- 3. External aluminum fittings and base plates.
- 4. Self-closing gate.
- 5. Assembly Dimensions: 36" x 96" x 42" high.
- 6. Finish: Mill finish.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where disappearing stair 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. Coordinate as required with other trades to ensure proper and adequate provision in the work of those trades for interface with the work of this Section.
- B. Install the work of this Section in strict accordance with the original design, pertinent requirements of the City of New York, and the manufacturer's recommended installation procedures as approved by the Commissioner, anchoring all components firmly into position for long life under hard use.
- C. Upon completion of installation, put each operating component of each appliance through at least 5 complete operating cycles, adjusting as needed to secure optimum operation level.
- D. Promptly remove from the job site all cartons and packing material associated with the work of this Section.

END OF SECTION

SECTION 115200 VIDEO DISPLAY AND BACKGROUND MUSIC SYSTEM

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment and services necessary to complete the Video Display and Background Music Systems as shown on the drawings and/or specified herein.
- B. The work covered under this section of the specifications consists of providing all labor, equipment, supplies and materials, and in performing all operations necessary for the "TURNKEY" and fully functional and complete installation of a Video Display and Background Music Systems in accordance with the specifications and the accompanying drawings, except as specifically noted otherwise.
 - 1. The Work includes the following:
 - a. Furnish and install conductors and cables.
 - b. Furnish and assemble/install LCD monitors and enclosures.
 - c. Furnish and assemble/install ceiling speakers.
 - d. Furnish and assemble/install AV equipment rack system.
 - e. Interface AV Systems to customer internet connection
 - f. Systems documentation
 - g. Systems instruction
 - h. Contractor's Guarantee

1.3 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Installing contractor must have a minimum of three years previous experience in audio/visual systems, and telecommunication systems. The contractor and/or vendors supplying all or parts of the work on site described herein will supply project references which substantiate the contractor's/vendors' previous experience as noted herein.

1.4 SUBMITTALS

A. Provide a complete listing of all major components required for a complete and fully functional Video Display and Background Music Systems as specified. List the quantity, Manufacturer, Model number, and a short description of each item. The material list should follow the sequence of items as listed in Part 2. Any proposal submitted without such written documentation may be considered non-responsive and rejected.

B. References

1. Provide project references as required in part 1.3 of this section with the response.

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 FUNCTIONAL REQUIREMENTS

A. General

- 1. The Video Display System is designed to allow looping playback of graphic images on the 15" LCD displays. The looping playback of graphic images will be played back by the associated digital media player. The digital media player will be connected to the "AV ethernet network" and to an AV PC where the content will be loaded and stored and subsequently published utilizing the most recent version of the associated digital media player software to the digital media player(s) via the "AV ethernet network". The graphic images that will be loaded and stored on the AV PC and subsequently published to the digital media player(s) will be provided to the contractor by the City of New York. The contractor will create all required setup files for the digital media players and assign the required IP addresses to the AV devices on the "AV ethernet network" including but not limited to:
 - a. AV PC
 - b. Ethernet Router
 - c. Digital Media Players
- 2. The Background Music System is designed to allow looping playback of MP3 audio file(s) amplified and distributed through the overhead ceiling speakers in the facility. The system will consist of a mixer/power amp, digital media player with SD memory card and ceiling mounted

speakers. The MP3 audio file(s) that will be loaded and stored on the SD digital media card used by the digital media player will be provided to the contractor by the City of New York.

B. Material

- 1. Provide sub-system products including but not limited to:
 - a. Video Display Devices Forming Basis of Design:
 - 4ea. Open Frame 15" Monitor:
 - i. I&E Company PRT-15 LCD Open Frame 15" Monitor or approved equal --or--
 - ii. Vision Pro 15" Dual Resolution LCD With Protective Glass Overlay 49-2762-36 or approved equal
 - 4ea. Custom metal enclosure for open frame monitor:
 - i. Museum Arts, Inc. custom metal enclosure for open frame monitor or approved equal

--or--

- ii. Museum Fabrication Group, LLC custom metal enclosure for open frame monitor or approved equal
- 4ea. Digital Video Playback Device:
 - i. BrightSign HD220 Solid State HD Digital Video Playback Device with Ethernet or approved equal
- 4ea. SDHC Memory Card:
 - i. Sandisk 8GB Ultra SDSDU-008G SDHC Memory Card or approved equal --or--
- ii. Transcend TS8GSDHC10 8GB SDHC Memory Card Class 10 or approved equal 4ea. Display Cable:
 - i. Kramer C-HM/DM-25 HDMI (M) to DVI-D (M) Cable 25' U (for use with PRT-15 LCD) or approved equal --or--
 - ii. BTX Technologies YD-HD15MMC25 (for use with Vision Pro 15 LCD) or approved equal
- b. Graphic Management Server System:
 - 1ea. Ethernet Switch with Power over ethernet:
 - i. Cisco SF300-24P Ethernet Switch with POE or approved equal --or—
 - ii. Netgear FS728TPv2 ProSAFE® 24-Port 10/100 Smart Switch with POE or approved equal
 - 1ea. CAT5E Patch Panel, 24 Port:
 - i. Leviton 5G596-U24 CAT5E Patch Panel, 24 Port or approved equal
 - ii. Panduit DP245E88TGY Patch Panel, 24 Port or approved equal

1ea. PC System with Windows 7 Professional 64-bit:

- Xi3 NUC ELLI PC System with Windows 7 Professional 64-bit, Intel i3 Dual Core 2.1Ghz Processor, 8GB Ram 128GB SSHD (Brightsign media & BrighAuthor software) – or approved equal
- OptiPlex 9020 Micro with Windows 7 Professional 64-bit, Intel i5 Quad Core
 2.0Ghz Processor, 8GB Ram 500GB HDD (Brightsign media & BrighAuthor software) or approved equal

lea. Single Space Rack Shelf:

- i. Middle Atlantic U1 Single Space Rack Shelf (PC & power supply) or approved equal
 - --or--
- ii. Raxxess UNS-1 Single Space Rack Shelf (PC & power supply) or approved equal lea. HDMI Female to Mini HDMI Male Adapter:
 - i. ShowMeCables 4502 HDMI Female-to-Mini HDMI Male Adapter Cable (for use with Xi3 PC) or approved equal
 --or--
 - ii. StarTech DP2HDMI2 Display Port Male-to-HDMI Female Adapter Cable (for use with Dell PC) or approved equal

lea. PC-to-Display Cable:

- i. Kramer C-HM/DM-6 HDMI (M) to DVI-D (M) Cable 6' or approved equal --or-
- ii. StarTech MDMIDVIMM6 HDMI (M) to DVI-D (M) Cable 6' or approved equal lea. Computer Monitor:
 - i. ASUS VS207T-P 19" LED Backlit Widescreen Computer Monitor or approved equal
 --or--
- ii. Dell P1913 19" Professional Widescreen LED Monitor or approved equal lea. Rackmount for LCD Monitor:
 - i. Middle Atlantic RM-LCD-PNLV Rackmount for LCD Monitor (PC Monitor) or approved equal
 --or--
 - ii. Raxxess NAM1T Rackmount for LCD Monitor (PC Monitor) or approved equal

1ea. Mini USB Keyboard:

- i. Adesso EasyTouch Mini USB Keyboard or approved equal
- ii. Gearhead 89 Key Mini USB Keyboard or approved equal

lea. USB Trackball:

- i. Logitech Trackman Marble USB Trackball or approved equal --or-
- ii. Adesso iMouse T1 USB Trackball or approved equal

lea. Sliding Shelf:

- i. Middle Atlantic SS Sliding Shelf for Keyboard/Trackball or approved equal --or-
- ii. Raxxess SLS-1 Sliding Shelf for Keyboard/Trackball or approved equal

c. Background Music System:

lea. Utility Mixer/Amplifier:

- i. Peavey UMA™ 1502 Utility Mixer/Amplifier or approved equal
- ii. Bogen Gold Seal Series GS150 with GSRPK Mixer/Amplifier or approved equal lea. Audio Playback Unit:
 - i. Gilderfluke Sd-10 MP3 Digital Audio Playback Unit or approved equal
- ii. ACS-CF-CFSoundIV Digital Audio Playback Unit or approved equal lea. SD Secure Digital Card:
 - i. Sandisk SDSDB-128 128MB SD Secure Digital Card or approved equal
- ii. OEMPCWorld SD128 128MB SD Secure Digital Card or approved equal lea. Audio Monitor:
- i. Rolls HR-155 Audio Monitor with RMS270 or approved equal
- ii. Remote Audio SPKEZR1Audio Monitor or approved equal

4ea. Full-Range 6" Ceiling Speaker:

- AtlasSound FAP62T Full-Range 6" Speaker with transformer and FAP62-TR or approved equal
 --or--
- ii. Peavey Architectural Acoustics PHR630 Full-Range 6" Speaker with transformer or approved equal

1ea. 12VDC Power Supply:

- Mean Well GS40A12-P1J 12VDC Power Supply with power cord (for use with Sd-10) – or approved equal
 -or--
- ii. Condor CENB1040A1203F01 12VDC Power Supply with power cord (for use with Sd-10) or approved equal

d. AV Equipment Rack System:

1ea. AV Equipment Rack Cabinet:

- Middle Atlantic 5-29-26 Slim 5 Series Rack with SP-5-29-26 Side Panels and 5W Set of Casters or approved equal
- ii. Raxxess NG1F2828 G1 Series Rack with NG1S2828 Side Panels and NAC25H Set of Heavey Duty Casters or approved equal

lea. Power Strip

- i. Belkin F9D1000-15 10-Socket Metal SurgeMaster Power Strip or approved equal --or--
- ii. Tripp-Lite UL800CB-15 10-Outlet Industrial Power Strip or approved equal 1ea. Rack Mount UPS:
 - i. APC Smart-UPS 750VA SMT750RM2U Rackmount 2U with LCD (120V) or approved equal
 --or--
 - ii. Tripp-Lite SU750RTXLCD2U Rackmount 2U with LCD (120V) or approved equal
- 2. Provide above basis of design sub-system products, or approved equals.
- 3. Provide for each category of sub-system products above:
 - All Required & Miscellaneous Cable and Wiring
 - All Hardware and Materials

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where Video Display and Background Music Systems are to be installed. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

- A. Perform this work in accordance with acknowledged industry and professional standards and practices, and as specified herein. Provide and install all materials, devices, components, and equipment for complete, operational systems.
- B. Maintain a competent supervisor and supporting technical personnel, acceptable to the City of New York, during the entire installation. Change of the supervisor during the project shall not be acceptable without prior written approval from the City of New York.
- C. Coordinate all efforts with those of related trades. In the event of any conflicts, delayed or improper preparatory work by others, notify the City of New York; the City of New York's decision will be binding. Verify all field conditions.

3.3 SYSTEM DOCUMENTATION

- A. Prior to final acceptance tests, the Contractor shall submit to the City of New York an operating and maintenance manual for the system that has been installed. These manuals will be used during the final acceptance testing of the system. Each manual shall contain the following information:
 - 1. As-built drawings.
 - 2. Operation and maintenance manuals.
 - 3. Single line diagrams showing system connections.

3.4 INSTRUCTION

A. Provide instruction as required herein for this system. Training is to include operation of basic system and system troubleshooting.

1. INSTRUCTION HOURS

a. Instruction time is specifically defined as those hours set aside for the sole purpose of instruction of facility personnel. Credit will not be given for time spent in the same physical location as facility personnel while performing other tasks.

2. INSTRUCTION REQUIREMENTS

a. Provide each group of users as defined below with the minimum hours as specified. Video record each type of instruction session and provide and install video files on the AV PC.

3. OPERATORS

- a. Provide four hours of instruction divided into two "block" sessions. The first block session will consist of a two-hour instruction session and occur once the basic system comes on line and coordinated/scheduled with the City of New York. The second block will also consist of a two-hour instruction session and will occur within fourteen days of the first session or earlier if requested by the City of New York. This session must also be coordinated/scheduled with the City of New York. The City of New York will designate the required personnel to attend the operator session. These sessions should cover:
 - 1) Basic System Configuration and Operation Knowledge.
 - 2) Basic digital media player software use for creating digital media projects and publishing projects to digital media player units.
 - 3) Typical User Troubleshooting skills.
 - 4) Basic system troubleshooting skills.

CONTRACTOR'S GUARANTEE

A. The Contractor shall guarantee that the system components and labor required to meet the scope of work defined in this specification for a period of one year after substantial completion. The Contractor will exhibit that a full service office, capable of troubleshooting and repairing any system failure, is located within proximity of the project site. This guarantee will cover the replacement of all parts and labor to replace same made necessary by normal usage and wear. The following conditions will apply:

- 1. The Contractor shall be responsible to provide service within eight (8) normal business hours, after notification by the City of New York, within the hours of 8:00AM to 5:00PM from Monday through Friday for any major system failure. A "major system failure" is a failure, which prohibits the use of the system in two (or more) exhibit spaces. Service Request forms will be supplied by the Contractor and the faxing or emailing of such a request form shall constitute notification by the City of New York of a service request.
- 2. The Contractor shall be responsible to provide service within sixteen (16) normal business hours, after notification by the City of New York, within the hours of 8:00AM to 5:00PM from Monday through Friday for any minor system failure. A "minor system failure" is a failure, which does not prohibit the use of the system in more than one instructional space. Service Request forms will be supplied by the Contractor and the faxing or emailing of such a request form shall constitute notification by the City of New York of a service request.

3.6 SUBSTANTIAL COMPLETION

A. Substantial completion is identified as the date upon which the first instruction session, as outlined, has been completed.

END OF SECTION

SECTION 131000

AQUATIC LIFE SUPPORT SYSTEMS

PART1 GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. This specification is for all equipment, hydraulic vessels, fabrications, piping, and appurtenances for aquatic life support systems (LSS) complete with all necessary fittings, hangers, supports, anchors, accessories, coatings and testing, to provide a functional installation.
- B. This section includes but is not limited to the following life support systems and associated equipment:
 - 1. Pumps and motors.
 - 2. Pipe, fittings, supports, and appurtenances.
 - 3. Valves and valve actuators
 - 4. Pressure filter vessels.
 - 5. Fractionators (protein skimmers).
 - 6. Ozone contacting systems.
 - 7. Heaters and heat exchangers.
 - 8. Fiberglass and PVC tanks, grating, platforms and specialty items.
 - 9. Sand and gravel media for pressure filters.
 - 10. Tower media.
 - 12. Basket strainers.
 - 13. Water quality instrumentation.
 - 14. Miscellaneous LSS items and equipment.

15. Work shown on LSS drawings.

RELATED WORK SPECIFIED ELSEWHERE 1.3

- A. Concrete work
- B. Unit Masonry
- C. Painting and coatings
- D. Joint Sealers
- E. Lath and Plaster
- F. Gypsum Drywall
- G. Mechanical, Electrical, Plumbing work
- H. Exhibit tanks
- I. Exhibit habitats (artificial rockwork)
- J. Exhibit lighting
- K. Procedures and requirements for submittals and shop drawings: Division 1.

1.4 **DEFINITIONS**

- A. As used in this Section, the following abbreviations are understood to have the following meaning:
 - 1. AASHTO American Association of State Highway and Transportation 2. Officials

 - 3. ACS Automated control system
 - 4. AISI American Iron and Steel Institute
 - 5. ANSI American National Standard Institute
 - 6. ASCE American Society for Civil Engineers
 - 7. ASTM American Society for Testing and Materials
 - 8. AWWA American Water Works Association
 - 9. BWD Backwash drain
 - 10. CFM Cubic feet per minute
 - 11. Degrees F Degrees Fahrenheit
 - 12. EPDM Ethylene Propylene Dienemethylene Terpolymer
 - 13. FMVSS Federal Motor Vehicle Safety Standard #302
 - 14. FNPT Female National Pipe Thread
 - 15. FRP Fiberglass reinforced polymer

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- 16. FT Feet
- 17. GPM Gallons per minute
- 18. HDPE High density polyethylene
- 19. HP Horsepower
- 20. HVAC Heating ventilation and air conditioning
- 21. ID Inner diameter
- 22. Kwh Kilowatt hours
- 23. GAL Gallon
- 24. LSM Life support makeup
- 25. MM Millimeters
- 26. MNPT Male National Pipe Thread
- 27. NACE National Association of Corrosion Engineers
- 28. No. Number
- 29. NUSIG National Uniform Seismic Installation Guidelines
- 30. NPT National pipe thread
- 31. PPM Parts per million
- 32. PSIG Pounds per square inch gauge
- 33. PVC Polyvinyl chloride
- 34. PVC(LXT) Low extraction PVC
- 35. PWF Packaged water filter
- 36. RPM Revolutions per minute
- 37. SCFM Standard cubic feet per minute
- 38. SCFH Standard cubic feet per hour
- 39. SMACNA Sheet Metal and Air Conditioning Contractors National Association
- 40. SST Stainless steel
- 41. SWR Saltwater return
- 42. SWS Saltwater supply
- 43. TDH Total dynamic head
- 44. UL Underwriters Laboratory
- 45. W/O Without

SYSTEM DESCRIPTION 1.5

- A. This specification includes requirements for packaged equipment that assembles hydraulic vessels, fabrications, pumps, piping, lamps, controls and/or accessories. Provide the following packaged equipment complete and operational for the quantities required:
 - 1. Fractionators
 - 2. UV sterilizers
 - 3. Heaters/heat exchangers
 - 4. Reactors
- B. Requirements

- 1. Design The specific design requirements for each packaged equipment system are described in PART 2 of this specification, including upgrades to standard components of the packaged equipment to match the products specified in this Section.
- 2. Performance All packaged equipment will match the performance requirements as stated on the construction schedules or in the specifications.

1.6 SUBMITTALS

- A. Shop Drawings: Shop drawings are required for all elements of the life support systems including, but not limited to, the following items:
 - 1. Pipes and pipe fittings.
 - 2. Proposed pressure testing procedures.
 - 3. Pipe penetration fire stopping.
 - 4. Valves and valve actuators.
 - 5. Fiberglass grating.
 - 6. Pumps, motors and bases.
 - 7. Venturi injectors and eductors.
 - 8. Water quality instrumentation.
 - 9. Pipe supports.
 - 10. Piping and equipment identification systems and materials.
 - 11. Tower media.
 - 12. Coatings.
- 13. Heaters/heat exchangers
- 14. FRP fabrications (pressure filters, tanks, towers, platforms, etc.) and fiberglass and PVC specialty items. The drawings and data submitted shall include the following:
- a. Dimensions including anchor bolt layouts.
- b. Nozzle schedule including size, mark, thickness, and rating.
- c. Details of all clips and lugs for pipe brackets, pressure gages, and anchor bolts, as integral parts of the tank.

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- d. Details of structural support members such as angles, flanged beams and grating.
- e. Equipment weight, empty and filled with water and media.
- f. Laminate sequence of construction and all materials of construction listed.
- g. Specifications for all anchors/hold-downs bolting, gaskets, and accessory items.
- h. Structural engineering calculations signed and stamped by a registered civil or structural engineer in the STATE OF NEW YORK for each tank. Structural calculations shall include calculations for wall thickness, structural support members, anchors/hold-downs and other elements based on hydrostatic, wind and seismic loads.
- i. Equipment capacity (gallons)
- j. Maximum design specific gravity for the contained fluids
- 15. Fractionators. Shop drawings shall include bill of materials listing all components with manufacturer's name, trade and identification marks. The drawings and data submitted shall include the following:
- a. Dimensions, sizes, and elevations of the vessel and all piping and anchor connections.
- b. Equipment weight, empty and filled with water and media.
- c. Specifications for all supplied bolting, gaskets, and accessory items.
- d. Product data for all pumps, valves, actuators, controllers, and miscellaneous equipment that are packaged with the fractionator reaction vessel.

In addition shop drawings shall be prepared for all exhibit areas, exhibit tanks, life support rooms and other areas, both above-grade and below grade, that contain LSS equipment and piping. Shop drawings must be approved by the COMMISSIONER prior to installation of corresponding elements for this project. The shop drawings shall be a coordinated set prepared and submitted as a single document

B. The CONTRACTOR shall prepare and provide ¼-inch scale piping and equipment plans for the life support systems. These shop drawings shall indicate the exact location of all life support equipment, pipes, fittings, valves and connections to structures. Elevations of all piping shall be shown on the shop drawings. The shop drawings shall indicate that detailed coordination with all other trades has been performed. These shop drawings shall be prepared for all equipment rooms, exhibit tanks, valve vaults and site piping. Where an approved equal of life support equipment requires changes in the life support system and the adjoining work of any other trade, shop drawings for those changes shall be provided. Modifications required must be fully noted to bring specific

- attention to all changes required in order to install the approved equal product. The cost of these changes shall be bourn by the CONTRACTOR.
- C. Product Data Submittals: Manufacturer's technical literature, descriptive data, and catalog cut sheets are required for all elements of the life support systems and shall be provided to the COMMISSIONER by the CONTRACTOR. Equipment submittals must be approved by the COMMISSIONER prior to installation of corresponding elements for this project. Submittals shall include but are not limited to the following items.
 - 1. Pipes and pipe fittings.
 - 2. Proposed pressure testing procedures.
 - 3. Pipe penetration fire stopping.
 - 4. Valves and valve actuators.
 - 5. Fiberglass grating.
 - 6. Pumps, motors and bases.
 - 7. Venturi injectors and eductors.
 - 8. Water quality instrumentation.
 - 9. Pipe supports.
 - 10. Piping and equipment identification systems and materials.
 - 11. Tower media.
 - 12. Coatings.
 - 13. Heaters/heat exchangers.
- D. Data and Operation Instructions: The CONTRACTOR shall prepare (4) sets of the manufacturer's operations and maintenance materials for the life support equipment including but not limited to that identified below. Three ring binders shall be tabbed and indexed. The materials shall be in the original published form from the supplier (photo copies are not acceptable). One set shall be furnished to the COMMISSIONER as a submittal for review of completeness. After incorporating corrections or additions to the first set, three complete sets shall be delivered to the COMMISSIONER.
 - 1. Pumps and motors.
 - 2. Fractionators

- 3. Thermoplastic vessels, tanks, towers, and specialty items.
- 4. Fractionators.
- 6. UV sterilizers
- 7. Reactors
- 8. Heaters/heat exchangers.
- E. Samples: The CONTRACTOR shall be responsible for ensuring that the following media samples are provided for review by the COMMISSIONER. The filter submittal will not be approved until media samples have been submitted and approved.
 - 1. Biological media: Submit for approval, samples of the bio-media proposed to be used. No media shall be shipped to the site prior to approval. The filter media delivered to the site shall equal in all respects the approved samples, and similar samples shall be furnished as required during the preparation and placing of the media.
 - 2. Samples for Neoprene Pads: Minimum 2-inch by 6-inch samples of the sponge neoprene pads used between pipes and pipe clamps, clevis hangers, under FRP towers and as wrap around buried pipe. Provide certification indicating that the product meets the requirements for Bridge Bearing neoprene formulation in accordance with AASHTO Standards.
 - 3. Piping Identification System: Samples of all types of identification devices to be used in the work. Provide a list of suggested wording for all valve tags prior to fabrication. Provide a list of available color choices for the identifying devices and coatings.

F. Test Reports

- 1. The CONTRACTOR shall be responsible for ensuring that a 10-day operational test is performed on the system during which time all components shall be operated and proved functional. The CONTRACTOR shall submit a detailed report clearly detailing each component functioned as intended.
- 2. The CONTRACTOR shall submit reports for pressure testing of all piping and field inspections of FRP/PVC fabrications.

1.7 PRODUCT HANDLING

A. All items delivered to the site will be stored in accordance to the manufacturer's recommendations. At a minimum, protect all equipment delivered and designated for storage, from wet weather, sunlight, excessive humidity and temperature variations, dirt and dust, or other contaminants. Any item found to be stored in a manner not recommended by the

manufacturer shall be considered defective and that item will be rejected and not allowed to be installed.

- B. Procedure: In accordance with General Conditions.
- C. Pressure Filters: After installation and prior to the placing of the filter media, the interior of the tanks shall be inspected by the COMMISSIONER and any required repairs shall be made.
- D. Pressure Filter Media: Special care shall be taken in transporting and placing the sand and gravel to avoid the possibility of contamination and to prevent the sand and gravel from becoming dirty. All sand or gravel contaminated by organic matter will be rejected.
- E. All equipment and piping shall be shipped, handled, stored, and installed in accordance with the manufacturer's requirements.

1.8 QUALITY ASSURANCE

- A. Contractor Qualifications
 - 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.
- B. Reference Specifications and Standards

American National Standards Institute (ANSI)

- 1. ASME: A13.1 (2007) Scheme for the Identification of Piping Systems
- 2. ASME: B16.5 (2003) Standard for Pipe Flanges and Flanged Fittings: NPS 1/2 Through NPS 24 $\,$
- 3. ASME: B31.3 (2006) Process Piping
- 4. ASME: B73.1 (2001; R 2007) Specification for Horizontal End Suction Centrifugal Pumps for Chemical Process
- 5. ASTM: B 338 (2008a) Standard Specification for Seamless and Welded Titanium and Titanium Alloy Tubes for Condensers and Heat Exchangers
- 6. ASTM D 412 (2006a) Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers Tension
- 7. ASTM D 413 (1998; R 2007) Rubber Property Adhesion to Flexible Substrate
- 8. ASTM D 471 (2006) Standard Test Method for Rubber Property Effect of Liquids

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- 9. ASTM D 638 (2003) Standard Test Method for Tensile Properties of Plastics
- 10. ASTM D 695 (2002a) Standard Test Method for Compressive Properties of Rigid Plastics
- 11. ASTM D 790 (2007) Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
- 12. ASTM D 883 (2008) Terminology Relating to Plastics
- 13. ASTM D 1204 (2007) Linear Dimensional Changes of Non-rigid Thermoplastic Sheeting or Film at Elevated Temperature
- 14. ASTM D 1559 (1989) Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus
- 15. ASTM D 1599 (2005) Resistance to Short-Time Hydraulic Failure Pressure of Plastic Pipe, Tubing, and Fittings
- 16. ASTM D 1784 (2007) Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC)Compounds
- 17. ASTM D 1785 (2006) Standard Specification for Poly(Vinyl Chloride) (PVC), Plastic Pipe, Schedules 40, 80, and 120
- 18. ASTM D 2412 (2002) Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading
- 19. ASTM D 2466 (2006) Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40
- 20. ASTM D 2467 (2006) Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
- 21. ASTM D 2513 (2007b) Thermoplastic Gas Pressure Pipe, Tubing, and Fittings
- 22. ASTM D 2563 (1994; R 2002e1) Classifying Visual Defects in Glass-Reinforced Plastic Laminate Parts
- 23. ASTM D 2564 (2004e1) Standard Specification for Solvent Cements for Poly(Vinyl Chloride)(PVC) Plastic Piping Systems
- 24. ASTM D 2583 (2007) Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor
- 25. ASTM D 2584 (2002) Standard Test Method for Ignition Loss of Cured Reinforced Resins
- 26. ASTM D 2657 (2007) Heat Fusion Joining Polyolefin Pipe and Fittings
- 27. ASTM D 2661 (2006) Standard Specification for Acrylonitrile-Butadiene-Styrene

- (ABS)Schedule 40, Plastic Drain, Waste, and Vent Pipe and Fittings
- 28. ASTM D 2855 (1996; R 2002) Standard Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings
- 29. ASTM D 2925 (2001e1) Standard Test Method for Beam Deflection of "Fiberglass"(Glass-Fiber-Reinforced Thermosetting Resin) Pipe Under Full Bore Flow
- 30. ASTM D 3299 (2000) Filament-Wound Glass-Fiber-Reinforced Thermoset Resin Corrosion-Resistant Tanks
- 31. ASTM D 3350 (2006) Polyethylene Plastics Pipe and Fittings Materials
- 32. ASTM D 4097 (2001) Contact-Molded Glass-Fiber-Reinforced Thermoset Resin Corrosion-Resistant Tanks
- 33. AWWA B100 (2001) Filtering Material
- 34. CAN/CSA B 137.3 (2005) Rigid Polyvinyl Chloride (PVC) Pipe and Fittings for Pressure Applications International Organization for Standardization (ISO)
- 35. ISO 5211 (2001) Industrial valves Part manufacturer attachments NACE International (NACE)
- 36. SSPC PA 2 (2004) Measurement of Dry Coating Thickness With Magnetic Gages
- 37. SSPC SP 1 (1982; E 2004) Solvent Cleaning
- 38. SSPC SP 2 (1982; E 2004) Hand Tool Cleaning
- 39. SSPC SP 3 (2004; E 2004) Power Tool Cleaning

1.9 ELECTRICAL COORDINATION

- A. If changes to the voltage or other electrical requirements are needed for any equipment or appurtenances other than as indicated on the drawings, the Utility Companies shall provide transformers where necessary to ensure that all equipment will function as specified with the electrical service provided. Refer to the equipment schedules on the drawings for information regarding electrical requirements for the equipment. Transformers shall be provided in accordance with the electrical specifications.
- B. The CONTRACTOR shall install all pumps, motors, heat exchangers, and other electrical equipment in direct or indirect contact with process pool water. The Utility Companies shall provide connection of this equipment with cable termination lugs and connect the equipment to a common bonding grid, as required, to eliminate any voltage gradient between the LSS equipment and other electrical systems in contact with the pool water.

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1.10 UL LISTING

A. All equipment and equipment assemblies shall be in conformance with all local, state and federal codes, statutes and ordinances where they apply, and shall be listed and labeled by Underwriters Laboratories (UL) or code equivalent. The manufacturer shall be fully responsible for compliance with these requirements. If shop or field UL (or other approved testing agency) listing is necessary to meet these requirements, it shall be completed without delay to the project and at no additional cost to the CITY OF NEW YORK.

1.11 HOUSEKEEPING PADS AND OPENINGS IN CONCRETE SLABS FOR LSS EQUIPMENT

- A. General: All pumps, filters, fractionators, tanks, blowers, compressors, heat exchangers, and other LSS equipment shall be mounted on thermoplastic or equivalent housekeeping pads. Unless otherwise shown, these housekeeping pads shall provided by the CONTRACTOR.
 - 1. Approximate quantities and sizes of the housekeeping pads for LSS equipment are shown on the drawings. Housekeeping pads shall be 3" high minimum, or greater if required to provide adequate clearance for basket strainers or other appurtenances on adjacent piping. Housekeeping pads shall extend a minimum of 4" beyond the outer edge of the equipment frames or bases (all around), including hold downs. Actual heights and plan dimensions for housekeeping pads shall be based on the sizes and requirements of the actual equipment selected by the CONTRACTOR, and the piping and equipment shop drawings prepared by the CONTRACTOR. The CONTRACTOR shall coordinate the required heights, plan dimensions and equipment weights with the COMMISSIONER. The CONTRACTOR shall prepare calculations to determine reinforcing requirements for housekeeping pads and provide to the COMMISIONER for review prior to installation of the housekeeping pads.

1.12 WARRANTY

A. The CONTRACTOR shall guarantee all equipment specified in this section or listed on the construction drawings to a period of not less than one year from the COMMISSIONER's acceptance of the Work.

PART 2 PRODUCTS

2.1 GENERAL

A. Materials.

1. Provide materials which are as specified for each equipment, piping and appurtenance, as shown, and are suitable for the service intended. Provide materials which are new and unused, except for tests. Where two or more pieces of equipment, valve, instrument or other product performing the same function are required, they shall be duplicate products of the same manufacturer.

2. Unless otherwise noted, all fasteners and hardware shall be Type 316SST or FRP. All submerged hardware and fasteners shall be FRP.

B. Standard Products

1. Provide equipment, piping and appurtenances which are the standard product of a manufacturer regularly engaged in the manufacture of the product and which duplicate equipment that has been in satisfactory operation at aquatic life support systems installations for at least 2 years prior to bid opening. Nominal sizes shall be used for all products. Equipment shall be supported by a service organization that is, in the opinion of the COMMISSIONER, reasonably convenient to the site.

C. Nameplates

1. Provide equipment identified in the equipment schedules with the manufacturer's name, address, type or style, model or serial number, and catalog number on a plate secured to the item of equipment.

2.2 PIPING

A. General:

1. The CONTRACTOR shall furnish and install all piping systems shown and specified, in accordance with the requirements of the Contract Documents. Each system shall be complete with all necessary fittings, hangers, supports, anchors, valves, accessories, insulation, coating and testing, to provide a functional installation.

B. Pipe Flanges and Penetrations:

- 1. Flanges: All pipe flanges shall be 150-lb. plastic ANSI flanges with full face gaskets. Unless otherwise shown, all flange bolts shall be Type 316 SST. Bolt holes shall straddle the vertical center line. Flanges shall conform to ANSI B16.5 150-lb. class. Flanges shall have flat faces and shall be attached with bolt holes straddling the vertical axis of the pipe unless otherwise shown. Flanges for miscellaneous small pipes shall be in accordance with the standards specified for these pipes.
- 2. Flange Bolts: Type 316 SST machine bolts shall be used on all flanged connections with Type 316 SST washers and hex nuts. Studs and bolts shall extend through the nuts a minimum of 1/4-inch.
- 3. Flange Gaskets: Gaskets for flanged joints shall be full-faced, 1/8-inch thick EPDM with 60 to 70 Shore hardness. Blind flanges shall have gaskets covering the entire inside face of the blind flange and shall be cemented to the blind flange. Ring

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gaskets shall not be permitted.

- C. Hydrophilic waterstops shall be a single component paste or gel type water-swelling sealant with the following properties:
 - 1. Specific gravity: 1.25 to 1.45.
 - Tensile strength: 300 psi minimum per ASTM D 412.
 - % elongation: 600 % minimum.
 - Volume expansion: not less than 180 % of its original dry volume.
 - e. Hydrophilic waterstops shall be manufactured by Adeka, De Neef construction Chemicals, Inc., and Greenstreak, or approved equal.
 - D. Neoprene Wrap: Neoprene wrap for below-grade pipe encasement shall be provided where shown on the Drawings at the indicated thickness to permit unrestrained deflection of the wrapped pipe due to differential settlement of soils. Neoprene shall be secured to the wrapped pipe all around by duct tape.
 - 1. The material shall be closed cell neoprene conforming to the following:
 - a. Classifications: ASTM D-1056-67, SCE-45
 - b. ASTM D-1056-00, 2C5 ASTM D-6576-00 Type II, Grade A or B Firm
 - c. Compression deflection (25%): 17 to 24 PSI
 - d. Shore 00 durometer 70 to 90
 - e. Density: 22 to 35 lb/ft3
 - f. Water absorption by weight: 5% max
 - g. Temperature Range: -40 to 200 °F
 - h. Heat aging (7 days at 158 °F): +/- 30% max
 - i. Tensile strength: 150 PSI min
 - j. Elongation: 175% min
 - k. Resilience (1/2 thickness at 72 °F): 25%
 - 2. Neoprene wrap shall be Rubatex R-451 or equal.
 - E. Polyvinyl Chloride (PVC) Pipe:
 - 1. Unless otherwise shown, all pipe and fittings shall be Schedule 80 PVC or chlorinated polyvinyl chloride (CPVC), as indicated on the drawings.
 - 2. PVC piping shall be solvent cemented, rigid pressure pipe made from Class 12454-B

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- (Type 1, Grade 1) compounds with no fillers or re-grounds in accordance with ASTM D1784. The pipe shall be manufactured in strict compliance to ASTM D1785, consistently meeting and/or exceeding the quality assurance test requirements of this standard with regard to material, workmanship, burst pressure, flattening and extrusion quality. CPVC piping shall be made from Class 23447 compounds.
- 3. The pipe shall also meet the frozen drop impact requirements of CSA Standard B137.3 and shall bear the mark of the CSA listing agency.
- 4. Standard lengths of pipe sizes 6" and larger shall be beveled at each end by the pipe manufacturer. The pipe shall be marked with the National Sanitation Foundation (NSF) seal of approval for potable water applications, and shall be marked with the manufacturers date code that includes the day, month, year and exact time of manufacture in minutes. All PVC pipe shall be manufactured by Harvel Plastics, Inc.; Charlotte Pipe and Foundry Company; North American Pipe Company; or approved equal.

F. PVC and CPVC Fittings:

- a. General:
- 1. PVC fittings shall be of the same material and schedule rating as the adjoining pipe. PVC material shall be made from Class 12454-B (Type 1, Grade 1) compounds with no fillers or re-grounds in accordance with ASTM D1784. CPVC fittings shall be made from Class 23447 compounds.
- 2. Fittings shall be designed and installed to carry stresses developed with free-end conditions, without thrust blocking end other external restraint.
- a. Construction:
- 1. All fittings 6-inches in diameter and smaller shall be molded fittings. Molded fittings shall be of the same material and Schedule rating as the adjoining pipe.
- a. Fittings shown on the drawings are based on the dimensions for a specific manufacturer. If actual dimensions for fitting proposed by the CONTRACTOR are different than those shown on the drawings, the CONTRACTOR shall be responsible for all piping adjustment to accommodate different dimensions.
- b. Molded fittings shall be labeled with the name of the manufacturer, part number, size, description, production code and classification.
- c. Manufacturers of molded fittings shall be Spears, Dura Plastics, Chemtrol, or approved equal.

- 6. Unless otherwise shown, joints shall be solvent cemented in accordance with ASTM D2855 and the fitting manufacturer's instructions. Solvent cement shall be in accordance with ASTM D2564. For CPVC, solvent cement shall be in accordance with ASTM F493. Use solvent cement with set time as recommended by manufacturer appropriate for joint size and weather conditions.
- a. All joints in PVC piping for sodium hypochlorite or calcium hypochlorite applications shall use solvent cement suitable for 12.5 percent sodium hypochlorite or calcium hypochlorite solution. Manufacturer of solvent cement for such hypochlorite applications shall be IPS Corporation, Oatey SCS, Spears or approved equal.
- 7. PVC and CPVC welding is not allowed, except for placement of water stops. Where allowed, PVC and CPVC welds shall be performed using accepted hot gas welding techniques and shall include the following steps:
- a. Welding edges shall be properly beveled and cleaned to provide area for the welding rod and to permit better adhesion.
- b. Section shall be clamped and tack welded to adhere the two surfaces together.
- c. Welding rod shall be applied with an accepted welding tip in three applications, cutting the rod after each pass.

G. Cam-Lock (Quick-Disconnect) Fittings:

- 1. Unless otherwise shown, Cam-Lock fitting shall be used for temporary connection of hoses or pipes without threading, twisting, or using lugs.
- 2. Male adapter Cam-Lock fitting shall be secured with tabs that fold down after insertion. Cam-lock type cap shall be provided when hose is not in use. Cap shall be attached to pipe with SST cable.
- 3. Coupler (female) of a Cam-Lock hose fitting shall lock over the insert with tabs that fold down after insertion.
- 4. Body material shall be polypropylene. Gasket material shall be EPDM.
- 5. Cam-Lock fittings shall be Dixon Valve, Banjo, Bee Valves, or approved equal.

H. Pipe Supports:

- 1. All LSS piping shall be supported per the requirements of Section 3- EXECUTION
- 2. Fiberglass pipe hangers and clamps shall be contact molded fiberglass. The reinforcing

material shall consist of bi-directional glass cloth approximately 65 percent of the laminate by weight with a synthetic surface weir for maximum resistance to corrosion. The hanger system will conform to ANSI B31.3 for static loading. Hanging rods shall be Type 316 SST. Manufacturer of fiberglass pipe support systems shall be Aikinstrut, IMCO Reinforced Plastics, Super Strut, or approved equal.

I. Piping Identification Systems

1. Identification of Piping:

- a. Pipe identification shall consist of a printed label identifying the name of the pipe, and
 - a. a flow arrow to indicate direction of flow in the pipe. All labels shall be preprinted on pressure-sensitive adhesive-backed vinyl cloth or plastic tape. Arrows shall be die cut of the same type of material as the labels.
 - Letter sizes and colors for lettering, arrows, and background shall conform to ANSI A13.1.
 - Ozone gas piping shall also be labeled with the phrase "OZONE GAS HIGHLY TOXIC OXIDIZER" in addition to required labels of this specification section.

2. Identification of Valves and Short Pipe Lengths:

- a. Identifying devices for valves and the sections of pipe that are too short to be identified with lettered labels and arrows shall be identified with metal or plastic tags as specified herein.
- b. Metal tags shall be of stainless steel with embossed lettering. Plastic tags shall be of solid black plastic laminate with white embossed letters. All tags shall be designed to be firmly attached to the valves or short pipes or to the structure immediately adjacent to such valves or short pipes.

3. Valve Tags:

- a. Valve tags shall be Type 316 SST or brass and shall be permanently attached to the valve or structure by means of two bolts or screws and a tie wire, all of equal material as the valve tags.
- b. The wording on the valve tags shall describe the exact function of each valve, e.g., "SWS to Exhibit", "BWD to Sanitary Sewer", "Ozone Gas Shut-Off", etc.

J. Drip Pans:

1. Provide drip pans under piping when installation over or within 5 feet of electrical apparatus is unavoidable or in rooms containing electrical equipment or under drainage

piping at ceilings of food preparation areas. Pan shall be reinforced, properly supported and made watertight. Provide enclosed type for pressure piping. Extend 1-1/4 inch drain pipe from pan to spill over nearest floor drain or as indicated. Construction shall be 1/4 inch thick PVC.

2.3 VALVES

A. Ball Valves:

- 1. PVC Ball Valves:
- a. All thermoplastic ball valves shall be of a true union design. PVC True Union Ball Valves shall be of a one piece capsule design or one side threaded carrier design and shall include both socket and threaded end connectors. All True Union Ball Valves shall have Teflon seats with elastomeric backing cushions of the same material as the valve seals. Valves shall be designed for a water-working pressure of not less than 150 psi. When in the fully-open position, valves shall have a port diameter not less than Schedule 80 PVC pipe of the same nominal diameter. Unless otherwise indicated on the contract documents, valves 3-inches in diameter and smaller shall be PVC ball valves.
- b. PVC ball valves for sodium hypochlorite applications shall be provided with a vented ball. 1/8-inch diameter vent hole shall be drilled, deburred and installed on the upstream side of the ball. All materials used for PVC ball valves for sodium hypochlorite applications shall be suitable for continuous exposure to 12.5 percent sodium hypochlorite solution.
- c. PVC ball valves shall be constructed of low extraction PVC LXT(PVC) where indicated on the drawings for ozone service.
- d. Ball valves shall be provided with both socket and threaded end connections.
- e. Three-way ball valves shall be provided where shown on the drawings. Unless otherwise shown, three-way valves shall be vertical-type with a single "L" port ball.
- f. Manufacturer of two-way and three-way ball valves shall be Asahi/America (Type 21 or Multiport), Spears Manufacturing Company (2000 Series), George Fischer (limited to Type 546 or 375 only), or Hayward (True Union Series).
- B. Check Valves for Water Service:
 - 1. Check valves shall be thermoplastic wafer swing type, size as indicated. Where external weight systems are used, they shall be configured appropriately for the installed orientation of the check valve. In all cases, mechanisms shall be provided to assist in disc closure regardless of valve orientation.

- a. CONTRACTOR shall use thermoplastic body check valves.
- b. Thermoplastic check valves shall be pressure rated to 150 psi for sizes 3/4-inch to 3-inch diameter, 100 psi for sizes 4-inch to 6-inch diameter, and 70 psi for size 8-inch diameter. Valve body shall be PVC, valve trim shall be Type 316 SST, and seat shall be EPDM. Valves shall incorporate a single disc design suitable for either horizontal or vertical installations. Valves shall be of top entry bonnet design for maintenance purposes. Valves shall be manufactured by Asahi/America, Hayward Flow Solutions, or Spears Manufacturing Company.

2.4 PUMPS

A. General:

- 1. The CONTRACTOR shall furnish and install all tools, supplies, materials, equipment and labor necessary for the installation, testing, and placing into operation of all pumps and pumping appurtenances, complete and operable, all in accordance with the requirements of the Contract Documents.
- 2. The provisions of this Section shall apply to all pumps and pumping equipment specified, except where otherwise specified in the Contract Documents.
- 3. The CONTRACTOR shall assign to a supplier full responsibility for the furnishing and functional operation of the complete pump system including the pumps, drives, drive motors, starters, and accessories. The designated supplier, however, need not manufacture more than one part of the unit (pump, or motor and drive), but shall coordinate the design, assembly, testing and erection of the unit(s) as specified herein.
- 4. Wherever it is specified that a supplier shall be responsible for the compatible and successful operation of the various components of any pumping equipment, it shall be understood to mean that the CONTRACTOR shall furnish and install only such pumping equipment as the designated supplier will certify is suitable for use with its equipment and with the further understanding that this in no way constitutes a waiver of any specified requirements.
- 5. All manufactured items provided under this Section shall be new, of current manufacture and shall be the products of reputable manufacturers specializing in the manufacture of such products; such manufacturers shall have had previous experience in such manufacture.
- 6. All combinations of manufactured equipment that are provided under these specifications shall be entirely compatible, and the Supplier shall be responsible for the compatible and successful operation of the various components of the units conforming to specified

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requirements. Each unit of pumping equipment shall incorporate all basic mechanisms, coupling, electric motor or engine drive and unit mounting. All necessary mountings and appurtenances shall be included.

- 7. Where two or more units of the same type and/or size of pumping equipment are required, such units shall all be produced by the same manufacturer.
- 8. All materials employed in the pumping equipment shall be suitable for the intended application; material not specifically called for shall be high-grade, standard commercial quality, free from all defects and imperfection that might affect the serviceability of the product for the purpose for which it is intended, and shall conform to the following requirements:
- a. Stainless steel pump shafts and miscellaneous stainless steel parts shall be of Type 316 SST.
- b. All anchor bolts, nuts and washers shall be Type 316 SST unless otherwise specified in individual pumping equipment specifications.
- 9. All exposed materials (except stainless steel components) that have not been shop painted, shall be field coated as specified in the Protective Coatings section of this specification. Shop painted items that suffered damage to the shop coating shall be touched up as specified in said Protective Coating Section.
- 10. Motor Starters, HOA Switches and Disconnects: Motor starters, HOA switches and disconnects shall be provided by the COMMISSIONER in accordance with the manufacturers recommendations.

11. Pump Appurtenances:

- a. Flexible Pump Couplings: Flexible couplings shall be provided at all pump suctions and discharges for all pumps except plastic pumps with integral strainers. Flexible couplings shall be single arch type with EPDM elastomer material and Type 316 SST backing rings. In all cases, concentric reducer type couplings shall be used to transition to the larger pipe sizes for suction and discharge piping. Type 316 SST thrust rods shall be provided for thrust restraint at all locations except the suction side of the pump. Flexible pump couplings shall be manufactured by Red Valve, Dynex, or approved equal.
- b. Nameplates: Each pump shall be equipped with a stainless steel nameplate indicating rated head and flow, impeller size, pump speed, horsepower, and manufacturer's name and model number.
- c. Pressure gauges shall be installed on all pump suctions and discharges as shown on

the drawings.

- d. Temporary wire screens shall be provided as described in Part 3.
- 12. Mechanical Seals. Mechanical seal designs shall be selected for highest reliability and for rugged service. Mechanical seals shall be internal pump cover (product) flushed, unless otherwise specified.
- 13. Recessed impeller pumps and self-priming pumps (no externally mounted priming chambers are allowed) shall be provided where indicated on the pump schedule. Recessed impeller pumps shall be externally flushed with potable water. Solenoid valves and/or other appurtenances shall be provided as necessary to provide a supply of potable water to external flushing systems only when the associated pumps are operating. The CONTRACTOR shall be responsible for providing and connecting the potable water piping to the externally flushed pumps and for providing and connecting all required controls and control wiring between the external flushing systems and the associated pump motor starters as required to provide the functions described above.
- 14. Pumps shall be close-coupled where indicated on the pump schedule.
- 15. Installation of pumps shall be provided as described in Part 3.
- B. Horizontal Centrifugal Pumps: Fiberglass (for saltwater applications):
 - 1. General: Pumps shall be suitable in all parts and materials for the type of liquid involved, seawater or freshwater. Pumps shall be end suction, self-venting ANSI/ASME B73.1 conformance for maximum interchangeability. Pump adjusent shall permit external adjustment of the impeller to maintain operating clearances without disassembly of the pump or piping. Pump shall be of back pullout design to permit ease of maintenance.
 - 2. Pump Requirements:
 - a. Construction: Construction of fiberglass body horizontal centrifugal pumps shall conform to the following requirements. In addition, all pump components in contact with the fluid shall be of a corrosion resistant, non-metallic thermoset construction utilizing fiberglass reinforcement for optimum strength and corrosion resistance.
 - 1. Casing: FRP with vinyl ester resin
 - 2. Impeller: FRP with vinyl ester resin. Impeller and shaft sleeve shall be integral one-piece design without gaskets or O-rings, or approved equal.
 - 3. Bearing housing: Cast iron or ductile iron with oil reservoir and sight glass for

ease of viewing, fill port to prevent overfilling, and similar to IMPRO-type labyrinth oil seals. Exterior surface of bearing housing shall be powder coated with a thermosetting polyester.

- 4. Bearings: Inboard single row radial bearing and outboard double row axial thrust bearings. Bearings shall be oil lubricated.
- 5. Shaft: Solid Type 316 SST
- 6. Shaft Sleeve: FRP with vinyl ester resin. Shaft sleeve shall be integral with impeller to eliminate the potential of damaging leakage past shaft sleeve O-rings and prevent process fluid from coming in contact with the shaft, or approved equal.
- 7. Mechanical Seal: Mechanical seal to be single outside type John Crane 8B2 with Type 316 stainless metal parts, Hastelloy springs, carbon and chemical grade ceramic faces, and Viton secondary seals. Seal flush to be internal pump cover flush. This would allow the pumped fluid to recirculate internally and provide a flush of the mechanical seal faces, thereby eliminating the need for a separate fresh water external flush.
- 8. Coupling: Couplings shall be spacer type with Type 316 SST OSHA approved coupling guard.
- 9. Pump base: FRP with vinyl ester resin.
- 10. Flanges. Suction and discharge flanges shall conform to ANSI standard B16.1 or B16.5 dimensions.
- 11. Drains. All gland seals, air valves, and cooling water drains shall be piped to the nearest floor sink, or drain, with PVC pipe, properly supported with brackets.
- 12. The pump manufacturer must have five installations in operation for at least three years in similar saltwater aquarium applications for each size and type of pump provided. The manufacturer shall be FYBROC Division of Metpro Corporation, Ingersoll Dresser Pumps, Flowserve Durco or approved equal.

C. Motors:

1. Unless otherwise shown, all centrifugal pumps shall be provided with direct-drive heavy duty, premium-efficiency, mill and chemical duty, TEFC electric motors suitable for voltages specified on the pump schedules. Where pumps are to be used with variable frequency drives, as shown on the pump schedule, motors shall also be inverter duty. Inverter duty motors with frame sizes equal to or greater than 324T or 324TS shall be

provided with insulated bearings. Inverter duty motors shall also be provided with carbon grounding brushes to help the buildup and discharge of electric currents within the motor and/or it's bearings. Grounding brushes shall be provided and installed by the motor or pump manufacturer. The CONTRACTOR shall ensure that all grounding brushes are properly grounded to ensure proper operation and in accordance with the manufacturer's recommendations. Service factor for all motors shall be 1.15 minimum. All motors shall be sized such that no motor for any pump shall overload at flows less than 150 percent of the design flow.

D. Plastic Pumps with Integral Strainers:

- 1. General: Pumps shall be rated by the manufacturer for pumping seawater, outdoor installation, self-priming and "run dry" operation. All body components shall be constructed of glass-filled thermoplastic; pump impeller shall be Noryl or higher strength plastic; pump seal shall be ceramic; bearings shall be permanently lubricated and sealed. Body shall incorporate integral basket strainer with 180 cubic inch capacity, except for 1/2 HP pumps, which may have a 110 cubic inch basket strainer. Strainer cover shall be of transparent Lexan with cam for removal without tools. The pump shaft and all wetted metallic parts shall be 300 series stainless steel. The motor shall be heavy duty, high performance, energy efficient rated, single speed, suitable for use in a wet, corrosive environment. Piping connections shall be 2-inch FNPT for 1/2 to 3 HP pumps, 3-inch FNPT for 5 HP pumps, and 4"x6" for larger than 5 HP pumps.
- 2. Manufacturer: Jacuzzi Magnum Force Series by Cantar Pool Products, Whisperflo/Challenger/EQ by Pentair Pool Products, Max-E-Glass II by Sta-Rite, or approved equal.
- 3. Where specified on the drawings, plastic pumps shall be provided with wall-mounted, ULlisted commercial-grade variable frequency drives with integral local control panel.

2.5 FRACTIONATORS (PROTEIN SKIMMERS)

- A. The size, capacity and configuration of the fractionators shall be as indicated on the construction documents. All materials of construction shall be suitable for use with ozone, chlorine and seawater and shall be resistant to ultraviolet light.
- B. The fractionators shall be constructed in accordance with the following specifications:
 - 1. The reaction chamber shall be constructed of molded high density polyethylene (HDPE). The foam collection chamber shall be constructed of clear acrylic.
 - 2. All piping shall be Schedule 80 PVC, as described in the piping portion of this specification section.

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- 3. The size of the discharge piping shall be as shown on the drawings. A PVC level control valve shall be provided on the discharge piping. The level control valve shall be as specified in Part 2.2 of these specifications.
- 4. Piping connections to the reaction chamber shall be made with flanged or rigid bulkhead fittings.
- 5. Solenoid valves or electric actuated PVC true union ball valves shall be provided for the freshwater and saltwater rinse systems. Valves shall be of the size shall be rated for not less than 150 psi working pressure. Valves shall be suitable for use with ozonated seawater at concentrations up to 5 ppm.
- a. Solenoid valves, ball valves, and electric actuators shall be provided as specified in valves portion of this specification section.
- b. Solenoid and ball valves shall be provided with integral or external programmable timers. Battery operated timers shall not be accepted.
- 6. A saltwater foam rinse system shall be provided to clean the inside of the interior foam riser chamber.
- 7. A freshwater foam rinse system shall be provided to clean the outside of the interior foam riser chamber.
- 8. A clear acrylic rotameter shall be provided for the air intake to the venturi injector. The rotameter shall be provided with an adjustable throttling valve. A PVC ball check valve shall be provided between the rotameter and connection for the ozone gas piping to prevent backflow of ozone gas through the rotameter.
- 9. A closed loop, recirculating venturi injection system shall be provided, including injector pumps and venturi injectors. The quantity and size of injector pumps shall be as indicated on the drawings. One venturi injector shall be provided for each injector pump. Injector pumps shall be mounted on non-metallic FRP or polymer bases. Injector pumps shall be constructed of non-corrosive materials suitable for use with ozonated seawater and shall have monel pump seals, stainless steel shafts and Type 316 stainless steel hardware. The venturi injectors shall be constructed of non-corrosive plastics or composite material adequate for saltwater environments and use with ozone.
- 10. Each venturi injector shall be installed with a removable PVC union on the downstream side and removable true-union PVC ball valve on the upstream side to allow the injectors to be easily removed from the piping system without draining the fractionators.
- 11. Where more than one ventruri injector is provided for a single fractionator, ozone shall be

supplied to only one injector.

C. The fractionators shall be manufactured by RK2 Systems or approved equal, which can be supplied by Aqua Logic, Aquatic Design Systems, Custom Aquatic or an equal distributor.

Where necessary, the standard units shall be modified to meet the requirements of this specification.

2.6 HEAT EXCHANGERS AND ELECTRIC HEATERS

- A. Titanium Tube Sheet Heat Exchangers. Titanium tube sheet coil type heat exchangers with split system chiller condenser shall be used where indicated on the drawings. These heat exchangers shall be provided in accordance with the following specifications:
 - 1. ASME construction and labeled for 90 psig working pressure at 300 degrees F.
 - 2. Tube sheet coils shall be titanium with a minimum thickness of 0.50 mm enclosed in insulated Schedule 40 PVC shell.
 - 3. Gaskets shall be EPDM.
 - 4. Tube flange nuts and bolts shall be Type 316 SST.
 - 5. Heat exchangers shall be one-pass design with end connections on the stationary cover as indicated.
 - 6. Provide heat exchangers with supports as shown on the Drawings. Support frame shall be minimum 304 stainless steel.
 - 7. Capacities shall be as indicated on the drawings. Maximum pressure drop through the heat exchanger on the exhibit water side shall be per the equipment schedule in the drawing.
 - 8. Heat exchangers for chilling shall be suitable for use with a 15 percent glycol solution in the chilled water loop. However, the heat exchangers shall be sized based on a chilled water loop without glycol.
 - 9. Condensing units shall be suitable for indoor/outdoor locations and installed with a minimum clearance of 36 inches above each unit and unrestricted a minimum of 12 inches from all sides.
 - 10. The CONTRACTOR shall make all necessary connections to the mechanical hot and chilled water systems as necessary to provide a complete and operable system.
- 11. Manufacturer of titanium tube sheet heat exchangers with split system chiller shall be

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AquaLogic Inc., Universal Marine Industries, RK2 Systems or equal.

- B. Electric Inline Type Titanium Heaters. Titanium Inline type electric heaters shall be used where indicated on the drawings. These heat exchangers shall be provided in accordance with the following specifications:
 - 1. Titanium heater tube
 - 2. 45 watts per square inch (6.9 w/cm2) with minimum/maximum flow rates of 4.4/43 GPM.
 - 3. Vapor tight, flame retardant polypropylene terminal enclosure with 3-foot (.9m) flexible PVC liquid tight conduit
 - 4. Grounded Construction
 - 5. Replaceable style thermal protector for solutions up to 180°F (82°C)
 - 6. UL listed to U.S. safety requirements
 - 7. Integrated Temperature Controller
 - a. LCD digital display with adjustable temperature range from -30°F (-34°C) to 220°F (104°C).
 - b. +/- 1°, single digit accuracy
 - c. UL listed
 - d. Pre-wired terminal blocks for heater thermal protector interface
 - 8. Manufacturer of Inline Heaters shall be Aqua Logic, Inc., Elecro, Integrated Aqua Systems Inc. or approved equal.

2.7 TOWER MEDIAS

- A. Biological Media:
 - 1. Biological media shall be moveable, barrel-type constructed of plastic in a drum shape with cross member pattern. Media shall have specific surface area of 200 to 250 ft2/ft3. Quantity shall be as shown on drawings.
 - 2. Media shall be Kaldnes (K1), F.L.I. Brightwater Bmax, WaterTek MB3, or approved equal moveable bed type.
- 2.8 UV STERILIZERS

- A. Low Pressure Ultra Violet (UV) Sterilizers. Low pressure mercury vapor lamp style UV sterilizers shall be used where indicated on the drawings. These UV sterilizers shall be provided in accordance with the following specifications:
 - Schedule 80 PVC construction of sterilization vessels, chambers, connections and associated fittings.
 - Quartz sleeve for use with single end low-pressure high-output or amalgam mercury vapor UV lamps.
 - 3. Service ports located in UV lamp vessel housing for water drainage and associated sensors with compatible controller module.
 - 4. Mountable enclosed external power source and ballast.
 - 5. Output capacity range of 30-120 mJ/cm² for variable flow rates up to a maximum of 50 PSI.
 - 6. Manufacturer of UV sterilizers shall be Emperor Aquatics, Current USA, Aqua UV, or approved equal.

2.9 REACTORS/WATER CONDITIONERS

- A. Reverse Osmosis-De-ionization (RODI) Filters. RODI filters shall be used for the preparation and conditioning of source water at a rate of 1500 2000 gallons per day where indicated on the drawings. These RODI filters shall be provided in accordance with the following specifications:
- 1. High-efficiency/high-capacity pleated filament or fiber wound sediment sediment pre-filter 0.2-1 micron (up to 98% particulate removal).
- 2. High-capacity granular activated carbon filter.
- 3. Low pressure, high rejection TFC RO membrane with stainless steel housing (>98% efficiency removal rate for organics, dissolved organics, micro-organisms, pyrogens, colloids and conductivity rejection).
- 4. Semiconductor-grade DI cartridges with housing.
- 5. Integral booster delivery and permeate pump up to 100 PSI delivery pressure.
- 6. Dual probe 0-999 digital TDS meter with multi-point water purity monitoring.
- 7. Microprocessor control module with automatic periodic membrane flush.

8. Manufacturer of RODI filters shall be SpectraPure, Kent Marine, Aqua FX or approved equal.

2.10 WATER QUALITY MONITORS, PROBES, SENSORS, INDICATORS AND TRANSMITTERS

A. General: Pressure gauges, pressure switches, thermometers, flow meters, level sensors, level switches, ORP (oxidation-reduction potential) probes, temperature elements, and other water quality instruments shall be provided where indicated on the drawings and specifications. All water quality instruments shall be 24V DC. The CONTRACTOR shall provide 120V AC to 24V DC transformers where required and shall coordinate any other electrical requirement for these items with the ACS. For flow meters, ORP probes, temperature elements, and other insertion type instruments, the CONTRACTOR shall provide tees or saddles supplied by the probe or sensor manufacturer for proper installation of the instruments into the process piping and shall provide the instrument size suitable for the size of the process piping at the point of installation.

B. Connector Plugs:

1. The CONTRACTOR shall provide and install connector plugs where indicated on the drawings. Connector plug shall consist of a Type 316 stainless steel 1/4-inch NPT fitting rated for 500 psi, two self-sealing valves with intervening pocket, and core type orifice, with neoprene gaskets; suitable for inserting a 1/8-inch O.D. probe assembly from dial type gauge. Equip orifice with screw cap and cap retainer. In addition, the CONTRACTOR shall provide four gauge adapters with 1/8-inch O.D. probe. Gauge adapter shall be constructed of Type 316 stainless steel.

C. Thermometers:

- 1. Thermometers shall be as specified by the mechanical engineer, with the exception that all exposed metallic components shall be Type 316 SST. The scale of the thermometers shall be suitable for the specific process flow stream.
- 2. Thermometers shall be provided on piping connections using an oversized tee and Type 316 SST well. Locate one thermometer in each of the following locations for each life support system and as noted on the drawings: heat exchanger supply piping (HXS), heat exchanger return piping (HXR), chilled water supply piping (CWS) chilled water return piping (CWR), hot water supply piping (HWS), and hot water return piping (HWR).

D. Temperature Sensors:

1. Temperature sensors shall be provided where indicated on the drawings. Enclosures for flow indicator/transmitters shall be rated NEMA 4X and shall be provided with a mounting kit suitable for mounting the enclosure on a wall, stanchion or other stationary surface.

The temperature indicator/transmitter shall include a digital display, a 4 to 20 mA output and two relays.

- a. LCD digital display with adjustable temperature range from -30°F (-34°C) to 220°F (104°C).
- b. +/- 1°, single digit accuracy
- c. Vinyl covered 8-foot (2.4m) sensor included standard with the control
- d. Vapor tight, NEMA 1, IP23, flame retardant gasketed plastic enclosure with stainless steel hardware
- e. UL listed
- f. Pre-wired terminal blocks for heater thermal protector interface.

2.11 FIBERGLASS (FRP) AND PVC FABRICATIONS

A. General:

- 1. The CONTRACTOR shall furnish and install fabricated fiberglass and PVC items, complete and serviceable as shown and specified herein, all in accordance with the requirements of the Contract Documents.
- 2. Manufacturer's Experience: All fiberglass and PVC items to be provided under this Section shall be furnished only by manufacturers having experience in the manufacture of similar products, with a record of successful installations.
- 3. Quality: All fiberglass items shall be constructed of new, first class, commercial-quality, fiberglass reinforced polymer material of the strength, thickness, and dimensions shown and specified herein, using the matched die-molded method.
- 4. Finish: All finished surfaces of fiberglass items and fabrications shall be smooth, resinrich, free of voids and without dry spots, cracks, or unreinforced areas, and shall provide for corrosion resistance and weathering. Outer surfaces shall be reasonably smooth and no glass fibers shall be exposed.
- 5. Supports and Fasteners: The CONTRACTOR shall provide all bolts, anchor bolts, nuts, washers, and supports required for all the PVC and fiberglass items in accordance with the requirements of the manufacturers of the PVC and fiberglass items. All bolts, anchor bolts, washers, supports and other metal hardware required for the PVC and fiberglass items shall be Type 316 stainless steel, unless specified otherwise. Connection to walls and concrete pads shall be in accordance with wind and seismic requirements of the local building codes and the design calculations provided by the tank manufacturer.

B. Fiberglass Grating:

- 1. Construction: Fiberglass grating shall be of a square pattern with bars at 1-1/2 inches on center and the thickness of the fiberglass grating shall be 1-1/2 inch minimum Unless otherwise noted on the drawings. All cut edges shall be resealed with a premium vinyl ester resin. Supports shall be spaced as required to ensure that the maximum deflection under a design load of a 250 lb. concentrated load and a 100 psf uniformly distributed load remains less than 3/8-inch. Supports shall be provided as shown on the drawings. Where pedestals are used to support the grating, pedestals shall be fixed-type. The CONTRACTOR shall provide structural design calculations for the grating support system signed and stamped by a registered structural engineer in the STATE OF NEW YORK.
- 2. Grate shall be molded from standard fiberglass using a chemical resistant resins. All FRP grating, supports, anchor bolts and hardware located within the ozone contact tower and deaeration tower shall be constructed using a premium vinyl ester resin. All FRP grating, supports, anchor bolts and hardware located within the exhibit pools shall be constructed using a premium vinyl ester or isophthalic polyester resin.
- 3. Unless otherwise noted or requested by the COMMISSIONER, all FRP grating shall be installed with the smooth side up.
- 4. Fiberglass grating shall be as supplied by Sea-Safe, Chemical Proof Corporation, Chemgrate, Delta Composites, R&B Aquatics, or approved equal.

C. Fiberglass (FRP) Fabrications:

- 1. General:
- a. The CONTRACTOR shall furnish all labor, equipment, materials, tools, supplies, fittings, and appurtenances required for the fabrication, support, installation, anchorage, hook-up, lining, protective coating, testing and backfilling of fiberglass reinforced plastic tank(s), and all appurtenant work, for a complete and workable installation as specified herein, all in accordance with the requirements of the Contract Documents.
- b. The fiberglass items specified under this Section shall be furnished by a manufacturer having 3 years experience of similar products and having a record of successful installations in similar applications.
- c. All plastic and fiberglass items shall be manufactured of material suitable for ozonated seawater and shall be certified for such use on the shop drawings.
- d. Tanks shall be designed for all hydraulic, wind and seismic loads suitable for the location of the project site.

2. Reference Specifications, Codes and Standards:

- a. ASTM C 581-83 Practice for Determining Chemical Resistance of Thermosetting
- b. Resins Used in Glass Fiber Reinforced Structures, Intended for Liquid Service.
- c. ASTM D 638-82a Test Method for Tensile Properties of plastics.
- d. ASTM D 695-80 Test Method for Compressive Properties of Rigid Plastics
- e. ASTM D 790-81 Test Methods for Flexural Properties of Unreinforced and
- f. Reinforced Plastics and Electrical Insulating Materials.
- g. ASTM D 883-82a Definitions of Terms Relating to Plastics.
- h. ASTM D 2563-70 Recommended Practice for Classifying Visual Defects in Glass-
- Reinforced Plastic Laminate Parts.
- ASTM D 2583-81 Test Method for Indentation Hardness of Rigid Plastics by Means j.
- k. of a Barcol Impressor.
- 1. ASTM D 2584-68 Test Method for Ignition Loss of Cured Reinforced Resins.
- m. ASTM D 3299-81 Specification for Filament-Wound Glass Fiber Reinforced
- n. Thermoset Resin Chemical-Resistant Tanks.
- o. ASTM D 4097-82 Standard Specification for Contact-Molded Glass-Fiber-
- p. Reinforced Thermoset Resin Chemical-Resistant Tanks.

When two or more of the above regulations are applicable, the more stringent requirement shall be met.

3. Construction:

- a. General: Fiberglass structures shall be constructed with a continuous shell and shall be fabricated using the filament winding methods, and in accordance with ASTM D 3299. For low to medium volume applications or molded type structures, the hand lay-up technique shall be used and conform to ASTM D 4097.
- b. The structural laminate and corrosion barrier construction shall be as follows:
- 1. All internal wet surfaces shall be sealed with a two-layer resin rich corrosion barrier liner. The surface layer shall consist of two layers of C-veil 90 percent resin and 10 percent glass. Each veil shall be 10 mils thick. The inner layer shall consist of two layers of 1.5 oz. chopped strand mat with 60 percent resin and 40 percent reinforcement. The total combined thickness of the corrosion barrier shall be 100 mils minimum.
- 2. Non-Corrosive Applications: For non-corrosive environments, such as freshwater storage basins, the corrosion barrier and structural laminates shall utilize a premium grade isophthalic polyester resin.
- 3. Corrosive Applications: For ozonated and/or chlorinated freshwater and saltwater, vinyl ester resin shall be used for the all layers of the corrosion barrier and the structural laminates. Vinyl ester resin shall be Derakane Momentum 411, Ashland Hetron 922, Atlac 382 or approved equal.

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- 4. Unless otherwise noted, resins for all fiberglass fabrications shall be selected for corrosive applications as described above.
- 5. All FRP structures shall be post-cured in accordance with FDA requirements.
- c. Top Heads and Bottoms.
- 1. Top heads, regardless of shape, shall be able to support a single 250 lb. load on a 4 ft by 4 ft area without damage and with maximum deflection of $\frac{1}{2}$ percent of the tank diameter at the area the load is applied.
- 2. Flat bottoms shall be molded integrally with the shell wall.
- d. Fittings and Accessories.
- 1. Unless otherwise specified, all connections shall be flanged. All flanges shall be made by hand lay-up. Flanges shall be flat and true to a tolerance of plus or minus 1/32 inches. If machining is required, the machined surface shall be faced with "C"-glass veil. Machine facing of the back of hand lay-up flanges is not permitted. All bolt holes shall be spot faced for SAE-size washers if required. Flange drilling on pipe connections shall be in accordance with ANSI B-16.5 for 150-psi pressure class. Minimum flange thickness shall, be based on 50 psi pressure rating.
- 2. All nozzles shall be reinforced with plate gussets. Conical gussets having comparable strength may be substituted for the plate gussets, but a drain hole must be provided in the base of the conical gusset at its lowest point of installation on the tank wall.
- 3. Bolt holes in flanged nozzles are to straddle the vertical centerline. Tolerance in bolt holes location and in diameter of bolt circle shall be plus or minus 1/16-inch.
- 4. On all flanges joints, use 1/8-inch thick full-faced elastometric gaskets having a Return Shore A Durometer hardness of 60 + 5.
- 5. Hold Down Lugs shall be provided on all vertical flat bottom tanks. The design, number, and attachment of such lugs is the responsibility of the fabricator, based on the wind, seismic, and other loads specified.
- 6. Compression molded or cemented on flanges are prohibited.
- 7. Vertical dish or cone bottom tanks shall have integral fiberglass skirt.
- 8. Fiberglass reinforced threaded fittings shall be installed with laminates inside and outside as required for flanged nozzle.
- 9. The reinforcement pad of nozzle and manway openings in the vessel walls shall consist of alternate plies of mat and woven roving with the final top layer being a

mat surfacing veil.

- 10. All FRP and PVC fabrications that are outside or otherwise exposed to natural sunlight shall be provided with a UV resistant coating to protect the items from damage or degradation from exposure to UV radiation.
- 11. Where insulation is shown or specified, the FRP structure shall be insulated with 1-inch thick fiberglass insulation with aluminum jacketing, or approved equal. Insulation shall not block name plates of other identifying items on the exterior of the tower.
- 12. Manufacturers: All custom FRP tanks, skimmers, boxes, sump boxes, and hydraulic structures shall be as manufactured by Custom Structures Corporation, Canyon Lake, TX (800-745-7181), Waterdog Products, El Cajon, CA (619-441-9688), Red Ewald, Karnes City, TX (800-242-3524), or approved equal.

2.12 PIPE PENETRATION FIRESTOPPING

A. Materials:

- 1. Provide materials classified by a qualified third party test facility tested in a system to provide fire resistance equal to at least the rating of construction assembly being penetrated.
- 2. Provide asbestos free materials that comply with applicable codes and have been tested in accordance with ASTM E-814 (ANSI/UL 1479), ASTM E-119 (ANSI/UL 263).
- 3. For PVC pipe penetration through fire rated walls, firestopping shall be provided in accordance with UL System No. W-J-2091 or C-AJ-2420. The firestopping details used for each penetration shall be suitable for the size and type of pipe and the fire rating of the wall or floor penetrated by the pipe.

B. Acceptable Manufacturers:

- 1. Products meeting the requirements described above. The following manufacturers are approved; Tremco, 3M, Dow Corning, or equal.
- C. System Types: Use a system that best matches the wall and floor construction or refer to the manufacturer's published literature.

PART 3 EXECUTION.

3.1 INSPECTION

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- A. Examination: The CONTRACTOR shall examine surfaces for conditions that will adversely affect execution, permanence and quality of work. The CONTRACTOR shall work with the COMMISSIONER to identify any existing facilities which may interfere with the WORK.
- B. Unsatisfactory Conditions: The CONTRACTOR shall correct unsatisfactory conditions before proceeding with the WORK.
- C. Operational Tests: prior to formal acceptance of WORK, the CONTRACTOR shall successfully start, operate, maintain, stop, and secure all mechanical plants under this project for 10 consecutive days (12 consecutive hours per day during times of normal facility operation). Testing sequence shall be completed as described below. The COMMISSIONER shall witness the tests. Upon completion of such successful operational tests, submit statement, signed by said witnesses, certifying such successful tests. The CONTRACTOR shall bear all expenses incurred under this provision, witnesses' expenses excepted.
- D. Operating Instruction: Upon completion of WORK and acceptance of operation and maintenance manuals, the CONTRACTOR shall provide instruction on the operation of the treatment system equipment, systems and appurtenances for a period of 8 hours, at a time designated by the COMMISSIONER. Upon completion of instruction, the CONTRACTOR shall obtain from the COMMISSIONER a dated and signed statement certifying the completion of such instruction.
- E. Fiberglass vessel inspection to include the following:
 - a. Visual defects. ASTM D 2563 shall be used for quality control of both filament-wound and hand lay-up construction. Acceptance levels shall be as follows:
 - 1. Process Surface: Defects:
 - a. Blisters None
 - b. Burned Areas None
 - c. Chips None
 - d. Cracks None
 - e. Crazing None
 - f. Dry Spots None
 - g. Entrapped air None at surface. If in laminate 1/16-in.dia.max. and 5/sq.in. max.
 - h. Exposed Glass None
 - Exposed Cut Edges None
 - j. Foreign Matter None
 - k. Pits Max. 1/8 in. dia. x 1/32-in deep, max. 10/sq.ft.
 - Scratches None (coated)
 - m. Surface Porosity None
 - n. Wrinkles Max. deviation 10 percent of wall thickness
 - o. Sharp Discontinuity None
 - Non-Process Surface: Defects:

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- a. Blisters Max. 1/4-in. x dia. 1/16-in high
- b. Burned Areas None
- c. Chips Max. 1/4-in. with max. thickness of 20 percent of wall
- d. Cracks None
- e. Crazing Slight
- f. Dry Spots Max. 2 sq. in./sq. ft.
- g. Entrapped Air 1/8-in. dia., max., no more than 3 percent of area.
- h. Exposed Glass None
- i. Exposed Cut Edges None
- j. Foreign Matter None if it affects the properties of laminate.
- 3. Non-Process Surface: Defects:
- a. Pits Max. 1/8-in. dia x 1/16-in deep.
- b. Scratches None (coated)
- c. Surface Porosity None
- d. Wrinkles Max. deviation 20 percent of wall thickness, but not to exceed 1/8-in.
- e. Sharp Discontinuity None
- b. If the area fails to meet the requirements of entrapped air or voids in less than 40 percent of the total surface, those areas may be repaired and re-inspected. If the defective areas exceed 40 percent of the total surface, the entire vessel shall be rejected.
- c. Check for compliance with drawing dimensions and adherence to construction standards.
- d. An acetone wipe test to check surface cure. No surface tackiness is permitted.
- e. A barcol hardness test; at least 90 percent of manufacturer's specified hardness must be attained.
- f. Examination of laminated (nozzle) cutouts.
- g. A hydrotest of at least 24 hours duration to check for leaks.

F. Review of Work:

- 1. The CONTRACTOR shall not allow or cause any mechanical work to be covered, concealed or enclosed until such work has been tested and reviewed. Should such work be covered, concealed or enclosed before being tested and reviewed, such shall be uncovered and thereafter restored at no additional cost.
- 2. The right of the COMMISSIONER to conduct job site observation of the CONTRACTOR's performance is not intended to review the adequacy of the CONTRACTOR's safety measures in, on, or near the construction site. The CONTRACTOR shall be solely responsible for the adequacy of such safety during all hours of the construction duration.

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- G. Project Close-Out Requirements:
 - 1. The CONTRACTOR shall provide the following items as prerequisite to formal acceptance of the project:
 - a. Reproducible Record Drawings.
 - b. Valve Identification Chart.
 - c. ASME Certificates.
 - d. Maintenance and Operating Manuals.
 - e. Operating Instructions and Certified Statement.
 - f. Certified Statement of Successful Test.
 - g. Pump Installation Certificate.
 - h. Provide all required spare parts.

3.2 INSTALLATION

A. General

- 1. The CONTRACTOR shall not allow or cause any mechanical work to be covered, concealed or enclosed until such work has been tested and reviewed. Should such work be covered, concealed or enclosed before being tested and reviewed, such shall be uncovered and thereafter restored at no additional cost.
- 2. The right of the COMMISSIONER to conduct job site observation of the CONTRACTOR's performance is not intended to review the adequacy of the CONTRACTOR's safety measures in, on, or near the construction site. The CONTRACTOR shall be solely responsible for the adequacy of such safety during all hours of the construction duration.
- B. Pipe and Equipment Installation:
 - 1. The CONTRACTOR shall install all piping, valves, and equipment in a manner and in locations to avoid obstructions and keep openings clear. Pipe and/or equipment shall not be installed where it will present a potential tripping hazard or below 7'-0" above finished floor, where it would be a potential head knocking hazard. Installation shall permit direct access to all valves and pieces of equipment that will require maintenance. The CONTRACTOR shall make any changes as directed by the COMMISSIONER, at no additional expense, which may be necessary in order to accomplish this purpose.
 - 2. Before being placed in position, all pipe, pipe fittings and accessories shall be cleaned,

and shall be maintained in a clean condition. Piping shall be installed and aligned in accordance with the Drawings with a tolerance of \pm 1/8-inch in the horizontal and vertical directions.

- 3. All work specified and not clearly defined by the Drawings shall be installed and arranged as directed and in a manner satisfactory to the COMMISSIONER.
- C. Valves: All valves, operating units, stem extensions, and accessories shall be installed as shown and specified. All valves shall be installed to provide easy access for operation and maintenance and to avoid conflicts between valve operators and structural members. Where combinations of valves, sensors, and controls are specified, it shall be the responsibility of the CONTRACTOR to properly assemble and install these various items so that all systems are compatible and operating properly. The relationship between interrelated items shall be clearly noted on shop drawing submittals.
- D. Testing of pumps and motors: The CONTRACTOR shall be responsible for the coordination of the following tests for each pump, drive, and motor:
 - 1. Field Tests: All pumping units shall be field tested after installation, in accordance with the Contract Documents, to demonstrate satisfactory operation, without causing excessive noise, vibration, cavitation, and overheating of the bearings. The field testing shall be performed in the presence of an experienced field representative of the manufacturer of each major item of equipment, who shall supervise the following tasks and shall certify in writing that the equipment and controls have been properly installed, aligned, lubricated, adjusted, and readied for operation:
 - a. Start-up, check, and operate the equipment over the entire speed range. The vibration shall be within the amplitude limits recommended in the Hydraulic Institute Standards and it shall be recorded at a minimum of 4 pumping conditions defined by the COMMISSIONER.
 - b. Pump performance shall be documented by obtaining concurrent readings, showing motor voltage, amperage, pump suction head, and pump discharge head, for at least 4 pumping conditions at each pump rpm. Each power lead to the motor shall be checked for proper current balance.
 - c. Bearing temperatures shall be determined by a contact-type thermometer. A running time of at least 20 minutes shall be maintained for this test, unless liquid volume available is insufficient for a complete test.
- d. Electrical and instrumentation testing shall conform to applicable sections of these Specifications.

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- e. The field testing shall be witnessed by the COMMISSIONER. In the event any of the pumping equipment fails to meet the above test requirements, it shall be modified and retested in accordance with the requirements of these Specifications. The CONTRACTOR shall then certify in writing that the equipment has been satisfactorily tested, and that all final adjustments thereto have been made. Certification shall include date of final acceptance test, as well as a listing of all persons present during tests, and resulting test data. The cost of all work performed in this paragraph by factory-trained representatives shall be borne by the CONTRACTOR. When such personnel are available, the COMMISSIONER will provide assistance in the field testing. The CONTRACTOR shall not delay the field testing due to the unavailability of the COMMISSIONER's personnel for assistance.
- 2. Instruction of the CITY OF NEW YORK: The CONTRACTOR shall provide for the services of a factory service representative to instruct the CITY OF NEW YORK in the operation and maintenance of the equipment. This service shall consist of a one day's visit to the plant for each type of similar pumps.
- 3. After completion of the installation and testing, the CONTRACTOR shall remove all debris from the site, clean all the pumping equipment and controls, and hand over this work in perfect operating condition.
- 4. After completion, the CONTRACTOR shall furnish to the COMMISSIONER the manufacturer's written guarantees that the pumping equipment will operate with the published efficiencies, heads, and flow ranges and meet these specifications. The CONTRACTOR shall also furnish the manufacturer's warranties as published in its literature and as specified.

E. Installation of Piping:

- 1. All PVC and ABS Pipe will be transported, stored and installed with regard to manufacturer's recommendations. Bolting of PVC flanges shall be in accordance with manufacturer's recommendations and shall not be unduly stressed through the use of excessive torque while tightening bolts. Use of torque wrench will be required.
- 2. Bolting of PVC flanges shall be in accordance with manufacturer's recommendations and shall not be unduly stressed through the use of excessive torque while tightening bolts. Use of torque wrench will be required.
- 3. Penetrations Through Hydraulic Structures or Non-Hydraulic Structures: Where passing through a wall, floor or ceiling of a hydraulic structure or through a concrete at-grade or below-grade wall or floor (i.e., slab on grade, below-grade wall, etc.), all pipes shall be provided with a wall flange and hydrophilic waterstop as shown on the drawings.

- 4. Penetrations Through Other Non-Hydraulic Structures: Unless otherwise noted, where passing through a wall, floor or ceiling of a non-hydraulic structure, pipes shall be provided with 1-inch thick bead of waterproof polyurethane sealant all around per the drawings and treated to comply with code required floor or wall fire rated assembly or system acceptable to local jurisdiction.
- 5. Below-Grade Flanges: Below-grade flanges shall not be used without prior approval by the COMMISSIONER. In the rare instance where use of below grade flanges is approved, additional protective measures shall be required as determined by the COMMISSIONER and shall provided and installed at no additional cost to the CITY OF NEW YORK.
- 6. Insulation: The LSS piping shall be insulated where required on the drawings and in accordance with referenced specifications.
- 7. High Points and Low Points: High-points shall be avoided for all below-grade piping except where specifically approved by the COMMISSIONER. For horizontal segments of pipe, the definition of high-points shall include, but not be limited to, elevation differences in excess of one percent of the pipe span between adjacent pipe supports (for both temporary and permanent supports). For both above-grade and below-grade piping, high point vents shall be provided for all high points. For above-grade piping, low point drains shall be provided for all low points. Where high point vents are installed, they shall terminate with a vent and a valve in an accessible above-grade location approved by the COMMISSIONER.
- 8. Pipe to Wall Penetration Closures for Non-Hydraulic Below-Grade Structures:
- a. Description: Where shown, pipe to wall penetration closures seals shall be modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill the annular space between the pipe and wall opening. Links shall be loosely assembled with bolts to form a continuous rubber belt around the pipe with a pressure plate under each bolt head and nut. After the seal assembly is positioned in the sleeve, tightening of the bolts shall cause the rubber sealing elements to expand and provide an absolutely water-tight seal between the pipe and wall opening. The seal shall be constructed so as to provide electrical insulation between the pipe and wall, thus reducing the possibility of cathodic reaction between them. All metal hardware shall be Type 316 SST.
- b. Wall Opening: CONTRACTOR shall determine the required inside diameter of each individual wall opening or sleeve before ordering, fabricating or installing. The inside diameter of each wall opening shall be sized as recommended by the manufacturer to fit the pipe and Link-Seal to assure a water-tight joint.
- c. Installation: CONTRACTOR shall install the devices in accordance with

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the manufacturer's instructions and installation requirements. Installation shall be conducted in such a fashion to avoid damage to the associated piping, fittings, joints, etc.

9. All life support piping shall be flushed clean prior to connection to equipment or tanks.

F. Installation of Pipe Supports:

- 1. The CONTRACTOR shall provide all tools, supplies, materials, equipment, and all labor necessary for the furnishing, construction, and installation of all pipe supports, hangers, guides, and anchors shown, specified, or required for a complete and operable piping system, in accordance with the requirements of the Contract Documents. Supports shall be manufactured of Type 316 SST, Type 6061-T6 aluminum, or fiberglass components, as shown and required by these specifications for the complete installation.
- 2. Pipe supports shall be provided by the CONTRACTOR to resist all wind, seismic, gravity and thrust forces. Pipe supports shall be provided by the CONTRACTOR with vibration isolation and seismic restraint in accordance with the associated portions of this specification.
- 3. Pipe supports shall be capable of supporting the pipe and its contents in all conditions of operation. They shall allow for free expansion and contraction of the piping.
- 4. Stresses on Equipment: All piping shall be supported to avoid transfer of stresses from piping to equipment, including pumps, filters, heat exchangers, etc.
- 5. Wherever possible, pipes shall be attached to structural members. Where it is necessary to frame structural members between existing members, such supplementary members shall be provided by the CONTRACTOR at no additional cost to the CITY OF NEW YORK. All supplementary members shall be in accordance with the requirements of the building code, the specifications, and the American Institute of Steel Construction.
- 6. Support Spacing: Supports for piping with the longitudinal axis in approximately a horizontal position shall be spaced to prevent excessive sag, bending and shear stresses in the piping with special consideration given where components, such as flanges and valves, impose concentrated loads. Vertical supports shall be spaced to prevent the pipe from being over stressed from the combination of all loading effects. Where calculations are not made or more stringent requirements from pipe manufacturers do not prevail, suggested maximum spacing of supports are given in the tables below.
- a. Support Spacing for Schedule 40 or Schedule 80 PVC Pipe. Pipe Size Suggested Max. Span * inches (@ 100 degrees F) feet

- ½" 4 ft
- 3/4 " 4.5ft
- 1" 5ft
- 1-1/4" 5.5ft
- 1-1/2" 5.75ft
- 2 " 6.25ft
- 3" 7.5ft
- 4" 8.25ft
- 6 " 10ft
- 8" 11ft
- 10" 12.25ft
- 12" 13.25ft
- b. Support Spacing for Fiberglass Reinforced Plastic Pipe Pipe Size Suggested Max. Span * inches (@ 100 degrees F) feet
- 2" 8.8ft
- 3" 10ft
- 4" 11ft
- 6 "-12.7ft
- 8 "-13.4ft
- 10 "-14ft
- 12" 15.5ft
- 14" 16.2ft
- 18" & above 18ft
- * Tables indicates the maximum support spacing based on the pipe manufacturer's requirements. The load bearing capacity of the individual pipe anchors and supports may dictate decreased support spacing intervals. Do not exceed the manufacturer's rated load capacity for the anchors and supports.

- 7. Pipe Hangers: All hangers shall have a means of vertical adjustment after erection. Hangers shall be designed so that they cannot become disengaged by any movement of the supported pipe. Hangers subject to shock, seismic disturbances, or thrust imposed by the actuation of safety valves shall include hydraulic shock suppressers. All hanger rods shall be subject to tensile loading, only.
- 8. Hangers Subject to Horizontal Movements. At hanger locations where lateral or axial movement is anticipated, suitable linkage shall be provided to permit such movement. Where horizontal pipe movement is greater than 1/2 inch, or where the hanger rod deflection from the vertical is greater than 4 degrees from the cold to the hot deflection of the pipe, the hanger rod and structural attachment shall be offset in such a manner that the rod is vertical in the hot position.
- 9. Riser Supports: Risers shall be supported on each floor with riser clamps and lugs, independent of the connected horizontal piping.
- 10. Freestanding Piping: Free-standing pipe connections to equipment, like chemical feeders, pumps, etc., shall be firmly attached to pipe supports anchored to the structure. Exterior, free-standing overhead piping shall be supported on fabricated pipe stands, consisting of pipe columns anchored to concrete footings, with horizontal, welded angles and U-bolts or clamps, securing the pipes.
- 11. Lateral Bracing: All piping (including horizontal and vertical runs of pipe, risers, freestanding piping, etc.) shall be laterally supported to the nearest structural members to prevent movement of the pipes due to thrust loads, seismic loads, wind loads, surge forces, transient conditions, equipment vibration, equipment start-up and shut-down and all other operating and environmental conditionals that may induce movement of the pipes and/or piping system.
- 12. Submerged Supports: All submerged piping shall be supported with hangers, brackets, clips, or fabricated supports. All materials for submerged supports shall be FRP utilizing vinyl ester resin products. Anchor bolts for submerged supports shall also be FRP utilizing vinyl ester resin. Submerged supports shall be designed to resist buoyant forces as well as all gravity, seismic and thrust forces.
- 13. Point Loads: Any meters, valves, heavy equipment, and other potential point loads on PVC, fiberglass, and other pipes, shall be supported on both sides, according to manufacturer's recommendations to avoid undue pipe stresses and failures. To avoid point loads, all supports on plastic and fiberglass piping shall be equipped with extra wide pipe saddles or aluminum shields.
- G. Installation of Pumps and Motors:

- 1. Pumps and motors shall be installed and aligned in accordance with the Drawings and Manufacturer's Recommendations.
- 2. Prior to operation, the manufacturer or an authorized representative of the manufacturer shall certify that each pump has been installed and aligned per the manufacturer's instructions and installation requirements.
- 3. Unless otherwise noted, all pumps shall be installed on concrete housekeeping pads.
- 4. Grouted Bases: For frame mounted horizontal pumps, the cavity between the baseplate and the concrete housekeeping pad shall be filled with grout per manufacturer's instructions. The grout fill shall be installed and cured prior to the pumps being aligned.
- 5. Manufacturer's representative shall supply written certification to the COMMISSIONER that the pumps have been properly installed, aligned and lubricated prior to start-up.
- 6. For pumps without basket strainers, temporary conical-shaped wire screens with a minimum open area equal to 150-percent of the pipe cross section shall be provided to protect end suction pump inlets during startup. CONTRACTOR shall remove screens no sooner than 14 days and not later than 30 days after start-up and continuous operation of the systems. Screens shall be constructed of heavy gauge stainless steel.
- H. Installation of Skimmers and Weirs.
 - 1. Skimmers and weirs shall be installed level and within ¼-inch (in elevation) of all other skimmers and weirs for the same exhibit. This requirement shall be based on all adjustable weir plates being in the completely down position.
- I. Installation of Identification Devices
 - 1. The CONTRACTOR shall furnish, mark, and install identification devices for all exposed piping and valves using colored paint, lettering, flow direction arrows, and related permanent identification devices.
 - 2. Each pipe shall be identified at intervals of 20 feet, and at least one time in each room. Piping shall also be identified at a point within approximately two feet of all turns, elbows, valves, and on the upstream side of all distribution fittings or branches. Sections of pipe that are too short to be identified with color bands, lettered labels, and directional arrows shall be tagged and identified similar to valves.
 - 3. Identification of all exposed pipe shall be accomplished by colored painting of pipe segments and by lettering as specified in Section 2- PRODUCTS.

4. Pumping equipment shall be installed in accordance with approved procedures submitted with the shop drawings, with the manufacturer's written instructions and as indicated on the Drawings, unless otherwise approved by the COMMISSIONER.

J. System Tests:

- 1. Prior to hydraulic testing of concrete structures, exhibits, etc., the CONTRACTOR shall determine with a surveying instrument the following elevations:
- a. Bottom of all sumps.
- b. Top of all skimmers, overflows and weirs.
- 2. Skimmers and weirs shall be level within + 1/4-inch. This information shall be delivered to the CITY OF NEW YORK in typewritten form prior to any waterproofing being applied.
- 3. The CONTRACTOR shall provide one or more full-time mechanical technicians as required to complete the WORK who is familiar with the system for a period of two weeks to aid the COMMISSIONER in testing, starting and operating the system.
- 4. Life Support Piping: Prior to testing, all piping shall be fully supported and anchored and flushed clean with water. All water lines shall be testing using pressurized water at 100 psi. Ozone and compressed air lines shall be tested using filtered, dried air at 100 psi. Leakage allowance for all systems shall be zero. All tests shall be carried out under the observation of the COMMISSIONER. The CONTRACTOR shall provide notification 7 days in advance of proposed testing. Tests performed without observation will not be valid. Following testing, all piping will be immediately covered or capped to prevent entry of foreign material.
- a. The piping systems shall be subjected to hydrostatic tests by slowly filling the system with water while purging air. It is essential to purge all air from the system. High point air vents shall be added as required to ensure all trapped air can be vented. Slowly bring the pipeline up to the 100 psi and hold for 10 minutes. The pressurization pumps shall be disconnected from the pipeline and the pressure in the system shall then be monitored for 4 hours while the pipeline is inspected for leaks.
- b. All return piping (on the suction side of pumps) shall be pressure tested as described above as well as vacuum tested. The process shall be performed in a similar manner to the pressure test. A vacuum pump shall be used to draw full vacuum on the pipeline. After full vacuum is achieved, the vacuum pump shall be disconnected from the pipeline. The system must maintain full vacuum for 4 hours.
- c. All buried, encased, or concealed piping shall be tested prior to covering or backfilling. All buried, encased, or concealed piping shall be tested again after cover

or encasement to verify that the piping has not been damaged during the backfill or the intervening period. This test shall be performed as soon as possible and before additional work on the tanks, buildings, or structure further obstructs the piping.

- d. If changes are made to the piping system or additional piping is added after the acceptance of the tests, re-testing is required.
- e. If the piping systems do not hold test pressure for the duration of the test, the CONTRACTOR shall locate the exact location of all leaks and replace the defective piping sections. PVC welding is not an approved method for repair of PVC piping under any circumstance. The piping systems shall be re-tested after making repairs.
- f. The CONTRACTOR shall isolate all equipment and appurtenances as necessary during the pressure and vacuum tests to ensure that test pressures and test vacuums remain within the rated capacities of such items and do not damage such items.
- g. The CONTRACTOR shall provide pipe extensions, temporary pipe caps, temporary pipe supports and any other items that may be required to perform all tests.

END OF SECTION

SECTION 131300

AQUARIUM EXHIBIT TANKS & HABITATS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

- A. This Section includes fiberglass tanks with acrylic viewing windows and constructed artificial habitats (internal tank rockwork) for the display of aquarium exhibits.
- B. Related Sections include the following:
 - 1. Division 7 Section "Joint Sealants" for sealing joints around aquarium tanks.
 - 2. Division 13 Section "Aquatic Life Support Systems" for systems and components connected to aquarium tanks.

1.3 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Aquarium tanks, including structural reinforcement and foundation, shall be capable of withstanding the effects of dead and live gravity loads.
- B. Seismic Performance: Aquarium tank, including structural reinforcement and foundation, shall be capable of withstanding the effects of earthquake motions as noted below.

1.4 ACTION SUBMITTALS

- A. Product Data: Include rated capacities, accessories, appurtenances, and furnished specialties for each aquarium tank indicated.
- B. Shop Drawings: Show fabrication and installation details for each aquarium tank, including the following:
 - Tank, bottom, and openings and built in fixtures.
 - 2. Plans, elevations, sections, details, and attachments to other work.

3. Shop drawings of all tank rockwork and theming indicating coverage, style, coloring and artificial coral placement.

1.5 QUALITY ASSURANCE

- A. The CONTRACTOR shall furnish all labor, equipment, materials, tools, supplies, fittings, and appurtenances required for the fabrication, support, installation, anchorage, hook-up, lining, protective coating and testing of fiberglass-reinforced plastic tank(s), and all appurtenant work, or a complete and workable installation as specified herein, all in accordance with the requirements of the Contract Documents.
 - 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.
- B. The manufacturer providing the material or equipment specified in this section must, for the past five (5) 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 five (5) years.
- C. All plastic and fiberglass items shall be manufactured of material suitable for ozonated seawater and shall be certified for such use on the shop drawings.
- D. Tanks shall be designed for all hydraulic and seismic loads suitable for the location of the project site. Preparation of Shop Drawings, design calculations, and other structural data shall be by a qualified structural engineer.
 - 1. Design Loads
 - a. Tanks shall be designed to a static water level which is at the top edge of the skimmer box or the top of the tank, whichever is applicable. This is typically several too many inches above the overflow spillway and is used in the event the skimmer drain or overflow plumbing malfunctions.
 - 2. Design Criteria
 - a. The structural design of fiberglass tanks shall follow guidance from the American Society of Mechanical Engineers Standard, ASME-RTP-1-95 (REINFORCED THERMOSET PLASTIC CORROSION RESISTANT EQUIPMENT), and ASTM-4097-95a (STANDARD SPECIFICATION FOR CONTACT-MOLDED GLASSFIBER-REINFORCED THERMOSET RESIN CORROSION RESISTANT TANKS).

- b. The primary aspects of the ASME specifications which must be used are laminate material properties and safety margins. For all static, sustained load cases a safety margin of 10 will be adhered to above the laminates ultimate tensile strength as prescribed in ASME-RTP-1, section 3A-210. In general, this gives an allowable stress for sustained load cases of 1500 psi. For transient, or live load situations a safety margin of 5 must be maintained above the laminates ultimate tensile strength as prescribed in ASME-RTP-1, section 3A-440. In general, this gives an allowable stress of 3000 psi for these cases.
- 3. The deflection criteria for the hydrostatic loads are as follows:
- a. For the design of the FRP panels and top flange a deflection limit of L/240 is required.
- b. For the design of the perimeter of the window opening along each span a deflection limit of L/360 is required.
- c. Deflection requirements are adhered to for seismic.
- 4. Seismic Design
- a. Design the FRP tanks to the 1997 Uniform Building Code, Section 1632. Seismic zone of 4.
- E. Reference Specifications, Codes and Standards:
 - 1. ASTM C 581-83 Practice for Determining Chemical Resistance of Thermosetting Resins used in Glass Fiber Reinforced Structures, Intended for Liquid Service.
 - 2. ASTM D 638-82a Test Method for Tensile Properties of plastics.
 - 3. ASTM D 695-80 Test Method for Compressive Properties of Rigid Plastics
 - 4. ASTM D 790-81 Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
 - 5. ASTM D 883-82a Definitions of Terms Relating to Plastics.
 - 6. ASTM D 2563-70 Recommended Practice for Classifying Visual Defects in Glass-Reinforced Plastic Laminate Parts.
 - 7. ASTM D 2583-81 Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.
 - 8. ASTM D 2584-68 Test Method for Ignition Loss of Cured Reinforced Resins.

- 9. ASTM D 3299-81 Specification for Filament-Wound Glass Fiber Reinforced Thermoset Resin Chemical-Resistant Tanks.
- 10. ASTM D 4097-82 Standard Specification for Contact-Molded Glass-Fiber-Reinforced Thermoset Resin Chemical-Resistant Tanks.

PART 2 - PRODUCTS

2.1 AQUARIUM TANKS

A. Manufacturers: Subject to compliance with requirements, aquarium tanks shall be provided by Waterdog Products, Inc., El Cajon, CA, CalAquaria, Ontario, CA, Titan Aquatic Exhibits, Chandler, AZ or approved equal.

2.2 FIBERGLASS DESCRIPTION

- A. Fiberglass structures shall be constructed with a continuous shell and shall be fabricated using the filament winding methods, and in accordance with ASTM D 3299. For low to medium volume applications or molded type structures, the hand lay-up technique shall be used and conform to ASTM D 4097.
 - 1. The structural laminate and corrosion barrier construction shall be as follows:
 - a. All internal wet surfaces shall be sealed with a two-layer resin rich corrosion barrier liner. The surface layer shall consist of two layers of C-veil 90 percent resin and 10 percent glass. Each veil shall be 10 mils thick. The inner layer shall consist of two layers of 1.5 oz. chopped strand mat with 60 percent resin and 40 percent reinforcement. The total combined thickness of the corrosion barrier shall be 100 mils minimum.
 - b. Non-Corrosive Applications: For non-corrosive environments, such as freshwater storage basins, the corrosion barrier and structural laminates shall utilize a premium grade isophthalic polyester resin.
 - c. Corrosive Applications: For ozonated and/or chlorinated freshwater and saltwater, vinyl ester resin shall be used for the all layers of the corrosion barrier and the structural laminates. Vinyl ester resin shall be Derakane Momentum 411, Ashland Hetron 922, Atlac 382 or approved equal.
 - d. Unless otherwise noted, resins for all fiberglass fabrications shall be selected for corrosive applications as described above.
 - e. All FRP structures shall be post-cured in accordance with FDA requirements.

- 2. Top Heads and Bottoms.
- a. Top heads, regardless of shape, shall be able to support a single 250 lb. load on a 4 ft by 4 ft area without damage and with maximum deflection of $\frac{1}{2}$ percent of the tank diameter at the area the load is applied.
- b. Flat bottoms shall be molded integrally with the shell wall.
- 3. Fittings and Accessories.
- a. Unless otherwise specified, all connections shall be flanged. All flanges shall be made by hand lay-up. Flanges shall be flat and true to a tolerance of plus or minus 1/32 inches. If machining is required, the machined surface shall be faced with "C"-glass veil. Machine facing of the back of hand lay-up flanges is not permitted. All bolt holes shall be spot faced for SAE-size washers if required. Flange drilling on pipe connections shall be in accordance with ANSI B-16.5 for 150-psi pressure class. Minimum flange thickness shall, be based on 50 psi pressure rating.
- b. All nozzles shall be reinforced with plate gussets. Conical gussets having comparable strength may be substituted for the plate gussets, but a drain hole must be provided in the base of the conical gusset at its lowest point of installation on the tank wall.
- c. Bolt holes in flanged nozzles are to straddle the vertical centerline. Tolerance in bolt holes location and in diameter of bolt circle shall be plus or minus 1/16-inch.
- d. On all flanges joints, use 1/8-inch thick full-faced elastometric gaskets having a Return Shore A Durometer hardness of 60 + 5.
- e. Hold Down Lugs shall be provided on all vertical flat bottom tanks. The design, number, and attachment of such lugs is the responsibility of the fabricator, based on the wind, seismic, and other loads specified.
- f. Compression molded or cemented on flanges are prohibited.
- g. Vertical dish or cone bottom tanks shall have integral fiberglass skirt.
- h. Fiberglass reinforced threaded fittings shall be installed with laminates inside and outside as required for flanged nozzle.
- i. The reinforcement pad of nozzle and manway openings in the vessel walls shall consist of alternate plies of mat and woven roving with the final top layer being a mat surfacing veil.

- 4. All FRP and PVC fabrications that are outside or otherwise exposed to natural sunlight shall be provided with a UV resistant coating to protect the items from damage or degradation from exposure to UV radiation.
- B. Where insulation is shown or specified, the FRP structure shall be insulated with 1-inch thick fiberglass insulation with aluminum jacketing, or approved equal. Insulation shall not block name plates of other identifying items on the exterior of the tower.

C. Workmanship

1. Visual defects. ASTM D 2563 shall be used for quality control of both filament-wound and hand lay-up construction. Acceptance levels shall be as follows:

a. Process Surface: Defects:

- 1) Blisters None
- 2) Burned Areas None
- 3) Chips None
- 4) Cracks None
- 5) Crazing None
- 6) Dry Spots None
- 7) Entrapped air None at surface. If in laminate 1/16-in. dia.max. and 5/sq.in. max.
- 8) Exposed Glass None
- 9) Exposed Cut Edges None
- 10) Foreign Matter None
- 11) Pits Max. 1/8 in. dia. x 1/32-in deep, max. 10/sq.ft.
- 12) Scratches None (coated)
- 13) Surface Porosity None
- 14) Wrinkles Max. deviation 10 percent of wall thickness
- 15) Sharp Discontinuity None
- b. Non-Process Surface: Defects:
 - 1) Blisters Max. 1/4-in. x dia. 1/16-in high
 - 2) Burned Areas None
 - 3) Chips Max. 1/4-in. with max. thickness of 20 percent of wall
 - 4) Cracks None
 - 5) Crazing Slight
 - 6) Dry Spots Max. 2 sq. in./sq. ft.
 - 7) Entrapped Air 1/8-in. dia., max., no more than 3 percent of area.
 - 8) Exposed Glass None
 - 9) Exposed Cut Edges None
 - 10) Foreign Matter None if it affects the properties of laminate.
 - 11) Pits Max. 1/8-in. dia x 1/16-in deep.
 - 12) Scratches None (coated)

- 13) Surface Porosity None
- 14) Wrinkles Max. deviation 20 percent of wall thickness, but not to exceed 1/8-in.
- 15) Sharp Discontinuity None
- c. If the area fails to meet the requirements of entrapped air or voids in less than 40 percent of the total surface, those areas may be repaired and reinspected. If the defective areas exceed 40 percent of the total surface, the entire vessel shall be rejected.
- 2. Shop Inspection. The COMMISSIONER shall be permitted access to the plant area at all times during fabrication and shall be notified one week prior to the estimated date of tests and/or inspections. Final inspection and approval shall be obtained prior to shipment unless written waiver is obtained. The shop inspection of the equipment shall include the following:
- a. Check for compliance with drawing dimensions and adherence to construction standards.
- b. An acetone wipe test to check surface cure. No surface tackiness is permitted.
- c. A barcol hardness test; at least 90 percent of manufacturer's specified hardness must be attained.
- d. Examination of laminated (nozzle) cutouts.
- e. A hydrotest of at least 24 hours duration to check for leaks.
- D. Installation: All fiberglass reinforced plastic tanks shall be installed on level concrete pads with neoprene gaskets between them and the concrete to the manufacturer's instructions. All pipes and equipment connecting to the towers shall be firmly supported to avoid stresses on the tower.
- E. Field Inspection: The field inspection shall include the following:
 - 1. An acetone wipe test of field laminated areas to check for surface cure. No surface tackiness is permitted.
 - 2. A barcol hardness test of field laminated areas, at least 90 percent of manufacturer's specified hardness must be attained.
 - 3. A hydrotest of at least 24 hours to check for leaks on field erected towers.

2.3 ACRYLIC VIEWING PANELS

- A. Cast Acrylic Viewing Panels: Reynolds R-Cast, Nippura, CLAX Italia or approved equal.
 - 1. For or equal approval submit full specifications, test data and sample of acrylic to acrylic bond.
- B. Setting Blocks: Acrylic setting blocks as required to set acrylic viewing window in fiberglass rebate.

2.4 FERROUS METALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Tubing: ASTM A 500, cold-formed steel tubing.
- C. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.

2.5 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Silicone Sealant: Dow Corning 795 or approved equal.
- C. Black Out Paint: Acrylic lacquer paint approved by the acrylic manufacturer.

2.6 TANK THEMING (ARTIFICIAL HABITATS)

- A. Artificially themed habitats consisting of rockworks, reef structures, etc. shall be provided by a CONTRACTOR for tanks designated for exhibiting Southeast Asian tropical freshwater, Atlantic-Caribbean tropical marine, and Pacific-California Coast temperate marine habitats as per drawings. Artificial themed habitats shall be provided in accordance with the following specifications:
 - Structures shall be constructed using AZA certified Zoopoxies, polyurethanes, and/or fiberglass materials.
 - 2. Unless otherwise noted all resins for fiberglass and composite materials shall be selected for corrosive applications.
 - 3. Armatures and structural supports for integrity and loading of artificially themed habitats shall be suitable for immersion in aquarium environments and constructed using non-corrosive materials.
 - 4. All structures shall be post-cured rinsed and leached in water in accordance with FDA requirements.

- 5. Installation: Structures shall be fabricated in their entirety at an offsite facility and fitted for installation as whole panels/structures or in segments that can be seamed or bonded into their intended whole structure within the designated tanks as per associated drawings. Attachment points of themed structures must appear to be seamless with edging and connections with tank walls and associated structures hidden from view. These structures shall be fully integrated with any internal life support piping within the tank hidden from view. Coordination of the installation of such structures shall be the responsibility of the CONTRACTOR.
- B. Naturally themed habitats consisting of live rock, living coral and associated base structures for support shall be provided by the CITY OF NEW YORK for the Indo-Pacific live tropical reef habitat.

2.7 MIRROR FILM

A. Manufacturers: 3M, Reflectiv, Solarfilmco or approved equal

2.8 BLACK VINYL

A. Manufacturers: 3M, Arlon, Oracal or approved equal

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements construction layout, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ACRYLIC WINDOW INSTALLATION

- A. Paint black out around edge of acrylic the same width as the bearing surface of the window.
- B. Sand rebate to remove all shine, paying particular attention to the corners. Remove all dust from the rebate.
- C. Adhere neoprene rubber gasket to wet side of rebate and add setting blocks equally spaced around rebate.
- D. Set and secure acrylic panel, on wet side mask along sealant/bonding joint and install backer rod before installing silicone sealant. Smooth sealant and remove masking. Repeat procedures for dry side. Check for problem spots in the sealant and repair. Cure as per silicone manufacturers recommendations.

3.3 METAL SUPPORT STAND FABRICATION

- A. Design metal tank stand to support weight of tank and water, provide engineered shop drawings. Stand will be sitting on a reinforced concrete floor. Stand must be shipped not attached to tank
- B. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm), unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- D. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- E. Form exposed work true to line and level with accurate angles and surfaces and straight edges.
- F. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- G. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts, unless otherwise indicated. Locate joints where least conspicuous.

3.4 STEEL FINISHES

A. Surface Preparation: Clean surfaces according to SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

- 1. After cleaning, apply a conversion coating suited to the organic coating to be applied over it.
- B. Powder Coating: Immediately after cleaning, apply 2-coat finish consisting of epoxy primer and TGIC polyester topcoat, with a minimum total dry film thickness of not less than 0.20 mm (8mils). Comply with coating manufacturer's written instructions.
 - 1. Color and Gloss: Gloss black.

3.5 AQUARIUM TANK INSTALLATION

- A. Coordinate with COMMISSIONER for the best access way to move tanks into the Aquarium.
- B. Erect tanks and accessories level and plumb, secure as required.
- C. Install closure-trim strips and similar items requiring fasteners in a bed of sealant.
- D. Install joint sealant in joints between equipment and abutting surfaces with continuous Joint backing unless otherwise indicated. Produce airtight, watertight, vermin-proof.

3.6 CLEANING

- A. Clean interior and exterior of aquarium tanks, verify cleaning procedures with manufacturer.
- 3.7 SCHEDULE
 - A. Per Construction Drawings

END OF SECTION

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SECTION 135060

AQUARIUM EXHIBIT TANK LIGHTING

PART 1 - GENERAL

RELATED DOCUMENTS 1.1

The following documents apply to all required work for the Project: (1) the Contract A. Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

SUMMARY 1.2

A. This Section includes tank lighting components for the display of aquarium exhibits.

1.3 PERFORMANCE REQUIREMENTS

A. Tank lighting, including structural housings and fixtures for mounting support, shall be capable of withstanding the effected loads.

ACTION SUBMITTALS 1.4

- A. Product Data: Include rated capacities, accessories, appurtenances, and furnished specialties for each light system indicated.
- B. Shop Drawings: Show specifications and installation details for aquarium tank light systems, including the following:
 - 1. Factory ratings and cut sheets for selected lighting fixtures and control devices.
 - Plans, elevations, sections, locations and details for fixtures, mounting structures and associated devices.

CLOSEOUT SUBMITTALS 1.5

A. Operation and Maintenance Data: For the following to include maintenance manuals:

QUALITY ASSURANCE 1.6

A. The CONTRACTOR shall furnish all labor, equipment, materials, tools, supplies, fittings, and appurtenances required for the support, installation, anchorage, hook-up, and testing of tank lighting fixtures, and all appurtenant work, or a complete and workable

installation as specified herein, all in accordance with the requirements of the Contract Documents.

- B. Reference Specifications, Codes and Standards:
- C. UL Listing: All equipment and equipment assemblies shall be in conformance with all local, state and federal codes, statutes and ordinances where they apply, and shall be listed and labeled by Underwriters Laboratories (UL) or code equivalent. The manufacturer shall be fully responsible for compliance with these requirements. If shop or field UL (or other approved testing agency) listing is necessary to meet these requirements, it shall be completed without delay to the project and at no additional cost to the Commissioner.
- D. Warranties: The Contractor shall provide manufacturer warranties for all equipment specified in this section or listed on the construction drawings to a period of not less than one year from the purchase of the equipment.

PART 2 – PRODUCTS

2.1 TANK LIGHTING SYSTEMS

- A. LED lighting systems shall be used for exhibit tanks where indicated on the drawings. These LED lighting systems shall be provided in accordance with the following specifications:
 - Energy efficient single multi-chip LED capable of 5000 25,000K, or 453nm blue.
 - 2. IP65 rated for wet environments.
 - 3. Elliptical reflection for maximum spread and capability of penetrating water depth > 8 ft.
 - 4. Remote LED driver with dimmable function.
 - 5. Mounting brackets and associated hardware for connections and fixture designations as indicated on drawings.
 - 6. Manufacturer of LED tank lighting systems shall be Ecoxotic, Orphek, Kessil or approved equal.

END OF SECTION

SECTION 211300

AUTOMATIC SPRINKLER SYSTEM

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this specification as shown or specified should be in accordance with the requirements of the Contract Documents, General Conditions, Supplementary Conditions, Division 1 – General Requirements.

1.2 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project:
 - 1. The Contract Drawings
 - 2. The Specifications
 - 3. The General Conditions
 - 4. The Addendum
 - 5. The Contract [City of New York Standard Construction Contract].

1.3 WORK INCLUDED

- A. Work of this Section includes all labor, materials, equipment, and services necessary to provide a Combined Standpipe and Automatic Sprinkler System as shown on the drawings and as specified herein.
 - 1. Complete sprinkler system including piping, fittings, valves, sprinklers, alarms, and accessories as indicated on the Drawings and as specified herein.
 - Hydraulic calculations.
 - 3. Testing of systems including written documentation.
 - 4. Fire Extinguishers
- B. General Requirements:
 - 1. All work shall be properly coordinated with the other trades to avoid conflicts. Refer to the architectural drawings for required ceiling elevations and space clearances and details.
 - 2. All necessary cutting and patching in floor slabs, roof slabs, walls and ceiling for the Plumbing and Fire Protection work shall be performed by this contractor. Restore to match existing conditions.

- 4. All materials and workmanship shall be guaranteed for a period of one year from date of final acceptance of this work. Instruct the City of New York's personnel in the proper operation and serving of the system.
- 5. Secure all required permits and approvals and transmit same to the City of New York. Contractor shall be responsible for all fees.

1.4 RELATED WORK

- A. General Requirements for Plumbing Work.
- B. Hangers and Supports.

1.5 QUALITY ASSURANCE

- A. A.N.S.I. -American National Standards Institute
- B. A.W.W.A. -American Water Works Association
- C. F.S. -Federal Specifications
- D. N.F.P.A. -National Fire Protection Association
- E. F.M. -Factory Manual
- F. I.R.I. -Industrial Risk Insurers
- G. U.L. -Underwriters Laboratories
- H. N.Y.C.M.E.A. -New York City Materials Equipment Acceptance
- I. N.Y.C.B.C. -New York City Building Code

1.6 SUBMITTALS

- A. Layout drawings with hydraulically remote areas indicated.
- B. Pipe and Fittings.
- C. Control valves, check valves.
- D. Sprinkler Specialties.
- E. Fire extinguishers.
- F. Alarm actuating devices.
- G. Automatic sprinkler and accessories.
- H. Hydraulic calculations and demand curves in accordance with NFPA-13.
- I. Copy of test reports.
- J. Approval shall be obtained for all equipment and material before delivery to the job site. Delivery, storage or installation of equipment or material, which has not had prior approval, will not be permitted at the job site.
- K. All submittals shall include adequate descriptive literature, catalog cuts, shop drawings and other data necessary ascertain that the proposed equipment and materials comply with

- specification requirements. Catalog cuts submitted for approval shall be legible and shall clearly identify equipment being submitted.
- L. A minimum period of 2 weeks, exclusive of transmittal time, will be required in the Engineer's office each time a shop drawing, product data and/or samples is submitted for review. This time period must be considered by the Contractor when scheduling his work.
- M. Submittals for individual systems and equipment assemblies, which consist of more than one item or component, shall be made for the system or assembly as a whole. Partial submittals will not be considered for approval.
- N. Submittals shall be marked to show specification reference including the section and paragraph numbers.
- O. Submit each section separately and include the following:
 - 1. Information, which conforms to contract requirements. Include the manufacturer's name, model or catalog numbers, catalog information, technical data sheets, shop drawings, pictures, nameplate data and test reports as required.
 - Submittals on all pumps shall be complete with performance curves marked with the design points. Additionally, submittals for any pumps that are in series or parallel with other pumps shall include compounded performance curves for analysis by the Commissioner.
 - 3. Submittals on electrical equipment shall be complete with all power and control wiring diagrams.
- P. Submit samples as directed of items called for in the specifications; samples of the materials, which the manufacturer will actually ship, shall be submitted for approval after award of contract and be properly labeled or identified.
- Q. Sprinklers shall be referred to on drawings, submittals and other documentation, by the sprinkler identification of Model number as specifically published in the appropriate agency listing or approval. Trade names or other abbreviated designations shall not be allowed.
- R. Grooved joint couplings and fittings shall be shown on drawings and product submittals, and be specifically identified with the applicable Victaulic style or series number.

1.7 SHOP DRAWINGS AND COMPOSITE DRAWINGS

A. Promptly prepare and submit all shop drawings required by the specifications, contract and contract drawings, and also all incidental shop drawings required for the proper performance of the work. The shop drawings shall illustrate fully the requirements of the specifications and the contract drawings, and shall accurately show quantities, kind of materials, methods of assembly and all data required for fabrication, erection and installation. The relationship to adjoining work, whether furnished under other subdivisions of this contract or by other contractors, shall be properly shown.

B. At the completion of this phase, hold a coordination meeting with the other Contractors to eliminate any interference among the trades that the drawings indicate and to avoid any conflicts in installing the work.

1.8 OCCUPANCY HAZARD

- A. Sprinkler systems shall be based on noted occupancy hazard, unless the requirements of any specific area make mandatory, a more restrictive system.
 - 1. Light hazard.

1.9 HYDRAULIC CALCULATIONS

- A. Submit for review four (4) sets of hydraulic calculations stamped approved by NYC DOB to provide a complete system of automatic sprinklers.
 - 1. Indicate remote areas and hydraulic reference points.
 - 2. Submit with demand curves.

1.10 APPROVALS

A. NYC DOB.

1.11 CODES AND STANDARDS

- A. Work performed under this Contract shall conform to all applicable laws, ordinances, regulations, codes (state, local and federal), and shall be subject to control of NYC DOB.
- B. Wherever requirements of such laws, codes, regulations differ from the drawings or specifications, they shall take precedence over the drawings specifications, and are expressly made part of the Contract, except where the drawings or specifications are more stringent or require better materials, which would also be acceptable to NYC DOB (i.e., the more stringent code shall always apply).
- C. Any portion of work which is not subject to the approval of The City of New York having jurisdiction shall be provided in accordance with National Fire Protection Association requirements.
- D. Comply with applicable NYC DEP rules and regulations.
- E. Comply with Occupational Safety and Health Act (OSHA) requirements.

1.12 INSPECTIONS, PROGRESS INSPECTIONS, SPECIAL INSPECTIONS AND TESTING

A. New York City Building Code requires the City of New York to directly retain the services of an authorized testing agency to perform all required inspections, tests, progress inspections and special inspections as required by the Building Code. The Contractor shall provide all required support services required by the inspectors.

B. Upon completion or partial completion of the permitted plumbing work, inspections, progress inspections, special inspections and tests shall be conducted by approved agencies or special inspectors qualified to conduct such inspections and tests. Inspections and progress inspections shall be performed in compliance with section BC 109 of the New York City Building Code. Special inspections shall be performed in compliance with sections BC 1704 and BC 1707 of the New York City Building Code for all plumbing systems regulated by the New York City Plumbing Code, sections PC 107, PC 312, Chapters 6, 7, 9 and 11, the New York City Fuel Gas Code, Sections FGC 107, and FGC 406. Refer to article 116 of Chapter 1 of Title 28 of the Administrative Code for additional provisions related to inspections.

1.13 REFERENCE DOCUMENTS AND STANDARDS

- A. Accepted plumbing standards and organization whose abbreviations are used to identify such standards are listed below:
 - 1. A.G.A., American Gas Association.
 - 2. A.S.M.E., American Society of Mechanical Engineers.
 - 3. A.N.S.I., American National Standards Institute, Inc.
 - 4. A.S.S.E., American Society of Sanitary Engineering.
 - 5. A.S.T.M., American Society for Testing and Materials.
 - 6. A.W.W.A., American Water Works Association.
 - 7. C.I.S.P.I., Cast Iron Soil Pipe Institute.
 - 8. C.S., Commercial Standard National Bureau of Standards.
 - 9. F.S., Federal Specifications.
 - 10. N.S.F., National Sanitation Foundation Testing Laboratory, Inc.
 - 11. P.D.I., Plumbing and Drainage Institute.
 - 12. N.F.P.A., National Fire Protection Association.
 - 13. U.L., Underwriters Laboratories.
 - 14. F.M., Factory Mutual
 - B. Upon completion of all Special Inspections, Testing and Building Department sign-off, the fire protection contractor shall secure all certificates of compliance for the following service equipment and transmit same to City of New York:

- 1. Pre-engineered non-water fire extinguishing systems, including systems installed in connection with commercial cooking systems.
- 2. Fire department siamese connections, standpipe system hose outlets and pressure reducing valves.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Steel Pipe:
 - 1. U.S. Steel Company.
 - 2. Youngstown Steel and Tube Co.
 - 3. Republic Steel Corporation.
- B. Ductile Iron Pipe:
 - 1. Clow
 - 2. US Pipe
- C. Grooved M.I. Fittings and Couplings for Grooved Pipe
 - 1. Victaulic Company
 - 2. Gustin-Bacon Manufacturing Company
 - 3. Grinnell Corporation
- D. Sprinkler Specialties:
 - 1. Reliable Automatic Sprinkler Co.
 - 2. Viking Corp.
 - 3. Central Sprinkler Corp.
 - 4. Victaulic
 - 5. Star Sprinkler Corp.
- E. Pipe Couplings/Fittings:
 - 1. Victaulic
 - 2. Gustin Bacon

- 3. Stockham
- 4. Grinnell
- F. Control and Check Valves (Inside):
 - 1. Milwaukee
 - 2. Stockham
 - 3. Victaulic
 - 4. Walworth
- G. Valves (Underground):
 - 1. Clow
 - 2. Mueller
 - 3. Stockham
- H. Backflow Preventers:
 - 1. Watts
 - 2. Wilkins
 - 3. Hersey
 - 4. Ames
- 2.2 PIPING
 - A. Combined system piping shall be suitable for working pressures in accordance with the following table:
 - 1. Pipe, Fitting and Valve Pressure Ratings:

Height from top of System to Fire Pump	Class of 2-1/2" Hose Valves	Fittings wwp in PSI	Valves (Gate and Check) wwp in PSI	Sched. Pipe
0'-115'	A	300	175	40
115'-270'	A	300	250	40

- B. Inside Building:
 - 1. UL listed, FM approved.

- 2. Schedule 40 steel pipe, ASTM A795 or A53, with standard weight threaded or flanged cast iron, or threaded malleable iron fittings, except as noted.
 - a. 8" and larger: Schedule 40.
- 3. Grooved end ASTM A536 ductile iron fittings, full-flow, short radius, Victaulic FireLock, Ward Manufacturing, Anvil International, or approved equal, or forged or fabricated from carbon steel pipe conforming to ASTM A53. Bolted clamp type ductile iron couplings with synthetic rubber pressure-responsive sealing gaskets for grooved end pipe 500psi wwp, similar to Victaulic Style 75 may be used.
 - Rigid Type: Housings shall be cast with offsetting, angle- pattern bolt pads to provide rigidity and support and hanging in accordance with NFPA 13.
 - 1) 1-1/4"-4", Installation ready designed for direct "stab" installation onto grooved pipe without prior disassembly of the coupling, 300 psi, Victaulic EZ Style 009.
 - 2) 5"-8", standard rigid joint, 300 psi, Victaulic Style 005.
 - 3) 10"-12", standard rigid joint, 400 psi, Victaulic Style 07.
 - Flexible Type: Flexible type couplings shall be used in seismic areas where required by NFPA 13. Gaskets shall be suitable for intended service. Victaulic Style 75 or 77.
 - c. Flange Adapters: For use with grooved end pipe and fittings, flat face, for direct connection to ANSI Class 125 and Class 150 flanges, Victaulic Style 744. For direct connection to ANSI Class 300 flanges, Victaulic Style 743.
 - d. Gaskets shall be pressure-responsive, synthetic rubber, listed for use with the housings:

Fire Protection Service	Temperature Range	Gasket Recommendation
Water/Wet Systems	Ambient	Grade EPDM, Type A

- 4. In lieu of threaded cast or malleable iron fittings, carbon steel press fit products may be used for fire protection service. Products shall be UL listed and FMG approved for fire protection service to 175 psi, precision cold drawn carbon steel, externally zinc electroplated, with synthetic rubber o-rings (grade to suit the intended service).
 - a. Use a Victaulic "PFT" series tool with the proper sizes jaw for pressing.
- 5. For 2-1/2" and larger piping Schedule 10 steel piping, ASTM A795 or A53 permitted with roll-grooved ends.
- 6. Expansion fittings:
 - a. Similar to Metroflex "Fireloop."
 - b. Use flexible type grooved joint mechanical couplings equal to Victaulic Style 75, Romac Industries, Metroflex, or approved equal on expansion loops in accordance with the latest Victaulic recommendations for expansion compensation.

C. Underground:

- 1. UL listed.
- 2. Ductile iron, AWWA Class 56, ANSI A-21, cement lined, seal coated, mechanical joint ends.
 - a. Bolted joint, stuffing box type, integral bell with flange made up with rubber ring gasket.
 - b. Similar to Clow.
 - c. Provide flanged connection inside building.
- D. Galvanized pipe for following:
 - 1. All preaction system / dry sprinkler piping.
 - 2. Drain and test piping subject to alternate wetting and drying.
 - 3. Piping inside building between Siamese and check valve.

2.3 CONTROL VALVES

- A. UL listed and FM approved.
- B. 2" and smaller:
 - 1. Ball type, bronze body, threaded or grooved ends, 175 psi wwp, solid wedge disc, slow close with position indicator, supervised one circuit tamper switch, similar to Milwaukee Valve Co. BB-SCS02 or BB-VSCS02 series "Butterball", Clow Valve Company, Stockham, or approved equal.
 - 2. Ball type, bronze alloy body, grooved or threaded ends, 350 psi wwp, chrome plated brass ball, stainless steel stem, brass die cast gear box with supervisory switches, similar to Victaulic Series 728 FireLock Ball Valve, Mueller, Stockham, or approved equal.

C. 2-1/2" and larger:

- 1. Flanged, IBBM, OS&Y gate type, 175 psi wwp.
 - a. Milwaukee No. 2885-FP, Clow Valve Company, Nibco, or approved equal.
 - b. Provide with UL listed 120 volt, closed circuit, supervisory tamper switch.
- 2. Grooved, butterfly valve, 300 psi wwp, synthetic rubber coated ductile iron disc.
 - a. Victaulic Series 705W, Nibco, Milwaukee Valve, or approved equal.
 - b. Provide with supervisory switches and weatherproof actuator.

D. 4" and larger.

1. UL listed, FM approved, butterfly type, 175 psi wwp, iron body, supervised two circuit tamper switch, similar to Victaulic Series 708W.

E. OS&Y.

- 1. UL listed, flanged IBBM, OS&Y gate type, 175 psi wwp; similar to Stockham No.G-634.
- 2. UL listed, FM approved, flanged IBBM, OS&Y gate type, 250 psi wwp; similar to Nibco Valve Co. No. F-607-RW. Where required for 250 psig service.

2.4 FLOOR CONTROL VALVE ASSEMBLY

- A. UL/FMG, floor control valve assembly consists of the following:
 - Control/Indicating Valve: Butterfly-type, 300 psi wwp, ductile iron body with grooved ends, integral weatherproof gear operator, and integral indicating device, provided with supervisory tamper switches. Victaulic Series 705W, Nibco, Milwaukee Valve, or approved equal.
 - 2. Inspector's Test Valve Assembly: Grooved or threaded, globe type, with bronze body and bonnet, bronze and copper alloy internals with stainless steel spring, dual polycarbonate sight glasses, integral orifice, and malleable iron handwheel. Victaulic Style 720 TestMaster II, Tyco, Reliable, or approved equal.
 - 3. Water Flow Device: System Sensor Model WFD, Tyco, Viking, or approved equal, vane type water flow detector.
 - 4. Pressure Gauge.

2.5 DRAIN AND TEST VALVES

- A. Two-piece threaded bronze ball type with chrome-plated brass ball, quarter-turn handle, Stockham No. S-214-TT, Tyco, Reliable, or approved equal.
- B. Grooved or threaded globe type with bronze body and bonnet, bronze and copper alloy internals with stainless steel spring, dual polycarbonate sight glasses, integral orifice, and malleable iron handwheel. Victaulic Style 720 TestMaster II, Tyco, Reliable, or approved equal.
- C. Provide at all low points for system drainage and testing.

2.6 PRESSURE REDUCING VALVES

A. 1 1/2" to 10":

- 1. UL listed, 175 psi rated, ductile iron body, bronze trim, stainless steel spring of required tension.
- 2. Flanged or threaded body, globe or angle pattern, pilot operated, Buna-N diaphragm and disc.
- 3. Internal/external epoxy coated, open/closing speed controls and inlet strainer.
- 4. Cla-Val Model 90G-21KCXHI, 300G, DB, CRDKXHI, Watts, Zurn, or approved equal.
- 5. Provide with pressure relief valve set at maximum of 175 psi and pipe to drain riser.

2.7 BACKFLOW PREVENTERS

- UL listed, FM approved, spring-loaded double check detector assembly.
- B. Toggle lever check valves, two shut-off gate valves, 175 psi wwp, epoxy coated inside and outside, test cocks, horizontal or vertical mounting.
 - 1. 2-1/2" and Larger: Flanged with 5/8" x 3/4" meter.
- C. Wilkins Model 950 DA, Watts, Febco, or approved equal.

2.8 CHECK VALVES

- A. Swing type, except as noted:
 - 1. 2" and smaller: Threaded bronze, 175 psi wwp; Milwaukee No. 509S or approved equal.
 - 2-1/2" and larger: UL/FMG, grooved ends, single-disc design, spring-assisted, ductile iron body with aluminum bronze or elastomer encapsulated ductile iron disc, stainless steel spring and shaft, synthetic rubber or welded-in nickel seat; 250 psi wwp: Victaulic Series 717/717R, Milwaukee Valve, Clow Valve Company, or approved equal.
 - a. 4" and larger sizes available with riser check kit.
 - b. Riser check valves shall be permitted in wet systems that have a constant water pressure. Provide water flow devices equal to System Sensor WFD Series, Potter, Tyco, or approved equal and electric alarm valve.
 - 3. 2-1/2" and larger: Flanged IBBM:
 - a. 175 psi wwp; Stockham No. G-939 or approved equal.

2.9 AUTO BALL DRIPS

A. 3/4" bronze with both ends threaded; similar to Croker 6780 series or approved equal.

2.10 SPRINKLERS

- A. Underwriters' listed, cast brass, body with hex shaped wrench boss, closed fusible link or frangible bulb wet type with ½ inch discharge orifice. "K" factor shall be 5.3 to 5.8 unless otherwise specified or required. Reliable Automatic Sprinkler Co., Inc., Victaulic Company, or as approved.
 - 1. General Hung Ceiling Area: Standard recessed type, chrome plated.
 - a. Reliable model G with matching escutcheon.
 - b. Victaulic model V2707 or V2708 with matching escutcheon.
 - 2. Hung Ceiling Areas, where selected by Architect, fully recessed, concealed type "dull white" painted over.
 - a. Reliable model G-1 Concealer.
 - b. Victaulic model V3801 or V3802.
 - 3. Finished areas without hung ceilings: Standard upright or pendent type chrome plated.
 - a. Reliable model G.
 - b Victaulic model V2703, V2704, V2707, or V2708.
 - 4. Unfinished areas (Mechanical Equipment rooms, etc.): Standard upright or pendent type, rough brass.
 - a. Reliable model G.
 - b. Victaulic model V2703, V2704, V2707, or V2708.
 - 5. Sidewall upright or pendent, dry type head where indicated.
 - a. Reliable model G3, G3A.
 - b. Victaulic model V3609, V3610, V3605, or V3606.
 - 6. Sidewall Chrome plated where indicated.
 - a. Reliable model G-HSW1.
 - b. Victaulic model V2709 or V2710.
- B. Sprinkler heads shall be Underwriters' Approved cast brass closed fusible link or frangible glass bulb type.

FLEXIBLE DROP SYSTEM 2.11

In lieu of rigid pipe offsets or return bends for sprinkler drops, the Victaulic FireLock Flexible A. Drop system, Flex Head Industries, Viking, or approved equal may be used to locate sprinklers as required by final finished ceiling tiles and walls. The drop system shall consist of a braided or corrugated type 304/316 stainless steel hose piece, 1" NPT male threaded adapter for connection to header piping and a 1/2" or 3/4" NPT female adapter for connection to the sprinkler head. Unions shall be provided on either end of the flexible hose for ease of installation. The flexible drop shall attach to the ceiling grid using a one-piece bracket that can be installed without the use of tools and have a 3" minimum bending radius for installation in narrow or confined spaces. The braided drop system is UL listed and FM approved and the corrugated system is UL listed for sprinkler services to 175 psi.

SPRINKLER CABINET 2.12

Enameled steel with approved number of sprinklers of all type and rating installed, two sprinkler wrenches. Install where directed by the Architect. Quantity of sprinklers shall be in A. accordance with NFPA Standards.

SEALS, SIGNS, TAGS AND CHARTS 2.13

- Seals: Provide brass cross link chain, all brass padlock, two keys, or copper wire and approved seal, as required by NYC Fire Department and NYC DOB for each manually operated shut-off A. valve required to be sealed in open position.
- Signs: Provide identification signs of standard design, fastened securely at designated B. locations, as required by NFPA 13, 14, NYC Fire Department, and NYC DOB.
- Tags: Provide brass tags 2" in diameter, stamped with designating numbers and secured with C. 12 gauge copper wire to spindle of all control valves.
- Chart: Provide 2 copies of approved Sprinkler System diagram and valve chart, giving designation number, function, and location of each valve. Mount in painted, glazed frames and D. hang where directed.

SYSTEM TEST PIPES 2.14

- Provide 1" inspectors test pipes fitted with a 1" shutoff valve for each valved sprinkler zone.
 - 1. For open drains: 1" blind test connection, Reliable Model A, Tyco, Viking, or approved equal.
 - 2. Sight glass with 1/2" minimum orifice for closed drain systems.
 - a. Orifice: Sized for minimum flow rate of one sprinkler in respective sprinkler zone.
- Pipe to floor drains or service sink. Floor drains and service sinks shall be provided under В. another Section.

- C. See details on drawings.
- D. In lieu of test pipe assembly, Victaulic Style 720 TestMaster II, Guardian Fire Equipment, Potter Signal, or approved equal alarm test module may be used for each valved sprinkler zone.

2.15 TAMPER SWITCHES

- A. UL listed, FM approved:
 - 1. Potter Electric Signal Co., Model OSYB or OSY-SUA.
 - 2. System Sensor Model OSY2 or PIBV2.
- B. Switch shall be "SPDT" with two sets of spare contacts.
- C. Wiring: Provided under another Section.
- D. Provide on all control valves.

2.16 WATERFLOW SWITCHES

- A. UL listed, FM approved, Reliable Automatic Sprinkler Company Model "A" or System Sensor WFD paddle type with adjustable pneumatic retard device to prevent false alarms due to water surges.
- B. Switch shall be "SPDT" with two sets of spare contacts.
- C. Wiring: Provided under another Section.
- D. Vane type with adjustable pneumatic retard device to prevent false alarms due to water surges.
 - 1. Potter Electric Signal Co., VSR series.
 - 2. System Sensor Model WFD

2.17 ALARM CHECK VALVE

- A. UL listed, FM approved.
- B. IBBM. Body: Cast iron with flanged or ductile iron grooved ends conforming to ANSI B16.5. Clapper: Rubber faced.
- C. Pressure rating: 175 psi wwp and factory tested at 350 psi.
- D. Valve shall be rigged with closed drain retard chamber for variable inlet pressure. Victaulic Series 752, Tyco, Reliable, or approved equal.

- E. Provide with mechanical (Victaulic Series 760, Viking, Tyco, or approved equal) and electrical alarm, pressure switch (System Sensor EPS-10, Gems Sensors, Mamco Precision Switches, or approved equal.)
- F. Provide with trim including pressure gauges, test valves, drain valves, external piping and necessary appurtenances.
- G. Internal parts shall be replaceable without removing valve from installed position. Shall be permitted in wet systems that have a constant water pressure.
- H. Victaulic Series 751, Tyco, Reliable, or approved equal.

2.18 FIRE EXTINGUISHERS

- A. Ten (10) pound size, dry chemical type, U.L. rating 4A:60B:C.
- B. Red polyester coated steel cylinder with pressure gauge and hose with nozzle.
- C. Croker 4010, Buckeye, Larsen's Manufacturing Co., or approved equal.
- D. Fully recessed cabinet where required. 20 gauge box and door, 18 gauge frame, prime finish, glass panel front.
 - 1. Croker 2616, JL Industries, Larsen's Manufacturing Co., or approved equal.
- E. Mechanical/Electrical rooms: 15 pounds CO2 type Croker 4415, Buckeye, Larsen's Manufacturing Co., or approved equal.
- F. Install as required by code or as noted on A/E drawings.

PART 3 EXECUTION

3.1 INSTALLATION REQUIREMENTS

- A. Temporary shutdown of existing services:
 - 1. Install new work and connect to existing work with minimum interference to existing facilities.
 - 2. Temporary shutdown of existing services:
 - a. At no additional charges.
 - b. At times not to interfere with normal operation of existing facilities.
 - c. Only with written consent of City of New York.
 - 3. Maintain continuous operation of existing facilities as required with necessary temporary connections between new and existing work.

- B. Piping shall be installed to be clear of any and all conduits, lighting fixtures, ductwork and heating piping. Consult with the Contractors of the other trades to facilitate the erection of the System.
- C. After cutting, all pipes shall be reamed out to full bore and before erection the inside of all pipes shall be thoroughly cleaned.
- D. In erecting pipe, friction wrenches and vises shall be used exclusively and any pipe cut, dented or otherwise damaged shall be replaced by this Contractor.
- E. Pipe threads shall be made with the best dies and tools available. During threading, the pipes shall be saturated with solvent to assure sharp threads free of burns and notches.
- F. All screwed joints shall be made with the best quality pure red lead, carefully placed on threads of pipe and not in fittings.
- G. Grooved joint piping systems shall be installed in accordance with the manufacturer's (Victaulic, Romac Industries, Anvil International, or approved equal) guidelines and recommendations. All grooved couplings, fittings, valves and specialties shall be the products of a single manufacturer. Grooving tools shall be of the same manufacturer as the grooved components.
- H. Grooved coupling manufacturer's factory trained field representative shall provide on-site training for contractor's field personnel in the proper use of grooving tools, application of groove and installation of grooved piping products. Factory trained representative shall periodically review the product installation. Contractor shall remove and replace any improperly installed products.
- I. Pipe for the press fit system shall be square cut, +/- 0.030", properly deburred and cleaned. Pipe ends shall be marked at the required location to ensure full insertion into the coupling or fitting during assembly. Use a Victaulic 'PFT" series tool, Novopress, Rigid, or approved equal with the proper sized jaw for pressing.
- J. Any and all sprinkler heads placed in location where they are liable to be accidentally hit in the normal course of events shall be provided with heavy wire guards.
- K. Sprinklers in general shall have ordinary degree temperature rating, but any and all heads subject to abnormal heating conditions, as those in vicinity of heating units, boilers, or very close to hot piping, shall be of sufficiently high temperature rating to prevent their accidental discharge when no fire is present.
- L. Sprinklers: Installed on a true axis line in both directions with a tolerance of 1/2" ±. At the completion of the installation, if any heads are found to exceed the above-mentioned, and any adjoining work that may be disturbed in reinstating said heads shall be repaired or reinstated at no additional cost to the City of New York.

- M. The sprinkler bulb protector must remain in place until the sprinkler is completely installed and before the system is placed in service. Failure to follow this instruction could cause damage to the glass bulb, resulting in improper sprinkler operation, serious personal injury and property damage. Remove bulb protectors carefully by hand after installation. Do not use any tools to remove bulb protectors.
- N. Do not install sprinklers that have been dropped, damaged, or show a visible loss of fluid. Never install sprinklers with cracked bulbs.
- O. Piping and fittings shall be so erected that the entire system may be thoroughly drained. On dry-pipe systems branch lines shall be pitched 1/2" in 10'; cross and feed mains shall be pitched 1/4" in 10' minimum.
- P. See Architectural, Structural, Mechanical and Electrical Drawings for construction and interference details. Any changes that may be necessary because of physical conditions or compliance with the standards shall be made by this Contractor without additional cost.
- Q. Specific references in this Section or on the drawings to any article, device, product or material, fixtures or equipment by name, make, or catalog number shall be interpreted as establishing a basis of cost and a standard quality. All the devices shall be of the make and type listed by the Underwriters Laboratories, Inc. No consideration will be granted for any alleged misunderstanding of the materials to be furnished or work to be done due to a lack of information on the drawings or in the Specifications.
- R. Make notifications in respect to location of sprinkler heads, as may be required by field conditions or as may be found necessary by the Architect at the time of installation, valves, fittings, hangers means of draining systems, alarm and connections thereto and all necessary appurtenances shall be installed as required. Any changes that may be necessary because of physical conditions or compliance with the standards and requirements of NYC Fire Department and NYC DOB shall be made by this Contractor without additional cost to the City of New York.
- S. The riser branch assemblies and trimmings shall be installed inside of the building at the locations directed. Approved devices shall be installed for the automatic annunciation of the flow of water. Each wet pipe assembly and its appurtenances shall be so arranged and equipped in an approved manner that the transmission of accidental water flow alarms (due to surges or related conditions) will positively be prevented.
- The system shall be so installed that no part thereof will interfere with doors, windows, heating, plumbing or electrical equipment, and sprinkler heads shall not be located closer than one foot from lighting fixtures or other obstructions and two feet from partitions. Coordinate work with the other trades as to avoid any interference with effectiveness of the Automatic Sprinkler System and incorporate in composite Working Drawings, location of sprinkler heads in relation to other ceiling located equipment, elevations and inverts of piping, ductwork equipment, electrical appurtenances of other Sections in conflict.
- U. Provide all required drains. Inspector's test valve to be installed, supplied from the highest and most remote part of each system in relation to the riser or main branch assembly, and be conveniently accessible. Test pipes to be valved and pipe to discharge through proper orifice to floor drains or sinks and/or as indicated on the Drawings.

- V. After the piping installations have passed a satisfactory hydrostatic test and/or air test all iron and steel parts shall be thoroughly cleaned ready for painting.
- W. All piping shall be accurately cut to measurements established by the Contractor and shall be installed without springing or forcing.
- X. Drips and drains shall be installed at low pressure points and where required and shall discharge to open sight drains or to standard interior floor drains or service sinks.
- Y. Direct connection from any drain to any component of the sanitary drainage system shall be prohibited.
- Z. Furnish and set sleeves in walls and floors as required. Escutcheons shall be provided at all penetrations through finish/exposed areas.
- AA. Provide all valves 6" and larger with a rating of over 150 lbs. with a 1" bypass valve of same pressure rating as the bypassed valve.
- BB. All pipe openings shall be capped or plugged during construction and all piping shall be flushed out before closing system.
- CC. Pipe compound shall be applied to male threads only.
- DD. Sprinkler heads installed in fittings before piping is erected shall be prohibited.
- EE. A drain connection shall be provided near the base of each riser and at lowest point of each horizontal main.
- FF. The use of bushings to reduce the size of openings of fittings is prohibited.
- GG. Before ordering any material or doing any Work, verify all measurements, ceiling heights and conditions at the Site and be responsible for the correctness of same. Extra charges or compensation will not be allowed on account of differences between actual measurements and the dimensions shown on the Drawings, but any such differences which may be found shall be submitted to the Architect for adjustment, before proceeding with the work.
- HH. Provide flushing connections for flushing scale and foreign material from sprinkler system in accordance with NFPA.
- II. Installation: Made by contractor, specializing in sprinkler and fire protection work, having not less than three years experience in installing systems of comparable size.
- JJ. See Architectural, Structural, Mechanical and Electrical Drawings for construction details of the new and alteration work. Any changes that may be necessary because of physical conditions or compliances with the standards shall be made by the Sprinkler Contractor without additional cost to the City of New York.

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AUTOMATIC SPRINKLER SYSTEM

3.2 TESTING

A. Before any paint is applied, the system shall be tested hydrostatically at not less than 200 psi pressure for two (2) hours minimum, and in accordance with all requirements of NYC DOB, NYC Fire Department, and NFPA latest edition.

END OF SECTION

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SECTION 220500

GENERAL REQUIREMENTS FOR PLUMBING 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.

1.2 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project:
 - The Contract Drawings
 - 2. The Specifications
 - 3. The General Conditions
 - 4. The Addendum
 - 5. The Contract [City of New York Standard Construction Contract].

1.3 WORK INCLUDED

- A. Work of this Section includes all labor, materials, equipment, hoisting and rigging, scaffolding and services necessary to complete the Plumbing Work as shown on the drawings and specified herein, including, but not limited to, the following:
 - Excavation and backfill.
 - Temporary toilet facilities and water for construction.
 - Domestic water and sprinkler services.
 - Sanitary drainage and vent systems.
 - Storm water drainage systems.
 - 6. Sump pumps.
 - 7. Domestic water systems.
 - 8. Fuel gas systems.
 - 9. Insulation.

- 10. Plumbing fixtures.
- 11. Valved water for HVAC equipment.
- 12. Connection to Existing Piping.
- 13. Electrical equipment as noted.
- 14. Removals.
- 15. Shop drawings and samples.
- 16. Testing of systems.
- 17. Record and as-built drawings.

1.4 WORK NOT INCLUDED

- A. Finished painting.
- B. Toilet accessories except installation as required by DDC and NYC DOB.
- Electrical power wiring other than control wiring.
- D. Installing cover frames for sump pits.
- E. Drainage piping extended from HVAC equipment.

1.5 CONTRACTOR'S RESPONSIBILITY

- A. Contract drawings for plumbing work are diagrammatic, intended to convey the scope of work and indicate general arrangement of equipment, piping and approximate sizes and locations of equipment outlets. Plumbing trade shall follow these drawings in layout of their work, consult general construction, structural and electrical and automatic sprinkler drawings to familiarize themselves with all conditions affecting their work, and shall verify spaces in which their work will be installed. The drawings indicate size, connections points, and routes of piping. It is not intended however, that all offsets, rises, and drops are shown.
- B. Be responsible for establishing grades and elevations, checking of all interferences, and verify all dimensions and locations in the field prior to the start of any work and/or installation of equipment and piping. The Contractor shall, at his expense, perform all minor rerouting of piping around obstructions from new or existing construction whether or not such conditions are indicated on the plans. Minor rerouting of piping is defined as any rerouting which requires less than 10 linear feet of additional piping over and above that shown on the drawings in order to avoid an obstruction. Such rerouting shall be performed with piping of a size equal to that shown on the original routing. Whenever an obstruction requires more than a minor rerouting as defined above, report the condition to the Commissioner prior to the start of pipework on the affected system. Be responsible for neglect of checking all elevations, clearances, dimensions and locations of piping systems prior to the start of work on same.

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- C. Additional and supplemental drawings may, from time to time, be furnished and the same when made are to constitute a part of the original contract drawings and will not depart materially there from.
- D. The Commissioner specifically reserves the right, up to the time of roughing-in, to exactly define the position of the equipment to be installed and connected to and arrangement of these connections.

1.6 DEFINITIONS

- A. The following definitions of terms and expressions used in this section are in addition to listing given in General Conditions:
 - 1. "Herein" shall mean the contents of a particular section where this term appears.
 - "Indicated," shall mean, "indicated on contract drawings".
 - 3. "Scheduled" shall mean, "as scheduled on contract drawings".
 - "Concealed", where used in connection with insulation and painting of piping, ducts and accessories, shall mean that they are hidden from sight, as in trenches, chases, furred spaces, pipe shafts or hung ceilings.
 - 5. "Exposed", where used in conjunction with insulation and painting of pipe, ducts and accessories, shall mean that they are not "concealed" as defined herein above.
 - 6. "Singular Number": In all cases where a device or part of the equipment or system is herein referred to in the singular number (such as pump), it is intended that such reference shall apply to as many such items as are required to complete the installation.

1.7 CARE OF WORK AND SAFEGUARDS

- A. Protect the work from damage by any cause until it is completed and accepted by the City of New York.
- B. Protect from damage any underground service or structure exposed by the execution of this work.
- C. Any damaged property resulting from work performed either by this Contractor, his subcontractors, or anyone in his employ shall be repaired and restored to its original state at no cost to the City of New York.

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1.8 SCHEDULE OF WORK

A. Schedule all work to conform to the job progress schedule as submitted to and approved by the Commissioner.

1.9 SUBMITTALS

- A. Approval shall be obtained for all equipment and material before delivery to the job site. Delivery, storage or installation of equipment or material, which has not had prior approval, will not be permitted at the job site.
- B. All submittals shall include adequate descriptive literature, catalog cuts, shop drawings and other data necessary ascertain that the proposed equipment and materials comply with specification requirements. Catalog cuts submitted for approval shall be legible and shall clearly identify equipment being submitted.
- C. A minimum period of ten (10) working days, exclusive of transmittal time, will be required in the Engineer's office each time a shop drawing, product data and/or samples is submitted for review. This time period must be considered by the Contractor when scheduling his work.
- D. Submittals for individual systems and equipment assemblies, which consist of more than one item or component, shall be made for the system or assembly as a whole. Partial submittals will not be considered for approval.
- E. Submittals shall be marked to show specification reference including the section and paragraph numbers.
- F. Submit each section separately and include the following:
 - Information, which conforms to contract requirements. Include the manufacturer's name, model or catalog numbers, catalog information, technical data sheets, shop drawings, pictures, nameplate data and test reports as required.
 - Submittals on all pumps shall be complete with performance curves marked with the design
 points. Additionally, submittals for any pumps that are in series or parallel with other
 pumps shall include compounded performance curves for analysis by the Commissioner.
 - 3. Submittals on electrical equipment shall be complete with all power and control wiring diagrams.
- G. Submit samples as directed of items called for in the specifications; samples of the materials, which the manufacturer will actually ship, shall be submitted for approval after award of contract and be properly labeled or identified.
- H. Submit a minimum of three (3) hard copies of all shop drawings and submittals for Engineer's review.

1.10 CODES AND STANDARDS

- A. Work performed under this Contract shall conform to all applicable laws, ordinances, regulations, codes (New York State, New York City and federal), and shall be subject to control of NYC Department of Buildings, having jurisdiction.
- B. Wherever requirements of such laws, codes, regulations differ from the drawings or specifications, they shall take precedence over the drawings specifications, and are expressly made part of the Contract, except where the drawings or specifications are more stringent or require better materials, which would also be acceptable to The City of New York (i.e., the more stringent code shall always apply).
- C. Any portion of work which is not subject to the approval of The City of New York having jurisdiction shall be provided in accordance with National Fire Protection Association requirements.
- D. Comply with applicable utility company rules and regulations.
- E. Comply with Occupational Safety and Health Act (OSHA) requirements.

1.11 INSPECTIONS, PROGRESS INSPECTIONS, SPECIAL INSPECTIONS AND TESTING

- A. New York City Building Code requires the City of New York to directly retain the services of an authorized testing agency to perform all required inspections, tests, progress inspections and special inspections as required by the Building Code. The Contractor shall provide all required support services required by the inspectors.
- B. Upon completion or partial completion of the permitted plumbing work, inspections, progress inspections, special inspections and tests shall be conducted by approved agencies or special inspectors qualified to conduct such inspections and tests. Inspections and progress inspections shall be performed in compliance with section BC 109 of the New York City Building Code. Special inspections shall be performed in compliance with sections BC 1704 and BC 1707 of the New York City Building Code for all plumbing systems regulated by the New York City Plumbing Code, sections PC 107, PC 312, Chapters 6, 7, 9 and 11, the New York City Fuel Gas Code, Sections FGC 107, and FGC 406. Refer to article 116 of Chapter 1 of Title 28 of the Administrative Code for additional provisions related to inspections.

1.12 REFERENCE DOCUMENTS AND STANDARDS

A. Accepted plumbing standards and organization whose abbreviations are used to identify such standards are listen below:

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- 1. A.G.A., American Gas Association.
- 2. A.S.M.E., American Society of Mechanical Engineers.
- 3. A.N.S.I., American National Standards Institute, Inc.

- 4. A.S.S.E., American Society of Sanitary Engineering.
- 5. A.S.T.M., American Society for Testing and Materials.
- 6. A.W.W.A., American Water Works Association.
- 7. C.I.S.P.I., Cast Iron Soil Pipe Institute.
- 8. C.S., Commercial Standard National Bureau of Standards.
- 9. F.S., Federal Specifications.
- 10. N.S.F., National Sanitation Foundation Testing Laboratory, Inc.
- 11. P.D.I., Plumbing and Drainage Institute.
- 12. N.F.P.A., National Fire Protection Association.
- 13. U.L., Underwriters Laboratories.
- 14. F.M., Factory Mutual

1.13 GUARANTEE

A. In addition to the requirements stated in the specifications, guarantee all equipment, materials and appurtenances installed to be free from all defects. Upon written notice from the Commissioner, promptly correct all defects without additional cost to the City of New York. Make good, at no extra cost any defects in materials or workmanship that may appear. The guarantee period shall be from one (1) year after final inspection and acceptance of the project.

PART 2 PRODUCTS

2.1 PRODUCT HANDLING

- A. In addition to the requirements of the General Conditions, the Contractor shall be responsible for the following:
 - 1. Responsibility for care and protection of plumbing work rests with the Contractor until it has been tested and accepted.
 - 2. After delivery, before, during and after installation, protect equipment and materials against theft, injury and damage for all causes.
 - 3. Coat polished or plated metal part with Petrolium jelly immediately after installation.
 - 4. Protect equipment outlets and pipe, openings with caps.

Receive, properly house, handle, hoist, deliver to proper location, equipment and other material B. required for the contract.

MATERIALS 2.2

Design: A.

- 1. Unless otherwise specified, equipment or material of same type or classification, used for the same purpose, shall be products of the same manufacturer. All material shall be new and of the latest design of manufacturer providing equipment or materials.
- 2. Equipment and accessories not specifically described or identified by manufacturer's catalog numbers shall be designed in conformity with ASME, or other applicable technical standards, suitable for maximum working pressure and shall have neat and finished appearance.

Electrical Characteristics: B.

1. It shall be the responsibility of this Contractor to ensure that the voltage and current characteristics of the electrical equipment furnished by him shall be suitable for the electrical services as specified.

Lubricating Devices: C.

1. Provide oil level gauges, grease cups, grease gun fittings for machinery bearings as recommended by machinery manufacturer; where lubricating means are not easily accessible, extend to accessible extend to accessible locations. Furnish all grease gun fittings of uniform type.

Belt Guards: D.

1. Provide guards to enclose belts, pulleys, sheaves or belt-driven equipment. Construct of galvanized expanded or perforated sheet steel, or 1" mesh wire screen in angle frame with steel angle or channel mounting supports; make guard easily removable for access to belt, pulley or sheave. Conform to codes or regulations of NYCBC and OSHA Requirement. Provide access holes for tachometers.

SLEEVES 2.3

- Extend through construction. A.
 - 1. For Insulated Piping: Sized to allow for insulation.
- No. 22 USSG galvanized iron through: B.
 - 1. Interior floor slabs.
 - 2. Ceilings.
 - 3. Walls and partitions.

2.4 ESCUTCHEONS

- A. Cast iron or cast brass set screw type.
- B. Pressed steel.
- C. For exposed piping through floors or walls.
- D. Finish at exposed walls: Chrome plated.

2.5 NAMEPLATES AND DEVICE PLATE MARKINGS

- A. Install nameplates on all electrical equipment supplied under his Contract. This shall include all safety switches, motor starting switches, motor starters, control cabinets, panels, temperature motor control centers, and unit substations designating the equipment served.
- B. Plates shall be laminated plastic 1/2" x 2" or larger in dimension, fastened with counter sunk oval head chrome plated machine screws. Lettering shall be 3/16" high engraved black on white plated.

(Nameplates shall be plastic glued back punched letters as produced by labeling devices by Dymo, Brother, Epson, or approved equal. Letters shall be 1/4" high).

C. Submit an itemized schedule of proposed markings for approval.

PART 3 EXECUTION

3.1 SUPERVISION

A. All work shall be performed by competent mechanics under supervision of an experienced erection supervisor. Upon initiation of construction, keep a suitable force for men (including supervisory personnel) on the site at all times in order to place all sleeves, inserts, and fixtures, and provide all other openings as are required for the satisfactory installation of equipment.

3.2 COORDINATION

- A. Schedule construction and time limitations for each phase of the work. Work shall be coordinated to permit proper setting of the work of other trades.
- B. Where piping work and appurtenances are in place prior to completion of adjacent concrete and masonry work, they must be protected against damage and displacement until construction is completed.

3.3 CUTTING AND PATCHING

A. Cutting:

- 1. Provide sleeves for all items furnished and set in new construction. Sleeves in exterior walls or located where moisture must be restricted shall consist of schedule 40 black steel pipe cut to match thickness of wall or floor. 1/4" thick steel plate extending 2" beyond the outside diameter shall be continuously welded midway of the length of the sleeve. Pipe or conduit shall be accurately centered within the sleeve. The remaining annular space shall not be less than 1/2 for pipe up to 3", 3/4" for pipe greater than 3". Impregnated rope shall be packed in, at both ends to a point giving a 2" recess in the annular space. The remaining 2" recess shall be sealed with a resilient, non-hardening sealer, Tremco Mono-Lasto-Meric or approved equal.
- 2. Cutting, chasing, or boring in the existing building shall be done by this Contractor. Where existing foundations or walls below grade are involved, specific instructions shall first be obtained from the Commissioner.
- 3. Measure all existing openings such as doorways, shafts, windows, hatchways, etc., through which equipment may have to be transported or moved. Include in bid any and all necessary widening of existing openings, or any other change in the existing structure necessary to place his materials and equipment in the proper position. All such alterations or changes shall be completely restored to the original condition, including patching, immediately after the necessary is passed.
- 4. Cutting, chasing or boring will not be permitted in bearing walls, trusses, girders, or similar structural items unless special permission is obtained from the Commissioner. Be responsible for damages resulting from failure to observe this provision.

B. Patching:

- 1. Restore surfaces to original condition with materials coordinated with the Contractor.
- 2. Patch painting shall be done by this Contractor.

3.4 TEMPORARY OPENINGS

- A. Temporary openings not indicated on the drawings which may be required for purpose of bringing equipment into building shall be provided as required subject to the approval of the Commissioner. Perform work of providing protecting and maintaining openings and of restoring structure.
- B. Holes provided in general construction work to permit installation of piping for temporary plumbing services shall, after removal of such piping, be patched as specified.

3.5 TESTING, ADJUSTING AND BALANCING

 Make all required adjustments to Plumbing system devices until all specified performances are met. Before commencement of construction, test existing equipment to establish output, etc. Submit certified reports indicating motor and compressor amperage draw, rpm, discharge pressure, suction pressure and setting of all controllers.

3.6 CLEAN-UP

A. Be responsible for the general clean-up of all areas affected by the work in the Contract. All rubbish and accumulative material shall be removed from the premises and the premises left "broom clean" upon completion.

3.7 SUPPORTS, HOUSEKEEPING PADS AND STANDS

- A. Housekeeping Pads:
 - 1. Housekeeping pads will be provided by the Contractor.
 - 2. Provide to the Contractor dimensions, size of foundation bolts, methods of setting, aligning and anchoring of equipment as recommended by manufacturer of equipment. Make minimum height above finished floor 4" and extend outer edges 2" minimum beyond machinery bed-plate. Submit shop drawings for approval.
 - 3. Supply to the Contractor foundation bolts, sleeves, washers, nuts and templates to locate position of bolts. Make sleeves of steel pipe; finish flush with top of rough concrete. For anchorage, make embedded end of bolts hooked, or threaded with nut and square plate.
 - 4. All concrete equipment bases that are installed on vibration isolators, all anchor and thrust blocks and all piping supports in trenches shall be provided under the work of this Section.
 - 5. All concrete work shall conform to A.C.I. standards.
 - 6. Provide 1" thick grouting between machinery base plate and concrete pad; fill completely the space between them. Clean top of pad; wet before grouting. Do not remove leveling wedges before grout reaches its final set. Fill voids left by removal of wedges with grout to make neat appearance.
- B. Where supports, stands and suspended platforms for machinery, tanks or other equipment are indicated or specified in mechanical work sections, perform as follows:
 - 1. Design and construct supporting structures of strength to safely withstand stresses to which they may be subjected, and to distribute properly the load and impact over building areas. Conform to applicable technical societies' standards, also to codes and regulations of agencies having jurisdiction.
 - 2. Locate supports for tanks so as to avoid undue strain on shell and interference with pipe connections to tank outlets.
 - 3. For tanks containing tubes, check support locations for clearances to pull tubes.
 - 4. Mount power-driven equipment on common base with driver, unless otherwise indicated, specified or approved.

5. Submit detailed shop drawings of all supports; obtain approval before fabricating and constructing.

C. Floor Stands:

 Unless otherwise indicated, where equipment is indicated or specified to floor mounted on stands or legs, construct of structural steel members or steel pipe and fittings; brace and fasten with flanges bolted to floor.

D. Suspension Support for Pipes, Equipment:

- Unless otherwise indicated, all pipes and equipment that are suspended shall be connected directly to the building steel. Where hangers are required between building steel points, supplementary steel members shall be added by the Contractor as required to adequately support the load.
- 2. Pipes shall not be supported from other pipes or equipment.

3.8 PAINTING AND FINISHING

- A. Except as specified herein, the finished painting of Plumbing Work within the building and on the roof shall be as specified in Section 220553.
- B. All plumbing equipment shall have a factory applied prime and finish coat of paint. Galvanized surfaces shall be considered as finished surfaces for equipment rooms and items concealed from view. Plastic products shall be acceptable without a finish coat of paint. All items of equipment marred or rusted, even though factory finished, shall be repainted.

3.9 IDENTIFICATIONS

A. Piping System:

- 1. All piping systems shall be identified by the name of contents and the direction of flow in accordance with ANSI A13.1 (1981).
- 2. Name of contents and directional arrows shall be placed near each valve, on both sides of pipes passing through walls, on long pipe runs at 30-foot intervals.
- 3. Names of contents and directional arrows shall be laminated in plastic and wraparound pipe marker as manufactured by Seton Nameplate Co., or approved equal.

B. Equipment:

- 1. All items of plumbing equipment shall be identified by approved nameplates by Contractor furnishing equipment.
- 2. Nameplates shall be securely affixed to each individual piece of equipment and also to controls for that equipment.

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- 3. Nameplates shall be aluminum 2-1/2" x 3/4" with black enamel back-ground etched or engraved natural aluminum lettering. Manufacturer shall be Seton Nameplate Company or approved equal.
- 4. Equipment shall be identified as to its type and unit number.

C. Valves:

1. Identify valves and other parts of mechanical systems by means of polished and lacquered brass or aluminum tags, minimum 1- 1/2" round or octagonal, with stamped letters and numbers 1/2" high and filled with black paint. Tag must bear name of particular plumbing or sprinkler system involved and identifying number.

D. Charts:

- 1. Charts of valves including valve identification number, location and purpose shall be furnished in duplicate.
- 2. Charts of piping system identification shall be furnished in duplicate. Charts shall include the following:
 - a. Service
 - b. Color field
 - c. Legend
 - d. Color of letters
- 3. One (1) copy of each chart shall be mounted in a wood frame with clear glass front, and secured to wall, as directed.
- 4. Second chart shall be prepared for use in location as directed, provided with approved transparent plastic enclosure for permanent protection. Two (2) holes shall be furnished at top of plastic enclosure to allow for affixing an 8" length of nickel-plated bead chain. Each hole to be reinforced by a small brass or nickel grommet. Plastic enclosures as furnished by Seton Nameplate Company, Envision Plastics & Design, Polycase, or approved equal.

3.10 FIRE-STOP PROTECTION

- A. Where pipes pass through fire partitions, firewalls or floors, install a firestop that provides an effective barrier against the spread of fire, smoke and gases. Fire-stop material shall be packed tight and completely fill clearances between pipe and sleeves. Provide escutcheon plates on both sides of all rated construction.
- B. Fire-stopping material shall maintain its dimension and integrity while preventing the passage of flame, smoke and gases. Fire-stopping material shall be non-combustible as defined by ASTM E136.

3.11 ACCESS PANELS

- A. Supply access panels for the installation to the Contractor for concealed valves, expansion joints, valves, traps, strainers and other parts requiring accessibility for operation and maintenance.
- B. Access panel size shall be as indicated; when not indicated, make 18" x 18" minimum or larger as directed or required.
- C. Frames shall be 16-gauge steel.
- D. Access panels for use on masonry, tile, and drywall shall have frames with flanges to hide rough openings in walls.
- E. When access panels or doors are installed in fire-rated construction they shall be fire rated to match the construction.

3.12 ELECTRICAL WIRING DIAGRAMS

- A. Prepare and submit for approval terminal point to terminal point completely coordinated and integrated wiring diagrams for all wiring.
- B. Submit specific wiring diagrams for factory-installed equipment wiring.

3.13 CLEARANCE FROM ELECTRICAL EQUIPMENT

- A. Piping is prohibited in all electric rooms and closets, telephone rooms and closets, and elevator machine rooms, and shall not be installed within 5 feet of transformers, substations, switchboards, motor control center, standby power plant, motors. If 5 foot minimum is totally unavoidable, provide sleeve drained outside of electrical equipment room where approved by Commissioner.
- B. Where transformers, switchboards, motor control centers, electric panels, motor starters, and variable speed drives are located in spaces other than those identified in paragraph A above, a minimum of 3 feet clearance to any equipment, ductwork or piping shall be maintained in front of all low voltage equipment (208 volts or less) and 3-1/2 feet in front of all high voltage equipment (460 volts). This work space shall extend from the floor to the height of the equipment, but not less than 6 1/2' above floor. The width of the workspace shall equal the equipment width but not less than 30".
- C. Where transformers, switchboards, motor control centers, electric panels, motor starters, and variable speed drives are located in spaces other than those identified in paragraph A above, no piping shall be permitted up to the slab above the equipment footprint.

3.14 DEMOLITION, REMOVALS AND ALTERATIONS

A. All existing equipment, piping, controls, supports, accessories, etc., shall be removed unless otherwise indicated, required for the operation of equipment or systems to remain, or required for continuity of service to areas outside the work scope.

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- 1. If the Contractor is unclear as to what must be removed, he shall notify the Commissioner prior to demolition.
- B. Modify existing equipment and/or systems as required by the drawings or specifications and as may be required when such work is uncovered and found to interfere with the completion of work in this contract or other contract work.
- C. Remove all demolition material from the project site.

3.15 EXCAVATION AND BACKFILL

- A. All excavation is unclassified. The contractor shall inspect the site and include in his bid for soil to excavate since no compensation will be given where rock is encountered.
- B. The contractor, unless otherwise noted on the drawings, shall do all excavations for trenches, foundations, and pits of whatever kind necessary for the installation of this work. Bottom of trenches shall have the proper uniform grade wherever possible, or unless otherwise directed.
- C. Trenches are to be excavated to the widths, lines and grades indicated on the drawings and/or specified in the appropriate sections of these specifications. Trenches for piping are to be excavated to a minimum width of one foot (1') plus the outside diameter of the pipe. The trench shall be excavated in a manner such that the pipe will be located in the center of the trench with the trench bottom having the proper uniform grade in the direction of flow. Trenches for water services shall be deep enough to provide a minimum of four feet cover.
- D. In earth excavation, trenches shall be carried to invert of pipe. If rock is encountered, carry trench to a point six inches (6") below pipe invert. No pipe shall be bedded directly upon rock but shall be cushioned by a six-inch (6") layer of selected crushed stone or gravel.
- E. Shore, sheet-pile and brace excavations as required to maintain them secure and to adequately protect life and property; remove shoring as the backfilling progresses, but only when banks are safe against caving or collapse.
- F. Water shall be removed from all excavations promptly and continuously throughout the progress of the work. Keep excavations dry at all times until the pipe and/or accessories are installed. Precautions shall be taken to protect uncompleted work from flooding during storms or from other causes. All necessary precautions shall be taken to prevent disturbance of, and to properly drain, the areas upon which concrete is to be placed. Provide, maintain and operate such sumps, pumps, hoses, piping and other related approved means and equipment, as may be necessary to keep the excavation free from water during all stages of the construction operations and course of work. Provide such sumps and pumping as may be also required to prevent the flow of surface waters into excavated areas and into any and all areas where construction or installations are in progress. Pumped or diverted water shall not adversely affect adjacent property or any other work under construction.
 - 1. Water levels shall be kept at the lowest point to safely execute and maintain the work during the entire course of the work.
- G. Do not install conduit or manholes in frozen ground. When freezing temperature may be expected, do not excavate to the full depth indicated, unless the conduit and/or manholes can be

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- installed immediately after the excavation has been completed. Protect the bottoms so excavated from frost if installation of pipe and/or manholes is delayed.
- H. All excavations shall be left open until work has been inspected and approved by the Commissioner. Sufficient time shall be allowed after notice is given that work is ready for inspection for making all examination and tests. Under no circumstances shall excavated material be left, even temporarily, where it will interfere with the building or other contractor's operations.
- I. Excavations which pass under or within eighteen inches (18") of columns or wall foundations shall be backfilled up to the level of the columns or wall foundations with concrete mixed in proportions to one part cement, three parts sand and five parts coarse aggregate. Excavations shall not undermine foundations at a slope of 1:1 or greater.
- J. All earth backfilling shall be made in layers not to exceed eight inches (8") and each layer shall be thoroughly tamped into place before the next layer is placed. Backfilling shall be clean earth, free of stone, pieces of concrete, rubbish and other foreign materials. Material frozen in lumps or material softer than the adjoining soil shall not be used in backfilling. The contractor shall distribute on the premises as directed all earth remaining after the backfilling.
- K. Any necessary blasting shall be performed by experienced and competent personnel in the most careful manner. All local ordinances and laws relating to blasting and storing of explosives must be strictly observed. No explosives shall be stored on the project property. All contractors shall be notified prior to any blasting. Explosives used shall be subject to approval of the Commissioner. The blasting shall be properly covered with blasting mats. Any blasting required shall be performed at such times as to meet reasonable request of the Commissioner.
- L. Any rock encountered within five feet (5') of pipes or building walls shall be removed without blasting.
- M. Provide adequate temporary crossovers for pedestrians and vehicular traffic including guardrails, lamps, flags, as directed; remove same when necessary for such protection ceases.
- N. Material shall be clean, selected earth obtained either from required excavation or from other sources. It shall be used to backfill excavations up to the proper rough grade level required by elevations shown on the drawings. Excavated material used for fill shall be clean, free of loam containing no boulders or stone over 4" in diameter, nor debris, vegetable matter, roots, sod, scrap metal or glass, refuse or other undesirable matter.
- O. Provide and place any additional fill material from off the site as may be necessary to produce the rough sub-grades required. Fill obtained from off site shall be of kind and quality as specified herein before for excavated material. Providing off site fill shall include furnishing, transporting, placing, and consolidating.

P. Backfilling:

- 1. Backfill trenches only after locations of duct banks and appurtenances have been recorded.
- 2. All lumber, rubbish, and braces shall be carefully removed from excavations before backfilling. Backfill all voids where sheet piling, shoring and bracing is removed.

- 3. Materials used for backfill shall contain water content proper for compaction. If the materials are dry, add the required amount of water for compaction and thoroughly mix the soils and water. If the materials contain excessive moisture, they shall be allowed to dry until the proper moisture content for compaction is present.
- 4. For a depth of at least 12 inches above the top of the duct bank, pipe or conduit backfill by hand with earth or granular material. Tamp this backfill thoroughly in layers not exceeding 4 inches in thickness, taking care not to disturb or injure the pipe.
- 5. For the remaining trench depth, backfill with material as specified in the preceding Section. Compact thoroughly the backfill here referred to with a heavy rammer or an approved mechanical tamper. Backfilling under pavement and other surfacing shall be compacted solidly with mechanical tampers in layers not more than 6" thick, measured loose and each layer shall be compacted to minimum of 95% of the ASTM D1557 maximum density before the next layer is placed. Backfilled areas in locations to be landscaped or not otherwise specified above shall be compacted to not less than 90% of the referenced density test, or as required, to prevent noticeable shrinkage or settlement.
- 6. Puddling with water will not be permitted for backfill. Do not attempt compaction when solid is wet with too much moisture or frost in order to avoid rebound and swelling at a later date.

3.16 INTERFERENCE WITH THE CITY OF NEW YORK'S NORMAL OPERATION

- A. All work shall be performed in such as not to interfere with the normal work operations in adjacent spaces or buildings.
- B. Do not block or restrict the means of egress of adjacent spaces, decrease the fire ratings of walls, partitions, ceilings, doors or combination thereof of adjacent spaces or means of egress, interrupt safety systems or in any way adversely affect the safety of people or materials.
- C. Provide containment measures to prevent dirt, dust or fumes from reaching adjacent work spaces.
- D. All personnel traffic and material delivery shall be routed so as to absolutely minimize travel through adjacent work areas.

3.17 CONNECTIONS TO EXISTING WORK

- A. Connect new work to existing with minimum interference.
- B. Rebalance entire water system where new work connects to the existing system.

3.18 TEMPORARY SERVICE

A. Temporary services are specified under DDC General Conditions.

END OF SECTION

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SECTION 220513

ELECTRIC MOTORS AND MOTOR CONTROLLERS

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this specification as shown or specified should be in accordance with the requirements of the Contract Documents.

1.2 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project:
 - 1. The Contract Drawings
 - 2. The Specifications
 - 3. The General Conditions
 - 4. The Addendum
 - 5. The Contract [City of New York Standard Construction Contract].

1.3 WORK INCLUDED

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the Electric Motors, Motor Controllers as shown on the drawings and as specified herein, including but not limited to the following.
 - 1. Furnish and install motors required for plumbing equipment.
 - 2. Furnish motor starters required for plumbing equipment.
 - Coordination of the installation of motors and starters.
 - 4. Motor control actuating and actuated devices required for plumbing equipment.
 - 5. All control wiring other than power wiring.

1.4 RELATED WORK

- A. Plumbing equipment.
- B. Electrical specifications for installation of motor starters and power wiring.

1.5 QUALITY ASSURANCE

A. NEMA

- B. New York City Electrical Code
- C. IEEE

1.6 SUBMITTALS

- A. Shop Drawings:
 - 1. Wiring diagrams of all manufactured equipment.
 - 2. Electrical equipment terminal-to-terminal point connections.
 - 3. Elementary diagrams.
 - 4. Integrated and coordinate wiring for safety and interlocking controls for motor starters and motor actuating and actuated devices.
 - 5. Motor nameplate data including: Motor horsepower, full load amperes, voltage, number of phases, service factor and locked rotor amperes. Include manufacturers recommended overcurrent device and thermal overload.
 - 6. Provide starter shop drawing indicating manufacturer, size, type, number of poles, and voltage.
 - B. Materials Data: Manufacturer's printed data, test data, recommendations and installation.

1.7 DEFINITIONS

- A. Power Wiring (Motor Power Circuit): Power circuit operating at 120 volts or more, and carries electrical input energy to starter and from starter to motor.
- B. Control Wiring (Motor Control Circuit): Other than power wiring, all other wiring intended for directing or indicating the performance of a motor starter, including connections to actuating and actuated devices.
- C. Motor Actuating Device: Any device performing a switching function in a motor control circuit (i.e., pushbuttons, hand-off-automatic switches, automatic contacting devices, time clocks, etc.).
- D. Motor Actuated Device; any device which functions in response to voltage received from a motor control circuit (i.e., pilot lights, solenoids, PE, EP, damper motors, etc.).

PART 2 MATERIALS

2.1 MOTORS

A. General:

- Motors shall be of proper power and speed to suit the specified makes of equipment. If
 other makes of equipment (other than specified) are accepted, the proper adjustment of
 motor speed and power must be included without additional cost. Sizes and types shall be
 submitted for approval before the equipment is purchased.
- Motors shall be open drip-proof, squirrel cage induction motors rated at 1,750 rpm or 3,500 rpm, as scheduled. Where motors are multi-speed, speeds shall be as scheduled or specified.
- 3. Motors voltage shall be as scheduled or specified.
- 4. Unless otherwise specified, motors shall be suitable for operation in either direction of rotation.
- 5. Motors shall be built in accordance with current NEMA standards (MG-1), except as noted in these specifications.
- 6. Motors shall be NEMA Design B unless otherwise noted.
- Fractional horsepower motors less than 1/2 HP shall be 120 volt, single phase, 60 Hz. Motors 1/2 HP and above shall be 60 Hz, three phase with voltage as scheduled or specified.

B. Insulation:

- 1. Insulation system employed shall have been tested by the manufacturer and will be Class B or F.
- 2. Temperature rise shall be in accordance with NEMA limits for the Class of Insulation, Service Factor and Enclosure specified.
- 3. Unless noted otherwise, motors will be rated for 40 degrees C ambient operation.

C. Mechanical:

- 1. Motors shall be built in NEMA standard T-Frame sizes.
- 2. Dripproof and totally enclosed motor frames will be of rugged construction and material will be steel, aluminum or cast iron.
- 3. End bracket will be of cast iron or aluminum construction and aluminum <u>must</u> have steel inserts in the bearing relubrication.
- 4. Bearings will be anti-friction type and bearing housings will be equipped with plugged provision for relubrication.

Staten Island Zoo Aquarium Reconstruction CAPITAL PROJECT NUMBER: PV175AQUA 220513-3 5. Bearings will be rated for minimum L-10 life of 20,000 hours assuming bearing load to be calculated with a NEMA minimum V-belt pulley, so located that the center line of the belt load will be located at the end of the NEMA standard shaft extension.

D. Energy Efficient Motors:

1. Provide high efficiency electric motors for all polyphase dripproof and totally enclosed motors as shown on contract documents. Motor shall have a standard product of an approved motor manufacturer and shall have the following minimum guaranteed full load efficiencies at 1,750 rpm as defined by the latest NEMA standards. Submit certification of motor efficiency with equipment shop drawings. Motors for different rpm's shall be of same construction and comparable efficiency as 1,750 rpm motors.

<u>HP</u>	Minimum Efficiency %
1	82.5
1.5	84.0
2	84.0
3	84.0
5	84.0
7.5	89.5
10	90.2
15	91.7
20	91.7
25	92.4
30	93
40	93
50	93.6
60	94.1
75	94.1
100	94.5

E. Noise Levels:

1. Sound power levels for all motors will be no greater than the guidelines recommended by NEMA Standard MG1-12.49.

F. Tests and Test Data:

- 1. Motors will be 100% production tested and quality control checked to assure compliance with this specification.
- 2. The insulation system will be tested by procedure outlined in NEMA Standard MG1-12.03.
- 3. A load test will be performed on each motor to assure compliance with the energy-efficiency section of this specification.
- 4. Typical test data on each motor will be available if requested.

2.2 MOTORS STARTERS

- A. Fractional Horsepower Starters for Motors less than 1/2 HP:
 - 1. Thermal overload relay with field adjustment capability.
 - 2. NEMA I general purpose enclosure with flush mounted enclosure and plate.
 - 3. Quick-make, quick-break mechanism.
 - 4. Pilot light indicating activation.
 - 5. Speed control, where indicated.
 - 6. Magnetic starter type with HOA switch where required to be automatically controlled by a motor actuating device.

B. Starter for Motors 1/2 HP and above:

- 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 the time delay type fusing. For combination circuit breaker. Provide ambient compensating features extending to 50 degrees C.
- 5. Magnetic Starters NEMA Size 3 and larger: Equipped with an auxiliary control circuit relay arranged to permit the actuation of the starter without introducing holding coil currents into the external control circuit.
- 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 contact features (if any) in the external control circuit.
- 8. Where specified or scheduled provide reduced voltage starter.
 - a. Locked rotor motor current shall not exceed value given in NEMA Standard MG-1.
 - b. At no time during the starting and running period following initial closing into the line shall be an "open conductor" condition exist in any phase of wiring up to the motor terminals.

- c. Breakaway and accelerating torque produced by the motor during start-up: Adequate for the mechanical loading on the motor.
- d. Starter Type: Magnetic, combination reduced voltage autotransformer with fused disconnect switch.
- 9. Where motors are specified as multi-speed, provide multi-speed starter with speed and direction selector control switch.
- 10. Where motors are specified to be reversible, provide reversing start and direction selector switch.
- 11. Combination Type Motor Starters: Equipped with approved padlock and key and a means for double padlocking its manual line disconnect in the open position.
- 12. Motor Starters: Equipped with an engraved lamicoid nameplate permanently fastened on the outside of the starter cover, with high white lettering on a black background identifying the motor and system controlled.
- 13. In addition to auxiliary contacts required for interlocking or indicating purposes, provide magnetic starters with one normally closed and one normally open additional contacts for future use.
- 14. Enclosure Sizes and Wiring Terminals of Motor Starters: Suitable for the application of copper power and control circuit wires.
- 15. Motor Starters, which are not part of Packaged Equipment: One manufacturer throughout the project.
- 16. Wire all starter control wires for external connection including spare auxiliary to terminal blocks. Each terminal block point is identified with unique number shown also on submitted wiring diagrams.

2.3 MOTOR CONTROL ACTUATING AND ACTUATED DEVICES

- A. Furnish mount and wire up manual control actuating devices and pilot lights required in starter covers.
- B. Motors Control Actuating and Actuated Devices in the Starter Covers: Housed in NEMA Class I general purpose enclosures, except that where intended for use in damp or hazardous locations, provide enclosures of the proper NEMA classification of the conditions. Gang together in a single enclosure and wire up to a terminal block two or motor control actuating or actuated devices at a single location.
- C. Contacts with Motor Control Actuating Devices: Rated at not less than 10 amperes AC at 250 Volts regardless of the actual duty they are required to perform.
- D. Motor control actuated devices intended to operate in conjunction with motors supplied from power circuits having a voltage in the range of 100 to 125 volts and 200 to 250 volts: Suitable for operation in this range.

- E. Pushbuttons: Heavy-duty oil-tight return momentary type. Provide flush mounted in stainless steel faceplate with pilot light and label indicating equipment served, where stations are remotely located.
- F. Selector Switches: Heavy-duty oil-tight maintained contact type.
- G. Pilot Lights: Heavy-duty type with resistor or transformer, equipped with nameplates indicating the operating conditions they annunciate.
- H. Devices such as pushbuttons, pilot light and selector switches, where mounted in enclosure other than the cover of the starter: Equipped with nameplates indicating the motor with which they are associated and their function (on-off, manual-automatic, etc.).
- I. Nameplates: Engraved lamicoid, permanently fastened lettering and a black background.

2.4 APPROVED MANUFACTURERS

- A. Motors: Gould, General Electric, Westinghouse, Baldor, Century or approved equal.
- B. Starters: Cutler-Hammer, Westinghouse, Square D, Allen-Bradley or approved equal.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Coordinate with other work described under "Related Work".
- B. Comply with the requirements of the New York City Electrical Code for the control wiring work.
- C. Install in accordance with the equipment manufacturer's instructions.
- Provide all control and interlock wiring for all provided plumbing equipment.

END OF SECTION

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SECTION 220523

VALVES

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this specification as shown or specified should be in accordance with the requirements of the Contract Documents.

1.2 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project:
 - 1. The Contract Drawings
 - 2. The Specifications
 - The General Conditions
 - 4. The Addendum
 - 5. The Contract [City of New York Standard Construction Contract].

1.3 WORK INCLUDED

- A. Work of this Section includes all labor, materials, equipment and services necessary to the installation of valves as shown on the drawings and as specified herein, including but not limited to the following:
 - 1. Furnish and install valves and accessories.

1.4 RELATED WORK

- A. Pipe, Tube and Fittings.
- B. Hangers and Supports
- C. Insulation.

1.5 QUALITY ASSURANCE

- A. UL Underwriters Laboratory
- B. New York City Building Code
- C. FM Factory Manual
- D. AWWA American Water Works Association

E. ANSI – American National Standards Institute

1.6 SUBMITTALS

- A. Shop Drawings:
 - 1. Valves.
 - 2. Valve boxes and accessories.

1.7 VALVES – GENERAL

- A. Provide all valves and piping accessories required to complete the installation of all plumbing systems indicated on the drawings and as specified.
- B. Provide valve tags and charts 2" diameter, 18 gauge aluminum or brass, embossed numbers filled in with black paint, fastened by heavy aluminum or brass hooks/chains on all valves and controls (except equipment shutoff valves).
- C. To assure uniformity and compatibility, all grooved end valves and adjoining couplings shall be supplied by a single manufacturer.

D. Gate Valves:

- 1. Wedge type with painted iron wheel handles, gland followers in stuffing boxes, and constructed to allow repacking while open and under pressure.
- 2. 2" and smaller: Bronze with brazed or screwed joint ends as required by the piping system in which they are installed.
- 3. 2-1/2" and larger: IBBM with flanged or grooved ends as required by the piping system in which they are installed. Where controlling equipment: OS&Y rising stem type except where space conditions do not permit the installation of this type of valve. In such cases only, use non-rising stem type.

E. Globe Valves:

1. All bronze with composition disc, threaded or brazed joint ends as required by piping system in which they are installed.

F. Check Valves:

- 1. 2" and smaller: All bronze spring actuated type with push-to connect ends.
- 2. 3" and smaller: All bronze swing type with grooved, threaded or blazed joint ends.
- 3. 4" and larger: IBBM with flanged joint or ductile iron body with stainless steel trim and grooved ends as required by piping system in which they are installed.
- G. Drain valves shall be 3/4" heavy cast brass with composition washers with male thread for hose connections.

- Provide at the high point of hot water piping system a 1/2" automatic IBBM air release valve,
 125 PSI, WOG Class. Pipe drain to spill over nearest floor drain or service sink.
 - 1. Hoffman Specialty No. 78
 - 2. Watts
 - 3. TLV
 - Exterior domestic and fire protection water piping shall comply with NYC Fire Department and NYC DEP.
 - J. Fire standpipe system: UL listed and Factory Mutual approved and in compliance with all other authorities having jurisdiction. Valves shall be iron body bronze mounted (IBBM), OS&Y solid wedge type valves with rising stems for 175 psi minimum working pressures; iron wheel handles shall be painted red. Tamper switch shall be provided on all fire standpipe valves as indicated on the Drawings. Valves requiring tamper switches shall have factory ground flats on the stems.
 - K. Exterior valves shall conform to all applicable requirements of American Water Works Association C500-61 Standard for Gate Valves for Fire Water Work Services.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Exterior valves:
 - 1. Clow
 - 2. Kennedy
 - 3. Stockham
 - 4. Mueller
- B. Interior valves:
 - 1. Victaulic
 - 2. Apollo
 - 3. Milwaukee
 - 4. Stockham
 - 5. Crane

6. Watts

2.2 EXTERIOR FIRE PROTECTION VALVES

- A. Furnish and install all underground control valves and valve boxes for fire protection service and branches as indicated on the Drawings.
- B. 4" and larger:
 - 1. UL listed, FM approved.
 - 2. IBBM, mechanical joint ends, 175 psi wwp.
 - 3. Double disc, parallel seats.
 - 4. Seats, gaskets, bolts, and nuts per ASTM specifications.
 - a. Kennedy 70X (bell ends), Clow Valve Company, Stockham, or approved equal.
 - b. Kennedy 71X (mech joint ends), Clow Valve Company, Stockham, or approved equal.

C. Valve Boxes:

- 1. Three piece screw type to grade and coated with coal tar pitch.
- 2. Kennedy fig. 121, open left, Star Pipe Products, Bingham & Taylor, or approved equal.
- 3. Cover with word "Fire" cast in.
- 4. Valve key of required height. Kennedy fig. 122.
- D. Install valves and valve boxes in piping as shown on the Drawings, and set plumb and centered with boxes places directly over valves. Earth fill shall be carefully tamped around the valve box to a distance of 4 feet on all sides of the box or to undisturbed trench face if less than 4 feet.
- E. Vertical Indicating Post (P.I.V.): Cast iron construction, UL listed and FM approved for trench depth of 3'-6" to 5'-6".
 - 1. Kennedy fig. 54125 thru 54129.
 - 2. Nibco
 - 3. Mueller Company
- F. 3" and smaller:
 - 1. AWWA, mechanical joint ends, 200 psi wwp, IBBM.
 - 2. Kennedy fig. 571X, Clow Valve Company, Stockham, or approved equal.

2.3 EXTERIOR DOMESTIC 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. Gate Valves:

- 1. 3" and larger:
 - a. AWWA, mechanical joint, 200 psi wwp, IBBM.
 - b. Double disc, parallel sent, with operating nut. Valves open left.
 - c. Glands, gaskets, bolts and nuts per ASTM specifications.
 - 1) Kennedy fig. 571X, Clow Valve Company, Flowserve Corp., or approved equal. Other manufacturer will be accepted when required by local authorities.

2. 2 1/2" and smaller:

- a. Bronze, non-rising stem, 125 psi wwp.
- b. Walworth No. 4, threaded ends, Milwaukee Valve, Flowserve Corp., or approved equal.
- c. Walworth No. 4 SJ, solder ends, Milwaukee Valve, Flowserve Corp., or approved equal.
- d. Wheel handle and extension rod or 1 1/4" operating nut.
- C. Install complete with valve boxes and covers set flush with proposed finished grade.
 - Kennedy, Fig. 121, Star Pipe Products, Bingham & Taylor, or approved equal as specified for the fire service. Coated with coal tar pitch varnish and word "WATER" cast on cover.
- D. 2" and smaller for polyethalene pipe:
 - 1. ANSI/AWWA C800.
 - 2. Brass construction.
 - 3. Mueller Mark 2 Oriseal with cast iron curb box, Star Pipe Products, Bingham & Taylor, or approved equal.

- E. Deep box type yard hydrants: Cast brass non-freeze with 3/4" inch hose connection, vacuum breaker and a bleed-off connection on valve body to drain the casing, for 5'-0" bury. At least six (6) cubic feet of crushed stone (French drain) shall be provided at the drip valve.
 - 1. J.R. Smith Fig. No. 5810-VB, Woodford Manufacturing, Josam, or approved equal.

2.4 EXTERIOR NATURAL GAS SERVICE VALVES

- A. Exterior gas valves shall meet local Gas Company requirements or shall be similar to Style 90 "Dresser" end iron body lubricated plug type:
 - 1. Walworth No. 2907 modified, Nibco, AY McDonald, or approved equal, 50 psi WOG, with galvanized steel extension pipe and cast iron flush box with lock, marked "Gas":

2.5 INTERIOR PIPING SYSTEM VALVES

A. Domestic water valves tabulated herein are manufactured by Stockham Valve Co., or as noted. Approved equals of Milwaukee, Victaulic, Crane Co., Walworth Co., and Nibcowill be reviewed.

Gate Valves	2" & Smaller	Threaded	B100
		Solder Ends	F
	2-1/2" & Larger	Flanged Rising Stem	B108 G623
Globe Valves	2-1/2" & Larger	Flanged	F532
	2" & Smaller	Threaded	
Angle Valves	2" & Smaller		B62
		Threaded	B222T
Check Valves	3" & Smaller	Threaded	B319Y
	3" & Smaller	Solder Ends	B309Y
		Grooved Ends	Victaulic Series 712
	2-1/2" & Larger	Grooved Ends	Vicatulic Series 716
			(Series 717 for Fire
	4" & Larger	Flanged	Protection Systems) G931
Ball Valves (Full Port)	3" & Smaller	Threaded	S206BRRT
	3" & Smaller	Solder	
		Solder	S206BRRS
	1 1/2" – 2 1/2"	Grooved	Nibco G595-Y
Butterfly Valves	2 1/2" & Larger	Grooved	Victaulic Series 608
	2" & Larger	Grooved Ends	Victaulic
	2-1/2" & Larger		Vic-300 MasterSeal
	2-1/2" & Larger	Grooved Ends	Victaulic Series 608

Check valve for sewage	3" & Larger	Grooved	Victualic Series 317
and sump pumps Balancing Valves	2" & Smaller	Solder	B&G Model CB
Grooved End Check Valves, 300 psi max., ductile iron body, stainless steel spring and shaft.		Pump discharges, except sewage ejectors	Victaulic Series 716
Grooved End Valve Assembly 175 psi maximum CWP	3" through 6"	Sump Ejector System	Victaulic Series 318

- B. Drain valves shall be similar to Crane #117 or equal.
- C. Balancing valve shall be bronze construction, glass and carbon filled TFE seat rings, 1/4" NPT tapped drain/purge port, memory stop and calibrated name plate to assure specific valve setting. Leak-tight at full rated working pressure.
 - UL listed and FM approved, 175 psi wwp, O.S.&Y., IBBM. Stockham Valve Co. Fig. No. G-634 or Victaulic Series 771.
 - Valves to 2" and smaller: Stockham No. B-132, Milwaukee Valve, Nibco, or approved equal. Class 200, all bronze, solid wedge, rising stem.
- D. Fire Pressure Reducing Valve see Section Sprinklers.
- E. Low pressure natural gas valves shall be AGA standard bronze gas cocks.
 - 1. Up to 1" size tee head: Walworth No. 594, Nibco, Flowserve Corp., or approved equal. Up to 2" size square head, Walworth No. 590, Nibco, Flowserve Corp., or approved equal.
 - 2 1/2" and over, flanged, iron body lubricated plug type 175 psi WOG Walworth No. 1796, Nibco, Flowserve Corp., or approved equal.
 - 3. Provide operating wrenches with each valve.
 - 4. Gas Solenoid Valves:
 - a. 115 V, single phase solenoid valve for normally closed operation.
 - b. Provide push-button station to activate solenoid valve, for installation by the electrical trade under Division 16.
 - c. ASCO No. 8215.
 - F. Full port ball valves may be used for domestic water piping as an alternate to gate valves for sizes 3" and smaller. If used, provide extended handles.
 - G. Modulating Float Valve (for tank) see Section 221100.

- H. Pressure Reducing Valve see Section 221100.
- Solenoid Safety Shut Off Valve (Domestic Water) see Section 221100.

PART 3 EXECUTION

3.1 INSTALLATION REQUIREMENTS

- A. The entire plumbing and fire protection systems shall be supplied with valves so located, arranged and operated as to give a complete regulating control to all fixtures and apparatus.
- B. Shut-off valves shall be provided on all risers, branch lines and at each piece of equipment.
- C. Install check and globe valves on downstream side of the shutoff valve on hot water circulating riser and branch lines.
- D. Valves, where exposed and used in connection with finished piping, shall be same finish as the pipe.
- E. Provide capped drain valves at the heel of each plumbing water riser and at low points of the horizontal mains.
- F. Provide chain operators on all valves 4" and larger located 7'-0" and higher above floor.
- G. Provide shut-off valves and check valves on each pump discharge line and shut-off valve only on each pump suction line.
- H. Install valves where required for proper operation of piping and equipment, including valves in branch lines necessary to isolate sections of piping. Locate valves so as to be accessible.
- I. Install valves with stems pointed up, in vertical position where possible, but in no case with stems pointed downward or horizontal plane unless unavoidable. Install valve drains with hose-end adapter for each valve that must be installed with stem below horizontal plane.
- J. Where insulation is indicated, install extended-stem valves, arranged in proper manner to receive insulation.
- K. Install valves with bodies of metal other than cast iron where thermal or mechanical shock is indicated or can be expected to occur.
- L. Do not install bronze valves and valve components in direct contact with steel, unless bronze and steel are separated by dialectic insulator. Install bronze valves in steam and condensate service and in other services where corrosion is indicated or can be expected to occur.

- M. Except as otherwise indicated, install gate, ball, globe, and butterfly valves to comply with ANSI B31.1. Where throttling is indicated or recognized as principal reason for valve, install globe or butterfly valves.
- N. Select and install valves with renewable seats, except where otherwise indicated.
- O. Installation of Check Valves:
 - 1. Swing Check Valves: Install in horizontal position with hinge pin horizontally perpendicular to centerline of pipe.
 - 2. Wafer Check Valves: Install between 2 flanges in horizontal or vertical position.
 - 3. Horizontal Lift Check Valve: Install in horizontal piping line with stem vertically upward.
 - 4. Vertical Lift Check Valve: Install in vertical piping line with upward flow with stem vertically upward.
 - 5. Grooved End Spring-Assisted Check Valve: Install in vertical or horizontal piping line with Victaulic couplings.
 - 6. Air Compressor Lift Check Valve: Install in air compressor discharge line.
 - 7. Spring Loaded Horizontal Lift Check Valve: Install in horizontal piping line with stem vertically upward.
 - P. Install valves so that they are accessible for repacking. Install with operating clearance for handle and stem.
 - Q. On equipment isolation valves install so that valve and piping do not interfere with equipment removal or maintenance. Install unions, grooved couplings, Victaulic couplings, or flanges on equipment side of valves unless valve is flanged type.
 - R. Provide valves of a design permitting packing while open and under pressure.
 - S. Provide shutoff valves in supply and return to reach item of equipment such as pumps, tanks, coils, traps, automatic valves and similar items. Valves shall be suitably located to isolate each unit to facilitate maintenance or removal of all equipment and apparatus. Valves 2- 1/2" and larger shall be flanged or grooved end, 2" and smaller shall have a union installed between valve and equipment.
 - T. Provide drains at low points of all liquid piping systems including each riser. Locate drain valves in Mechanical Equipment Rooms not higher than 6' above floor and pipe to nearest floor drain. Provide caped drain cocks with threaded ends for hose connections at all other drain points. Provide one 100' length of heavy-duty 1" hose.
 - U. Provide all valves 6" and larger with a rating of over 150 lbs. with a 1" bypass valve of same pressure rating as the bypassed valve.

- V. Provide renewable bronze seat rings and bronze spindles for all cast iron body valves.
- W. Use globe valves or plug cocks for all throttling service (including throttling service at pump discharges), and where noted on the drawings.
- X. If globe valves are not available in the sizes required for installation in the discharge lines from the large pumps, install valves of the lubricated tapered plug type.
- Y. Lubricate tapered plug cocks with the manufacturer's proper lubricant for water service before shipment to the job site. Furnish four (4) hand wrenches for each size valve, where gear operators are not required.
- Z. Butterfly valves of the lug or grooved end type permitted in lieu of valves indicated above for water service only. 150 lb. construction with totally enclosed weather-proof operator replaceable packing bonnet and material combination as follows:
 - 1. Galvanized iron body, stainless steel stem and disc, steel ring and Buna seat.
 - 2. Ductile iron body, elastomer encapsulated ductile iron disc with integrally cast stem.
- AA. Safety valve discharges shall be piped and extended to drains. From the drain and the elbow provide a common 3/4" drain line extended to discharge down 6" above the nearest floor drain.
- BB. Provide chain-operated sheaves and chains were indicated on drawings and for all valves 6" and larger which are more than 6' above the floor.

END OF SECTION

SECTION 220529

HANGERS & SUPPORTS

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this specification as shown or specified should be in accordance with the requirements of the Contract Documents.

1.2 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project:
 - 1. The Contract Drawings
 - The Specifications
 - The General Conditions
 - 4. The Addendum
 - 5. The Contract [City of New York Standard Construction Contract].

1.3 WORK INCLUDED

- A. Work of this Section includes all labor, materials, equipment and services necessary to provide Hangers and Supports for Plumbing, Piping and Equipment as shown on the drawings and as specified herein, including but not limited to the following:
 - 1. Pipe supports.
 - 2. Anchors and guides.
 - 3. Base supports.

1.4 RELATED WORK

- A. Pipe, Tube and Fittings
- B. Insulation

1.5 QUALITY ASSURANCE

- A. Underwriters Laboratories U.L.
- B. Factory Mutual F.M.
- Provide Pipe Hangers and Supports MSS-SP-58.

- D. Select and Apply Pipe Hangers MSS-SP-69.
- E. Fabricate and Install Pipe Hangers and Supports MSS-SP-89.

1.6 SUBMITTALS

- A. Shop Drawings:
 - 1. Pipe Hangers and Supports.

1.7 SPECIFIC REQUIREMENTS

- A. The Contractor shall be responsible for the proper transfer all loads of the piping system to the structure. No additional cost to the City of New York will be allowed for any corrective work during construction.
- B. Supports and hangers shall be provided for all horizontal and vertical piping. The hanger design shall conform to the ANSI Code for Pressure Piping. Hangers shall be kept outside of pipe insulation.
- C. All bracket clamps and rod sizes indicated in these Specifications are minimum size only. This Contractor shall be responsible for structural integrity of all supports. All structural hanging material shall have a safety factor of five (5) built in.
- D. All horizontal cast iron pipe shall be supported every five (5) feet and at each hub and/or "no-hub" clamping assembly. When a concentration of fittings occur, additional support shall be installed consistent with good trade practices. "No-hub" system must be supported in accordance with Standard CISPI-310-78.
- E. Fire standpipe piping shall be independently supported with UL/FM hangers and supports.
- F. All pipes supported in conformance with seismic restraint requirements.

PART 2 PRODUCTS

2.1 PIPE SUPPORTS, HANGERS AND INSERTS

- A. Provide one of the following types of hanger for overhead support of horizontal piping:
 - 1. For copper tubing where hangers are in direct contact with tubing, use clevis type steel hanger, copper plated with supporting rod to suit.
 - 2. For all piping 2 1/2" and larger: Use clevis type hangers.
 - 3. Piping 2" and smaller: Swivel ring type.
 - 4. Provide supporting rods for hangers of diameter as indicated and where not indicated, as specified under "Horizontal Pipe Supports Schedule" hereinafter, of lengths as required, with double locknuts for each.

- B. Where hanger rods leave unsightly holes in ceilings in finished areas, provide steel ceiling plates or cast iron ceiling plates with set screw.
- C. Provide one of the following to support horizontal piping from wall:
 - 1. Where no provision for expansion and contraction is required and pipe can be located close to wall, use steel J-hook, suitable for pipe sizes up to 3".
 - 2. For hanger suspension, 750 lb. maximum loading, use light welded steel bracket with hole for one rod up to 3/4" diameter. For additional rod suspension, use with this bracket steel clip for pipe sizes up to 3".
- D. Vertical piping supports for copper tubing where hangers are in direct contact with tubing, use copper tubing riser clamps. For steel cast iron pipe use steel extension pipe clamps.
- E. Where beam clamps are required, use malleable iron "C" clamps with case hardened cup pointed set screw and retaining strap or beam clips as required or directed.
- F. Concrete inserts shall be approved for local use and shall be black malleable iron universal type, for threaded connections with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms.
- G. All insulated pipe shall be protected at supports by pipe saddles. Pipe saddles for use on hangers shall be Insul-Shield pipe saddles as manufactured by Insul-Coustic Corp. or approved equal.
- H. Steel anchors of an approved design shall be provided where indicated or required for proper control of stress in piping due to expansion. Anchors shall be made of structural materials of heavy cross section and securely fastened to building construction. Submit detail drawings of approval installation.
- I. Provide pipe alignment guides where indicated, required or directed, to guide the expanding pipe to move freely from anchor points in expansion joints, loops or bends. Construct with angles or channels. Submit detail drawings for approval before installation.

2.2 ACCEPTABLE MANUFACTURERS

- A. Pipe supports shall of the following type and figure number, manufactured by C&P, F&M, Grinnell, or equal as approved:
- B. Pipe Hanger Schedule:

D. CI	<u>C&P</u>	F&M	Grinnell
Beam Clamp	268	282	Onmen
Clevis Hanger	100	239	
180° Shield	265P		260
Pipe Saddle	351	80	
Rigid Trapeze U-Bolt		170 & 180 series	1700 series
rugia Trapeze O-Bolt	371		Std. 45
Diggr Cl	382	176	137
Riser Clamp	89 or 126	241	
Double Bolt Pipe Clamp	304	261	261
Welding Beam Attachment	113B	751	295
Insert	650	/31	66
Continuous Slotted Insert			280
======================================	1480	190	

C. Insulation Protection

1. For all insulated pipe furnish clevis hangers with welded shields and equal to C&P, Inc., Fig. 100-SH.

D. Pipe Supports in Pipe Chases

1. Supports shall securely hold piping, prevent vibration, etc. Provide pipe supports and channels as required made Grade KJA Cycolac DH self-extinguishing ABS as manufactured by the Summer Corporation or equal.

PART 3 EXECUTION

3.1 INSTALLATION REQUIREMENTS

- A. Provide necessary structural members, hangers and supports of approved design to keep piping in proper alignment and prevent transmission of injurious thrusts and vibrations. In all cases where hangers, brackets, etc., are supported from concrete construction, care shall be taken not to weaken concrete or penetrate waterproofing. All hangers and supports shall be capable of screw adjustment after piping is erected. Hangers supporting piping expanding into loops, bends and offsets shall be secured to the building structure in such a manner than horizontal adjustment perpendicular due to expansion. All such hangers shall be finally adjusted, both in the vertical and horizontal direction.
- B. Where piping is run near the floor and not hung from the ceiling construction but is supported from the floor, such supports shall be of pipe standards with base flange and adjustable top yoke, 101 or equal.
- C. Except where otherwise noted, piping shall be supported from structural steel only. Provide supplementary steel where required.

3.2 HANGER SPACING:

A. Horizontal steel piping shall be supported as follows:

PIPE SIZE (Inches)	ROD DIAMETER (Inches)	MAXIMUM SPACING (Feet)
Up to 1	3/8	8
1 ½ to 2	3/8	10
2 ½ to 3	1/2	12
4 to 5	5/8	15
6	3/4	17
8 to 12	7/8	20

B. Horizontal copper piping shall be supported as follows:

PIPE SIZE (Inches)	ROD DIAMETER (Inches)	MAXIMUM SPACING (Feet)
Up to 1	3/8	5
1 1/4 to 2	3/8	8
2 1/2	1/2	9
3 to 4	1/2	10

- C. All hub or joint pipe shall be supported within the above recommendations for steel and at each joint.
- D. Plastic piping systems such as (polyvinyl chloride pipe (PVC) and polypropylene piping) shall be supported at intervals recommended by the manufacturer for a 120°F fluid temperature. Other specialty piping systems, such as PVDF tubing for specialty water systems, shall be continuously supported as recommended by the manufacturer.
- E. All pipes shall be supported within one (1) foot of elbows, valves, flanges, or fittings.
- F. All vertical piping shall be supported at 10 feet maximum intervals or designed as necessary to meet MSS guidelines.

3.3 SEISMIC DESIGN

A. The Plumbing contractor shall engage the services of a professional engineer with experience in the field of equipment support and seismic restraints (or an approved piping expert who has specialized in piping design). The engineer shall select and coordinate the restraints and supports based on the final coordinated drawings showing exact location of piping and equipment and shall coordinate with the Commissioner to ascertain that the connections to the

- structure will resist the horizontal forces to which they might be subjected. He shall submit details and calculations as required to demonstrate compliance.
- B. Seismic Restraints as indicated below shall be installed to restrain and protect piping in the event of an earthquake and shall be installed in addition to pipe hangers, brackets and supports. Seismic Restraints shall not be used in lieu of regular hangers and supports as are otherwise required to support the piping.
 - 1. Type LS Seismic Restraints shall be installed for all horizontal and vertical pipe at intervals shown in table below except that all pipe runs 25 ft. or longer shall contain at least one (1) anchor. Where piping contains valves, strainers or other components whose weight is twice greater than an equivalent length of pipe, supplemental Type LS Seismic Restraints shall be installed to restrain the component.

SIZE PIPE

MAXIMUM SPACING OF SEISMIC RESTRAINTS

Under 2" 2 1/2" to 12"

20 ft.

25 ft.

*Pipe anchors are Seismic Restraints

- 2. Anchors to provide axial restraint shall be installed for all pipe runs over 100 ft. or where weight of a straight section of pipe including pipe, fittings, valves, contents and insulation exceeds a weight in pounds of 500 x nominal pipe diameter (for example, 6000 lb. for 12" pipe, 1500 lb. for 3" pipe). Anchors shall also be installed as described to sectionalize the line to properly accommodate thermal movements, and as required for expansion joints.
- 3. Where piping is connected to equipment, the piping from equipment nozzle to first Type LS Seismic Restraint shall be designed to accommodate amount of movement permitted by equipment Seismic restraints. If length of piping between equipment nozzle and first Type LS Seismic Restraint exceeds maximum spacing as indicated in paragraph B.1, stress calculations must be performed to assure that pipe stress does not exceed 15000 psi or flexible connectors must be installed to accommodate expected movement.
- C. Type LS Seismic Restraints shall consist of Thunderline Corp. Link-Seal (or approved equal) interlocking synthetic rubber links installed according to manufacturer's instructions in a solid or split pipe sleeve constructed of standard weight pipe or equivalent thickness steel plate rigidly attached to building structure. Style C Link-Seal constructed with EPDM rubber shall be used for all systems operating below 250°F. Where piping is insulated, Link-Seal is to be installed directly on the carrier pipe with the insulation installed to abut the links. Where vapor barriers must be retained, the vapor barrier material should be secured to sleeve or in the case of split sleeves, extend over the sleeve.
- D. The attachment to structure must be designed to accommodate the forces and moments acting in all directions at pipe centerline using an allowable stress of steel components of 1/5 minimum tensile strength or 9500 psi for carbon steel of unknown origin and calculated as follows, but with a minimum force in pounds of 300 x nominal pipe diameter.
 - 1. For straight sections of pipe, a force in pounds equal to weight of pipe between Seismic Restraints plus proportional weight of any valves and fittings.

- 2. For guides installed immediately after an elbow where there is no anchor on the other leg, a force in pounds equal to the weight of the other leg of pipe for which movement is being restrained.
- 3. For trapeze hangers supporting more than one pipe, multiple sleeves may be attached to the base of the trapeze, however, the attachments to structure must be designed for total load imposed by all pipes attached to trapeze.
- E. Attachments to structure shall be designed to accommodate force and moment as indicated and shall consist of individual members such as pipe, channels, angles or I-beams in conjunction with at least two additional vertical struts for each vertical member, one (1) longitudinal and one (1) radial to axis of pipe.
- F. In all cases, attachments to structure shall be approved by the Commissioner with drawings submitted for approval. Loads and details of attachment to structure shall be submitted to Commissioner for coordination.
- G. Anchors shall be designed to accommodate forces as indicated plus any forces imposed by expansion joints or pipe bends and lops. Loads and details of attachment to structure shall be submitted to Commissioner for coordination.
- H. All requirements for Seismic Design shall be applicable to standpipe, sprinkler and fuel gas systems only.

3.4 PIPE SUPPORTS, HANGERS AND INSERTS

- A. Support horizontal piping in accordance with the following schedule:
 - 1. All horizontal steel and copper pipe shall be supported at maximum intervals as follows:
 - a. Steel pipe up to 1- 1/4" 8'-0"; 1- 1/2" to 2- 1/2" 10'-0"; 3" and larger 12'-0".
 - b. Copper tube and Brass pipe up to 1- 1/4" 6'-0"; 1- 1/2" to 2- 1/2" 8'-0"; 3"and larger 10'-0".
- B. Support vertical piping with clamps attached to the pipe, resting on the floor slab. In general, one clamp for each two floors, one clamp at each floor for copper tubing. Where pipes are open shaft, provide forged steel bar brackets to wall.
- C. Support hangers from concrete inserts of beam clamps. Furnish, locate and set such inserts and make sure that such inserts are in place when the concrete is poured. Construct inserts of malleable iron or pressed steel with space for rods of all sizes. Install all inserts for pipes 3" and larger in size with a reinforcing rod 5/8" in diameter, run through a slot in the insert specifically provided for this purpose.
- D. If any pipe has to be hung in spaces where no inserts have been provided, drill holes in the slab and provide rods and hanger attached to an approval fishplate or install 2 Star No. 7000 double expansion shields connected by a 2" x 2" angle, from which suspended the hanger rod. For pipe size 2" and under use single No. 7000 shields, but the hanger spacing defined herein before reduced to 5'-0". The carrying capacity and size of each shield to be calculated on the basis of the spacing indicated above the minimum size to be 3/8". Install additional shields of

- the same size so that the number of hangers are of adequate size to support the loads which they carry. Shields may be used in concrete slabs only.
- E. Regardless of the type of construction (i.e., concrete, concrete-deck-steel or other variations) take particular care to support all main lines and all large and heavy pipes in an approved manner, including the furnishing and installation of supplementary steel, if required. Submit shop drawings, indicating support methods, point loadings to the building structure and hanger locations for review sufficiently in advance of concrete pouring schedules to permit evaluation, critique and any necessary changes to handling and support methods.
- F. Set all inserts for all pipes in ample time to allow concrete work to be performed on scheduled time.
- G. Hangers may be directly bolted to steel beams of building construction, where they occur. Smaller pipes may be suspended from cross-pieces of pipe or steel angles, which in turn, to be securely fastened to building beams or hung from building concrete construction by means of rods and inserts. The intention is to provide supports which, in each case, shall be amply strong and rigid for the load, but which will not weaken or unduly stress the building construction.
- H. Provide approved roller support, floor stands, wall brackets, etc. for all lines running near the floor or near walls, which can be properly supported or suspended by the floors or walls, which can be near walls may also be hung by hangers carried from approved wall brackets to a higher level than the pipe.
- Do not hang piping from other piping. Support of hangers by means of vertical expansion bolts is not permitted.
- J. Whenever hangers using pipe rolls are used provide approved steel pipe covering protection saddles, spot welded to the piping at each hanger location.
- K. Anchor piping where required to localize expansion or to prevent undue strain on piping and branches. Anchors to be entirely separate from hangers and of heavy forged or welded construction of approved design. All anchor designs, when submitted for approval, to include piping reactions which respective anchors are capable of supporting. Provide all indicated or required expansion loops.
- L. Support all line of copper tubing individually by approved type hangers not more than 6' apart, or as shown on the drawings. Hangers for Uncovered Tubing: Broad straps fitting outside of covering.
- M. Hangers for cold piping to support the pipe without piercing the insulation. Use insulation shields to protect the insulation on cold pipes. Weld insulation protection saddles to insulated hot pipes at roller supports. Wherever fibrous glass pipe insulation is installed, install calcium silicate of equal thickness in lieu thereof wherever hangers and insulation shields shall bear only on an insulation material which is of such density that it will not compress, crush or deform.
- N. This Contractor may coordinate with other Contractors to use common means of support. Submit for approval all pertinent design data relating to the support as well as verification of the responsibility for the support.

- O. Support vertical water piping at approximately the mid-height of the riser (unless otherwise indicated) using a clamp, installed so that expansion an contraction dos not cause trapping of air or prevent drainage.
- P. For piping 4" and larger, support the elbows of the piping adjacent to the pumps with steel supports from the floor, and from the inertia base where pump is on such a base, to prevent loading heavy weights of piping on pump casings.
- Q. Trapeze type hangers shall be made up of angles bolted back-to-back or channels for supporting parallel lines of piping. Trapeze type hangers shall be supported with suspension rods having double nuts, and securely attached to construction with inserts, beam clamps, steel fishplates cantilever brackets, lag screws of other approved means. Use approved type brackets for supporting piping attached along walls. Non-insulated piping (compressed air, gas, etc.) supported by trapeze hangers shall be provided with hold down clamps at the trapeze hangers. If non-ferrous piping (copper, etc.) is supported on the trapeze hangers, the trapeze and hold down clamps shall be copper clad.
- R. Maximum weights on hanger rods shall be such that stress in tension shall not exceed 9,000 psi, using root area of threaded portion. In no case shall hanger size be less than 3/8" for pipe up to 2", 1/2" for pipe 1- 1/2" to 3- 1/2", 5/8" for pipe 4" to 5", 3/4" for pipe 6", 7/8" for pipe 8" to 12".

END OF SECTION

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SECTION 220553

IDENTIFICATION 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.

1.2 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project:
 - 1. The Contract Drawings
 - 2. The Specifications
 - 3. The General Conditions
 - 4. The Addendum
 - 5. The Contract [City of New York Standard Construction Contract].

1.3 WORK INCLUDED

- A. The atmosphere within the aquarium and its related mechanical spaces shall be considered a corrosive environment. All ferrous metal including galvanized steel either exposed or concealed above a hung ceiling shall be painted for protection.
- B. Paint apparatus, equipment, piping prior to insulating, hangers, supports, and foundations, except otherwise specified. For performing this work, employ an experienced subcontractor specializing in painting work and approved by the City of New York.
- C. Where a priming coat or other painting is specified under other sections of the specification, such coat shall not be considered as one of the coats of paint specified in this section.

1.4 RELATED WORK

- A. Hangers and Supports
- B. Pipe, Tube and Fittings
- C. Valves
- D. Insulation
- E. Plumbing Equipment, Specialties And Accessories

1.5 QUALITY ASSURANCE

- A. New York City Building Code.
- B. ASTM
- C. Federal Specifications

1.6 SUBMITTALS

- A. Paint samples, if requested.
- B. Color chips.

1.7 DELIVERY, STORAGE AND HANDLING

A. Painting materials: Store only in assigned spaces and maintain in a clean condition, safe from fire hazards. Comply with regulations of the Fire Department. The floors of assigned spaces shall be protected from paint damage by use of drop cloths or building paper. Remove waste material such as oily rags, and empty paint cans from site each night. Provide City of New York with one (1) key for each of these spaces if locked.

PART 2 PRODUCTS

2.1 PAINTING MATERIALS

- A. Factory mixed and delivered to the premises in original sealed containers, with unbroken seals. Containers shall bear the name and trade brand of the manufacturer and must indicate compliance with Federal Specifications, as noted below. Materials shall be approved by the City of New York before they are used. Before beginning the painting work submit an affidavit to the City of New York stating that all materials proposed comply with this specification.
- B. The paint system shall be as follows:
 - 1. High Performance Coating On Galvanized Ferrous Metals
 - a. First Coat: "27 Typoxy" or "N69 Epoxoline II" by Tnemec; "Intergard 345" by International Protective Coatings; "Carboguard 893 SG" or "Carboguard 888" by Carboline; "Devran 203 WB Epoxy Primer" by Akzo; or "Recoatable Epoxy Primer 867-45" by Sherwin Williams.
 - b. Second Coat: "V73 Endura Shield" or "1074/1075" by Tnemec; "Interthane 870UHS" or "990 UHS" by International Protective Coatings; "Carbothane 133 LH" by Carboline; "Devthane 379H Aliphatic Vizethne" by Akzo; or "Hi-Solids Urethane B65-300/350" by Sherwin Williams.

2. High Performance Coating On Non-Galvanized Ferrous Metals

- a. Prime Coat: "Tneme-Zinc 90/97" by Tnemec; "Interzinc 52" or "315" by International Protective Coatings; "Carbozinc 859, Class B" by Carboline; "Cathacoat 302V Reinforced Inorganic Zinc Primer" by Akzo; or "Zinc Clad II Plus Inorganic Zinc Rich Coating B69V212" by Sherwin Williams.
- b. Second Coat: "27 Typoxy" or "N69 Epoxoline II" by Tnemec; "Intergard 345" by International Protective Coatings; "Carboguard 893 SG" or "Carboguard 888" by Carboline; "Bar-Rust 231V Multi Purpose Epoxy Mastic" by Akzo; or "Macropoxy G46 I.C. Epoxy B58-600" by Sherwin Williams.
- c. Third Coat: "V73 Endura Shield" or "1074/1075" by Tnemec; "Interthane 870UHS" or "990 UHS" by International Protective Coatings; "Carbothane 133 LH" by Carboline; "Devthane 379H Aliphatic Urethane" by Akzo; or "Hi-Solids Polyurethane B65-300/350" by Sherwin Williams.

PART 3 EXECUTION

3.1 WORKMANSHIP

- A. Paints shall be applied in a careful manner by painters experienced and skilled in their trade. Materials or work to which paint is to be applied, whether in factory, in ship, or at the site, shall be properly prepared to receive the same. The surfaces shall be dry, free from foreign matter, dirt, cement, plaster, grease, oil, loose paint, scale, scratches, finger marks, and pencil marks. The various surfaces shall be sandpapered or rubbed before and between coats as required to produce a satisfactory surface. No paint shall be applied until the preceding coating is thoroughly dry. Paint shall be evenly spread and well brushed out. It shall be so applied as to eliminate drops, runs or sagging of materials. Enamel shall be evenly and smoothly flowed on. Painting at the site shall not be commenced until ordered by the City of New York.
- B. Drop clothes shall be used to prevent drops of paint and oil from defacing the painted walls, woodwork, floors, stairs, convectors and furniture. Contractor shall be particularly careful not to get paint on nameplates, valve tags, and on other finished surfaces. Paint spots shall be properly removed from floors and finished surfaces.
- C. Each separate application or coat of paint shall be left until it has been inspected and approved by the City of New York before another coat is applied. Each coat of paint applied prior to finishing coat shall be of a shade different from preceding coat, as directed, and from final coat.
- D. Where the finished surfaces of the building have become discolored, marred, damaged or otherwise destroyed in the performance of this Contract, the same shall be refinished, painted or varnished (as the case may be) in the best manner of such work and in every respect equal to the work previously existing.

3.2 PIPING IDENTIFICATION

- A. All piping systems to be color coded by paint identifications.
- B. Piping of each given layout first to be neatly painted with two coats of flat enamel in a buff color if existing paint is not satisfactory.
- C. The identification scheme shall be as follows:
 - 1. Pipes shall be identified by a 6" wide colored band located near strategic points such as valves, items of equipment, intersections, and with walls.
 - 2. The colored band shall consist of a background color designating the major classification of the material carried by the pipe.
 - 3. An arrow shall be stenciled on each colored band indicating the direction of flow through the pipe. This arrow shall be placed in such a location of the perimeter of the pipe as to be readily visible to operating personnel from the floor in the area. The arrow shall be black, approximately 3" long; 2" for the "shaft" and approximately 1" for the "head" formed by an equilateral triangle having a base equal to twice the width of the "shaft". The width of the "shaft" to be 1" (1/2" on pipes 3" or less in diameter).
- D. Stencil a lettered legend in black to further identify the pipe contents. Lettering to be stenciled in the band on the lower quarters of horizontal piping. Size of letters to be 7/8".
- E. For pipes smaller and 3/4" use tape bands or metal tags with lettering etched and filled with colored enamel to identify the pipe contents.
- F. Comply with the requirements of the New York City Building Code.
- G. Use the following scheme for the identification of piping systems:

Classification	Band Color	Stenciled Legend
Domestic Hot Water	Orange	Dom. Hot Water
Domestic Cold Water	Green	Dom. Cold Water
Domestic Hot Water Circulation	Orange	Dom. H. W. Circ.
Natural Gas	Yellow	Gas
Sanitary Drainage	Green	San.
Sprinkler	Green	Sprinkler

3.3 <u>PAINTING FOR MASONRY FOUNDATIONS</u>

A. Masonry foundations built by this Contractor shall be painted above the floor with two (2) coats of latex paint, color selected by Commissioner.

3.4 PAINTING FOR PIPING

- A. Except for finish brass piping and chrome plated piping which shall not be painted, all piping prior to insulating, including hangers, installed by this Contractor where required, shall be cleaned and then given one (1) coat of rust inhibitor epoxy primer, one (1) coat of epoxy based base coat paint, and one (1) coat of epoxy based topcoat coat paint, color as required.
- B. Galvanized piping shall be cleaned with an emulsifiable solvent cleaner prior to painting.
- C. Piping in floor trenches within the building shall be painted after fabrication with one (1) coat of black asphaltum paint.
- D. Piping buried in the ground including the underground piping shall be protected with one (1) coat of black asphaltum paint.

END OF SECTION

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SECTION 220577

PLUMBING SYSTEM TESTS

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this specification as shown or specified should be in accordance with the requirements of the Contract Documents.

1.2 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project:
 - 1. The Contract Drawings
 - 2. The Specifications
 - 3. The General Conditions
 - 4. The Addendum
 - 5. The Contract [City of New York Standard Construction Contract].

1.3 WORK INCLUDED

A. Work of this Section includes all labor, materials, equipment and services necessary to provide Plumbing System Testing as shown on the drawings and as specified herein.

1.4 RELATED WORK

- A. General Requirements for Plumbing Work
- B. Pipe, Tube and Fittings
- C. Drainage Systems
- D. Water Supply Systems
- E. Natural Gas System
- F. Automatic Sprinkler System

1.5 QUALITY ASSURANCE

- A. Plumbing Code
- B. N.F.P.A. National Fire Protection Association
- C. A.G.A. American Gas Association
- D. C.G.A. Compressed Gas Association

1.6 SUBMITTALS

A. After installation of plumbing system, Contractor shall provide a copy of Self-Certification Form OP-98 and submit to NYC DOB for approval.

1.7 SPECIFIC REQUIREMENTS

- A. All tests shall be made in the presence of the Commissioner, NYC DEP, and the NYC DOB of the work to be tested, as may be directed; and at least 72 hours notice shall be given in advance of all tests.
- B. The Work of this Contractor shall include the furnishing of all testing instruments, gauges, pumps, smoke machines, and other equipment required or necessary for tests, required by laws, rules and regulations and as specified.
- C. Provide all other tests required by NYC DOB and NYC DEP.
- D. All appurtenances shall be operated after installation to determine whether or not they meet the requirements of the Specifications.
- E. All defects disclosed in the work by tests and otherwise shall be made good or the Work replaced without additional cost to the City of New York. No caulking on screwed joint, cracks or holes will be acceptable.
- F. Tests shall be repeated after any defects disclosed thereby have been made good or the work replaced if it is deemed necessary.
- G. All tests shall be made at the expense of the Contractor.
- H. Tests are not permitted to be made with air except as noted.
- I. Contractor to provide required test plug tee fittings during erection of pipe system.
- J. If the pipe, installation fails to meet testing requirements, the Contractor shall determine at his own expense the source or sources of leakage, and he shall repair or replace all defective materials or workmanship. The completed pipe installation shall meet the requirements of the tests after the leaks have been corrected.
- K. All piping which is to be enclosed in partitions or hung ceilings shall be tested and made tight when directed by the Commissioner and in adequate time to permit the installation of partitions and ceilings. When necessary, the Contractor shall drain the piping and/or take such precautions as required to prevent damage by freezing.
- L. The Contractor shall also be responsible for the work of other trades that may be damaged or disturbed by the tests, or the repair or replacement of this Work, and he shall, without extra charges, restore to its original condition, any Work so damaged or disturbed.
- M. The Contractor shall be responsible for all tests listed in this Section as well as all Special Tests and Inspections in Section 220500.

PART 2 PRODUCTS

NOT APPLICABLE.

PART 3 EXECUTION

3.1 WORK PERFORMED PRIOR TO TESTING

A. Water Systems:

- 1. Flushed, filled and vented.
- 2. Correct pump rotation.
- 3. Proper strainer baskets clean and in place.
- 4. Temporary start-up strainer baskets removed.
- 5. Service and balance valves open.

3.2 BALANCING

- A. Balance and adjust water systems.
 - 1. Examine system and position valves and cocks in their required open or closed position.
 - 2. Make all adjustments as required to balance system and equipment.
- B. Mark valve tag of each valve or cock used for balancing to indicate position of valve stem.
- C. Make repairs to all leaks or defects without additional cost to the City of New York.

3.3 FINAL WATER SYSTEM BALANCING

- A. Provide final balancing and adjustments to water systems after Contractor corrects all deficiencies. Final balancing shall incorporate all Commissioner comments on Preliminary Balancing Report.
 - 1. Make all final adjustments as required to balance system and equipment. Submit report indicating final GPM to all risers and equipment. Report shall indicate final performance characteristics for pumps including total GPM, total dynamic head and actual motor amps.
- B. Mark valve tag of each valve or cock used for balancing to indicate position of valve stem.

3.4 TESTING OF AUTOMATIC CONTROLS

A. In cooperation with the control manufacturer's representative, adjust controls to operate as specified. Testing personnel shall check all controls for proper calibrations and list all controls requiring adjustment by control installers.

3.5 DOMESTIC WATER SYSTEM STERILIZATION

- A. The potable water system shall be disinfected prior to use. Samples shall be taken as required by the department of health. The method to be followed shall be that as prescribed by the Department of Health, by the following:
 - 1. The pipe system shall be flushed with clean, potable water until not dirty water appears at the outlets.
 - 2. The system or part thereof shall be filled with a water-chlorine solution containing at least 50 parts per million of chlorine and the system or part thereof shall be valved off and allowed to stand for 24 hours or, the system or part thereof shall be filled with a water-chlorine solution containing at least 200 parts per million of chlorine and allow to stand for 3 hours.
 - 3. Following the prescribed standing time, the system shall be flushed with clean potable water until no excess chlorine remains in the water coming from the system.
 - 4. The procedure shall be repeated if it is shown that contamination still persists in the system.
 - 5. Certify through an independent testing laboratory the quality of purity. Submit test results to Commissioner.

3.6 PIPING SYSTEM TESTS – GENERAL

- A. Each piping system shall be tested prior to application of insulation, painting or placing of backfill. Testing as stipulated herein shall be considered minimum, and where tests stipulated by lawfully jurisdictional authorities exceed these requirements, such more stringent tests shall be performed.
- B. All materials and equipment for testing shall be furnished by the installer of the system. Concealed work shall remain uncovered until required tests have been completed. In the event that the project construction schedule requires it, make arrangements and insert proper sectionalizing devices so that a portion of a system may be tested.
- C. All piping, unless otherwise specified, shall be tested to a hydrostatic pressure at least 2- ½ times the maximum designed working pressure (but not less than 50 psig) for a sufficiently long time to detect all leaks and defects, and after testing, shall be made tight in the most approved manner.
- D. Where controls and accessories are not designed to withstand pipe test pressures, they shall be properly protected against damage during such test.

- E. Compressed air piping for temperature control line shall be subjected to an air pressure test of 50 psig and connections checked with soapsuds.
- F. If in any tests leaks are observed, the defective work or material shall be replaced. No caulking of screw joints or holes will be acceptable. Repetition of the entire test will be required as many times as leaks can be observed from the tests, until no leaks result in successful completion of the test.
- G. Make all provisions for removal of test equipment and draining of pipes after tests have been completed. Insulation work shall not be performed prior to inspection and testing of piping.
- H. The Contractor shall inform the Commissioner in writing when a section of piping is to be tested and subsequently insulated or otherwise concealed. Such notice shall be given a minimum of five (5) working days prior to the start of testing.
- I. Where possible, arrange to conduct tests under constant ambient temperature conditions in order that compensation for temperature change is not necessary.

3.7 INTERIOR DOMESTIC WATER SYSTEMS

- A. Domestic cold, hot and hot water circulation system: The entire water supply system shall be tested to a hydrostatic pressure of 150 pounds per square inch or 1- ½ times the system pressure, whichever is greater, at lowest point of the water system in the building, and proved tight at this pressure before fixtures are installed. Water supply piping, if in any way concealed by structural work, shall be tested to the aforesaid pressure and proved tight before pipes are concealed.
- B. The test procedure shall be held for a period of not less than two (2) hours. The piping system shall be considered tight if the drop in pressure does not exceed 2 pounds per square inch during the test period. If the pressure drop exceeds 2 pounds, all repairs and alternations in the pipe system necessary to meet the test shall be made.

3.8 DRAINAGE AND VENT PIPING INSIDE BUILDING:

- A. Rough Plumbing: Except for outside leaders and perforated or open jointed drain title (subsoil drains), the piping of plumbing drainage and venting system shall be verified as to materials and shall be tested upon completion of the rough piping installation and proven to be watertight. The Commissioner may require the removal of any cleanout plugs to ascertain that the prescribed pressure has been reached in all parts of the system.
 - 1. Water Test: A water test shall be applied to the drainage system either in its entirety or in sections after rough piping has been installed. If applied to the entire system, all openings in the piping, except the highest opening, shall be tightly closed and the system filled with water to the point of overflow. If the system is tested in section, each opening, except the highest opening of the sections under test, shall be tightly plugged and each section filled with water. No section shall be tested with less than a 10 ft. head of water. In testing successive sections, at least the upper 10 ft. of the following section shall be tested, so that no joint or pipe in the building (except the uppermost 10 ft. of the system) shall have been submitted to a test of less than 10 ft. head of water. The water shall be kept in the system or in the portion under the test for at least 15 minutes before inspection starts; the system shall then be tight at all points.

- B. Finished Plumbing: 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.
 - 1. Smoke Test: The smoke test shall be made by filling all traps with water and the introducing into the entire system a pungent thick smoke produced by one or more smoke machines. When the smoke appears at stack openings of the roof, these openings shall be closed and a pressure equivalent to a 1" water column shall be maintained for the period of the inspection.
 - 2. Peppermint Test: The peppermint test shall be made by introducing 2 ounces of oil of peppermint into the roof vent terminal of every line or stack to be tested. The oil of peppermint shall be followed at once by 10 quarts of hot water (160 degrees F or higher), whereupon all roof vent terminals shall be sealed. The detection of the odor of peppermint at any trap or other point in the system shall determine the location of any leaks. Persons who have come in contact with oil of peppermint shall be excluded from the test area.

3.9 NATURAL GAS

- A. Low Pressure for 10 minutes without drop:
 - 1. With approved mercury gauge:
 - a. With air at 6" of mercury.
- B. From service valve to meters, 90 P.S.I.G.
- C. High Pressure As per National Fuel Gas Code as modified by the N.Y.C. Building Code.
- D. Purge all piping after pressure test.
- E. Purge all equipment after piping has been purged.
- F. Radiography shall be performed on all butt welds in gas meter and gas distribution piping operation at pressures exceeding 3 psig, within buildings, in accordance with API 1104-1977 or ASME Section IX Boiler and Pressure Vessel Code, 1980.
- G. The City of New York has the option of requiring the testing of welded joints in piping specified below to be performed by means of radiographic inspection. If welds are found to have been improperly made, or excess materials has been extruded into the piping, additional radiographic inspections may be required from the Contractor and all or parts of the work may be rejected. The testing laboratory selected by the Contractor to perform this work shall be acceptable to the City of New York.

3.10 SPRINKLER SYSTEM

A. Before any paint is applied, the fire standpipe system shall be tested hydrostatically at not less than 200 psi pressure for two (2) hours minimum, and in accordance with all requirements of the authorities having jurisdiction and NFPA latest edition.

B. Before any paint is applied, the dry standpipe system shall be tested by air pressure to 40 psig for a period of 24 hours. Leakage in excess of 1- ½ psig will not be acceptable.

END OF SECTION

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SECTION 220700

PLUMBING INSULATION

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this specification as shown or specified should be in accordance with the requirements of the Contract Documents.

1.2 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project:
 - 1. The Contract Drawings
 - 2. The Specifications
 - 3. The General Conditions
 - 4. The Addendum
 - 5. The Contract [City of New York Standard Construction Contract].

1.3 WORK INCLUDED

- A. Work of this Section includes all labor, materials, equipment and services necessary to provide Insulation on Plumbing Piping and Equipment as shown on the drawings and as specified herein, including but not limited to the following:
 - 1. Insulation, jacketing and adhesives for plumbing piping.
 - 2. Insulation, jacketing and adhesives for plumbing equipment.

1.4 RELATED WORK

- A. Pipe, Tube and Fittings
- B. Hangers and Supports
- 1.5 QUALITY ASSURANCE
 - A. Federal Specifications F.S.
 - B. Underwriters Laboratories U.L.
- 1.6 SUBMITTALS
 - A. Shop Drawings:

- 1. Insulation Materials.
- 2. Jackets.
- 3. Adhesives.

PART 2 PRODUCTS

2.1 INSULATING MATERIALS

- A. All insulation shall have composite (insulation, jacket facing and adhesive used to adhere jacket or facing to the insulation) fire and smoke hazard ratings as tested by Procedure ASTM E-84, NFPA 255 and UL 73, not exceeding flame spread of 25, fuel contributed of 50, and smoke developed of 50. Accessories such as adhesives, mastics, cements, tapes and cloths for fittings shall have component ratings as listed above. Insulation shall be glass fiber with a maximum K factor of 0.23 at 75 degrees F. mean temperature. Density shall not be less than 3 lbs. per cu. ft. Owens Corning, Buckaroos, Armacell Engineered Foams, or approved equal.
- B. Insulation thickness shall conform to application schedule specified herein for types and thickness.
- C. Pipes subject to freezing: Cover all piping subject to freezing with an additional layer of 2" glass fiber insulation of the same finish as specified for the particular service when not subject to freezing, but not less than 3" total thickness.
- D. The materials as specified below have been selected from Owens-Corning Fiberglass Corp. and are representative of the quality, design and finish desired. Insulation as manufactured by other manufacturers may be submitted for approval, provided the products meet fully in all respects (such as density, moisture absorption, alkalinity, thermal-conductivity, jacket, etc.) to the materials as delineated below.
- E. Fiberglass Pipe Insulation: FS HH-1-558B (Amend. 3), Form D, Type III, Class as indicated. Provide Class 12 for hot and cold plumbing piping.
- F. Fiberglass Pipe Fitting Insulation: FS HH-I-558, Form E, Class as indicated. Provide Class 16 for use with Class 12 pipe insulation, where temperature does not exceed 450 degrees F.
- G. Flexible Unicellular Pipe Insulation: FS HH-I-523, Class T.
- H. Calcium Silicate Pipe Insulation: FS HH-I-523, Type II, except type I where needed, factory applied jacket Class B.
- I. Vapor Barrier Materials: FS HH-B-100B, Type I, paper-backed aluminum foil, except as otherwise indicated, strength and permeability rating equivalent to adjoining pipe insulation jacketing.
- J. Bends shall be 0.016 inch thick, 1/2" aluminum spaced 18" on center, finish cement shall be J-M No. 375 or smooth coat by Insulation Industries, Inc.

- K. Wires shall be 20 gauge galvanized annealed steel, sealer shall be layer of J-M duramesh 207 or equal.
- L. Adhesives and Protection Finish shall be Benjamin Foster 30-36 or Insul-Coustic (I-C).
 - M. Jacketing Material for Equipment Insulation: Provide pre-sized glass cloth or canvas material, not less than 7.8 ounces per square yard.
 - N. Fitting and Valves: Zeston 25/50 rated 20 mil. P.V.C. covers over fiberglass insulation.

2.2 RELATED MATERIAL AND REQUIREMENTS

- A. At pipe supports Insul-Shield, Buckaroos, Erico, or approved equal pipe saddles and matching hanger shall be used. Joints of insulation abutting Insul-Shielding pipe saddles shall be butted with IC-405, and the joints firmly pressed together.
- B. All concealed and exposed piping shall be provided with factory ASJ (Owens/Corning Fiberglass, Buckaroos, Armacell Engineered Foams, or approved equal) secured in place with vapor barrier adhesive IC-225. Provide 1/2" aluminum bands spaced 18" on centers.

2.3 INSULATION REQUIREMENTS

- A. Cold Water Piping
 - Cold Water 1 inch and smaller 1/2" insulation, A.S. jacket.
 Cold Water 1- 1/4" to 2" 3/4" insulation, A.S. jacket.
 Cold Water 2- 1/2" and larger 1" insulation, A.S. jacket.
- B. Hot Water Piping
 - 1. Hot Water Supply -1/2" to 1-1/4" I.D. -3/4" insulation, A.S. jacket.
 - 2. Hot Water Supply -1-1/4" and larger -1" insulation.
 - 3. Hot Water Circulating all sizes 1" insulation, A.S. jacket.
- C. Except as noted insulate all exposed and concealed vertical and horizontal domestic water piping.

PART 3 EXECUTION

3.1 GENERAL

- A. Maintain integrity of vapor-barrier jackets on pipe insulation, and protect to prevent puncture or other damage. Staples shall not be used on vapor barrier.
- B. Cover valves, flanges, fittings and similar items in each piping system with equivalent thickness and composition of insulation as applied to adjoining pipe run. Install factory, precut or job fabricated units (at Installer's option) except where a specific form or type is indicated.

- C. Extend piping insulation without interruption through walls, floors and similar piping penetrations, except where otherwise indicated.
- D. Do not apply insulation to hot equipment.
- E. Apply insulation using the staggered joint method for both single and double layer construction, where feasible. Apply each layer of insulation separately.
- F. Coat insulated surfaces of equipment with layer of insulating cement, troweled in a workmanlike manner, leaving a smooth continuous surface. Fill in scored block, seams, chopped edges and depressions, and cover wire netting and joints with cement of sufficient thickness to remove surface irregularities.
- G. Cover insulated equipment surface with jacketing neatly fitted and firmly secured. Lap seams at least two inches. Apply cover vapor barrier where applicable.
- H. All horizontal storm drainage piping under roofs, exposed and above hung ceiling, and roof drain bodies shall be insulated as specified for cold water piping, but nested larger diameter covering over hubs and drain bodies.

3.2 INSTALLATION REQUIREMENTS

- A. Install insulation products in accordance with the manufacturer's written instructions, and in accordance with recognized industry practices to ensure that the insulation serves its intended purpose.
- B. Install insulation on pipe systems subsequent to testing and acceptance of tests.
- C. Install insulation materials with smooth and even surfaces. Insulate each continuous run of piping with full-length units of insulation, with a single cut piece to complete the run. Do not cut pieces of scraps abutting each other.
- D. Clean and dry pipe surfaces prior to insulating. Butt insulation joints firmly together to ensure a complete and tight fit over surfaces to be covered.
- E. The Contractor shall take every precaution necessary to insure that the covering material is in satisfactory condition to receive painting.
- F. Penetration of walls and floors by piping connection to rotating equipment shall be provided with a fiberglass sleeve, the full depth of pipe penetration.
- G. In all cases where new piping connects to existing piping that is insulated, the existing insulation that is removed to make the new connection shall be replaced with new insulation as hereinafter specified.
- H. Do not insulate hand holes, cleanouts, ASME stamp, and manufacturer's nameplate. Provide neatly finished beveled edge at interruptions of insulation.

- I. Replace damaged insulation, which cannot be repaired satisfactorily, including units with vapor barrier damage and moisture-saturated units.
- J. The installer of the piping insulation shall advise this Contractor of required protection for the insulation work during the remainder of the construction period to avoid damage and deterioration.

END OF SECTION

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SECTION 221000

PIPE, TUBE AND FITTINGS

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Specification as shown or specified should be in accordance with the requirements of the Contract Documents.

1.2 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project:
 - 1. The Contract Drawings
 - 2. The Specifications
 - 3. The General Conditions
 - 4. The Addendum
 - 5. The Contract [City of New York Standard Construction Contract].

1.3 WORK INCLUDED

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the installation of pipe, tube and fittings as shown on the drawings and as specified herein, including but not limited to the following:
 - 1. Atmospheric pipe systems.
 - 2. Pressure pipe systems.
 - 3. Note: All new drainage piping, fittings, and accessories shall be corrosion resistant due to the salt water environment.

1.4 RELATED WORK

- A. General Requirements for Plumbing Work
- B. Valves
- C. Insulation
- D. Hangers and Supports
- E. Drainage Systems
- F. Domestic Water Systems

- G. Fuel Gas System
- H. **Testing**
- I. Automatic Sprinkler Systems

1.5 **QUALITY ASSURANCE**

References A.

- 1. A.G.A. American Gas Association
- 2. A.N.S.I. American National Standards Institute
- 3. A.S.A. American Standards Association
- 4. A.S.T.M. American Society of Testing and Materials
- 5. A.W.S. American Welding Society
- American Water Works Association 6. A.W.W.A.
- 7. C.A.B.R.A. Copper and Brass Research Association
- 8. C.I.S.P.I. Cast Iron Soil Pipe Institute
- 9. Federal Specifications - U.S. Dept. of Commerce F.S.
- 10. F.M. Factory Manual
- 11. I.R.I. **Industrial Risk Insurers**
- 12. N.B.S. National Bureau of Standards
- 13. N.F.P.A. National Fire Protection Associations
- 14. O.S.H.A. Occupational Safety and Health Act
- 15. U.L. **Underwriters Laboratories**
- No welder shall be employed who has not been fully qualified and certified by an approved, B. nationally certified, welding bureau or similar recognized testing agency.
- The competent and experienced welders who have qualified shall be retained at the job at all C. times when welding is done. Once qualified, they shall not be removed from the job. Each welder shall be in possession of a stamp to identify work performed by him.
- Welding material and labor shall be in accordance with the welding procedures of ANSI piping D. codes. Mark of welder shall be stamped on each welded joint of pipe.

1.6 **SUBMITTALS**

- Shop drawings indicating pipe layout (3/8" scale), sizes, types of materials, details, attachment A. and installation. Coordinate the work with other trades doing sheet metal work, electrical work and general construction.
- Product Data: Manufacturers' printed data, catalog cuts, recommended connections and B. installation methods. Submit for valves, fittings, strainers, supports, sleeves, anchors and guides.
- C. Samples, when requested.
- D. Manufacturer's test data.
- E. Reports of pipe field hydrostatic test.

1.7 DELIVERY, STORAGE & HANDLING

- A. Deliver materials properly identified as to type, size, manufacturer's name, specification code, etc., and undamaged.
- B. Do not store exposed to weather; cover with suitable type material to protect from damage.
- C. Properly protect all piping so as to prevent damage to the pipe or the introduction of foreign material into the pipe. For the purpose of protecting pipe from pre-installation contamination, all piping shall be shipped to job site with suitable caps, sheet metal covers or plugs. Pipe caps, etc. shall not be removed until just before installation.
- D. Cap or plug all openings in pipe and pipe fittings during installation.
- E. During loading, transporting and unloading, use care to prevent injury to pipes and pipe fittings. Do not drop pipe or fittings. Examine all pipe and fittings before laying. Do not install any piece that is found to be defective.
- F. Store and protect all materials from injury prior to installation. Do not store any materials directly on the ground or floor. Keep materials as clean and dry as possible and free from damage or deteriorating elements.
- G. Remove and replace with new pipe any defective pipe and pipe fittings discovered after installation without additional expense to the City of New York.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Pipe:

- 1. Corrosion Resistant Drainage: Duriron Co., Inc., Corning Glass Works, GSR-Fuseal, Flowserve.
- 2. Ductile Iron: U.S. Pipe and Foundry, Clow Corporation.
- 3. Copper: Revere Copper Products, NIBCO.
- 4. Fittings for Brass Pipe and Copper Tubing: Flagg, Nibco.
- 5. Stainless Steel: Babcock & Wilcox, Carpenter Technology, Republic Steel.
- 6. Steel: Youngstown, Republic, U.S. Steel.
- 7. Flexible connectors: Flexonics, Resistoflex, Flexico.
- 8. Mechanical Fittings: Victaulic, Grinnell, MG Piping Products.
- 9. Sleeves: Thunderline Link-Seal, GPT Link Seal, Metraflex, or approved equal.

2.2 UNDERGROUND PIPE AND FITTINGS

- A. Sanitary Drainage and Vent Piping System:
 - 1. Duriron soil pipe and fittings with grooved hub and male spigot compression type joints using a neoprene gasket and lubricant similar to TY-Seal gaskets, Charlotte Pipe, Romac Industries, or approved equal. Conform to the latest ASTM A-74 and C-564 Standards.
- B. Storm Drainage Piping System:
 - 1. 12" and smaller shall be cast iron as specified herein for the exterior sanitary sewer.
 - 2. 15" and larger shall be reinforced concrete pipe and fittings, with bell and spigot joints. Constructed in accordance with ASTM Designation C-76, Class II to V, depending on depth of bury, suitable for conveyance of storm water. The pipe joints shall be sealed by a rubber gasket and steel bell ring. The rubber gasket shall be of an element suitable to make the joint watertight.
- C. Domestic Water and Fire Protection Systems:
 - 1. 3" and larger
 - a. Ductile iron pipe with mechanical joints conforming to A.S.T.M.A21.51 and A21.52 (AWWA/C151-65 60-42-10), and shall be approved by the NYC DEP.
 - b. Each pipe shall have cast on it or stamped on it by means of a hand dye stamp, the maker's name or mark, and the year in which the pipe is cast. The weight and thickness class shall be painted on each pipe.
 - c. Lined with cement mortar in accordance with the A.S.T.M. A21.4-1964. Coated outside with an approved bituminous material. The coating of the interior shall conform with the requirements of A.S.T.M. A21.4-1964. All fittings shall be cement-lined mechanical joint type, Class 250, short pattern ASA 21.10-1964 AWAC-110-64. Fittings: Lined and coated as specified for cast iron pipe above. Assembly of the mechanical joint pipe and fitting shall be completed with a torque switch.
 - d. PVC pipe, class 150, bell ends with gasket, AWWA C900.
 - 1) IPEX "Blue Brute", JM Eagle, PW Eagle, or approved equal.
 - 2) Fittings: AWWA C907, class 150, gasketted.
- D. Domestic Water Systems:
 - 1. 2 1/2" and smaller
 - a. Type "K" copper tubing and fittings, seamless hard drawn with silver brazed or compression joints and fittings in accordance with latest ASTM Standards and shall be either coated or mill-wrapped.

- b. Flexible Polyethelene tubing, NSF approved, AWWA C-901, 200 psi rated, potable water grade.
 - 1) Crestline HD CTB, ISCO Industries, JM Eagle, or approved equal.
 - 2) Fittings: Compression type similar to Mueller

E. Gas System:

1. Meet National Grid requirements or, as a minimum, shall be extra heavy, plain end, black steel pipe conforming to ASTM standard sizes and weights, and coated with Hill-Hubbell Spec. BAX-1 pipe covering, DuraSeal Coatings, Bayou Companies, or approved equal. Pipe 4 inches in size and larger shall be lap-welded. Buried tees or elbows shall be of extra heavy black steel with welded joints and coated similar to pipe. All pipes shall meet latest ASTM A53-47, A120-47, A135-46, and A139-46. All joints in underground piping shall be welded by an AWS certified welder. Dresser type connections in exposed locations are permitted at drip pots and valve. All underground piping shall be mill-wrapped.

2.3 INTERIOR PIPE AND FITTINGS

- A. Sanitary, Vent and Storm Drainage Systems:
 - 1. See Section 221300.
- B. Domestic Water System:
 - 1. Underground: 2" and smaller shall be Type "K" copper tubing, soft temper ASTM B-88 with wrought copper or cast brass brazed fittings, minimum 125 psi WWP. Brazing joints shall be as specified for domestic water piping. Pipe and fittings: Shall be asphaltum coated.
 - 2. Above ground domestic water piping: Seamless drawn or extruded copper tubing type "L" hard temper ASTM B 88. Fittings 1 ½" and smaller: Wrought copper or cast bronze, brazing type. Joints shall be made with a brazing alloy (95/5) consisting of copper, silver and phosphorus, and shall conform to Handy Harmon "Silphos" fluxless brazing (1,300 degrees F.) or equal. Brazing material shall meet ANSI/AWS A5.8 Specifications. Fittings 2" and larger: wrought or cast Victaulic type CTS grooved cooper fittings. Couplings: Victaulic style 606 ductile iron couplings, 300psi wwp.
 - a. See also Section 211300.

C. Above Ground:

- 1. Hubless, Standard Weight, cast iron soil pipe and fittings or galvanized steel pipe with threaded galvanized cast iron recessed drainage fittings, with galvanized malleable beaded fittings for vent piping.
- D. Gas piping shall meet the National Grid guidelines or shall be as follows:
 - 1. Black steel, Schedule 40 with maker's name rolled in the metal. Pipe three inches in diameter and larger shall be seamless.

- 2. Interior gas steel piping three inches and larger shall be welded; pipe 2- 1/2" and smaller provide 150 pound malleable iron threaded fittings.
- 3. All shoulder nipples shall be made of extra heavy pipe, no close nipples shall be accepted.
- E. Sump pump discharge waste to stack or main house drain:
 - 1. Galvanized steel pipe with galvanized thread cast iron drainage fittings.
- F. All screwed couplings and shoulder nipples not exceeding 5" in length shall be of the same material as the pipe but of dimensions conforming to Schedule 80.
- G. All fittings used at expansion loops or bends shall be of 250 lb. WSP Class.
- H. Welding fittings shall be of the same material and schedule as the pipe to which they are welded. Welding elbows shall be long radius pattern unless clearance conditions necessitate the use of standard radius pattern. Welded tees shall be used where difference between main and branch are two (2) standard pipe sizes or less. Branch connections shall be reinforced with Weldolets by Bonney Forge and Tool Works or welding saddles by Tube-Turn, Walworth or approved equal. Welding fittings shall be Tube-Turn, Walworth or approved equal.
- I. Unions 2" and smaller shall be screwed unless otherwise noted. Unions 2- 1/2" and larger shall be flanged. If mechanical joint grooved couplings are used, unions are not required. (Couplings shall serve as unions.) Screwed unions on wrought iron and steel pipe, unless otherwise specified, shall be of malleable iron with bronze ground seats suitable for 300 lbs. WSP. Screwed unions or brass pipe shall be brass, ground joint suitable for 300 lbs. WSP. Flanged unions shall be malleable iron, gasket type suitable for 150 lbs. WSP. Unions shall be as manufactured by Crane, Walworth or approved equal.
- J. Flanges shall be of the same weight as the fittings and valves in each service category. Welding neck flanges shall be used with flanged equipment, etc., on welded lines. All flanges shall be drilled in conformance with ANSI B16.5, 125 lb. or 300 lb. standard steel. Welding flanges shall be of steel. Laps shall be machined on front, back and edge and loose flanges have face and bore machined. Screwed flanges shall be faced perpendicular to adjoining pipe.
 - 1. Flange adapters for grooved end steel pipe shall be complete with pressure responsive synthetic rubber gaskets. Flange adapters shall be Class 150, Victaulic Style 741. Flange adapters for use with copper tube shall be Class 150, Victaulic Style 641.
- K. Flange joints shall be faced true, packed and made up perfectly square and tight. Each flange joint shall be provided with best grade steel bolts with square forged heads and with cold-pressed semi-finished hexagon nuts. Bolts and nuts shall be dripped in a mixture of graphite and oil, just before installation. All threads shall be U.S. Standard Gaskets shall be one-piece ring type 1/16" thick full face, suitable for temperature, pressure and service of systems.
- L. Dielectric Fitting: Dissimilar connections shall be made with an insulating dielectric material such as Teflon or neoprene between copper, brass or bronze and black steel pipe.

M. Fittings:

1. Cast iron threaded drainage: Recessed pattern, ANSI B-16.12.

- 2. Malleable iron: Threaded and banded, standard weight except as noted, ANSI B-16.3.
- 3. Cast iron threaded: Standard weight, except as noted, ANSI B-16.4.
- 4. Cast iron flanged fittings and flanges: Standard weight except as noted, ANSI B-16.1.
- 5. Ductile iron grooved: ASTM A-536.
- Steel grooved: Forged steel or fabricated steel ASTM A-53.
- 7. Steel welding: Standard weight seamless steel, ANSI B-16.9 and ASTM A-234.
- 8. Steel flanges: ANSI B-16.5.
 - a. ASTM A-181 Grade I up to 300 psi.
 - b. ASTM A-105 Grade I, 400 psi and above.
- Grooved end fittings for copper tubing: Wrought copper conforming to ASTM B-75, B-152, and ANSI B16.22 with copper tubing sized grooved ends designed to accept Victaulic couplings.
- 10. Flange adapters for grooved end pipe: Ductile iron ASTM A-536, with synthetic rubber pressure responsive gasket.
- 11. Couplings for grooved end pipe:
 - For steel pipe: ASTM A-536 ductile iron housings, with synthetic rubber pressure responsive gasket. (Rigid type with angle-pattern bolt pads, or flexible type where required.)
 - b. For copper tubing: ASTM A-536 ductile iron, with synthetic rubber pressure responsive gasket of a flush seal design, and angle pattern bolt pads. Coupling housings coated with copper colored alkyd enamel. Couplings shall be copper tubing sized.

N. Unions:

- 1. Ground joint type.
- Brass for brass pipe and copper tubing.
- 3. Galvanized malleable iron with brass seats for iron pipe.
- If mechanical joint grooved couplings are used, unions are not required. (Couplings shall serve as unions.)

2.4 EXTERIOR WALL/PIPE PENETRATIONS

A. Underground pipe through wall penetrations shall be sealed with positive hydrostatic seals. The modular mechanical seals shall consist of interlocking rubber links shaped to continuously

fill the annular space between the pipe and wall opening. The seals shall be "LINK SEALS" as manufactured by Thunderline Corporation of Wayne, Michigan or an approved equal. Caulking or other type of mastic sealants or lead or oakum joints are not acceptable. The Contractor shall determine the required inside diameter of each wall opening or sleeve to fit the pipe LINK SEAL. The LINK SEAL size and model shall be as recommended by the manufacturer's instructions.

1. Seal: Type "C".

2.5 SLEEVES

- A. Make sleeves of galvanized steel pipe when they are located in concrete beams of concrete fireproofing, waterproofed floors or where subject to moisture.
- B. In all other locations, sleeves shall be constructed of galvanized sheet steel with lock seam joint of following minimum gauges: 24 gauge for 2" and smaller; 22 gauge for 4" to 6" inclusive; 20 gauge for sizes over 6".
- C. Sleeve flashing shall be 16-ounce soft sheet copper, or a 4-pound lead flashing.

2.6 ESCUTCHEONS

- A. Escutcheons shall be one piece with set screw except where otherwise noted, constructed of the following material.
 - 1. White painted sheet brass or steel for pipes passing through white prefinished ceilings.
 - 2. Cast iron, deep cut type project above finished floor.
 - 3. Heavy, solid pattern steel or cast iron with set screw for all other piping.
- B. Provide escutcheons on all pipes passing through floors, walls, partitions and ceilings where exposed to view in occupied areas. Also, provide escutcheons within custom or factory-fabricated cabinet enclosures.
- C. At exposed finished walls: chrome plated.

2.7 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.
 - 1. Hoffman Specialty No. 78.
 - 2. Watts
 - 3. TLV
- B. Each float-operated vent shall be provided with a suitable vent line carried to the nearest floor drain, slop sink or other approved point of discharge.

- C. Access door shall be provided for installation by Contractor where access to vents is required.
- D. At a minimum provide air vents at top of each domestic hot, cold and return riser and at every pump inlet and outlet.

2.8 EXPANSION AND BALL JOINTS

A. Expansion Joints of the Packed Slip Type:

1. Internally guided, piston ring type, with cast iron or fabricated carbon steel bodies and flanged connections. Slips: Polished, chromium plated, seamless steel, with positive stop to limit outward movement and prevent disengagement of the slip. Fit the integral end of the slip and replacement of the packing rings while the joint is installed in the line and under full operating pressure. Arrange the internal guide to prevent metal-to-metal sliding contract with the polished surface of the slip. Provide deep stuffing boxes furnished with close fitting, vent connection, nipple and valve in the body of the joint, between the piston rings and the stuffing box for use during servicing operations. Rate all joints for the traverse, the temperature rating, the pressure rating and the test pressure rating of the service.

B. Expansion Joints of the Bellows Type:

1. Hydraulically formed, packless, stainless steel bellows type, self-equalizing, internally guided, full bore size, fully enclosed with flanged connections. Expansion joint flange ratings to those required for the traverse, the temperature rating, the pressure rating and the test pressure rating of the service.

C. Expansion Joints of the Flexible Ball Type:

- 1. Install in strict accordance with manufacturer's instructions. Torque flange bolts on the ball joints at the factory for the required duty and furnish with seals on all flange bolts to prevent any unauthorized readjustment. Rate all joints for the traverse, the temperature rating, the pressure rating, the test pressure rating, offset and gasket type of the service.
- D. Expansion joints shall be manufactured by ADSCO, Barko, Flexonics, or approved equal.

E. Expansion joints for grooved end steel pipe:

- 2" Through 6": Packless, gasketed, slip-type expansion joint with grooved end telescoping body for installation with Victaulic Style 07 rigid couplings. Provides axial end movement to 3", designed for water services up to 230°F and working pressure to 350 psi. Victaulic Style 150 Mover.
- 2. 3/4" Through 24: Combination of short nipples and Victaulic Style 75 or 77 flexible couplings joined in tandem for increased expansion. Joint movement and expansion capabilities determined by number of couplings/nipples used in the joint. Pressure rating dependent on size and style of flexible couplings used. Victaulic Style 155.

2.9 DRIP PANS

A. 18 gauge galvanized sheet steel, reinforced, properly supported watertight with 1-1/4" drain.

- B. Provide under piping where impossible to route water or drainage piping to avoid passing over or within 5 feet of electrical apparatus and in rooms containing only electrical equipment.
- C. Provide under all ground floor plumbing offsets and where indicated on plans.
- D. Provide under all sanitary piping in commercial kitchen and where indicated on plans.

2.10 GALVANIZING

- A. Hot process inside and outside of pipe with zinc coating, minimum 2 ounces per sq. ft.
 - 1. In accordance with American Hot-Dip Galvanizers Associations.

2.11 CHROMIUM PLATING

- A. In accordance with U.S. Government Standards under license from Chrome Corporation of America.
- B. Clean material and polish before plating.
- C. Plating: Heavy, evenly applied, guaranteed not strip or peel.
- D. Brass or Copper Plating: Nickel plated before chromium plating, ASTM B-281, B-456.
- E. Finish: Polished or satin as noted.

2.12 MISCELLANEOUS MATERIALS

- A. Galvanized Sheet Steel: ASTM A525.
- B. Cement: ASTM C-150.
- C. Sand, Stone and Gravel for Concrete: ASTM C-33.
- D. Sand for Mortar and Grout: ASTM C-144.
- E. Reinforcing Rods: ASTM A-615.
- F. Reinforcing Wire Mesh: ASTM A-185.

PART 3 EXECUTION

3.1 INSTALLATION OF PIPING

A. General:

 Piping: Installed in neat and workmanlike manner parallel to walls, column center lines but sloped to drain. Work of each trade shall be fully coordinated to provide the design systems without interference between systems. Piping shall be accurately cut, reamed and

- threaded with sharp dies. Install copper piping in accordance with best practices requiring accurately cut clean joints and soldered in accordance with the recommended practices for the materials and solder employed.
- 2. Piping shall be installed so as not to interfere with diffusers and electrical lightning outlets which must be accurately centered and located. Special attention shall be given to piping above ceilings, which must be kept a sufficient distance from the lighting outlet to permit later installations of the lighting fixtures and their reflectors fixtures, piping and equipment.
- Arrange and install piping as indicated, straight, plumb and as direct as possible, form right
 angles on parallel lines with building walls. Keep pipe close to walls, partitions and
 ceilings, offset only where necessary to follow walls, as directed.
- 4. Locate groups of pipes parallel to each other and space them at a distance to permit access for servicing valves. Risers shall not have couplings in runs from one floor outlet to the next.
- 5. The installation of copper tubing shall be accomplished in such a way as to not touch or come in contact in any way with ferrous metals. Where copper tubing piping or fittings may come in contact with ferrous metal anchors, supports or construction, an insulating non-conductor spacer, similar to lead, rubber or an approved equal, shall be installed to assure prevention of electrolysis.
- 6. Piping size change shall be accomplished by reducing ell, reducing tee. Eccentric reduction shall be applied in all piping requiring continuous drainage such as steam, condensate and blowdown piping. Concentric increasers shall be used where flow is in direction of increased size. Provide eccentric reduction, top flat, at pump suction reductions.
- 7. All welding piping shall be butt welded at circumferential joints. Flanges shall be weld-neck type or slip-on type flanges. Materials and methods for each type and class of piping are generally specified for particular services in this specification.
- 8. Companion flanges or Victaulic couplings at equipment or valves match flanges construction of equipment or valve. Raised face shall be removed at companion flanges when attached to flanges equipped for flat face construction.
- 9. Gaskets and bolting shall be applied in accordance with the recommendations of the gasket manufacturer and bolting standards of the Code for Pressure Piping (ANSI B31.1.0-1967 par. 108, 135). Strains shall be evenly applied without overstress of bolts.
- 10. Screw threads (ANSI B31.1.0 par. 135.4) shall be made up with piping compound or other sealing method approved to assure tight joints without overrun of thread into fittings. Compounds shall be approved for service application.
- 11. Threaded pipe shall be carefully cut, reamed or filed out to size of bore removing all chips, worked into place without springing. Provide Teflon tape on the male thread only. Threaded joints when tight shall not expose more than two full threads.
- 12. Grooved ends shall be clean and free from indentations, projections, and roll marks in the area from pipe end to groove. All grooved couplings, fittings, valves, and specialties shall

be the products of a single manufacturer. Grooving tools shall be of the same manufacturer as the grooved components.

- 13. Copper tubing shall be worked into place without springing.
- 14. Dielectric couplings or brass adaptors suitable for dielectric service shall be provided at pipe connections between steel or cast iron piping and copper piping.

B. Expansion Requirements:

- 1. All piping shall be installed throughout the project with due regard for expansion to prevent damage to the building, equipment and piping. Provide anchors, loops or approved type expansion joints where indicated or required for the accurate control of movement.
- 2. Branch connections to mains for risers shall be made with minimum of three 90 degree elbows.
- 3. Bullhead connections in any piping service are expressly prohibited.
- 4. Expansion pipe loops shall be supplemented with adequate guides as close to loops as possible to preserve alignment and pitch.
- 5. Securely support pipe anchors, constructed of steel angles and channels, required to keep pipe movement within area of expansion provision. Submit anchor details for approval before installation.
- 6. Provide adequate expansion allowance for service temperatures and piping materials.
- 7. When installing piping with loop or bend expansion, subject piping to cold spring, which will take care of about half of total expansion between hot and cold conditions. Make riser offsets in manner to avoid pocket forming due to expansion. Submit anchor details for approval before installation.
- 8. Expansion and contraction of grooved IPS steel piping systems shall be provided with loops or bends consisting of (8) Victaulic Style 75 or 77 flexible couplings, (4) grooved end 90 degree elbows, and grooved end pipe spools provided in water systems to 230°F in accordance with Victaulic recommendations for expansion compensation.

C. Concealed Piping:

- Where so indicated or specified, piping shall be concealed in building construction. Install
 such piping in time so as not to cause delay to work of other trades, and allow ample time
 for tests and approval, do not cover before approval is obtained. Wherever possible, run
 branches passing through floor into partitions, offset above floor close to equipment and
 expose only as much as necessary for final connection.
- 2. Where furred spaces are indicated, keep pipes as close to structural members as possible so as to acquire minimum furring. In case of furred beans, obtain approval of resulting headroom clearance before installing pipes. This Contractor is cautioned to check clearances on Architectural Drawings.

3.2 SLEEVES

- A. Provide sleeves for all pipes passing through floors, walls or partitions, hung or furred ceilings, etc. (of sufficient diameter to accommodate pipe covering where such is required). Set sleeves for concrete floors, walls and other masonry work in place before the floors or walls are poured or built and located and secured in place so that space all around the pipes, after the pipes are installed in place, are about equal.
- B. Protect pipes passing through floors with membrane waterproofing and roofs with Schedule 40 pipe extensions (not sheet metal) and provide "Zurn Z-197" or "Josam 1880" with cast iron integral flashing flange and clamping ring waterproof type pipe sleeves. For membraned floors, fill void between sleeve and pipe with mineral wool and then seal the top with mastic to prevent sound transmission. Sleeves for Penetrations of the Metal Deck (where applicable): Nail, Cut or drill the metal deck after the deck is poured. Set sleeves in such a manner so that no concrete fills their interior during the concrete pouring and screening operations.
- C. Sleeves for Reinforced Concrete Walls and in Concrete Beams: Standard weight galvanized steel pipe with anchor flanges. Sleeves through Toilet Rooms and any other such Wet Area Floors: Iron pipe size brass. Caulk floor sleeves for exposed pipes watertight and project approximately 2" above the finished floor so that the plate will properly fit over same. Finish sleeves flush with the bottom of slab and also with the finished faces of wall.
- D. Provide sleeves with an inside diameter at least 1/2" greater than outside of pipe served, including pipe insulation which must be continuous through sleeve.
- E. Use LINK-SEAL only for pipes and sleeves in exterior walls, foundation walls and pits. Where piping penetrates walls (other than foundation walls), partitions, floor slabs, etc., pack space between piping and sleeve with mineral wool.
- F. Do not support pipes by resting clamps on sleeves. Clamps must extend beyond sleeve and be supported outboard of sleeve in an approved manner.
- G. Provide escutcheon plates of the proper size for all piping in sleeves passing through walls, furrings, partitions, hung ceilings, etc. throughout
- H. Provide counterflashing for all piping passing through waterproof wall or roof construction consisting of steel rainhood welded all around to pipe and overlapping flashing.
- I. Where space for future pipe and conduits is required, provide sleeves and fill with lightweight concrete.
- J. Firestopping and grouting around pipes and ducts through concrete slabs and walls, and masonry walls with Portland cement grout in the sleeved opening extending full depth through wall or floor slab, with sheet metal over the insulation before grouting in. Around pipes and ducts through drywall construction wrap mineral rope and finish with sheet metal collar on ducts and escutcheons on pipe. Attach escutcheons to wall, not pipe. Use at all fire-rated walls and floors.

3.3 WELDING

- A. Welding Process: All welding shall be done by the oxyacetylene or electric arc welding process in accordance with the requirements set forth in Welding or Pipe Joints of the ASME Code for Pressure Piping.
- B. Beveling and Welding: All steel pipe 2-1/2" and larger may be purchased mill beveled or shall be machine beveled on both ends before welding. On odd lengths of pipe, beveling may be accomplished by means of the oxyacetylene cutting torch providing all paint, rust, scale and oxide are carefully removed with hammer, chisel or file. Joints shall be prepared and welded to assure thorough fusion with bare metal, complete penetration, maintenance of alignment, and the production of a joint that shall develop the full strength of the pipe and shall develop the full strength of the pipe and shall be leakproof in service.
- C. Welding Rods: The welding rod used for welding shall be Oswald No. BT or approved equal.
- D. All foreign matter shall be removed from the ends of pipe lengths before tacking and welding. Pipe lengths shall be lined up straight and abutting pipe ends shall be concentric. Spacing and tuck welding shall be such as to prevent the pipe form lapping or getting out of alignment during welding operation.
- E. All welding shall be come in accordance with the latest accepted practice applicable to the particular service and shall be performed only by welders who have been tested and qualified in accordance with the requirements of the ACA Piping Code for Welding. The Contractor shall furnish a certificate for each welder, certifying that the welder complies with these Specifications and of the National Certified Pipe Welding Bureau.
- F. Welders shall be licensed by NYC DOB.
- G. The welding of high pressure piping shall be under Controlled Inspection as required by the Building Code.

3.4 STRAINERS

- A. Provide approved self-cleaning strainers in inlet connections to each feeder and make-up connection, each automatic control valve and all automatic devices whose proper functioning would be affected by solids in the fluid.
- B. Except as noted, strainers in water lines to be Y-pattern set in a horizontal (or vertical downward) run of the pipe. Where it is not feasible, strainers may be of enlarged cross-section flat type. In all case, arrange strainers as not to "trap" pipes, and to facilitate disconnection and opening-up for cleaning.
- C. Provide approved valved dirt blowout connection for each strainer. Each valve located at hand-height and piped to the nearest floor drain, at a point where there is no risk of flooding or damage.
- D. Clean the strainers as necessary until accepted by the City of New York.
- E. Install strainers upstream of automatic control valves with the same size as the inlet pipe serving the control valve.

3.5 AIR VENTS

- A. Provide soft temper copper tube pigtail on manual vents so that end can be placed over a bucket.
- B. Provide all manual air cocks and automatic air vents required throughout the water circulating system for the removal of air, of ample strength for the pressure to which they will be subjected. Provide automatic air vents at all high points.
- C. Provide air vents of the compression type, all bronze construction, key operated. Provide each heat transfer element supplied with water with not less than 1/2" manual air vent. Furnish ten (10) keys. Provide air chambers where indicated.
- D. Use inverted ball float traps for vent water risers, mains and branches and where required. Trap Size: 3/4" with inlet an overflow connections, both valved.
- E. Provide manual air vent valves in the piping connections to each hot water heating coil and each chilled water coil (both supply and return where such are not automatically vented). Provide a 1/4" vent line from each air vent to nearest floor drain, or as directed, to suit job conditions.
- F. Provide gate valves with capped bibb connections at all drain points. Hose bibbs only will not be acceptable. Install capped drains at all low points of the systems. Threads of hose bibbs to fit standard rubber hose connection.

3.6 INSTALLATION NOTES FOR INTERIOR PIPING SYSTEMS

- A. It is the intent that each part of the plumbing systems shall be complete in all details and all lines provided with all control valves as indicated on Drawings, or as may be required for the proper control of the pipe lines under this Section so that any fixture, line or piece of apparatus may be removed for repair without interference or interruption of the service to the rest of the building.
- B. The size of storm, soil, waste, water, and vent piping shall be as determined by the local rules and regulations for plumbing and drainage, except where specifically noted to be larger by the Specifications or plans; and all fixed rules of installation as set forth in the Rules and Regulations shall be followed as part of the Specifications.
- C. Carefully examine the architectural plans and details and become familiarized with all conditions relative to the installation of piping, particularly where same is concealed behind furring or in hung ceilings.
- D. Do not permit piping to be exposed beyond finished plaster lines unless specifically shown on Drawings. Consult with the other trades in the building and install piping in such a way as to least interfere with the installation of other trades.
- E. Do not conceal or insulate piping until all required tests have been satisfactorily completed and work has been approved by the Commissioner, NYC DOB, and NYC DEP.

- F. Branch connections of the drainage systems shall be made with "Wye" and long "Tee-Wye" fittings, short 1/4" bends, common offsets and double hubs will not be permitted. Short "Tee-Wye" fittings are to be used in vertical piping only.
- G. Cleanouts shall be provided at base of all stacks, all changes of directions at the ends of branch runs where shown, and as required by Code, and shall be terminated as described under cleanouts.
- H. House drains: Slope at a minimum grade of 1/8" per foot downward in the direction of flow. Wherever possible, a 1/4" per foot pitch shall be maintained. Branch connections to stacks from fixtures shall pitch 1/4" per foot where possible. Attention is again called to the necessity of maintaining the ceiling height established.
- I. Connection to roof drains shall be installed in conjunction with the roofing called for under another Division or Section of these Specifications and at such times as designated by this Contractor, so that the building is adequately protected during construction from damage by storm water. All piping shall be adequately and properly supported, and all joints shall be made up as hereinafter specified.
- J. Furnish and install complete systems of vent piping from plumbing fixtures and other equipment to which drainage connections are made. Vent piping shall be connected to the discharge of each trap and shall be carried individually to point above the ultimate overflow level of the fixture before connecting with any other vent pipe; in general, this will be approximately 3'-6" minimum above the finished floor. Branches shall be arranged to pitch back to fixtures.
- K. The individual vent pipes shall be collected together in branch vent lines and connected vent stacks, in paralleling soil and waste stacks. Wherever possible, vent stack offsets shall be made with 45 degree fittings. The heels of vent stacks shall be connected to adjacent soil stacks for purpose of draining condensation where possible. The waste of a fixture shall be connected to the base of each vent stack for the purpose of washing out any scales or dirt which may accumulate, or the soil stack shall be used to wash out the heel of the vent.
- L. The tops of all soil and waste stacks shall be extended as additional vent pipes. The tops of all vent stacks shall run independently through the roof. Pipes smaller than 4" size shall be increased to 4" by means of approved increasers before passing through the roof slab. This provision shall apply only when future floors above are provided for.
- M. Where complete concealment is impossible because of obstruction such as beams, ducts, lights, piping, do not install any work before first consulting with the Commissioner and his instructions (written or revised drawings) shall be followed.
- N. Install capped drips at the foot of each gas riser and at each vertical change of direction. Install gas piping so that it will drain back to the risers, where possible. Do not bend pipes. All changes in direction to be made by the use of fittings. All reductions in sizes to be made with reducing tees, elbows or couplings. The use of flanged fittings or running threads is prohibited.
- O. Provide all gas piping to all gas outlets and equipment requiring gas connections. Make all connections to such outlets and equipment and provide a full main size plug cock for each. Do not install gas valves in suspended ceilings.
- P. Gas piping shall be installed in strict accordance with NFPA Pamphlet No. 54.

Q. Gas piping under floor slabs, inside of building, shall not be used. Tunnels or shafts containing gas piping shall be vented.

END OF SECTION

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SECTION 221100

WATER SUPPLY SYSTEMS

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this specification as shown or specified should be in accordance with the requirements of the Contract Documents.

1.2 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project:
 - 1. The Contract Drawings
 - The Specifications
 - 3. The General Conditions
 - 4. The Addendum
 - 5. The Contract [City of New York Standard Construction Contract].

1.3 WORK INCLUDED

- A. Work of this Section includes all labor, materials, equipment and services necessary to provide Water Supply Systems as shown on the drawings and as specified herein.
- 1. Domestic Cold Water Piping.
- 2. Domestic Hot Water Piping.
- 3. Domestic Hot Water Recirculation Piping.
- 4. Thermostatic Mixing Valves.

1.4 RELATED WORK

- A. Pipe, Tube and Fittings
- B. Hangers and Supports
- C. Plumbing Fixtures
- D. Insulation
- E. Plumbing Equipment, Specialties and Accessories
- F. Motors and Controllers

- G. Testing
- 1.5 QUALITY ASSURANCE
 - A. A.N.S.I. American National Standards Institute
 - B. Building Code of the City of New York
 - C. American National Standards Institute: ANSI A112.1.2 Air Gaps in Plumbing System.
 - D. American Society of Sanitary Engineering: ASSE 100 Pipe Applied Vacuum Breakers; ASSE 1010 - Water Hammer Arrestors.
 - E. National Fire Codes NFPA
 - F. A.S.H.R.A.E. 90-75
- 1.6 SUBMITTALS
 - A. Shop Drawings:
 - 1. Pipe and fittings.
 - 2. Valves.
 - 3. Hose bibbs.
 - 4. Thermostatic mixing valves.
 - 5. Circulating pumps.
 - 6. Tamper switches.

PART 2 PRODUCTS

- 2.1 MANUFACTURERS
 - A. Hose Bibbs:
 - 1. Speakman
 - 2. Chicago Faucet
 - B. Recirculation Pump:
 - 1. Bell & Gossett
 - 2. TACO

- 3. Thrush
- C. Thermostatic Mixing Valve:
 - 1. Armstrong.
 - 2. Lawler Automatic Controls.
 - 3. Holby.
 - 4. Powers.
 - 5. Symmons.
- D. Tamper Switches:
 - 1. Potter Electric Signal Co.
 - 2. Edwards Co.
 - 3. ADT Co.
- 2.2 PIPING
 - A. Underground:
 - 1. Domestic: Ductile iron mechanical joint water pipe, asphaltic coated, cement lined with class 250 fittings.
 - 2. Fire: Ductile iron mechanical joint water pipe, asphaltic coated, cement lined with class 250 psi fittings.
 - 3. Provide flanged connection on service inside building.
 - 4. Provide all tie-rods and accessories in accordance with NFPA standards.
 - B. Inside Building:
 - 1. Domestic: Type L hard drawn copper tubing with cast bronze or wrought copper fittings. Following options are permitted:
 - a. Grooved end wrought copper with ASTM A536 ductile iron couplings of the angle-pattern bolt pad type, coated with copper colored alkyd enamel, with synthetic rubber pressure-responsive flush seal sealing gasket for grooved end pipe. (Gaskets used on potable water systems shall be UL listed in accordance with ANSI/NSF 61 for hot (+180°F) and cold (+86°F) potable water service). Fittings and couplings shall be copper tube dimensioned. Flaring of pipe and fitting ends to IPS dimensions is not allowed. Victaulic Style 606, Dixon Valve, Romac Industries, or approved equal.

- b. For 2" and smaller: 304 pipe, Tyler Pipe, Romac Industries, couplings, fittings may be used with ASTM A312, type 304/304L stainless steel pipe. "O" rings used shall be UL listed in accordance with ANSI/NSF 61.
- 2. Fire standpipe/sprinkler service: Steel pipe with threaded or flanged cast iron fittings. UL listed and FM approved
 - a. Grooved end ASTM A536 ductile iron fittings. Victaulic FireLock, Felker Brothers Corp., American Cast Iron Pipe Co., or approved equal. Bolted clamp type ductile iron couplings with synthetic rubber pressure-responsive sealing gaskets for grooved end pipe, 500 psi wwp, similar to Victaulic Style 75, Romac, Metroflex, or approved equal may be used.
 - 1) Rigid Type: Angle pattern bolt pads to provide rigidity and support and hanging requirements corresponding to ASME B31.1, B31.9 and NFPA 13. Victaulic Style 005 or 07.
 - 2) Flexible Type: Couplings shall provide stress relief and vibration attenuation. Victaulic Style 75 or 77.
 - In lieu of threaded cast iron, carbon steel press fit products may be used for fire protection service. Products shall be UL listed and FM approved for fire protection service to 175 psi.
- 3. CW Piping: Schedule 40 or SDR 26 PVC and socket type fittings.
- 4. HW Piping: CPVC pipe and socket type fittings.
- 5. See also section 221000.
- C. Exposed at plumbing fixtures:
 - 1. Satin finish CP brass pipe with threaded cast bronze fittings.

2.3 HOSE BIBBS

- A. 1/2" chrome-plated angle valve with integral stop, renewable seat, composition washer, metal handle, vacuum breaker and 3/4" hose thread and wall flange on concealed piping.
 - 1. Speakman S-5911, Chicago Faucet, Woodford Manufacturing, or approved equal.

2.4 DRAIN VALVES

A. Three piece ball type with stainless steel ball and 3/4" hose and 300 psi wsp, similar to NIBCO No. 590.

2.5 TRAP SEAL PRIMER

A. Cast bronze, 1/2" connection, J.R. Smith #2699, MIFAB, Josam, or approved equal. Provide at all floor and funnel drains.

2.6 THERMOSTATIC MIXING VALVE

- A. Self-actuated, self-sensing, three-way type, union ends, manually adjustable, built-in strainer. ASSE 1017 compliant.
- B. Bronze body, 200 p.s.i. working pressure, nickel plated piston, copper actuator bulb and capillary.
- Capacity 25 GPM, pressure drop 2 p.s.i., temperature range 100 degrees F. to 200 degrees F., set point 120 degrees F.
- D. Armstrong RADA R series, Watts, Holby, or approved equal. Size as noted on drawings.
- E. Point of use: ASSE 1016 compliant, brass body, integral check valves, adjustment cap.
 - 1. Watts series MMV, Powers, Symmons, or approved equal, size as noted on drawings.

2.7 FLOW CONTROL FITTINGS

- A. Provide flow control fittings as manufactured by the Dole Valve Company or approved equal. Flow control valves are to be installed in accordance with the manufacturer's recommendations and shall be provided for all sinks, lavatories and electric water coolers.
- B. All lavatories: Dole Model #FMA 3/8" male pipe inlet and 3/8" female pipe outlet for rigid hot and cold supply risers. Flow rate 0.5 gpm.
- C. All sinks including equipment with sinks, mop receptors, service sinks and kitchen sinks, showers: Dole Model #FMC male pipe inlet and 1/2" female pipe outlet for hot and cold supply risers. Flow rates 4 GPM for service sinks and mop receptors 3 GPM for kitchen and casework sinks, 2.5 gpm for showers.
- D. Electric Water Coolers; Dole Model #F3/4C male pipe inlet and 3/8" female pipe outlet for cold supply riser. Flow rate 0.5 gpm.
- E. All exposed to view flow control fittings shall be chrome plate nickel, or nickel plated.

2.8 BACKFLOW PREVENTER ASSEMBLIES

- A. UL listed for sized 2 1/2" and larger. AWWA compliant.
- B. Bronze body for 3/4" and 1" size. IBBM for 2 1/2" and larger.
- C. Double check valve backflow preventer assembly Two brass independently operated internally spring loaded check valves, two gate valves and four test cocks for field testing. Check valves must be loaded to withstand 1 psi in direction of flow and must have soft rubber discs to assure positive closure. All internal parts must be readily accessible for maintenance without moving device from line, must be installed in a horizontal position and be accessible for periodic testing.

- D. Working pressure and temperature rating: 175 psi and temperature of 140 °F. Unit shall be shipped completely assembled and all valves, check valves, nipples and other fittings shall conform to the piping material in which they are installed.
 - 1. Watts: Refer to plumbing schedule.

2.9 LOCAL EQUIPMENT AND FIXTURE PRESSURE REGULATORS

- A. Furnish and install a CASH-ACME type HER or approved equal water pressure reducing valve on cold and hot water branch lines for food service, laboratory and medical equipment as provided under other Division or Sections of this Specification. Pressure regulators shall be of the differential type, self-contained, single seated, direct acting, spring locked type with no diaphragm. Valve body and spring housing shall be bronze and all other parts shall have a corrosion resistance equal to bronze.
- B. All valves shall be sealed against leakage including a top cap over the adjusting screw.
- C. Internal parts subject to wear shall be replaceable without removing valve from the pipe line, and valve shall be provided with means to adjust outlet pressure setting.
- D. Valves shall have sufficient water capacities to provide required rates of flow and shall be set at discharge pressure as required by the point of use.

2.10 RELIEF VALVES

- A. Provide adjustable bronze spring and diaphragm combination pressure and temperature type relief valves with test level and automatically resetting type thermostatic element. Pipe drain to spill over mop receptor floor drain, janitor sink, or to other safe location.
- B. Relief valves shall be ASME rated.

2.11 PRESSURE AND TEMPERATURE GAUGES

- A. Basis of Design Manufacturer Trerice
- B. Pressure and temperature gauges shall be located as shown on the drawings and as indicated below:
 - 1. Pressure Gauges:
 - High and low pressure side of pressure reducing valve.
 - b. Discharge side of water meter, provide tee and capped valved connection on inlet side.
 - c. Hot water tank.
 - d. Compound gauge at suction side of each pump.
 - e. Install capped tee with needle valve at discharge side of each pump for future pressure gauge.

2. Temperature Gauges:

- a. Hot water supply and return piping at hot water tank.
- Downstream side of mixing valve to indicate mixed water temperature.
- C. Pressure gauge shall be 4- 1/2" diameter with aluminum case, chrome ring, white background dial with black markings, glass window, micrometer pointer, stainless steel movement, 1/2 % accuracy over full scale range, phosphor bronze bourdon tube, 1/4" N.P.T. brass socket, bottom or back outlet, 0 psi to 200 psi for straight pressure gauge, 30" of vacuum to 300 psi for compound range Trerice #500X. Gauges to be used on sewage or storm water system shall be Trerice #500X with Trerice #877-2 diaphragm seal. Pressure and compound gauges shall be installed with Trerice #872-2 snubbers and Trerice #735 needle mounted using copper tubing.
- D. Temperature gauge shall be 4- 1/2" diameter with aluminum case, polished chrome ring white background dial with black markings, glass window, red tipped aluminum pointer, 7/16" x 2- 1/2" copper bulb, 1/2" N.P.T. brass union connection, adjustable angle direct mounted or adjustable angle bracket mounted with 5'0" bronze armored copper capillary as required, 30 degrees F. to 240 degrees F. Dial range. Trerice No. V80445 or V80341 as required.
- E. Other acceptable manufacturers Taylor, Wexler.

PART 3 EXECUTION

3.1 INSTALLATION

A. Piping:

- 1. Free of traps:
 - a. Grade for complete control and drainage of system.
 - b. Grooved end pipe shall be clean and free of indentations, projections and roll marks in area from pipe end to groove. All grooved products shall be of one manufacturer. Grooving tools shall be of the same manufacturer as the grooved components.
- 2. Grooved end pipe shall be clean and free from indentations, projections, and roll marks in the area from pipe end to groove. All grooved products shall be of one manufacturer. Grooving tools shall be of the same manufacturer as the grooved components.
- B. Prevention of Water Contamination:
 - 1. Water supply connections to plumbing fixtures and equipment.
 - a. Provide over-rim water supplies whenever possible.
 - Provide following with approved vacuum breakers and/or check valves or backflow preventors as noted or required.

- 1. Necessary below-rim connections.
- 2. Hose connections.
- 3. Connections or outlets for HVAC piping systems.
- c. Approved air gaps on water piping where noted or required by local authorities.
- 2. Equipment supplied under other sections of work and/or by City of New York, and having below-rim water supply connections, may not arrive on job in Code-approved condition.
 - a. Provide missing vacuum breakers and/or check valves, or relocate same to Code approved positions.
- C. Connections to Equipment:
 - 1. Flanges, unions or threaded adapters.
- D. Branch Water Connections:
 - 1. Provide three elbow swing connections for all water lines connecting to mains, sub-mains or branch mains.
- E. Terminate plugged or capped connections in threaded plug or threaded nipple and cap as required, except as otherwise noted.
- F. Brass of Copper Piping connecting to Galvanized Piping:
 - 1. Provide dielectric fittings or flanges.
- G. Provide drain valves at all low points in system.

END OF SECTION

SECTION 221300

DRAINAGE SYSTEMS

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this specification as shown or specified should be in accordance with the requirements of the Contract Documents.

1.2 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project:
 - 1. The Contract Drawings
 - 2. The Specifications
 - 3. The General Conditions
 - 4. The Addendum
 - 5. The Contract [City of New York Standard Construction Contract].

1.3 WORK INCLUDED

- A. Work of this Section includes all labor, materials, equipment and services necessary to provide Drainage Systems as shown on the drawings and as specified herein.
 - 1. Complete Sanitary Systems:
 - a. Connections to existing piping.
 - b. Connections to plumbing fixtures.
 - c. Connections to equipment requiring same.
 - d. Packaged submersible sump pump unit.
 - e. Floor drains
 - f. Pump basin
- B. All new drain piping, floor drains, and fittings serving Aquarium or Related mechanical spaces shall be corrosion resistant.

1.4 RELATED WORK

A. Pipe, Tube and Fittings

- B. Hangers and Supports
- C. Plumbing Fixtures
- D. Insulation
- E. Plumbing Equipment, Specialties and Accessories
- F. Testing
- G. Motors and Controllers

1.5 QUALITY ASSURANCE

A. Reference Standards:

- 1. A.N.S.I. American National Standards Institute
- 2. Building Code of the City of New York
- 3. American National Standards Institute: ANSI A112.1.2. Air Gaps in Plumbing System
- 4. New York State Department of Environmental Protection
- 5. Hydraulic Institute
- 6. NEMA MG 1: Motors and Generators
- 7. NFPA 70: National Electrical Code
- 8. UL 508: Standard for Industrial Control Equipment
- 9. UL 778 for motor-operated water pumps

B. Sump Pumps

- 1. Firms regularly engaged in manufacture of the specified product and system whose products have been in satisfactory use, in similar service, for not less than three (3) years.
- 2. Prior to shipment the pump manufacturer shall perform quality assurance tests to include: checks for compliance with specifications, operating the pumps submerged in water and verification of the integrity of the motor and cable insulation.
- Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to NYC DOB, and marked for intended use.

SUBMITTALS 1.6

A. Submit the following:

- 1. Shop Drawings:
- Pipe and fittings.
- 3. Drains.
- Cleanouts.
- Valves.
- Traps.
- 7. Sump pumps.
 - a. Product Data: For each type and size of pump specified. Include the following:
 - System design information sheets indicating design parameters pump type, 1. capacity and power requirements.
 - Pump material and construction drawing. 2.
 - Pump curve indicating design point. 3.
 - Detailed sequence of operation. 4.
 - Electrical power and control wiring diagrams with indication of field wiring 5. connections.
 - Catalog information on major components. 6.
 - All of the above shall be specifically prepared and certified for this project. 7.
 - b. Submittals which are generic and not specifically designed to meet the requirements of this project shall not be acceptable.
- 8. Controllers, wiring diagrams.

DELIVERY 1.7

- Delivery, Storage, and Handling Α.
 - Retain shipping flange protective covers and protective coatings during storage. 1.
 - Protect bearings and couplings against damage. 2.
 - Comply with pump manufacturer's written rigging instructions for handling. 3.

WARRANTY 1.8

A. The manufacturer of pumping equipment, or his representative, shall be responsible for the complete pumping system and its satisfactory performance as described in this section and shall provide a written guarantee covering all the equipment as well as the system performance for 12

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- months from date of start-up, not exceeding 18 months from date of shipment. The services of a factory trained engineer shall be provided for start-up and instruction of maintenance personnel.
- B. The Pump Manufacturer's Representative shall have single source responsibility for the pumps and complete control system. Start-up services including adjustment and field calibration of controls, operator instruction and system warranty shall be included in the price for the system. In addition to the requirements of 1.5 Quality Assurance, the Pump Manufacturer shall warrant the pumps and motors. Warranty shall be as follows: two (2) year for the complete system, five (5) years for the pumps from date of shipment under normal operation and service, twenty (20) years for the motors from date of shipment under normal operation and service. The warranty shall include parts and labor.
- C. Warranty Service Contract: The manufacturer's representative shall include a one (1) year service contract. The service contract period shall commence upon City of New York acceptance of the equipment. The service contract shall include a complete system inspection twice a year including: check running amperage and voltage of all phases, check electrical resistance of motor windings, check condition of submersible cables, check for proper pump sequencing and alarm activation with adjustments, as required; and review of instructions for operating personnel, if requested. The contract shall also include an annual change of the seal chamber oil. Any required service work to be noted in a formal inspection report along with a detailed proposal for the repairs.

PART 2 PRODUCTS

- 2.1 MANUFACTURERS (Other than those serving Aquarium or Related Mechanical Space)
 - A. Floor Drains, Cleanouts, Plumbing Fixtures Supports:
 - 1. J.R. Smith Manufacturing Co.
 - 2. Zurn Industries, Inc.
 - 3. Josam Manufacturing Co.
 - 4. Wade Division, Tyler Pipe & Foundry Co.
 - 5. Ancon.
 - 6. Proset Systems, Inc.
 - B. Sump Pumps:
 - 1. Flygt Pump.
 - Peerless Pump Co.
 - 3. Federal Pump Co.
 - 4. Stancor

5. Weil Pump Co.

2.2 MATERIALS

- A. Sanitary Piping Serving Aquarium or Related Mechanical Space:
 - 1. Piping to be used for above and below grade construction shall consist of extra heavy weight, high silicon iron pipe and fittings conforming to the most recent revision of ASTM Specifications A518 and A861, as manufactured by the Flowserve Corporation, Charlotte Pipe, Tyler Pipe, or approved equal.
 - 2. The piping system shall include high silicon iron pipe and fittings of the Bell & Spigot or Mechanical Joint type. It may also include acid resistant, asbestos-free rope packing or mechanical joint couplings, for use with Bell & Spigot piping and Mechanical Joint piping, respectively as manufactured by Flowserve Corporation, Charlotte Pipe, Tyler Pipe, or approved equal.

3. Joints

- a. Bell & Spigot joints shall be made using virgin lead and Red Stripe Sealite A312 acid-resistant rope packing.
- b. Mechanical Joint piping shall be installed using a two-bolt, mechanical joint coupling, as manufactured by Flowserve Corporation, Romac Industries, Charlotte Pipe, or approved equal. The mechanical joint coupling consists of an inner sleeve of PTFE, an outer sleeve of Neoprene rubber (a product of the DuPont DeNemours Company), and an outerband of 300-series stainless steel. Mechanical Joint couplings shall be installed by alternately tightening the nuts to a minimum of 9 ft-lbs and a maximum of 11 ft-lbs torque.
- c. Pipe may be joined to other types of piping by using adapters made by Flowserve Corporation, Charlotte Pipe, Romac Industries, or approved equal. Other metallic piping systems may be joined to pipe using a hub fitting and caulking the joint with Red Stripe Sealite A312 rope packing and virgin lead.
- All materials shall comply with the requirements and referenced standards listed in the New York City Plumbing Code.

B. Non-Aquarium Spaces

- 1. Underground Sanitary Piping:
 - a. Cast iron hub and spigot soil pipe and fittings, extra heavy, uncoated.
 - b. Joints: Compression type or caulked lead and oakum.
- 2. Aboveground Storm and Sanitary Piping:
 - a. Except as noted below: Cast iron hubless soil pipe and fittings, service weight, coated.

Couplings: Type 304 Stainless Steel, Neoprene Gasket, Four Clamps (six for pipe size 5" and longer). Anaheim Foundry Company A Husky @ Series 4000 or approved equal.

C. Sump Discharge Piping and Fittings:

- 1. Galvanized steel pipe, standard weight with Victaulic Style 75 carbon steel drainage fittings.
- On discharge of each sump and ejector pump provide, as per detail, one Victaulic series 318 Sump Ejector System including: 1 Vic S/365 plug valve, 1 Vic S/317 check valve, 2 Vic S/307 transition couplings, 1 Vic S/31 coupling.

D. Pump Gland and Bedplate Drains:

1. Galvanized steel pipe with threaded malleable iron fittings.

E. Chrome Plated Brass Piping:

1. Exposed in rooms with fixtures and equipment in finished areas.

2.3 DRAINS SERVING AQUARIUM SPACE OR RELATED MECHANICAL ROOMS

- A. Heavy Duririon, 8-3/4" diameter top, with double drainage flange and weep holes, with outlet connections as indicated and or sizes indicated on Drawings. Removable sediment basket shall be of heavy-duty one-piece construction as specified hereinafter. All strainers or grates shall be secured with vandalproof spanner type screws, unless otherwise specified.
- B. In membrane waterproof floors: Provide with 6 lb. lead flashing or 20 oz. soft rolled sheet copper and secured to the flashing flange with brass bolts and cast iron clamping device. Flashings shall bond not less than 1'-0" on all sides into membrane waterproofing.
- C. Set all drains in such a way that the floor finish and top of the drain will be plumb and flush with finish floor without requirements for future additional extension, modifications, etc.
- D. When Dex-O-Tex and/or vinyl waterproof floor is indicated on the Architecutral Drawings, all drains must be provided with required flanges.
- E. All drains, except as noted, shall be Flowserve Model Series 5501 or approved equal.

2.4 DRAINS SERVING NON-AQUARIUM OR RELATED MECHANICAL SPACE:

- A. Heavy cast iron, with double drainage flange and weep holes, with outlet connections as indicated and or sizes indicated on Drawings. Removable sediment basket shall be of heavy-duty one-piece construction as specified hereinafter. All strainers or grates shall be secured with vandalproof spanner type screws, unless otherwise specified.
- B. In membrane waterproof floors or showers: Provide with 6 lb. lead flashing or 20 oz. soft rolled sheet copper and secured to the flashing flange with brass bolts and cast iron clamping device. Flashings shall bond not less than 1'-0" on all sides into membrane waterproofing.

- C. Set all drains in such a way that the floor finish and top of the drain will be plumb and flush with finish floor without requirements for future additional extension, modifications, etc.
- D. When Dex-O-Tex and/or vinyl waterproof floor is indicated on the Architecutral Drawings, all drains must be provided with required flanges.
- E. All drains, except as noted, shall be J.R. Smith Mfg. Co. or approved equal.
- 2.5 FLOOR DRAINS SERVING NON-AQUARIUM OR RELATED MECHANICAL SPACE:
 - A. Conforming to ANSI A112.21.1
 - B. Coated cast iron body.
 - C. Integrated double drainage flange and weep holes.
 - D. No-hub outlet.
 - 1. Refer to Schedule on drawing P-800.00.
 - E. Install per architectural and plumbing details.

2.6 CLEANOUTS

- A. Conforming to ANSI A112.36.2.
- B. Cast iron with bronze plug, full size up to 4" and at least half size for larger pipes with 4" minimum.
- C. Provide easily accessible cleanouts where indicated to make entire drainage system accessible for rodding. Provide at least 18 inch clearance to permit access to cleanout plugs.
- D. Cleanouts for cast iron pipe shall consist of tapped extra heavy cast iron ferrule caulked into cast iron fittings, and extra heavy brass screw plug with solid hexagonal nut.
- E. Cleanouts turning out through walls and up through floors shall be made by long sweep ells of "Y" and 1/8" bends with plugs and face or deck plates to conform to architectural finish in room. 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 vandalproof.
- F. The following schedule indicates the various types of cleanouts required at various locations indicated on the Drawings. Cleanouts shall be J.R. Smith Mfg. Co. Basis of Design or approved equal. The characteristics and quality of the cleanout shall be as follows:
 - 1. Cleanout fitting in vertical stacks shall consist of tapped tees, capable of receiving a rough brass raised head cleanout plug.
 - a. J.R. Smith 4530 series.
 - 2. Cleanouts in Mechanical Equipment Rooms:

- a. J.R. Smith 4220 series.
- 3. Cleanouts in finished areas. With recess for tile floors:
 - a. J.R. Smith 4140 or 4020 series.
- 4. Cleanouts in Dex-O-Tex waterproof floors:
 - a. J.R. Smith DX4343.
- 5. Cleanouts for 3 or more fixtures piped horizontally shall be extended to wall cleanouts.
 - a. J.R. Smith 4452 or 4472 or 4402.
- G. All cleanout plugs shall be brass and lubricated with graphite before installation.

2.7 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 close to the fixture as possible.
- B. All running traps shall have inlet handhole cleanouts and brass plug cleanouts in bottom. Cast iron traps in ground: omit bottom plug. All exposed P traps shall have bottom cleanouts and be chromium plated cast brass.

2.8 STACK SLEEVES

- A. For pipes through roof with cast iron body. The space between the flashing sleeve and the pipe passing through the same shall be caulked watertight with lead.
 - 1. J.R. Smith 1740C (caulked).
 - 2. Josam Manufacturing
 - 3. Zurn Industries
 - 4. J.R. Smith 1750 (threaded).

2.9 FLASHING FITTINGS

- A. Provide vents and pipes through roofs with flashing fitting set at suitable level to terminate the flashing. Locate minimum of 12 inches from walls or other obstructions to permit proper flashing.
 - 1. J.R. Smith 1760.
 - 2. Josam Manufacturing
 - 3. Duraflow

2.10 SUMP PUMPS

A. Operation and Maintenance Data: For each pump to include in emergency, operation, and maintenance manuals.

B. Coordination

1. Coordinate size and location of concrete pits. Concrete, reinforcement, and formwork requirements are specified in Division 03.

C. Manufacturers

- 1. Subject to compliance with all specified requirements, provide products as produced by the manufacture used as the basis of design. Other manufacturers, whose products have been in satisfactory use in similar service for not less than 3 years, may be submitted for approval as an equal provided the submission contains sufficient information for evaluation and the manufacturer certifies full compliance with the performance, physical characteristic requirements and all operational features of these Specifications.
- 2. Should the initial "Or, Equal" submittal be incomplete or otherwise fail to demonstrate "Or, Equal" status, no further submissions by the failed manufacturer will be reviewed.

D. Submersible Sewage & Sump Pumps

- 1. Submersible, Quick-Disconnect Pump: Factory-assembled and -tested, simplex, single-stage, centrifugal, end-suction, submersible, direct-connected sewage and sump pump complying with UL 778 and with HI 1.1-1.2 and HI 1.3 for submersible sewage pumps. Pump shall have the ability to run dry and shall be designed to pump air and liquid in combination without becoming air-bound. Controls and basins shall be suitable for high temperature. Pump shall be furnished as a SubRig preassembled package. Contractor shall provide a temporary bypass ejector system for minimal system shutdown disruption during installation and commissioning, as necessary. Capacity and Characteristics: Flygt Model 2" DP3045 impeller 234 rated for 75 GPM at 22' TDH, 1.8 HP, 3345 RPM.
 - a. Manufacturer Basis of Design:
 - 1. Flygt; Xylem Water Solutions USA, Inc. GAF Series.
 - 2. Peerless Pump Co.
 - 3. Federal Pump Co.
 - Or, Approved equal.
 - b. Casing: ASTM A 48, Class 30B or higher gray iron construction, all external bolts and nuts shall be stainless steel. Casing shall be designed to seat the entire weight of the pump on the fixed discharge connection such that the pump inlet is elevated above the pit floor to permit free flow into the impeller.
 - c. Impellers: Shall be dynamically balanced, corrosion and wear resistant,-fiberglass reinforced, Polyamide.
 - d. Mechanical seals: Shall consist of two (2) totally independent seal assemblies operating in a lubricant chamber. The tandem seals shall have two separate tungsten-carbide

lapped face rings, no common parts shall be shared between the seals. The lower compression spring shall be protected against exposure to the pumped liquid. The seals shall require neither maintenance nor adjustment nor depend on direction of rotation for sealing. The mechanical seals and pump shall be designed and produced by the same manufacturer.

- e. The motor shall have a dry air filled shell with Class F insulation, designed for 155 °C maximum and voltage tolerance shall be +10% and -14%. The motor shall be capable of 15 equal starts per hour and shall be non-overloading of the complete pump curve. Pump and motor shall be capable of running continuously in a totally dry condition. Provide a junction chamber with terminal board having a watertight sealing gland between chamber and motor housing. The stator shall be dipped and baked three times in Class F varnish and shall be heat-shrink fitted into the housing. Motors shall have, protective thermal sensors imbedded in the windings and wired to the control panel. The motor cable entry system shall provide for separately functioning strain relief and water sealing by means of an elastomer grommet compression fitting.
- f. Pump Discharge Piping: Preassembled package, SubRig prefabricated submersible pump assembly package to facilitate installation, testing and service. The SubRig shall consist of cast iron discharge elbows; Sump pump HDL, full port self-cleaning ball check valves; full port fused Teflon ball isolation valves; color coded, grooved, interconnecting seamless galvanized steel discharge pipe and fittings terminating in a true Y connection. Discharge piping shall include a blowdown line and individual pump test ports with ball valves. The SubRig shall also contain all necessary installation hardware including: 304 stainless steel pump base, anchor bolts and pump guide rails; cast iron sliding brackets; and galvanized lifting chain. The SubRig shall be designed such that permanent fastening of the assembly is the last step of the installation assuring that the pumps will be correctly aligned with the cover.
- 2. Basin and Cover: Fiberglass basin with inlet hub as shown on the plans. Basin shall be self-supporting, constructed for high temperature and) (direct burial with steel antifloatation flange Basin cover shall be an FPS odor tight, gasketed, suitable for pedestrian loading. The cover shall be polished aluminum, diamond plate with a hinged access hatch for pump removal. The hatch shall have a removable T handle, stainless gas springs for easy opening and adjustable slam latch for a tight seal. Piping penetrations shall be by means of factory installed, heavy rubber, environ seals. Cover appurtenances: guide rail brackets; lifting chain, level sensor cable and pump cable holders shall be factory installed. Cover hinges and all fasteners shall be aluminum or stainless steel.
 - a. The basin may be split into sections for ease of shipment, field access and installation. The Contractor shall be responsible for coordinating the basin section sizes to facilitate installation.
- 3. Controller: NEMA-250, Type 4, watertight / dust-tight gasketed enclosure with drip shield, 3 point door latch system and keylocking handle for 3 phase, 3 wire power supply, including:
 - Circuit Breaker disconnect switches interlocked with compartment door.
 - b. Three pole across-the-line motor starters with three phase thermal overload protection and external reset buttons.
 - c. 115 volt and 24 volt control power circuit transformers fused on both the primary and secondary sides with individual power available lights and auxiliary alarm contacts.

- d. Logic control module with graphical HMI color touch screen.
- e. H-O-A selector switches with "H-O-A Off" auxiliary alarm contact.
- Motor insulation fault monitor.
- GAF Flush-Cleanse circuit.
- h. GAF Fleet-Flush circuit.
- Redundant level control circuit.
- High Temperature Quench Circuit.
- k. Audible alarm, silencing push-button and remote trouble alarm contacts.
- Set of necessary control relays and other accessory devices required to permit the system to operate in conformance with the specifications.
- m. All components shall be mounted on back panels.
- n. All power supplies shall have loss of power alarm contacts.
- o. OPTION: All fuses shall have a status indicating light which illuminates if a fuse is blown for quick trouble-shooting with use of a meter.
- p. All internal wiring shall be numbered corresponding to the wiring diagrams.
- All connections to auxiliary contacts and control components, whether remote or panel mounted, shall be made to terminal strips.
- The control panel shall bear the UL508 label of Underwriters Laboratories signifying that all work performed by the manufacturer is in compliance with the requirements of the Underwriters Laboratories. Approval of just the enclosure or electrical devices is unacceptable.
- The controller shall be configured to accept both power feed arrangements: one main power feed, or individual power feeds to each pump, to be determined in the field at the time of installation. The transformer shall have a, flip-flop, automatic transfer circuit on the primary side to insure continuous power under either arrangement.
- The controller shall include auxiliary contacts (Form "C" (1-NO, 1-NC)) and analog output signal for interface with building automation system, for the following:
 - 1) Control power available.
 - 2) On-off status of each pump.
 - 3) Common system trouble alarm status.
 - 4) Wet well level indication, 4-20 mA output signal.
- Control panels which rely upon a programmable logic controller ("PLC") or employ electronic level sensors shall have redundant electromechanical devices which function to maintain automatic pump operation and alarm activation in the event of control failure.
- 4. Logic Control Module: Shall be SCADA ready, intelligent, modular unit, capable of data acquisition, processing, historical event logging, alarm management and communication. Set points shall be maintained in non-volatile memory. The interactive HMI color touch screen shall have a bright high resolution 7" display not less than 800 x 480 pixels. The device shall have multiple screens and multiple operator security password levels. The primary screen shall provide for a minimum of twenty-six (26) visual and touch status points.
 - a. It shall graphically represent the real time status and provide set point adjustments of the following system components:
 - 1) wet well water level
 - 2) pump activation levels

- 3) pump run
- 4) pump run elapsed time log
- 5) wet well water temperature
- 6) wet well quench system
- 7) Flush-cleanse system
- 8) high water level alarm
- 9) low water level alarm
- 10) high water temperature alarm
- 11) back-up float
- 12) time & date
- b. The SCADA ready controller shall support Modbus communications with the Building Management System. The controller shall be configurable for network communications via optical cable, high speed Ethernet, RS-232 / 485 serial ports, USB ports, universal convertible inputs, phone lines, cellular or wireless spread spectrum radio.
 - 1) Communication points shall, at a minimum, include the following:
 - a. One (1) High speed Ethernet
 - b. Five (5) RS-232/485 serial ports
 - c. Four (4) USB ports
 - d. Eight (8) Universal inputs
- c. Logic control module shall be designed for operator convenience and serviceability.
 - 1) No tools or meters shall be required to calibrate the unit.
 - 2) Level simulation mode shall facilitate testing.
 - 3) Should the touch screen become damaged, the level control system shall continue to operate normally until the touch screen is replaced.
- 5. Sequence of operation shall be as follows: Upon increasing liquid level the pump sensor shall activate, the pump shall start and pump down to the pump off level set point.
 - a. The high water level alarm set point shall activate the alarm system should the level continue to rise.
 - b. The low water level alarm set point shall activate the alarm system should the pump fail to stop.
 - c. In the event of a pump power problem, phase loss, phase reversal, overvoltage, undervoltage, unbalanced voltages or overload trip of any pump, the pump shall be shutdown, operation will automatically transfer to the next pump and a pump trouble alarm shall be activated, manual reset required.
 - d. In the event of any failure of the primary level control system, a redundant level system shall operate the pumps automatically and activate the alarm indicating light and auxiliary alarm contact (no audible). The redundant system shall also provide for automatic system operation in the event that the logic controller is removed for service.
 - e. In the event of control power failure in either the primary or redundant circuits, an auxiliary alarm contacts shall be activated.
 - f. The controller shall monitor the integrity of motor insulation prior to every start and alarm if problem exists.

- 6. Level sensor: Submersible level transducer, suspended type, 316 stainless steel construction, reverse polarity, and surge protected, vented to atmosphere, having a 4-20 mA output. The transducer shall monitor wet well level and temperature. It shall be installed and held in position by means of a guide pipe retrieval mounting fixture. One differential level sensor shall be installed as a redundant level control device.
- 7. High Temperature Quench System: Dilution solenoid valve, 1", 24 volt DC, powered from the pump controller. The valve shall open at 102F as sensed by the temperature probe transducer and close when temperature drops to 100F. Should the temperature reach 105F the high temperature audio-visual alarm at the controller shall be activated and auxiliary alarm contact shall close for remote building alarm annunciation. Contractor shall provide an isolation valve, 1" RPZ and 1" manual bypass valve around solenoid.
- 8. Temporary Bypass: Contractor shall provide a temporary bypass system for minimal system shutdown disruption during installation and commissioning, if required to maintain service to the building. The system components which may be required consist of the following:
 - 1. Bypass tee and two (2) isolation valves, the first for the existing pump discharge connection and the second for connection to the temporary pump.
 - 2. Temporary sump pump.
 - 3. Temporary pump discharge hose and check valve.
 - 4. Temporary pump basin.
 - 5. Temporary pump control panel.

Building Automation System Interface E.

- 1. Provide auxiliary contacts (Form "C" (1-NO, 1-NC)) and analog output signal in the pump controllers for interface to building automation system. Include the following:
 - a. Control power available.
 - b. On-off status of each pump.
 - c. Common system trouble alarm status.
 - d. Wet well level indication, 4-20 mA output signal.

PART 3 EXECUTION

INSTALLATION 3.1

- Slope horizontal drainage piping 3" and smaller, 1/4" per foot where possible, but minimum A. 1/8" per foot with minimum computed velocity 2 fps.
- Slope horizontal drainage piping 4" and larger, 1/8" per foot except as noted. B.
- Provide hanger support at starting end of all drainage lines which turn from vertical to C. horizontal.
- Changes in direction of drainage piping by use of: D.
 - 1. 45 wyes.

- 2. Long turn tee wyes.
- 3. Long sweep quarter bends.
- 4. Sixth, eighth or sixteenth bends.
- E. Slip Joints: On fixture trap inlets or elbows connecting to fixture tailpieces only.
- F. Vent Piping: Grade to drain out condensation and connect at base to prevent accumulation of rust.
- G. Locate cleanouts as follows:
 - 1. Approximately every 50 feet on horizontal drainage piping.
 - 2. Changes in direction.
- H. Excavating, trenching, and backfilling are specified in Section 220500.
- I. Examine roughing-in for plumbing piping to verify actual locations of sanitary drainage and vent piping connections before pump installation.
- J. Install pumps according to applicable requirements in HI 1.4.
- K. Set submersible pumps on pit floors. Make direct connections to sanitary drainage piping.
 - 1. Anchor guide-rail supports to pit bottoms and covers. Install pumps so pump and discharge pipe disconnecting flanges make positive seals when pumps are lowered into place.
- L. Construct pump pits and connect to drainage and vent piping. Set pit curb frame recessed in and anchored to concrete. Fasten pit cover to pit curb flange. Install cover so top surface is flush with finished floor.

3.2 CONNECTIONS

- A. Piping installation requirements are specified in Division 22 Section "Pipe, Tube and Fittings." Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to pumps to allow service and maintenance.
- C. Connect sanitary drainage and vent piping to pump. Install discharge piping equal to or greater than size of pump discharge piping. Install vent piping equal to or greater than size of pump basin vent connection. Refer to Division 22 Section "Pipe, Tube, and Fittings."
 - Install check and shutoff valve on discharge piping of pump. Install unions on pump having threaded pipe connections. Install valves same size as connected piping. Refer to Division 22 Section "Valves" for general-duty valves for sanitary waste piping.
- D. Ground equipment according to Division 26 Section "Electrical Power Equipment."

E. Connect wiring according to Division 26 Section "Electrical Power Equipment."

STARTUP SERVICE 3.3

- Prior to startup the Contractor shall perform the following: Α.
 - 1. Complete installation and startup checks according to manufacturer's written instructions.
 - 2. Hang submersible pump power cables, level control cables and pump removal chains permanently so they do not become entangled in the pumps during operation
 - 3. Verify that each pump is free to rotate by hand. If pump is bound or drags, do not operate until cause of trouble is determined and corrected.
 - 4. Clean pit of all construction debris.
 - 5. Verify that pump controls are correct for required application.
- Engage a factory-authorized service representative to perform startup service. В.
 - 1. Verify that pump controls are correct for required application.
 - 2. Perform motor megger test in accordance with manufacturer's instructions.
 - 3. Start motors.
 - 4. Open discharge valves slowly.
 - 5. Check general mechanical operation of pumps and motors.
 - 6. Set pump controls for automatic start, stop, and alarm operation as required for system application.
 - 7. Verify that pump system operates in accordance with the specification, adjust settings as required. Test and adjust controls and safeties.
 - 8. Remove and replace damaged and malfunctioning components.
 - C. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project outside normal occupancy hours for this purpose.

DEMONSTRATION 3.4

A. Engage a factory-authorized service representative to train City of New York's maintenance personnel to adjust, operate, and maintain controls and pumps. Refer to DDC General Conditions.

END OF SECTION

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SECTION 223000

PLUMBING EQUIPMENT, SPECIALTIES & ACCESSORIES

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this specification as shown or specified should be in accordance with the requirements of the Contract Documents.

1.2 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project:
 - 1. The Contract Drawings
 - 2. The Specifications
 - 3. The General Conditions
 - 4. The Addendum
 - 5. The Contract [City of New York Standard Construction Contract].

1.3 WORK INCLUDED

A. Work of this Section includes all labor, materials, equipment and services necessary to provide Equipment, Specialties and Accessories as shown on the drawings and as specified herein.

1.4 RELATED WORK

- A. Pipe, Tube and Fittings
- B. Plumbing Fixtures
- C. Drainage Systems
- D. Water Supply Systems
- E. Natural Gas Systems
- F. Compressed Air and Vacuum Systems
- G. Reagent Water Systems
- H. Fire Standpipe System
- I. Automatic Sprinkler System

1.5 QUALITY ASSURANCE

- A. A.N.S.I. -American National Standards Institute
- B. A.W.W.A. -American Water Works Association
- C. F.S. -Federal Specifications
- D. N.F.P.A. -National Fire Protection Association
- E. A.G.A. -American Gas Association
- F. C.G.A. -Compressed Gas Association
- G. U.L. -Underwriters Laboratory
- H. Plumbing Code

1.6 SUBMITTALS

- A. Shop Drawings:
 - 1. Plumbing Equipment.
 - 2. Plumbing Specialties.
 - 3. Plumbing Accessories.

PART 2 PRODUCTS

2.1 PIPE EXPANSION COMPENSATORS

- A. Any breaks or damage to the piping system or to the Work of other Sections within the period of the guarantee due to improper provision for expansion and contraction must be replaced at this Contractor's expense.
- B. This Contractor is to provide for expansion of pipes by providing expansion compensators and/or expansion loops and shall provide anchors at pump discharge and suction lines. All expansion loops shall be pre-stressed.
- C. At connections of branches to water mains, risers and at connections to heaters, coolers and other equipment, and at risers, provide sufficient number of elbow swings to allow for proper expansion and contraction of piping.
- D. Provide in hot water recirculation pipe lines (except at building expansion joints) 3 inches and smaller and for system pressure less than 51 psi, Flexonics or an approved equal Model HP expansion compensators having two-ply phosphor bronze elbows and brass shrouds and end fittings, as manufactured by U.O.P. Flexonics Division, Bartlett, Illinois. All internal parts shall be of non-ferrous metals. Compensators shall have integral guides extending the full length of the bellows travel. Compensators shall have external positive anti-torque devices to prevent twist. All compensators shall be listed under NSF standard 61.
- E. Provide in hot, hot water recirculation piping, except at building expansion joints, etc., pipe lines 4 inches and larger and for system pressures exceeding 50 psi, Flexonics controlled-flexing expansion joints as manufactured by U.O.P. Flexonics Division, Bartlett, Illinois, or approved equal, with plate steel flanges having ANSI drilling, pipe nipple ends beveled for

welding, forged steel ANSI flanges to suit the installation. The bellows shall be hydraulically formed from a stainless steel reinforcing neck ring and control rings shall be of a design to limit movement of each corrugation, as well as to carry loop stress caused by internal pressures. Where required, the bellows shall be annealed and/or stress relieved. Before assembly, the corrugated bellows shall be pickled to remove all scale formed by annealing and passivated to provide the maximum corrosion resistance. All lines in which expansion joints are installed must be securely anchored and guided in accordance with manufacturer's recommendations.

2.2 VIBRATION ISOLATION

- A. Basis of Design Manufacturer Consolidated Kinetics
- B. All mechanical equipment over 1 horsepower unless otherwise noted, shall be isolated from the structure by means of resilient vibrator and noise isolators. Mounts and bases shall be as listed in the equipment schedule, and as described herein.
- C. Mounts, Hangers, and Bases
 - (1) "N" Mounts Type RD neoprene mounts, incorporating completely enclosed metal inserts to permit bolting to the supported unit.
 - (2) "F" Mounts Type KIP-Q precompressed molded fiberglass isolation pads, neoprenejacketed and stabilized during manufacturer.
 - (3) "S" Mounts Type FDS freestanding, unhoused stable spring mounts, incorporating leveling bolts, and 1/4" thick neoprene-jacketed precompressed molded fiberglass noise isolation pads.
 - (4) "L" Mounts Type FRS freestanding, unhoused stable spring mounts, similar to type FDS, except incorporating vertical limit stops.
 - (5) "H" Hangers Type SFH combination spring and fiberglass hangers, incorporating 2" thick neoprene-jacketed precompressed molded fiberglass inserts in series with springs, all encased in welded steel brackets.
 - (6) "B" Bases Type SRB or SBB structural steel rail or beam bases, designed and supplied by the isolator manufacturer.
 - (7) "I" Bases Type CIB reinforced concrete inertia bases, the steel members of which are designed and supplied by the isolator manufacturer. The concrete shall be poured into a welded steel channel frame, incorporating prelocated equipment anchor bolts and pipe sleeves, welded-in 1/2" diameter reinforcing bars of 8" centers each way, and isolator brackets to reduce the mounting height of the equipment.
 - (8) Installation shall be in accordance with manufacturer's instructions.
 - a. Other Acceptable manufacturers Mason Industries, Korfund.

2.3 FLEXIBLE CONNECTORS

- A. Furnish and install flexible connectors at all pipe connections to rotating or reciprocating equipment.
- B. Flexible connectors shall be manufactured by Keflex Inc, Metraflex, Flexicraft, or approved equal.
- C. Twin, sphere, floating flange type.
- D. Characteristics shall be as follows:

(O.A.) Pipe Size	Length	(@ 70°F) <u>Max. W.P.</u>	(Inches) End Max. Offset	Conn.
3/4" 1" 1- 1/4" 1- 1/2" 2" 2- 1/2" 3" 4" 5" 6"	11" 12" 13" 14" 15" 16" 17" 19" 20" 21"	675 550 510 450 435 350 325 270 200 185	0.50" 0.25" 0.50" 0.50" 0.50" 0.25" 0.25" 0.50" 0.50" 0.50"	MPT MPT MPT FLG FLG FLG FLG FLG

E. Flexible connectors shall be braided stainless steel annular close pitch hose with stainless steel braid. M.P.T. ends shall be carbon steel. Flange ends shall be 150 lb. rated conforming to ANSI B16.5.

2.4 ESCUTCHEONS

- A. This Contractor shall provide escutcheons on all exposed pipe wherever they pass through floors, ceilings, walls or partitions.
- B. Escutcheons for pipes passing through outside walls and floor shall be Ritter Pattern and Casting Co., or approved equal, No. 1 solid, cast brass, flat type secured to pipe with set screws.
- C. Escutcheons for pipes passing through interior walls, partitions, and ceiling shall be Ritter Pattern and Casting Co., or approved equal, No.1, solid, cast brass chromium plated type, secured to pipe with set screws.
- D. Escutcheons for pipes is unfinished areas shall be cast iron, secured with set screws.

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 close to the fixture as possible.
- 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 plug omitted. All exposed P traps shall have bottom cleanouts and shall be chromium plated cast brass.

2.6 DISSIMILAR METALS

- A. Connections between pipe, fittings, hangers and equipment of dissimilar metals shall be avoided.
- B. Dielectric unions or insulated couplings shall be installed between copper or brass piping material and steel piping material or steel tanks. Unions or insulated couplings shall be used for pipe sizes 2" and smaller, and dielectrically gasketed flanges and sleeves for pipes 2- 1/2" and larger.
- C. Pipes, fittings, hangers, etc., of dissimilar metals shall be insulated against direct contact one with the other, by using a high quality or grade of dielectric insulating material EPCO or approved equal.

2.7 STACK SLEEVES

A. Stack sleeves for pipes passing through roof shall be equal to Zurn or approved equal Z-195-10, with cast iron body, adjustable flashing ring, rust resistant bolts, and under deck clamp. The adjustable flashing ring shall be caulked after it is in the proper position. The space between the flashing sleeve and the pipe passing through the same shall be caulked watertight.

2.8 UNIONS

A. Where required: on inlet and outlet of all apparatus and equipment having connections 2" and smaller. Where valves are adjacent to equipment, unions shall be on downstream side of valves.

B. Type

- 1. Steel piping: Malleable iron, 300 lb. WOG female pattern, brass seat, ground joint.
- 2. Cooper tubing: Ground joint, cast iron, 150 lb. WOG pattern.
- 3. For piping over 2" flanged joints to be used.
- 4. Gaskets shall be 1/16" thick similar to Garlock or Cranite factory cut, one piece.

2.9 ACCESS LADDER (FOR FIRE PROTECTION CONTROL VALVES)

- A. Galvanized steel ladders with 2" x 3/8" side bars spaced 14 inches apart, 5/8" rungs spaced 12" on centers, fastened to construction, top and bottom.
- B. Required where fire control valves are located over 7 feet above floor.
- C. Ladders shall conform to O.S.H.A. requirements.

2.10 FIXED AIR GAPS

A. Provide where indicated on the Drawings and required by Code a fixed air gap to prevent contamination due to back flow in the stationary drain line. Air gap shall be J.R. Smith or approved equal No. 3951 to suit piping installation. Finish shall match connection.

2.11 FERRULES

A. Provide best quality ferrules of "Extra Heavy" cast brass, and of weight and sizes as follows:

Size	Minimum Length	Weight in Pounds
2 inch	4-1/2 inch	1.00
3 inch	4-1/2 inch	1.75
4 inch & Larger	6 inch	2.50

2.12 FRESH AIR INLETS

A. Exposed type:

- 1. Gooseneck type, cast iron.
- 2. Locate and size as shown on drawings.

B. Flush type:

- 1. Perforated bronze plate with pipe clamp, finish as specified by Commissioner.
- 2. J.R. Smith Fig. No. 9005, Watts, Josam Manufacturing, or approved equal, size as noted.

2.13 FLASHING FITTINGS

A. Provide vents and all other pipes passing through roofs with a flashing fitting set a suitable level above the roof to terminate the flashing. Arrange piping passing through roofs to be a minimum of 12 inches from walls or other obstructions so as to permit proper flashing.

2.14 PIPELINE AIR GAPS

A. Pipeline air gaps must assure against back-siphonage by overflowing. Units shall be installed in water makeup lines to vessels under atmospheric pressure only. Air gap of unit must be at least twice the pipe diameter of the pipe in which it is installed.

2.15 THRUST BLOCKS

- A. This Work shall cover the installation of concrete thrust blocks as shown on the plans or as required.
- B. Thrust blocks shall be composed of concrete aggregated meeting ASTM Specification C-33 and Portland Cement meeting ASTM Specification C-150 Portland Cement or C-175 for Air Entrained Portland Cement. Mix shall not be leaner than 1 cement, 2-1/2 sand, 5 stone, having a compressive strength of not less than 2000 psi in 36 hours when using high early cement and 7 days when using standard cement.
- C. Thrust blocks shall be applied or ordered at bends, tees and hydrants were changes in pipe diameter occur at reducers in fittings.
- D. Thrust blocks shall be placed between solid ground and the fittings to be anchored. The area of bearing on fitting and on ground in each instance shall be that required by the Commissioner. The concrete shall be placed so that the pipe and fitting joints will be accessible for repair unless otherwise directed by the Commissioner. Install one (1) layer of tar on all surfaces that will come in contact with concrete pour.

PART 3 EXECUTION

Not Used.

END OF SECTION

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SECTION 224000

PLUMBING FIXTURES

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this specification as shown or specified should be in accordance with the requirements of the Contact Documents, General Conditions, Supplementary Conditions and Division 1 – General Requirements.

1.2 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project:
 - 1. The Contract Drawings
 - 2. The Specifications
 - 3. The General Conditions
 - 4. The Addendum
 - 5. The Contract [City of New York Standard Construction Contract].

1.3 WORK INCLUDED

A. Work of this Section includes all labor, materials, equipment and services necessary to provide plumbing fixtures as shown on the drawings and as specified herein.

1.4 RELATED WORK

- A. Pipe, Tube and Fittings
- B. Drainage Systems
- C. Water Supply Systems

1.5 CODES AND STANDARDS

A. Comply with applicable portions of: the Building Code of the City of N.Y.; Local Law No. 58 of 1987; ANSI Code; Local Law 29 of 1989; N.Y. State Department of Environmental Conservation Law performance standards specified in Section 15-0314, including all administrative decisions.

1.6 QUALITY ASSURANCE

- A. References: ANSI:
 - 1. A112.6.1M "Supports for Off-The-Floor-Plumbing Fixtures for Public Use".

- 2. A112.19.1M "Enameled Cast Iron Fixtures".
- 3. A112.19.2M "Vitreous China Plumbing Fixtures".
- 4. A112.19.3M "Stainless Steel Plumbing Fixtures".
- 5. A112.19.5M "Trim for Water Closet Bowls, Tanks and Urinals".
- 6. A112.18.1M "Finished and Rough Brass Plumbing Fixture Fittings".
- B. All fixture trimmings, including faucets, strainers, escutcheons, shower head and arm, water closet supplies, stops, waste trap, escutcheons, visible hanger or chair carrier nuts shall be made of brass and shall be polished chromium plated. All material to be specified as chromium plated and shall be thoroughly and evenly applied and guaranteed not to strip or peel. All chromium plating on plumbing fixture trim shall be in accordance with Federal Spec. WW-P-54 lb for grade "R" plating. Manufacturer shall submit certification that all chrome plating on finished trim meets aforementioned Federal Specification. All plated work shall be highly buffed. Plastic, zinc or white metal will not be approved.
- C. All fixtures shall be free from imperfections, true as to line, angles, curves and color, smooth, watertight, nameplate in every respect and practically noiseless in operation. Fixtures as specified are given as a typical standard and they or other approved fixtures shall be furnished, set and connected in good substantial, neat and workmanlike manner.
- D. Fixtures: vitreous china ware of the best quality, non-absorbent and manufactured 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 glazing and vitreous china fixtures shall be thoroughly fused and united to the body, without discoloration, chips, or flaws, and shall be free from craze. Warped or otherwise imperfect fixtures will not be acceptable.
- E. Each supply fixture, casework fixture and equipment, shall be separately controlled by its own stops. Locate as required on wall, above floor or as directed.
- F. All faucets shall have metal handles. Shower valves shall have integral check stops on both hot and cold water supplies.
- G. All trim shall be permanently stamped with manufacturer's identification and shall be visible after installation.
- H. Colors and finishes shall be selected by the Commissioner.

1.7 SUBMITTALS

- A. Fixtures.
- B. Fittings and Faucets.
- C. Shower equipment.

- D. Fixtures literature and product data.
- E. Submit samples consisting of two pieces of each piece of brass work (fitting-trimming-etc.) required in connection with plumbing fixtures and showers, etc., only if other than specified item.
- F. Submit all the videotapes produced during the instruction. All tapes shall be labeled and turned over to the DDC within forty-eight (48) hours of instruction. Submit affidavit signed by the City of NY that all instruction has been conducted. Obtain receipt from the DDC that the tapes have been received.

1.8 INDEXING FAUCET HANDLES

A. All faucet handles shall be indexed to indicate type of water it will supply. Cold water faucet shall be indexed by a "C", "COLD", or be color coded blue. Hot water faucet shall be indexed by a "H", "HOT", or be color coded red. Tempered water shall be indexed by a "T" or be color coded white.

1.9 FIXTURE MOUNTING HEIGHT SCHEDULE

A. Unless otherwise required, plumbing fixtures shall be mounted in accordance with the following schedule. Mounting heights are measured from finished floor (AFF) to rim of fixture unless indicated otherwise, such as to seat or spout.

Fixtures

Lavatories

31"

Shower, Barrier Free: Seat

17"

38"min

Controls Bottom

48"max

- NOTE: 1. The height for all adult fixtures shall be same as that for high school.
 - 2. The height for Barrier Free Fixtures shall comply with the 2011 NYC Construction Code and Americans With Disabilities Acts.
 - 3. Clear knee space dimension, floor to bottom of apron, is indicated by (*).
 - 4. Barrier Free = B.F

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Plumbing Fixtures:

1. Eljer, American Standard, Zurn, or approved equal.

B. Flushometers:

1. Sloan, Zurn, Kohler, or approved equal.

C. Faucets:

1. Chicago Faucet, American Standard, Kohler, or approved equal.

2.2 FIXTURES

- A. Vitreous china, color as specified by Commissioner, except as noted.
- B. Stainless steel fixtures conforming to ANSI A112.19.3.
- C. Lavatory support shall be Josam Co., MIFAB MC#42, Zurn Z1231 or Jay R. Smith Figure 700-M31 for Kohler, Eljer, and American Standard and Figure 702-M31 for Crane, floor mounted type with cast iron concealed arms.

2.3 STOPS

- A. Provide lock shield loose key angle stops or straight stops, with each compression type faucet whether specifically called for or not, including sinks in wood and metal casework, and laboratory furniture. Locate stops centrally above or below fixture in accessible location. Chrome plated brass loose key 1/2" IPS angle stops by Kohler K-7675, McGuire HST06LKSB, Chicago 442-LK, T&S Brass and Bronze B418 CP or Zurn Aquaspec ZH8816LK-PC; cast brass 1/2" IPS straight loose key stops by Kohler K-7679, Chicago 45-LK or T&S Brass and Bronze B416 CP.
- B. Provide keys for lock shield stops to the City of New York.
- C. Supply from stops shall be chrome plated copper flexible tubing.
- D. Supply pipe from wall to valve stop shall be rigid threaded IPS copper alloy pipe.

2.4 ESCUTCHEONS

A. Heavy type, chrome plated cast brass with set screws. Provide for piping serving plumbing fixtures and at each wall, ceiling and floor penetrations in exposed finished locations and within cabinets. McGuire 127, Zurn Z8901-PC or Kohler.

2.5 FAUCET

- A. Barrier-free faucets shall be constructed to meet the clearances and requirements of ANSI 117.1.
- B. Coordinate faucet inlets with supplies and fixture holes and outlet with spout and fixture receptor for lavatories and sink. Coordinate faucet inlets with supplies and outlet with diverter valve for bathtubs and showers.
- C. Single Lavatory, Barrier-Free or General Use shall have a faucet deck mounted 4" center having the following features: metering type valves, 0.5GPM flow aerator, and be chrome

plated heavy cast brass construction. Faucet shall be Speakman 4141-NYC-BOCA/FLO-LD with brass yoke assembly, Chicago Faucets 802A-E2805-336, T&S Brass and Bronze B831 W/B199-8F or Zurn Aquaspec Z86500-3M.

2.6 SHOWER, INDIVIDUAL, NON BARRIER-FREE

- A. Non-barrier-free individual shower shall be a corner mounted or surface mounted shower module consisting of shower head, thermostatic shower valve, metering valve, and built-in liquid soap system. Module housing and piping shrouds shall be made from 16-gage stainless steel, type 304 with a satin finish. All internal water piping shall be copper tubing. Shower head shall be solid brass triple chrome plated with adjustment of spray from coarse to fine mist spray. Shower head shall have flow control which maintains 2.5 GPM at pressures from 10-100 PSI and up-down ball joint. Shower valve shall regulate shower water to maintain a constant water temperature and shall shut shower water off in the event of loss of either water supply. A metering valve shall be installed between the shower valve and the shower head. Metering valve shall be adjustable to deliver water between 5 to 60 seconds. Soap dispenser valve shall be designed for liquid soap from a built-in liquid soap system.—Soap valve shall be constructed of solid brass with stainless steel spring and metering system, and Buna-N O-ring seals. Entire exterior of soap valve shall be chrome plated. Soap dispenser valve shall be Acorn 3050 or Meteraft 185.
- B. Built-In Liquid Soap System: an integral soap tank, factory pre-piped, and installed within the Shower. The liquid soap is piped to the dispenser. Shower single station model shall be provided with a one quart tank. Soap dispenser shall be supplied for each soap station. The exact size is affected by shower supply configuration.
- C. Shower modules shall be Acorn "Apex" Model Number 423-T--F-Z-BS-GX-MV-S for corner mounted or Metcraft 702-SHC with options 204, MVR, 185, IST, 160, A311, and 76 with 1-BJ and FC2.5 for corner mounted and Model Number 453-T-F-Z-GS-GX-MV-SC or Metcraft 700-SHS with options 204, MVR, 185, IST, 160, A311, and 76 with 1-BJ and FC2.5 for surface mounted.

2.7 LATEX CEMENT GROUT

A. Latex Portland cement grout compound shall be a compound of Portland cement grout and latex additive complying with ANSI A118.6.

2.8 SEALANT, SILICONE

A. Silicone sealant shall be one-part mildew resistant silicone sealant by Dow Corning 786 or General Electric Sanitary 1700, color white.

2.9 CONNECTIONS

- A. Exposed Pipe, Fittings, Traps, Escutcheons, Valves, Valve Handles and Accessories, Above and Below Fixtures:
 - 1. CP brass.
 - 2. Set screw CP cast brass escutcheons for piping and tubing.

- 3. Traps: CP cast brass with cleanouts plugs, unless otherwise noted.
- 4. Covering tubes not permitted.
- 5. CP type "L" tubing supply risers may be used.
- 6. Wall hung water closets: chair carriers.

2.10 FIXTURE FITTINGS

- A. Renewable seats or replaceable internal units.
- B. Composition washers.
- C. All metal indexed handles.
- D. Lockshield integral or built-in stops.
- E. Finishes: As selected by Commissioner.

PART 3 EXECUTION

3.1 INSTALLATION REQUIREMENTS

- A. Make all plumbing connections to all equipment and fixtures requiring such connections as shown on Drawings whether the equipment and fixtures are furnished under this Section or other Divisions or Sections. Investigate the equipment furnished under other Divisions or Sections to determine if combination fittings have a means of shutoff or require the installation of check valves, backflow preventers and/or pressure reducing valves. Make final connections to such, including installations of all special traps, supplies, control valves, etc., furnished with such equipment, and furnish all material necessary that is not supplied with the equipment.
- B. Provide valved water connections in equipment spaces and other locations where shown for the use of other trades or other Sections. On each valved outlet for equipment with submerged inlets, provide a backflow preventer after the shut-off valve. Funnel drains and/or floor drains for the air conditioning, heating and refrigeration work shall be provided.
- C. Fixture 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. All fixture supplies shall have stops.
- D. As soon as installed, all metal fixture trimming shall be thoroughly covered by this Contractor with non-corrosive grease, which shall be maintained until all construction work is completed.
- E. Upon the completion of the Work, all fixtures and trimmings shall be thoroughly cleaned and polished and free from all marks and left in first-class condition.

- F. Upon completion of the Work, test flushometers and faucets for leaks or drips and adjust same for quiet and uniform operation.
- G. All fixtures shall be left thoroughly clean. All plated or polished fittings, pipes and appliances shall be coated with Vaseline, immediately after installation, and shall be finally polished and free from all marks and foreign substances.
- H. Equipment and all connections shall be in accordance with the rules relative to submerged inlets, and shall be provided with all necessary vacuum breakers and check valves, in accordance with the applicable codes.
- I. Connection between any fixture with a floor outlet and the flange shall be made with an approved prepared gasket that shall be a germicide, absolutely gas and fumeproof, watertight, stain-proof, containing neither oil nor asphaltum, and which will not rot, harden or dry under any extreme of climate change, and must adhere on wet surfaces.
- J. Each fixture shall be separately trapped, using the type and size of trap called for specifically in the Specifications, or the type required by the Plumbing Code. The traps shall be approved type.
- K. All fixtures requiring hot and cold water shall have the cold water faucet on the right hand side of the fixture and the hot water faucet on the left hand side of fixture.
- L. Be responsible for protecting against injury from the building materials, acids, tools and equipment, all plumbing fixtures, and equipment provided under Plumbing Work Sections.
- M. No slip joints will be permitted on water piping.
- N. Flexible supplies will not be permitted to fixtures in lieu of rigid supplies.
- O. Furnish and install all control wiring from plumbing fixture transformers to sensors and solenoids per manufacturers' requirements.

END OF SECTION

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SECTION 230500

GENERAL REQUIREMENTS OF HVAC 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.

1.2 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project:
 - 1. The Contract Drawings
 - 2. The Specifications
 - 3. The General Conditions
 - 4. The Addendum
 - 5. The Contract [City of New York Standard Construction Contract].

1.3 WORK INCLUDED

- A. Work of this section includes all labor, materials, equipment, disassembly and reassembly of equipment, hoisting and rigging, scaffolding and services necessary to complete the Heating, Ventilating and Air Conditioning Work as shown on the drawings and specified herein, including, but not limiting to, the following:
 - 1. Select demolition.
 - 2. Air handling unit with heat recovery wheel.
 - 2. Variable flow refrigerant systems with heat recovery air cooled condensers.
 - 3. Supply, toilet, and general exhaust systems including exhaust fans and air distribution system.
 - 4. Steam boilers and feed water pumps.
 - 5. Chilled water and steam supply and return piping distribution systems including piping, insulation and specialties.
 - 6. Air distribution systems including sheet metal ductwork, outlets, volume dampers, insulation and air outlets.
 - 7. Vibration isolation.

- 8. Automatic temperature controls.
- 9. Testing and balancing.
- 10. Temporary steam boiler

1.4 DEFINITIONS

- A. The following definitions of terms and expressions used in this section are in addition to listing given in General Conditions:
 - 1. "Herein" shall mean the contents of a particular section where this term appears.
 - 2. "Indicated" shall mean, "indicated on contract drawings".
 - 3. "Scheduled" shall mean, "as scheduled on contract drawings".
 - 4. "Concealed", where used in connection with insulation and painting of piping, ducts and accessories, shall mean that they are hidden from sight, as in trenches, chases, furred spaces, pipe shafts or hung ceilings.
 - 5. "Exposed", where used in conjunction with insulation and painting of pipe, ducts and accessories, shall mean that they are not "concealed" as defined herein above.
 - 6. "Singular Number": In all cases where a device or part of the equipment or system is herein referred to in the singular number (such as pump or heating system), it is intended that such reference shall apply to as many such items as are required to complete the installation.

1.5 COMMISSIONING

A. The Contractor shall provide all documentation, coordination and system testing as required by the Commissioning Agent. See DDC general requirements for these requirements.

1.6 SITE INSPECTION

A. All bidders on this work shall visit the job site and become thoroughly familiar with the conditions under which the work will be performed. The submission of a proposal shall be construed as evidence that the bidder has visited the site and has knowledge conditions. Any later claim for extra payment because of difficulties encountered will not be allowed.

1.7 SCHEDULE OF WORK

A. Schedule all work to conform to the job progress schedule as submitted to and approved by the COMMISSIONER.

1.8 SUBMITTALS

- A. Approval shall be obtained for all equipment and material before delivery to the job site. Delivery, storage or installation of equipment or material which has not had prior approval will not be permitted at the job site.
- B. All submittals shall include adequate descriptive literature, catalog cuts, shop drawings and other data necessary ascertain that the proposed equipment and materials comply with specification requirements. Catalog cuts submitted for approval shall be legible and shall clearly identify equipment being submitted.
- C. A minimum period of ten (10) working days, exclusive of transmittal time, will be required in the Engineer's office each time a shop drawing, product data and/or samples is submitted for review. This time period must be considered by the Contractor when scheduling his work.
- D. Submittals for individual systems and equipment assemblies which consist of more than one item or component shall be made for the system or assembly as a whole. Partial submittals will not be considered for approval.
- E. Submittals shall be marked to show specification reference including the section and paragraph numbers.
- F. Submit each section separately and include the following:
 - 1. Information which conforms to contract requirements. Include the manufacturer's name, model or catalog numbers, catalog information, technical data sheets, shop drawings, pictures, nameplate data and test reports as required.
 - 2. Submittals on all pump and fans shall be complete with performance curves marked with the design points. Additionally, submittals for any pumps or fans that are in series or parallel with other pumps or fans shall include compounded performance curves for analysis by the A/E.
 - 3. Submittals on electrical equipment shall be complete with all power and control wiring diagrams.
- G. Submit samples as directed of items called for in the specifications; samples of the materials which the manufacturer will actually ship shall be submitted for approval after award of contract and be properly labeled or identified.
- H. Submit a minimum of three (3) hard copies of all shop drawings and submittals for Engineer's review.

1.9 CODES AND STANDARDS

- A. Work performed under this Contract shall conform to all applicable laws, ordinances, regulations, construction codes, energy codes (New York State, New York city and federal), and shall be subject to control of NYC department of buildings,.
 - 1. UL
 - 2. ASME,
 - 3. ASTM,

- 4. ASHRAE
- 5. NEMA
- 6. NYCECC
- 7. NYC Building Code
- 8. NYC Mechanical code
- 9. NYC Electric Code
- 10. NYC Plumbing code
- 11. NFPA
- 12. SMACNA
- **13. IEEC**
- B. Wherever requirements of such laws, codes, regulations differ from the drawings or specifications, they shall take precedence over the drawings specifications, and are expressly made part of the Contract, except where the drawings or specifications are more stringent or require better materials, which would also be acceptable to the city of New York (i.e., the more stringent code shall always apply).
- C. Any portion of work which is not subject to the approval of The City of New York having jurisdiction shall be provided in accordance with National Fire Protection Association requirements.
- D. Comply with applicable utility company rules and regulations.
- E. Comply with Occupational Safety and Health Act (OSHA) requirements.

1.10 INSPECTIONS, PROGRESS INSPECTIONS, SPECIAL INSPECTIONS AND TESTING

- A. New York City Building Code requires the City of New York to directly retain the services of an authorized testing agency to perform all required inspections, tests, progress inspections and special inspections as required by the Building Code. The Contractor shall provide all required support services required by the inspectors.
- B. Upon completion or partial completion of the permitted mechanical work, inspections, progress inspections, special inspections and tests shall be conducted by approved agencies or special inspectors qualified to conduct such inspections and tests. Inspections and progress inspections shall be performed in compliance with Section BC 109 of the New York City Building Code and Chapter 5000 of the New York City Energy Conservation Code (1 RCNY §5000-01). Special Inspections shall be performed in compliance with Sections BC 1704 and BC 1707 of the New York City Building Code for all mechanical systems regulated by the New York City Mechanical Code, Sections MC 107, MC 507, Chapters 10, 11 and 12. Refer to Article 116 of Chapter 1 of Title 28 of the Administrative Code for additional provisions related to inspections.

1.11 BOILER PLAN APPROVALS

A. The complete installation of boilers, burners, fuel oil burning equipment, gas system, electrical work and all other items of work shall be in strict accordance with all laws

- and the latest rules and regulations of all municipal, Utility Company, and all other public agencies which have jurisdiction.
- B. The Contractor shall engage the services of a professional engineer registered in the State of New York who shall prepare and submit all plans and applications to the Department of Buildings and Division of Air Resources of the City of New York, the Utility Company and New York State Department of Environmental Conservation and shall obtain all required approvals. Sixty (60) days from the Letter of Award, the Contractor shall obtain all required work permits and approvals from the various agencies. The Contractor shall obtain re-approval of documents already submitted to, and approved to, and approved or in the process of approval, by the New York City Department of Buildings and Division of Air Resources and the New York State Department of Environmental Conservation. The Contractor shall be fully responsible to make all required modifications and to file all amendments.

1.12 GUARANTEE

- A. In addition to the requirements stated in the specifications, the Contractor must guarantee for 1 year all equipment, materials and appurtenances installed by him to be free from all defects. Upon written notice from the COMMISSIONER, the Contractor shall promptly correct all defects without additional cost to the City of New York. The Contractor must make good, at his own expense, any defects in materials or workmanship that may appear.
- B. An extended warranty of five (5) years shall be provided by the manufacturer for the following equipment:
 - 1. Compressors.
 - 2. Heat pump unit refrigerant circuit including compressors, coils, reversing valve and expansion valve.
 - 3. AC unit or heat pump unit control board.

PART 2 PRODUCTS

2.1 PRODUCT HANDLING

- A. In addition to the requirements of the General Conditions, the Contractor shall be responsible for the following:
 - Responsibility for care and protection of mechanical work rests with the Contractor until it has been tested and accepted.
 - 2. After delivery, before, during and after installation, protect equipment and materials against theft, injury and damage for all causes.
 - 3. Coat polished or plated metal part with Vaseline immediately after installation.
 - 4. Protect equipment outlets and pipe, openings with caps.

- B. Insulation and acoustic material within air handling equipment, fan coil units, VAV boxes, ductwork, etc. can absorb damaging moisture and become soiled when shipped and if left outdoors prior to being installed. Absorbed moisture can foster biological growth and can lead to indoor air quality problems at a later date. To minimize damage all such equipment shall be shrink-wrapped prior to shipment from the factory. The shrink-wrap shall only be removed once the units have been move into enclosed spaces within the building.
- C. The Contractor shall receive, properly house, handle, hoist, deliver to proper location, equipment and other materials required for the contract.
- D. 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.

2.2 MATERIALS

A. Design:

- Unless otherwise specified, equipment or material of same type or classification, used for the same purpose, shall be products of the same manufacturer. All material shall be new and of the latest design of manufacturer providing equipment or materials.
- 2. Equipment and accessories not specifically described or identified by manufacturer's catalog numbers shall be designed in conformity with ASME, or other applicable technical standards, suitable for maximum working pressure and shall have neat and finished appearance.

B. Electrical Characteristics:

1. It shall be the responsibility of this Contractor to ensure that the voltage and current characteristics of the electrical equipment furnished by him shall be suitable for the electrical services as specified.

C. Lubricating Devices:

1. Provide oil level gauges, grease cups, grease gun fittings for machinery bearings as recommended by machinery manufacturer; where lubricating means are not easily accessible, extend to accessible, extend to accessible locations. Furnish all grease gun fittings of uniform type.

D. Belt Guards:

1. Provide guards to enclose belts, pulleys, sheaves or belt-driven equipment. Construct of galvanized expanded or perforated sheet steel, or 1" mesh wire screen in angle frame with steel angle or channel mounting supports; make guard easily removable for access to belt, pulley or sheave. Conform to codes or regulations of agencies, OSHA, NYC DOB. Provide access holes for tachometers.

PART 3 EXECUTION

3.1 SUPERVISION

A. All work shall be preformed by competent mechanics under supervision of an experienced erection supervisor. The Contractor shall, upon initiation of construction, keep a suitable force of men (including supervisory personnel) on the site at all times in order to place all sleeves, inserts, outlet boxes and fixtures, and provide all other openings as are required for the satisfactory installation of equipment.

3.2 COORDINATION

- A. Contractor's attention is directed to scheduling of construction and time limitations for each phase of the work. Work shall be coordinated to permit proper setting of the work of other trades.
- B. Where piping work and appurtenances are in place prior to completion of adjacent concrete and masonry work, they must be protected against damage and displacement until construction is completed.

3.3 CUTTING AND PATCHING

- A. All cutting and patching associated with the installation of the HVAC work is the responsibility of the Contractor.
- B. No cutting of bearing walls, beams, etc. shall be done without the approval of the COMMISSIONER. All materials, patching and finishing, etc. shall match the surroundings. All cutting and patching shall be done by workman skilled in the trades and in the employ of the Contractor for the project. All cutting shall be done with the saw-type edges to give a neat and workmanlike appearance. All pipe holes shall be core drilled unless specified otherwise.

3.4 TEMPORARY OPENINGS

- A. All necessary temporary openings not indicated which may be required for purpose of bringing equipment into building shall be provided as required subject to the approval of the COMMISSIONER. The Contractor shall perform work of providing and maintaining openings and of restoring structure.
- B. Holes provided in General Construction work to permit installation of lines for temporary mechanical services shall, after removal of such lines, be patched as specified.

3.5 CLEAN-UP

A. The Contractor shall be held responsible for the general clean-up of all areas affected by the work in the Contract. All rubbish and accumulative material shall be removed from the premises and the premises left "broom clean" upon completion.

3.6 CLEARANCE FROM ELECTRICAL EQUIPMENT

- A. Piping or Ductwork is prohibited in all electric rooms and closets, telephone rooms and closets, and elevator machine rooms.
- B. Where transformers, switchboards, motor control centers, electric panels, motor starters, and variable speed drives are located in spaces other than those identified in paragraph A above, a minimum of 3 feet clearance to any equipment, ductwork or piping shall be maintained in front of all low voltage equipment (208 volts or less) and 3-1/2 feet in front of all high voltage equipment (460 volts). This work space shall extend from the floor to the height of the equipment, but not less than 6 1/2' above floor. The width of the workspace shall equal the equipment width but not less than 30".
- C. Where transformers, switchboards, motor control centers, electric panels, motor starters, and variable speed drives are located in spaces other than those identified in paragraph A above, no piping or ductwork shall be permitted up to the slab above the equipment footprint.

3.7 TESTING, ADJUSTING AND BALANCING

- A. Make all required adjustments to air or hydronic system devices until all specified performances are met. Prior to testing clean and comb all coils as required. Before commencement of construction, test existing equipment to establish output, etc. Submit certified reports indicating outlet cfm, motor and compressor amperage draw, rpm, static pressure, outdoor temperature at time of test, return air, mixed air, discharge air and setting of all controllers.
- B. Air and water system balancing shall be performed by an organization specializing in system balancing and procedures having at least three (3) years' experience and shall be AABC (Associated Air Balancing Council) or NEBB certified.

3.8 SUPPORTS, HOUSEKEEPING PADS AND STANDS

- A. Where supports, stands and suspended platforms for machinery, tanks or other equipment are indicated or specified in mechanical work sections, perform as follows:
 - 1. Design and construct supporting structures of strength to safely withstand stresses to which they may be subjected, and to distribute properly the load and impact over building areas. Conform to applicable technical societies' standards, also to codes and regulations of agencies having jurisdiction.
 - 2. Locate supports for tanks so as to avoid undue strain on shell and interference with pipe connections to tank outlets.
 - 3. For tanks containing tubes, check support locations for clearances to pull tubes.
 - 4. Mount power-driven equipment on common base with driver, unless otherwise indicated, specified or approved.
 - 5. Submit detailed shop drawings of all supports; obtain approval before fabricating and constructing.

6. Roof-mounted equipment shall be on prefabricated curbs unless indicated otherwise. Curbs for use with air intakes and relief or exhaust shall be of the insulated double shell type (refer to equipment sections). Equipment mounting rails shall be fabricated of 12 gauge, all welded, galvanized steel. Rails shall be 10" high with bottom raised cant, 2" x 4" treated wood nailer on top and a galvanized counterflashing cap. Rails shall be of adequate strength to handle the equipment weight.

B. Housekeeping Pads:

- 1. Provide concrete housekeeping pads for all floor mounted equipment. Use concrete mix reinforcement where required.
 - a. Where floor is water proofed, construct foundation so that anchor bolts will not pierce waterproofing.
 - b. Finished exposed parts of foundation with cement mortar; fill voids, trowel smooth, bevel edges and corners to make neat appearances; use cement hardener; paint to match finished floor.
 - c. Unless indicated otherwise provide housekeeping pads for all floor-mounting equipment. Pad dimensions, size of foundation bolts, methods of setting, aligning and anchoring of equipment shall be as recommended by manufacturer of equipment and as approved. Make minimum height above finished floor 4" and extend outer edges 2" minimum beyond machinery bedplate. Submit shop drawings for approval.
 - d. For machinery on pad, provide foundation bolts, sleeves, washers, nuts and templates to locate position on bolts. Make sleeves of steel pipe; finish flush with top of rough concrete. For anchorage, make embedded end of bolts hooked, or threaded with nut and square plate.
 - e. Provide 1" thick grouting between machinery base plate and concrete pad; fill completely the space between them. Clean top of pad; wet if before grouting. Do not remove leveling wedges before grout reaches its final set. Fill voids left by removal of wedges with grout to make neat appearance.

C. Floor Stands:

1. Unless otherwise indicated, where equipment is indicated or specified to floor mounted on stands or legs, construct of structural steel members or steel pipe and fittings; brace and fasten with flanges bolted to floor.

D. Suspension Support for Ducts, Pipes, Equipment:

- 1. Unless otherwise indicated, all pipes, ducts and equipment that are suspended shall be connected directly to the building steel. Where hangers are required between building steel points, supplementary steel members shall be added by the Contractor as required to adequately support the load.
- 2. Pipes or ducts shall not be supported from other pipes, ducts or equipment.

3. Hangers form joists shall be attached at the panel points. Pipes and ducts with weights of 50 pounds per foot (total for single or multiple runs) routed parallel with bar joists shall be supported from a minimum of three (3) joists at each hanger point (channel members between joists).

3.9 PAINTING AND FINISHING

- A. Except as specified herein, the finished painting of Mechanical Work within the building and on the roof shall be as specified in Architectural Drawings and Specifications.
- B. All mechanical equipment shall have a factory applied prime and finish coat of paint. Galvanized surfaces shall be considered as finished surfaces for equipment rooms and items concealed from view. Plastic products shall be acceptable without a finish coat of paint. All items of equipment marred or rusted, even thought factory finished, shall be repainted.
- C. All welded pipe connections, supports and stands shall be painted with an approved rust inhibitor ("extend" by Permatex or equal) prior to insulating.

3.10 IDENTIFICATIONS

A. Piping System:

- 1. All piping systems shall be identified by the name of contents and the direction of flow in accordance with ANSI A13.1 (1981).
- 2. Name of contents and directional arrows shall be placed near each valve, on both sides of pipes passing through walls, on long pipe runs at 30-foot intervals.
- 3. Names of contents and directional arrows shall be laminated in plastic and wraparound pipe marker as manufactured by Seton Name Plate Corp., Industrial Safety Supply Co., Inc., Brady Co, or approved equal.

B. Equipment:

- 1. All items of mechanical equipment such as fans, pumps, air handlers shall be identified by approved nameplates by Contractor furnishing equipment.
- Nameplates shall be securely affixed to each individual piece of equipment and also to controls for that equipment.
- 3. Nameplates shall be aluminum 2 1/2" x 3/4 with black enamel back-ground etched or engraved natural aluminum lettering. Manufacturer shall be Seton Nameplate Company or approved equal.
- 4. Equipment shall be identified as to its type and unit number.

C. Valves:

1. Identify valves and other parts of mechanical systems by means of polished and lacquered bras or aluminum tags, minimum 1 1/2" round or octagonal, with stamped letters and number 1/2" high and filled with black paint. Tag must bear name of particular mechanical system involved and identifying number.

D. Charts:

- 1. Charts of valves including valve identification number, location and purpose shall be furnished in duplicate.
- 2. Charts of piping system identification shall be furnished in duplicate. Charts shall include the following:
 - a. Service
 - b. Color field
 - c. Legend
 - d. Color of letters
- 3. One (1) copy of each chart shall be mounted in a wood frame with clear glass front, and secured to wall, as directed.
- 4. Second chart shall be prepared for use in location as directed, provided with approved transparent plastic enclosure for permanent protection. Two (2) holes shall be furnished at top of plastic enclosure to allow for affixing an 8" length of nickel-plated bead chin. Each hole to be reinforced by a small brass or nickel grommet. Plastic enclosures as furnished by Seton Name Plate Corp., Industrial Safety Supply Co., Inc., Brady Co., or approved equal.

3.11 FIRE-STOP PROTECTION

- A. Where pipes and conduit pass through fire partitions, fire walls or floors, install a firestop that provides and effective barrier against the spread of fire, smoke and gases. Fire-stop material shall be packed tight, and completely fill clearances between pipe and sleeves. Provide escutcheon plates on both sides of all rated construction.
- B. Fire-stopping material shall maintain its dimension and integrity while preventing the passage of flame, smoke and gases. Fire-stopping material shall be non-combustible as defined by ASTM E136.

3.12 ACCESS PANELS

- A. The Contractor shall furnish access panels for the installation by the Contractor for General Construction for concealed valves, expansion joints, valves, traps, strainers, dampers and other parts requiring accessibility for operation and maintenance.
- B. Access panel size shall be as indicated; when not indicated, make 18" x 18" minimum or larger as directed or required.
- C. Frames shall be 16 gauge steel.

- D. Access panels for use on masonry, tile, drywall shall have frames with flanges to hide rough openings in walls. Style M as manufactured by Milcor, or approved equal.
- E. When access panels or doors are installed in fire-rated construction they shall be fire rated to match the construction.

3.13 DEMOLITION, REMOVALS AND ALTERATIONS

- A. All existing equipment, ductwork, piping, controls, supports, accessories, etc., shall be removed unless otherwise indicated, required for the operation of equipment or systems to remain, or required for continuity of service to areas outside the work scope.
- B. Modify existing equipment and/or systems as required by the drawings or specifications and as may be required when such work is uncovered and found to interfere with the completion of work in this contract or other contract work.
- C. Remove all demolition material from the project site.

3.14 ELECTRICAL WIRING DIAGRAMS

- A. Electrical wiring for automatic temperature, safety an interlocking controls for motors, motor starters and other electrical apparatus and devices shall be provided by this Contractor, except for wiring of fractional horsepower fan motors which shall be by the Electrical Contractor. Power wiring will be under another Division.
- B. Prepare and submit for approval terminal point to terminal point completely coordinated and integrated wiring diagrams for all wiring.
- C. Submit specific wiring diagrams or factory-installed equipment wiring.

3.15 INTERFERENCE WITH THE CITY OF NEW YORK'S NORMAL OPERATION

- A. All work shall be performed in such manner as not to interfere with the normal work operations in adjacent spaces, buildings or other building occupants.
- B. In no way shall the Contractor block or restrict the means of egress for adjacent spaces and floors, decrease the fire rating of walls, partitions, ceilings, doors or combination thereof of adjacent spaces or means of egress, interrupt safety systems or in any way adversely affect the safety of people or materials.
- C. The Contractor shall provide exhaust fans and containment measures to prevent dirt, dust or fumes from reaching adjacent work spaces and occupants.
- D. All personnel traffic and material delivery shall be routed so as to absolutely minimize travel through adjacent work areas.

3.16 TEMPORARY STEAM BOILER

A. The Contractor shall be responsible for maintaining an operating No. 2 oil –fired steam boiler system at all times except for short tie-in periods (4 hours).

- B. The Contractor shall provide a rental steam boiler of approximately 860 lbs of steam per hour summer or 4300 lbs of steam per hour winter and a temporary condensate return pump and locate it as directed by the City of New York. The Contractor shall be responsible for rental fees and securing and paying for all permits.
- C. The Contractor shall tie the temporary boiler and pump into the steam supply and return system at the location as indicated on the drawings. The contractor shall supply all temporary hoses and piping and shall make all modifications to the existing piping including adding any valves to isolate the piping to be demolished and as required to make the tie-ins. The pressure ratings of all equipment, valves, temporary hoses or piping shall conform to the requirements of the Piping Specification.
- D. All steam supplied to the facility shall be metered.

3.17 CONNECTIONS TO EXISTING WORK

- A. Connect new works to existing with minimum interference. Where connections or interface to existing systems is required, air flows of existing system will be measured, rather than assuming that original design drawings are correct.
- B. This contractor shall be responsible for all shut-downs, drain-downs, refilling and water treatment of existing systems. All drain down schedules shall be coordinated with building ownership or management and adjacent occupants.

3.18 TEMPORARY SERVICE

A. Temporary services are specified under DDC general conditions.

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SECTION 230513

ELECTRIC MOTORS AND MOTOR CONTROLLERS

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this specification as shown or specified should be in accordance with the requirements of the Contract Documents.

1.2 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project:
 - 1. The Contract Drawings
 - The Specifications
 - The General Conditions
 - 4. The Addendum
 - 5. The Contract [City of New York Standard Construction Contract].

1.3 WORK INCLUDED

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the Electric Motors, Motor Controllers as shown on the drawings and as specified herein, including but not limited to the following:
 - 1. Furnish and install motors required for mechanical equipment.
 - Furnish motor starters required for mechanical equipment.
 - Coordination of the installation of motors and starters.
 - Motor control devices required for mechanical equipment.
 - 5. All control wiring other than power wiring.

1.4 RELATED WORK

- A. HVAC equipment.
- B. Automatic Temperature Controls.
- C. Electrical specifications for installation of motor starters and power wiring.

1.5 QUALITY ASSURANCE

- A. NEMA
- B. New York City Electrical Code
- C. IEEC

1.6 SUBMITTALS

- A. Shop Drawings:
 - 1. Wiring diagrams of all manufactured equipment.
 - 2. Electrical equipment terminal-to-terminal point connections.
 - 3. Elementary diagrams.
 - 4. Integrated and coordinate wiring for automatic temperature, safety and interlocking controls for motor starters and motor actuating and actuated devices.
- B. Materials Data: Manufacturer's printed data, test data, recommendations and installation.
- C. Tools: Deliver to the City of New York at the Project Site the following quantities of items in size/color distribution as directed. Store in locations directed, in unopened containers and in a manner recommended by the manufacturer.
 - 1. Tools
 - a. Deliver to the City of New York all special tools required for proper operation and maintenance of the equipment provided. Submit comprehensive list of tools.

1.7 DEFINITIONS

- A. Power Wiring (Motor Power Circuit): Power circuit operating at 120 volts or more, and carries electrical input energy to starter and from starter to motor.
- B. Control Wiring (Motor Control Circuit): Other than power wiring, all other wiring intended for directing or indicating the performance of a motor starter, including connections to actuating and actuated devices.
- C. Motor Actuating Device: Any device performing a switching function in a motor control circuit (i.e., pushbuttons, hand-off-automatic switches, automatic contacting devices, time clocks, etc.).
- D. Motor Actuated Device: Any device which functions in response to voltage received from a motor control circuit (i.e., pilot lights, solenoids, PE, EP, damper motors, etc.).

2.1 MOTORS

A. General:

- Motors shall be of proper power and speed to suit the specified makes of equipment. If
 other makes of equipment (other than specified) are accepted, the proper adjustment of
 motor speed and power must be included without additional cost. Sizes and types shall be
 submitted for approval before the equipment is purchased.
- 2. Motors shall be open dripproof, squirrel cage induction motors rated at 1,750 rpm or 3,500 rpm, as scheduled. Where motors are multi-speed, speeds shall be as scheduled.
- 3. Motors voltage shall be as scheduled.
- 4. Unless otherwise specified, motors shall be suitable for operation in either direction of rotation.
- 5. Unless otherwise indicated, motors shall have a service factor of 1.15.
- 6. Motors, shall be built in accordance with current NEMA standards (MG-1), except as noted in these specifications.
- 7. Motors shall be NEMA Design B unless otherwise noted.
- 8. Fractional horsepower motors less than ½ HP shall be 120 volt, single phase, 60 Hz. Motors ½ HP and above shall be 60 Hz, three phase with voltage as scheduled.

B. Insulation

- Insulation system employed shall have been tested by the manufacturer and will be Class H (180°c).
- Temperature rise shall be in accordance with NEMA limits for the Class of Insulation, Service Factor and Enclosure specified.
- 3. Unless noted otherwise, motors will be rated for 40 degrees C ambient operation.

C. Mechanical:

1. Motors shall be built in NEMA standard T-Frame sizes.

- 2. Dripproof and totally-enclosed motor frames will be of rugged construction and material will be steel, aluminum or cast iron.
- 3. End bracket will be of cast iron or aluminum construction and aluminum <u>must</u> have steel inserts in the bearing relubrication.
- 4. Bearings will be anti-friction type and bearing housings will be equipped with plugged provision for relubrication.
- 5. Bearings will be rated for minimum L-10 life of 20,000 hours assuming bearing load to be calculated with a NEMA minimum V-belt pulley, so located that the center line of the belt load will be located at the end of the NEMA standard shaft extension.

D. Premium Efficiency Motors:

Provide premium efficiency electric motors for all polyphase dripproof and totally enclosed motors 1 HP and above. Motor shall have a standard product of an approved motor manufacturer and shall have the following minimum guaranteed full load efficiencies at 1,750 rpm. Submit certification of motor efficiency with equipment shop drawings. Motors for different rpm's shall be of same construction and comparable efficiency at 1,750 rpm motors. Minimum efficiency's shall be as follows:

	OPE	N DRIP – PROOF (ODP)	
Motor Size (HP)	Speed (RPM)		
	1200	1800 NEMA Nominal Efficie	3600 ency
1 1.5 2 3 5	82.5% 86.5% 87.5% 88.5% 89.5%	82.5% 86.5% 87.5% 89.5%	77.0% 84.0% 85.5% 85.5% 86.5%

	TOTAL ENC	LOSED FAN-COOLED (TEFC)	
Motor Size (HP)		Speed (RPM)	
	1200	1800 NEMA Nominal Efficien	3600 ncy
		85.5%	77.0%
1	82.5%	86.5%	84.0%
1.5	87.5%	86.5%	85.5%
2	88.5% 89.5%	89.5%	86.5%
3	89.5% 89.5%	89.5%	88.5%

E. Noise Levels:

1. Sound power levels for all motors will be no greater than the guidelines recommended by NEMA (MGI-12.49).

F. Tests and Test Data:

- 1. Motors will be 100% production tested and quality control checked to assure compliance with this specification.
- 2. The insulation system will be tested by procedure outlined in NEMA MGI-12.03.
- 3. A load test will be performed on each motor to assure compliance with the energy-efficient section of this specification.
- 4. Typical test data on each motor will be available if requested.

2.2 MOTOR STARTERS

- A. Fractional Horsepower Starters for Motors less than ½ HP:
 - 1. Thermal overload relay with field adjustment capability.
 - 2. NEMA 1 general purpose enclosure with flush mounted enclosure and plate.
 - 3. Quick-mate, quick-break mechanism.
 - 4. Pilot light indicating activation.
 - 5. Speed control, where indicated.
 - 6. Magnetic starter type with HOA switch where required to be automatically controlled by a motor actuating device.
- B. Starter for Motors ½ HP and Above:

- 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 compensating features extending to 50°C.
- 5. Magnetic Starters NEMA Size 3 and Larger: Equipped with an auxiliary control circuit relay arranged to permit the actuation 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.
- 8. Where motors are specified to be reversible, provide reversing start and direction selector switch.
- 9. Covers and Combination Starters: Suitably hinged and interlocked with the handle of the disconnect means to prevent opening when the handle is in closed position.
- 10. Combination Type Motor Starters: Equipped with approved padlock and key and a means for padlocking its manual line disconnect in the open position.
- 11. Motor Starters: Equipped with an engraved lamicoid nameplate permanently fastened on the outside of the starter cover, with high white lettering on a black background identifying the motor and system controlled.
- 12. In addition to auxiliary contacts required for interlocking or indicating purposes, provide magnetic starters with one normally closed and one normally open additional contacts for future use.
- 13. Enclosure Sizes and Wiring Terminals of Motor Starters: Suitable for the application of copper power and control circuit wires.
- 14. Motor Starters which are not part of Packaged Equipment: One manufacturer throughout the project.
- 15. Wire all starter control wires for external connection including spare auxiliary contacts to terminal blocks. Each terminal block point be identified with unique number shown also on submitted wiring diagrams.

2.3 MOTOR CONTROL DEVICES

- A. Furnish mount and wire up manual control actuating devices and pilot lights required in starter covers.
- B. Motor Control Devices in the Starter Covers: Housed in NEMA Class I general purpose enclosures, except that where intended for use in damp or hazardous locations, provide enclosures of the proper NEMA classification for the conditions. Gang together in a single enclosure and wired up to a terminal block two or motor control actuating or actuated devices at a single location.
- C. Contacts for Motor Control Devices: Rated at not less than 10 amperes AC at 250 volts regardless of the actual duty they are required to perform.
- D. Motor control devices shall be suitable for operation at 120 volts.
- E. Pushbuttons: Heavy-duty oil-tight return momentary type. Provide flush mounted in stainless steel faceplate with pilot light and label indicating equipment served, where stations are remotely located.
- F. Selector Switches: Heavy-duty oil-tight maintained contact type.
- G. Pilot Lights: Heavy-duty type with resistor or transformer, equipped with nameplates indicating the operating condition they annunciate.
- H. Devices such as pushbuttons, pilot light and selector switches, where mounted in enclosure other than the cover of the starter: Equipped with nameplates indicating the motor with which they are associated and their function (on-off, manual-automatic, etc.).
- I. Nameplates: Engraved lamicoid, permanently fastened lettering and a black background.

2.4 APPROVED MANUFACTURERS

- A. Motors: Badlor Premium Efficiency Super-E Motor, Lincoln, Gould, Century General Electric, Westinghouse, or approved equal.
- B. Starters: Cutler-Hammer, Siemens, Square D, Allen-Bradley or approved equal.

2.5 VARIABLE FREQUENCY DRIVES

- A. The VFD package as specified consisting of a pulse width modulated (PWM) inverter designed for use on a standard NEMA Design B induction motor, completely assembled and tested by the manufacturer in an ISO9001 facility. The VFD tolerated voltage window shall allow the VFD to operate from a line of +30% nominal, and -35% nominal voltage as a minimum.
 - 1. Environmental operating conditions: 0 to 40°C (104 °F) continuous. VFD's that can operate at 40° C intermittently (during a 24 hour period) are not acceptable and must be oversized. Altitude 0 to 3300 feet above sea level, less than 95% humidity, noncondensing.

- 2. Enclosure shall be rated UL type 12 and shall be UL listed as a plenum rated VFD. VFD's without these ratings are not acceptable.
- B. All VFDs shall have the following standard features:
 - 1. All VFDs shall have the same customer interface, including digital display, and keypad, regardless of horsepower rating. The keypad shall be removable, capable of remote mounting and allow for uploading and downloading of parameter settings as an aid for start-up of multiple VFDs.
 - 2. The keypad shall include Hand-Off-Auto selections and manual speed control. The drive shall incorporate "bumpless transfer" of speed reference when switching between "Hand" and "Auto" modes. There shall be fault reset and "Help" buttons on the keypad. The Help button shall include "on-line" assistance for programming and troubleshooting.
 - 3. There shall be a built-in time clock in the VFD keypad. The clock shall have a battery back up with 10 years minimum life span. The clock shall be used to date and time stamp faults and record operating parameters at the time of fault. If the battery fails, the VFD shall automatically revert to hours of operation since initial power up. The clock shall also be programmable to control start/stop functions, constant speeds, PID parameter sets and output relays. The VFD shall have a digital input that allows an override to the time clock (when in the off mode) for a programmable time frame. There shall be four (4) separate, independent timer functions that have both weekday and weekend settings.
 - 4. The VFD's shall utilize pre-programmed application macro's specifically designed to facilitate start-up. The Application Macros shall provide one command to reprogram all parameters and customer interfaces for a particular application to reduce programming time. The VFD shall have two user macros to allow the end-user to create and save custom settings.
 - 5. The VFD shall have cooling fans that are designed for easy replacement. The fans shall be designed for replacement without requiring removing the VFD from the wall or removal of circuit boards. The VFD cooling fans shall operate only when required. To extend the fan and bearing operating life, operating temperature will be monitored and used to cycle the fans on and off as required.
 - 6. The VFD shall be capable of starting into a coasting load (forward or reverse) up to full speed and accelerate or decelerate to setpoint without safety tripping or component damage (flying start).
 - 7. The VFD shall have the ability to automatically restart after an over-current, over-voltage, under-voltage, or loss of input signal protective trip. The number of restart attempts, trial time, and time between attempts shall be programmable.
 - 8. The overload rating of the drive shall be 110% of its normal duty current rating for 1 minute every 10 minutes, 130% overload for 2 seconds. The minimum FLA rating shall meet or exceed the values in the NEC/UL table 430-150 for 4-pole motors. The following table identifies the drive size and model number to be used with each motor and the drive Amp rating:

208 Volts				
HP	Type Code	Amps		
	ACH550-UH-04A6-2	4.6		
1.5	ACH550-UH-06A6-2	6.6		
2	ACH550-UH-07A5-2	7.5		
$\frac{2}{3}$	ACH550-UH-012A-2	11.8		
	ACH550-UH-017A-2	16.7		

^{*} Note: Drive rating and Amps based on ABB ACH550 VFD.

- 9. The VFD shall have an integral 5% impedance line reactors to reduce the harmonics to the power line and to add protection from AC line transients. The 5% impedance may be from dual (positive and negative DC bus) reactors, or 5% AC line reactors. VFD's with only one DC reactor shall add AC line reactors.
- 10. The VFD shall include a coordinated AC transient protection system consisting of 4-120 joule rated MOV's (phase to phase and phase to ground), a capacitor clamp, and 5% impedance reactors.
- 11. The VFD shall be capable of sensing a loss of load (broken belt / broken coupling) and signal the loss of load condition. The drive shall be programmable to signal this condition via a keypad warning, relay output and/or over the serial communications bus. Relay outputs shall include programmable time delays that will allow for drive acceleration from zero speed without signaling a false underload condition.
- 12. If the input reference (4-20mA or 2-10V) is lost, the VFD shall give the user the option of either (1) stopping and displaying a fault, (2) running at a programmable preset speed, (3) hold the VFD speed based on the last good reference received, or (4) cause a warning to be issued, as selected by the user. The drive shall be programmable to signal this condition via a keypad warning, relay output and/or over the serial communication bus.
- 13. The VFD shall have programmable "Sleep" and "Wake up" functions to allow the drive to be started and stopped from the level of a process feedback signal.

C. All VFDs to have the following adjustments:

- 1. Three (3) programmable critical frequency lockout ranges to prevent the VFD from operating the load continuously at an unstable speed.
- 2. Two (2) PID Setpoint controllers shall be standard in the drive, allowing pressure or flow signals to be connected to the VFD, using the microprocessor in the VFD for the closed loop control. The VFD shall have 250 ma of 24 VDC auxiliary power and be capable of loop powering a transmitter supplied by others. The PID setpoint shall be adjustable from the VFD keypad, analog inputs, or over the communications bus. There shall be two parameter sets for the first PID that allow the sets to be switched via a digital input, serial communications or from the keypad for night setback, summer/winter setpoints, etc. There shall be an independent, second PID loop that can utilize the second analog input and modulate one of the analog outputs to maintain setpoint of an independent process (ie. valves, dampers, etc.). All setpoints, process variables, etc. to be accessible from the serial

- communication network. The setpoints shall be set in Engineering units and not require a percentage of the transducer input.
- 3. Two (2) programmable analog inputs shall accept current or voltage signals.
- 4. Two (2) programmable analog outputs (0-20ma or 4-20 ma). The outputs may be programmed to output proportional to Frequency, Motor Speed, Output Voltage, Output Current, Motor Torque, Motor Power (kW), DC Bus voltage, Active Reference, and other data.
- 5. Six (6) programmable digital inputs for maximum flexibility in interfacing with external devices, typically programmed as follows:
 - a. There shall be a run permissive circuit for damper or valve control. Regardless of the source of a run command (keypad, input contact closure, time-clock control, or serial communications) the VFD shall provide a dry contact closure that will signal the damper to open (VFD motor does not operate). When the damper is fully open, a normally open dry contact (end-switch) shall close. The closed end-switch is wired to an VFD digital input and allows VFD motor operation. Two separate safety interlock inputs shall be provided. When either safety is opened, the motor shall be commanded to coast to stop, and the damper shall be commanded to close. The keypad shall display "start enable 1 (or 2) missing". The safety status shall also be transmitted over the serial communications bus. All digital inputs shall be programmable to initiate upon an application or removal of 24VDC.
- 6. Three (3) programmable digital Form-C relay outputs. The relays shall include programmable on and off delay times and adjustable hysteresis. Default settings shall be for run, not faulted (fail safe), and run permissive. The relays shall be rated for maximum switching current 8 amps at 24 VDC and 0.4 A at 250 VAC; Maximum voltage 300 VDC and 250 VAC; continuous current rating 2 amps RMS. Outputs shall be true form C type contacts; open collector outputs are not acceptable.
- 7. Seven (7) programmable preset speeds.
- 8. Two independently adjustable accel and decel ramps with 1-1800 seconds adjustable time ramps.
- The VFD shall include a motor flux optimization circuit that will automatically reduce applied motor voltage to the motor to optimize energy consumption and audible motor noise.
- 10. The VFD shall include a carrier frequency control circuit that reduces the carrier frequency based on actual VFD temperature that allows the highest carrier frequency without derating the VFD or operating at high carrier frequency only at low speeds.
- 11. The VFD shall include password protection against parameter changes.
- D. The Keypad shall include a backlit LCD display. The display shall be in complete English words for programming and fault diagnostics (alpha-numeric codes are not acceptable). The keypad shall utilize the following assistants:

- 1. Start-up assistants.
- 2. Parameter assistants
- 3. Maintenance assistant
- 4. Troubleshooting assistant
- E. All applicable operating values shall be capable of being displayed in engineering (user) units. A minimum of three operating values from the list below shall be capable of being displayed at all times. The display shall be in complete English words (alpha-numeric codes are not acceptable):

Output Frequency
Motor Speed (RPM, %, or Engineering units)
Motor Current
Calculated Motor Torque
Calculated Motor Power (kW)
DC Bus Voltage
Output Voltage

F. The VFD shall include a fireman's override input and shut down. Upon receipt of contact closures from the fireman's control station, the VFD shall operate at an adjustable preset speed or shut down. The mode shall override all other inputs (analog/digital, serial communication, and all keypad commands) and force the motor to run at the adjustable, preset speed. "Override Mode" shall be displayed on the keypad. Upon removal of the override signal, the VFD shall resume normal operation.

G. Serial Communications

- The VFD shall have an RS-485 port as standard. The standard protocols shall be Modbus, Johnson Controls N2 bus, and Siemens Building Technologies FLN. Optional protocols for LonWorks, BACnet, Profibus, Ethernet, and DeviceNet shall be available. Each individual drive shall have the protocol in the base VFD. The use of third party gateways and multiplexers is not acceptable. All protocols shall be "certified" by the ISO. Use of non-certified protocols is not allowed.
- 2. Serial communication capabilities shall include, but not be limited to; run-stop control, speed set adjustment, proportional/integral/derivative PID control adjustments, current limit, accel/decel time adjustments, and lock and unlock the keypad. The drive shall have the capability of allowing the Direct digital controller to monitor feedback such as process variable feedback, output speed / frequency, current (in amps), % torque, power (kW), kilowatt hours (resettable), operating hours (resettable), and drive temperature. The Direct digital controller shall also be capable of monitoring the VFD relay output status, digital input status, and all analog input and analog output values. All diagnostic warning and fault information shall be transmitted over the serial communications bus. Remote VFD fault reset shall be possible. The following additional status indications and settings shall be transmitted over the serial communications bus - keypad "Hand" or "Auto" selected, bypass selected, the ability to change the PID setpoint, and the ability to force the unit to bypass (if bypass is specified). The Direct Digital Control system shall also be able to monitor if the motor is running in the VFD mode or bypass mode (if bypass is specified) over serial communications. A minimum of 15 field parameters shall be capable of being monitored.

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- 3. The VFD shall allow the Direct digital controller to control the drive's digital and analog outputs via the serial interface. This control shall be independent of any VFD function. For example, the analog outputs may be used for modulating chilled water valves or cooling tower bypass valves. The drive's digital (relay) outputs may be used to actuate a damper, open a valve or control any other device that requires a maintained contact for operation. In addition, all of the drive's digital and analog inputs shall be capable of being monitored by the Direct digital controller system.
- 4. The VFD shall include an independent PID loop for customer use. The independent PID loop may be used for cooling tower bypass value control, chilled water value control, etc. Both the VFD control PID loop and the independent PID loop shall continue functioning even if the serial communications connection is lost. The VFD shall keep the last good setpoint command and last good DO & AO commands in memory in the event the serial communications connection is lost.
- H. EMI / RFI filters. All VFD's shall include EMI/RFI filters. The onboard filters shall allow the VFD assemble to be CE Marked and the VFD shall meet product standard EN 61800-3 for the First Environment restricted level.
- All VFD's through 50HP shall be protected from input and output power mis-wiring. The VFD shall sense this condition and display an alarm on the keypad.
- J. Warranty
 - 1. Provide an extended warranty certified for two years for all parts and labor.
- K. Factory Start-up
 - 1. Certified factory and on-site start-up shall be provided for each drive by a factory authorized representative. A certified start-up form shall be filled out for each drive with a copy provided to the City of New York, and a copy kept on file at the manufacturer.
- L. Acceptable Manufacturers
- 1. VFD shall be manufactured by ABB Automation Model ACH 550, Emerson Electric, Graham or approved equal.

PART 3 EXECUTION

- 3.1 INSTALLATION
 - A. Coordinate with other work described under "Related Work".
 - B. Comply with the requirements of the New York City Electrical Code for the control wiring work.
 - C. Install in accordance with the equipment manufacturer's instructions.
 - D. Provide all control and interlock wiring for all provided HVAC equipment.

SECTION 230548

HVAC VIBRATION 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.

1.2 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project:
 - 1. The Contract Drawings
 - The Specifications
 - 3. The General Conditions
 - 4. The Addendum
 - 5. The Contract [City of New York Standard Construction Contract].

1.3 WORK INCLUDED

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the Vibration Control Work as shown on the drawings and specified herein, including, but not limited to, the following:
 - 1. Air handling unit
 - Energy recovery unit.
 - 2. Boilers
 - 3. VRF split air conditioning system.

1.4 RELATED WORK

- A. HVAC Equipment.
- B. Piping and Accessories.
- C. Sheet Metal Ductwork.
- 1.5 QUALITY ASSURANCE
 - A. SMACNA, ASHRAE, NFPA.

B. New York City Building Code and New York City Mechanical Code.

1.6 SUBMITTALS

- A. Furnish shop drawings adequate concrete reinforcing steel details and templates for all concrete foundations and supports, and all required hanger bolts and other appurtenances necessary for the proper installation of equipment.
- B. Include in the vibration isolation equipment submittal drawings the following information:
 - 1. Isolation mounting deflections.
 - 2. Spring diameters, compressed spring heights at rated load; solid spring heights, where steel spring isolation mountings are used.
 - 3. Equipment operating speed.
- C. Product Data: Manufacturer's printed data, test reports, catalog cuts and recommended method of installation.

PART 2 PRODUCTS

2.1 GENERAL

- A. For the purpose of establishing design and quality, products are identified by several manufacturer's names and catalog numbers. The equivalent items of other manufacturers will be accepted, as approved by the A/E. Approved manufacturers are as follows:
 - 1. Sound and Vibration Isolation:

a.	Mason Industries, Inc.	-	M.I.I.
b.	Vibration Eliminator Co.		
C.	Vibration Mountings & Controls, Inc	-	V.E.C.
4	Consolidate 1 12:		V.M.C.I.
	Consolidated Kinetics Co.	_	C.K.C.
e.	Korfund Dynamics Co.		
f.	Amber Booth	-	K.D.C.
	i mileti Bootii	-	A.B.

- B. Mounting Sizes: Determined by the mounting manufacturer.
- C. Mounting systems, including piping isolator components of the isolation mounting, shall not be resonant with the forcing frequencies of the supported equipment or supporting structure.
- D. Where equipment is located outdoors, vibration isolation equipment shall be weatherproof as required for operation in an exposed environment.
- E. See schedules for deflection and mounting type number.

- 2.2 ROOF MOUNTING OF CONDENSING UNITS MOUNTING TYPE 1 NEOPRENE PADS
 - A. Support the equipment base on 3/4" neoprene pads. Position these mountings in accordance with the weight distribution to ensure adequate deflection and vibration isolation.
 - B. Neoprene type isolators shall be free standing and laterally stable without any housing and complete with 3/4" neoprene acoustical friction pads. Pads shall be rated for no less than 15% compressed height at rated load.
 - C. Isolator types to be one of the following, or as approved:

Type Super W

M.I.I.

Type Shearflex

V.M.C.I.

Type 200 N

V.E.C.

- 2.3 MOUNTING OF ENERGY RECOVERY UNITS AND AIR HANDLING UNITS MOUNTING TYPE 1 NEOPRENE PADS
 - A. Support the equipment base on 3/4" neoprene pads. Position these mountings in accordance with the weight distribution to ensure adequate deflection and vibration isolation.
 - B. Neoprene type isolators shall be free standing and laterally stable without any housing and complete with 3/4" neoprene acoustical friction pads. Pads shall be rated for no less than 15% compressed height at rated load.
 - C. Isolator types to be one of the following, or as approved:

Type Super W

M.I.I.

Type Shearflex

V.M.C.I.

Type 200 N

V.E.C.

- 2.4 MOUNTING OF BOILER FEED PUMPS MOUNTING TYPE 1 NEOPRENE PADS
 - A. Support the equipment base on 3/4" neoprene pads. Position these mountings in accordance with the weight distribution to ensure adequate deflection and vibration isolation.
 - B. Neoprene type isolators shall be free standing and laterally stable without any housing and complete with 3/4" neoprene acoustical friction pads. Pads shall be rated for no less than 15% compressed height at rated load.

C. Isolator types to be one of the following, or as approved:

Type Super W

M.I.I.

Type Shearflex

V.M.C.I.

Type 200 N

V.E.C.

- 2.5 MOUNTING OF BOILERS MOUNTING TYPE 1 NEOPRENE PADS
 - A. Support the equipment base on 3/4" neoprene pads. Position these mountings in accordance with the weight distribution to ensure adequate deflection and vibration isolation.
 - B. Neoprene type isolators shall be free standing and laterally stable without any housing and complete with 3/4" neoprene acoustical friction pads. Pads shall be rated for no less than 15% compressed height at rated load.
 - C. Isolator types to be one of the following, or as approved:

Type Super W

M.I.I.

Type Shearflex

V.M.C.I.

Type 200 N

V.E.C.

- 2.6 SUPPORT OF PIPING IN EQUIPMENT ROOMS AND WHERE EXPOSED ON ROOF
 - A. All water piping and piping within 50 feet of connected rotating equipment to be resiliently sprung and neoprene supported with mountings providing a minimum deflection of 7/8" for all piping. The spring elements for the pipe hanger mountings to have a natural frequency of no less than 360 HZ.
 - B. Provide factory pre-compressed hanger rod isolators for water piping greater than 12" diameter and supplementary steel supports. Pre-compressors to be set for 75% of design rated deflection in the spring element of the hanger rod isolators.
 - C. Hanger rod isolators to be one of the following, or as approved, mountings:

Type 30N

M.I.I.

Type RSH

V.M.C.I.

Type DVC

V.E.C.

D. Floor and roof supported piping isolators to be one of the following, or as approved, mountings:

Type SLRS

M.I.I.

Type AWR

V.M.C.I.

Type KW

V.E.C.

2.7 STEAM AND CONDENSATE PIPING

A. Support all such piping and piping within 50 feet of rotating equipment and steam pressure reducing stations from resilient neoprene-in-shear hangers providing a minimum static deflection of 1/2". Mountings to be one of the following, or as approved:

Type RHD - V.M.C.I.
Type HD - M.I.I.
Type CD - V.E.C.

B. Floor and roof supported steam and condensate piping including steam pressure reducing stations to be similarly isolated except mountings to be one of the following, or as approved:

Type ND - M.I.I.
Type RD - V.M.C.I.
Type 368SD - V.E.C.

2.8 PIPING GUIDES

- A. Weld steel guide bars to the pipe at a maximum spacing of 60°. The outside diameter of the opposing guide bars to be smaller than the inside diameter of the pipe riser clamp in accordance with standard field construction practice. Each end of the pipe anchor isolation mounting, which in turn will be rigidly fastened to the steel framing within the shaft.
- B. The all-directional pipe anchor isolation mountings to consist of a telescoping arrangement of two sizes of steel tubing separated by a minimum of 1/2" thick heavy duty neoprene and canvas duck isolation pad. Provide vertical restraints by similar material arranged to prevent vertical travel in either direction; the allowable load on the isolation material not to exceed 500 psi.
- C. Mountings to be Type ADA (Guide) M.I.I. or approved equal.
- D. Construct low temperature piping guides with a 360°, 10 gauge metal sleeve around the piping. Provide the thermal insulation requirements for the piping between the piping and sleeve. Heavy duty neoprene and canvas duck isolation pad of thickness equal to thermal insulation requirements to space the metal sleeve away from the piping with urethane or other suitable sleeve and isolation pad material. The metal sleeve outside diameter to be smaller than the pipe riser clamp inside diameter in accordance with standard field construction practice. The pipe riser clamp to be rigidly attached to the steel framing within the shaft.

2.9 ANCHORS

- A. Weld the pipe riser clamp at anchor points to the pipe and to pairs of vertical acoustical pipe anchor mountings, which in turn will be rigidly fastened to the steel framing in the pipe shaft.
- B. The acoustical pipe anchor mountings to be capable of safely supporting loads developed by the installed piping and consisting of a bolted assembly of steel plates with laminations of 1/2" thick heavy duty neoprene and canvas duck isolation material. Provide a heat shield of 1/4" mineral fiber as required; the isolation material loading not to exceed 500 psi.
- C. Acoustical pipe anchor mountings to be Type ADA (Anchor) M.I.I. or approved equal.

2.10 SUPPORTS

- A. Provide piping supports within shafts with suitable bearing plates and two layers of 1/4" thick ribbed or waffled neoprene pad loaded for 50 psi maximum. Separate the isolation pads with 1/4" steel plate.
- B. The isolation pads to be one of the following, or as approved:

Type W - M.I.I.

Type Shearflex - V.M.C.I.

Type 200 N - V.E.C.

2.11 PIPING PENETRATION OF SHAFTS, FLOOR SLABS AND/OR PARTITIONS

A. Direct contact of piping with shaft walls, floor slabs and/or partition is not permitted. For gaps 1" and less sleeve all uninsulated piping with 1" fiberglass the full depth of the penetration. Gaps larger than 1" shall be filled with heavy-density putty such as Nelson FSP or CLK Sealant, J.M. Clipper "Duxseal" or 3M "Moldable Putty".

PART 3 EXECUTION

3.1 GENERAL

- A. All equipment, piping, etc. to be mounted on or suspended from approved foundations and supports, all as specified herein, as shown on the drawings, or as required.
- B. All concrete foundations, bases, forms, inertia blocks, supports and associated reinforcing shall be provided by the Contractor unless indicated otherwise on the drawings.
- C. Erect all floor mounted equipment on 4" high concrete pads over the complete floor area of the equipment, unless specified to the contrary herein. Wherever hereinafter vibration eliminating devices and/or concrete inertia blocks are specified, these items to be in turn mounted upon 4" high concrete pads unless otherwise specified to the contrary herein.
- D. Guarantee the vibration isolation systems to have the required deflection. Mounting systems and components of the isolation mounting not to be resonant with any of the forcing frequencies of the supported equipment or piping. Mounting sizes to be determined by the mounting manufacturer, and the sizes installed in accordance with the manufacturer's instructions.
- E. The installed vibration isolation system for each floor or ceiling supported equipment to have a maximum lateral motion under equipment start-up of shutdown conditions of 1/4". Motions in excess to be restrained by approved spring type mountings.
- F. During equipment installation, floor supported spring isolation bases to be set on 2" spacers between the isolation base and housekeeping pad. After all connection (pipe, duct and conduit) have been made to the equipment and the system filled, the spacers to be removed without change of equipment elevation or transfer of stress to the equipment.

- G. Provide mountings incorporating vertical limit stops with 1/4" spacers. The mountings to serve as blocking during installation. Adjust mountings and remove spacers after equipment operating loads.
- H. Protect all mounting systems exposed to weather and other corrosive environments with factory corrosion resistance. All metal parts of mounting (except springs and hardware) to be hot dip galvanized. Springs to be cadmium plated and neoprene coated. Nuts and bolts to be cadmium plated.
- I. Where steel spring isolation systems are described above the mounting assemblies to utilize bare springs with the spring diameter not less than 0.8 of the loaded operating height of the spring. Each spring isolator to be designed and installed so that the ends of the spring remain parallel during and after the spring specified minimum deflection from loaded operating height to spring solid height of 50% of the rated deflection.
- J. Provide, as shown or as approved, all necessary supports for equipment furnished under this specification. To meet the varying conditions in each case, these supports to consist of pipestands, steel angle or strap hangers, saddles, brackets, etc., as shown or as approved. All such supports to have substantial flanges, bolted to floor construction; hangers to be supported from framing as described herein. Supports to be properly located with reference to any supporting pads, legs, etc., of the equipment carried and must be of such number and so distributed as not to bring any undue strains upon the equipment. All details to be as approved.
- K. Provide suitable brackets, pipestands, piers or other supports for all coils, air filters, mixing and control dampers, etc., securely clamped to steel beams, columns or bearing walls. All details of the work to be shown on the drawings or as approved.
- L. Guarantee that the work as installed under this section of the specifications will not result in the transmission of objectionable noise or vibration to any occupied parts of the building, and take full responsibility for any necessary modifications of this equipment, or of the foundations and supports for the same, necessary to secure this result. Any corrective work required to accomplish the above will be borne at the sole cost and expense of this Contractor.
- M. Provide all required supplementary steel for the suspension and support of piping, ductwork, equipment and all other mechanical work.

END OF SECTION

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SECTION 230593

TESTING AND BALANCING

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 RELATED DOCUMENTS:
 - A. The following documents apply to all required work for the Project:
 - 1. The Contract Drawings
 - 2. The Specifications
 - 3. The General Conditions
 - 4. The Addendum
 - 5. The Contract [City of New York Standard Construction Contract].
- 1.3 WORK INCLUDED
 - A. Work of this Section includes all labor, materials, equipment, connections and services necessary to complete the Preliminary and Final Testing and Balancing Work as shown on the drawings and specified herein, including, but not limited to, the following:
 - 1. Air handling units and fans.
 - 2. Boilers
 - 3. VRF air conditioning units
 - B. Tests:
 - 1. Perform as noted and in presence of Commissioner.
 - 2. Submit Preliminary and Final results for review.
 - 3. Repair or replace defective work, as directed.
 - 4. Pay for restoring or replacing damaged work due to tests, as directed.

C. Balancing:

- 1. Balancing and testing of all systems shall be performed and supervised by an independent firm specializing in testing and balancing. Firm must be a member of AABC (American Air Balance Council) or NEBB.
- 2. Work to be performed by qualified technicians under supervision of skilled and experienced specialist engineers.
- D. Permanently mark setting of all valves, dampers and other adjustment devices in a manner that will allow the settings to be restored. If a balancing device is provided with a memory stop, it shall be set and locked.

1.4 QUALITY ASSURANCE

- A. Applicable Standards:
 - 1. National Standards for Total System Balance (American Air Balance Council) or NEBB.
 - 2. ASHRAE.

1.5 SUBMITTALS

- A. Six (6) copies of the Preliminary and Final balancing report shall be submitted and included in operating and maintenance instructions.
- B. Report forms (AABC or NEBB type).
- C. Methods of balancing and details of instruments used.
- D. Copies of air velocity and pressure readings.
- E. Sketches bound in folder showing where readings were taken.

PART 2 PRODUCTS

NOT APPLICABLE

PART 3 EXECUTION

3.1 WORK PERFORMED PRIOR TO TESTING AND BALANCING

- A. The Contractor is responsible for start-up and operation of systems during total system balance. Start-up shall include the following:
 - 1. All equipment shall be operable in safe and normal condition.
 - 2. Temperature control systems installed complete and operable.

- 3. Proper thermal overload protection in place for electrical equipment.
- 4. Air Systems:
 - a. Final filters clean and in place. If conditions warrant, the Contractor shall install temporary media in addition to the final filters.
 - b. Duct systems clean of debris.
 - c. Correct fan rotation.
 - d. Fire and volume dampers in place and open.
 - e. Coil fins cleaned and combed.
 - Access doors closed and duct end caps in place.
 - g. All outlets installed and connected.
 - h. Duct system leakage shall not exceed the rate specified.
 - 5. Water Systems:
 - a. Flushed, filled and ventilated.
 - b. Correct pump rotation.
 - Proper strainer baskets clean and in place.
 - d. Temporary start-up strainer baskets removed.
 - e. Service and balance valves open.

3.2 PRELIMINARY AIR SYSTEMS BALANCING

- A. Balance and adjust air distribution systems in accordance with AABC or NEBB Manuals:
 - 1. Adjust damper and registers to deliver or remove indicated air quantities for registers, diffusers and terminal units within $\pm 10\%$ in proper pattern so that there are no drafts.
 - 2. Make pitot readings taken in main trunk ducts in conjunction with inlet and outlet readings.
 - 3. Provide outlet test reports. All reports shall indicate initial readings prior to preliminary balancing and preliminary readings after balancing has been completed.
 - 4. Prepare a list of all system deficiencies which affect the balancing of all air systems and submit to Commissioner for action prior to final balancing.

- B. Test systems to certify compliance with air quantity schedules and with requirements of City of New York for:
 - 1. Ventilation.
 - 2. Proper functioning of operating devices. Prepare a list of all non-operational devices which affect the balancing of all air systems and submit to Commissioner for action prior to final balancing.
 - 3. Provide apparatus test reports indicating CFM, total S.P., RPM, AMPS and outside air CFM.
- C. If it is determined that drive changes are required, the Contractor shall provide all necessary new components prior to final air balancing.

3.3 FINAL AIR SYSTEMS BALANCING

- A. Provide final balancing and adjustments to air distribution systems after Contractor corrects all deficiencies. Final balancing shall incorporate all Commissioner comments on Preliminary Balancing Report.
 - 1. Final adjustments to dampers and registers to deliver or remove indicated air quantities for registers, diffusers and terminal units within $\pm 10\%$ in proper pattern so that there are no
 - 2. Make final pitot readings taken in main trunk ducts in conjunction with inlet and outlet readings.
 - 3. Provide outlet test reports. All reports shall indicate final readings after balancing has been completed.
- B. Final test of systems to certify compliance with air quantity schedules and with requirements of City of New York for:
 - 1. Ventilation.
 - 2. Proper functioning of operating devices.
 - 3. Provide final apparatus test reports indicating CFM, total S.P., RPM, AMPS and outside air CFM.

3.4 PRELIMINARY WATER SYSTEMS BALANCING

- A. Balance and adjust water systems in accordance with the AABC Manual.
 - 1. Examine system and position valves and cocks in their required open or closed position.

- 2. Make all requirements as required to balance system and equipment. Submit report indicating GPM to all risers and equipment. Report shall indicate performance characteristics for pumps including total GPM, total dynamic head and actual motor amps.
- B. Mark valve tag of each valve or cock used for balancing to indicate position of valve steam.
- C. Prepare a list of all leaks or defects, inoperational devices and all system deficiencies which affect the balancing of all water systems and submit to Commissioner for action prior to final balancing.

3.5 FINAL WATER SYSTEMS BALANCING

- A. Provide final balancing and adjustments to water systems after Contractor corrects all deficiencies. Final balancing shall incorporate all Commissioner comments on Preliminary Balancing Report.
 - 1. Make all final adjustments as required to balance system and equipment. Submit report indicating final GPM to all risers and equipment. Report shall indicate final performance characteristics for pumps including total GPM, total dynamic head and actual motor amps.
- B. Mark valve tag of each valve or cock used for balancing to indicate position of valve stem.

3.6 PRELIMINARY TESTING OF AUTOMATIC CONTROLS

- A. In cooperation with the control manufacturer's representative, adjust controls to operate as specified. Testing personnel shall check all controls for proper calibrations and list all control requiring adjustment by control installers.
- B. Prepare all list of inoperational control devices which affect all air and water systems balancing and submit to Commissioner prior to final air and water systems balancing.

3.7 FINAL TESTING OF AUTOMATIC CONTROLS

A. Make final adjustments of controls to operate as specified. Testing personnel shall check all controls for proper calibrations and list all controls requiring further adjustment by control installers.

3.8 SUPPLY AIR SYSTEMS (GENERAL)

- A. Preparation for Total Systems Balance:
 - 1. Total system balance shall not begin until the testing and balancing firm has verified that start-up procedures have been performed as specified in the AABC National Standards.
 - 2. The testing and balancing firm shall measure that amperes of all fan motors before total system balance is started and shall have proper steps to correct and report any overload.

- The testing and balancing firm shall not continue total system balance if any conditions are observed that are hazardous to the air system. This shall be reported before proceeding further.
- 4. The testing and balancing firm shall verify all outlets for compliance with design requirements and shall report any variations before starting total system balance.

B. Supply Fans:

- 1. The testing and balancing firm shall set the fan RPM to provide design total CFM within acceptable limits as indicated in the AABC National Standards and/or required static pressure to operate the system.
- 2. Fan speed shall not exceed the maximum allowable RPM as established by the fan manufacturer.
- 3. The final setting of fan RPM shall not result in overloading the fan motor in any motor in any mode of operation. Dampers shall be modulated, and the amperes of the supply fan motor shall be measured to ensure that no motor overload can occur. The amperes shall be measured in the full cooling, heating and economizer modes to determine the maximum brake horsepower.
- 4. After total system balancing, the following values shall be recorded.
 - a. Fan RPM.
 - b. Motor voltage and amperes.
 - c. Entering static pressure.
 - d. Leaving static pressure.
- 5. Final RPM of the fan shall be set to supply the required CFM with filters artificially restricted to simulate 50% loading. The testing and balancing firm shall verify that he fan motor will not be overloaded when the system is operating with unrestricted, clean filters in place.
- 6. When applicable, final fan settings shall be based on rated wet cooling coil resistance.
- 7. Final RPM of the supply fan in systems having mixed air dampers shall be set to provide required CFM with the systems in a logical non-modulating mode (e.g., minimum outside air).
- 8. When job conditions permit, static pressure shall be measured as follows:
 - a. Static pressure leaving the fan shall be taken as far down-stream from the fan as is practical, but shall be upstream of any restrictions in the duct (such as duct turns).
 - b. No reading shall be taken directly at the fan outlet or through the flexible connection.
 - c. Static pressure entering a single inlet fan shall be measured in the inlet duct upstream of any flexible connection and downstream of any duct restrictions.

- d. Static pressure entering a double inlet fan shall be measured through the wall of the plenum which houses the fan.
- 9. In all cases, the reading shall be taken so as to represent as true a value as possible. True value is actual measured static pressure.

C. Outlets:

- 1. All quantities shall be measured according to the AABC National Standards.
- 2. The systems shall be balanced so that the total supply air quantity to each space shall be within -5% to +10% of the design amount, unless otherwise noted.
- 3. All final quantities shall be obtained without generating noise.
- 4. The pattern for all adjustable outlets shall be adjusted for proper distribution without drafts.
- 5. If, during total system balance, the testing and balancing firm detects any outlet conditions that will not allow proper balancing to be performed, the facts shall be reported immediately.

D. Filters:

 Under final balanced conditions, the testing and balancing firm shall measure and record static pressure entering and leaving each filter bank.

E. Coils and Other Devices:

- Under final balanced conditions, the testing and balancing firm shall measure and record static pressures entering and leaving each coil bank.
- 2. Under final balanced conditions, the testing and balancing firm shall measure and record static pressures entering and leaving other devices not normally found in a system (such as, but not limited to, sound traps, heat recovery equipment, and air washers).

F. Temperature Control Dampers (Automatic):

 All temperature control dampers shall be verified by the testing and balancing firm for proper shutoff when driven closed by the controller. Dampers shall also be verified to be in the same position as indicated by the controller. Required corrections will be by others.

3.9 WATER SYSTEMS

- A. Balance and adjust water systems in accordance with the AABC Manual.
 - 1. Examine system and position valves and cocks in their required open or closed position.

- 2. Make all adjustments as required to balance system and equipment. Submit report indicating GPM to all risers and equipment. Report shall indicate performance characteristics for pumps including total GPM, total dynamic head and actual motor amps.
- B. Mark valve tag of each valve or cock used for balancing to indicate position of valve steam.
- C. Make repairs to all leaks or defects without additional cost to the City of New York.

3.10 TESTING OF AUTOMATIC CONTROLS

A. In cooperation with the control manufacturer's representative, adjust controls to operate as specified. Testing personnel shall check all controls for proper calibrations and list all controls requiring adjustment by control installers.

3.11 LOW PRESSURE AIR SYSTEMS

A. Single Zone System:

- 1. At completion of balancing, at least one (1) outlet damper shall be fully open on every branch duct.
- 2. At completion of balancing, at least one (1) branch duct balancing damper shall be fully open.
- 3. Air flow quantity of the fan shall be determined by pitot tube traverse unless impractical to do so. Traverses shall be taken as close to the fan as allowed by the AABC National Standards. When the quantity cannot be obtained by pitot tube traverse, the summation of the outlet quantities shall be used as the total CFM of the fan. Information shall be so noted on the data sheet.
- 4. Static pressure shall be measured at all points indicated in AABC National Standards.

3.12 EXHAUST AIR SYSTEMS

A. Air Inlets:

- 1. All quantities shall be measured according to the AABC National Standards.
- 2. Inlets on systems shall be adjusted to the required quantities with tolerance of \pm 10%.
- 3. At completion of total system balance, at least one (1) inlet of every branch shall be fully open and at least one (1) branch balancing damper in the system shall be fully open.
- 4. If, during total system balance, the testing and balancing firm encounters any conditions that will not allow proper balancing to be performed, the fact shall be reported immediately.
- 5. Return air inlets installed in ceiling where the space above the ceiling is used as a return air plenum are not to be measured or adjusted.

B. Fans:

- 1. The testing and balancing firm shall set the fan RPM to provide design total CFM within acceptable tolerances.
- 2. Fan speed shall not exceed the maximum allowable RPM as established by the manufacturer.
- 3. The final setting of fan RPM shall not result in overloading the fan motor in any mode of operation.
- 4. After total system balance, the following values shall be measured and recorded:
 - a. Fan RPM.
 - b. Motor voltage and amperes.
 - c. Static pressure entering the fan (power roof ventilators need not be measured).
 - d. Static pressure leaving the fan.
 - e. Building static pressure with all doors and windows closed.
- 5. Static pressure entering and leaving the fan shall be measured as follows:
 - a. Static pressure readings leaving the fan shall be taken as far from the fan as is practical, but shall be before any restrictions in the duct (such as duct turns).
 - b. No readings shall be taken directly at the fan outlet or through the flexible connection.
 - c. Static pressure entering the fan shall be measured in the inlet duct upstream of any flexible connection and downstream of any duct restriction.
 - d. In all cases, the readings shall be taken to represent as true a value as possible. True value is actual measured static pressure.
- 6. Under final balance conditions, the testing and balancing firm shall measure and record static pressure entering and leaving any heat recovery equipment in the system.

3.13 TEMPERATURE CONTROL SYSTEMS

- A. In the process of total system balance, the testing and balancing firm shall do the following:
 - Work with the temperature control contractor to ensure the most effective total system operation within the design limitations, and to obtain mutual understanding of intended control performance.
 - 2. Verify that all control devices are properly connected.

- 3. Verify that all dampers, valves and other controlled devices are operated by the intended controller.
- 4. Verify that all dampers and valves are in the position indicated by the controller (open, closed, or modulating).
- 5. Verify the integrity of valves and dampers in terms of tightness of close-off and of full-open position. This includes dampers in multi-zone units, mixing boxes and VAV terminals.
- 6. Check that all valves are properly installed in the pipe system in relation to direction of flow and location.
- 7. Check the calibration of all controllers.
- 8. Verify the proper application of all normally open and normally closed valves.
- 9. Check the locations of all thermostats and humidstats for potential erratic operation from outside influences such as sunlight, drafts or cold walls.
- 10. Check the locations of all sensors to determine whether their position will allow them to sense only the intended temperatures or pressures of the media.
- 11. Check the sequence of operation for any control mode is in accordance with approved shop drawings. Verify that no simultaneous heating and cooling occurs. Observe that heating cannot take place at VAV reheat terminals until the unit is at minimum CFM.
- 12. Verify that all controller set points meet the design intent.
- 13. Check all dampers for free travel.
- 14. Verify the operation of all interlock systems.
- 15. Perform all system verification to assure the safety of the system and its components.

END OF SECTION

SECTION 230700

HVAC 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.

1.2 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project:
 - 1. The Contract Drawings
 - 2. The Specifications
 - 3. The General Conditions
 - 4. The Addendum
 - 5. The Contract [City of New York Standard Construction Contract].

1.3 WORK INCLUDED

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the Insulation as shown on the drawings and specified herein, including, but not limited to, the following:
 - 1. Refrigeration Piping
 - 2. Low pressure steam supply and return piping
 - 3. Chilled water piping.

1.4 RELATED WORK

- A. Piping and accessories.
- B. Sheet metal ductwork.
- C. HVAC equipment.

1.5 QUALITY ASSURANCE

A. New York City Building Code, New York City Mechanical Code, ASTM, UL, NFPA, ECCCNYS (ASHRAE 90.1-2004).

B. Codes and Standards:

- 1. All insulations, jackets, or facings and adhesives used to adhere jacket or facing to the insulation, including fittings and butt strips, shall have non-combustible fire and smoke hazard system rating and label as tested by ASTM E-84, NFPA 255 and UL 723 not exceeding Flame Spread 25, Smoke Developed 50.
- 2. Accessories such as adhesives, mastics, cements, tapes and cloth for fittings shall have the same ratings as listed above.
- 3. All products or their shopping cartons shall bear the Underwriters' label indicating that flame and smoke ratings do not exceed the above criteria.

C. Qualifications of Installers:

1. Insulation shall be applied by experienced personnel in accordance with the best trade practice, guided by manufacturer's printed installation directions.

D. Qualifications of Materials:

1. Every package or standard container of insulation, jackets, facing, cements, adhesives and coatings delivered at the building site for use must have a manufacturer, brand and description of material. In addition, all vapor barriers shall be labeled, indicating the thickness of insulation, product nomenclature and manufacturer.

1.6 SUBMITTALS

- A. Shop Drawings: Shop detail drawings, including method of attachment.
- B. Product Data: Manufacturer's printed data, catalog cuts, test data and recommendations.
- C. Samples, when requested.
- D. Instructions: Installation instructions.

1.7 PRODUCT DELIVERY AND STORAGE

- A. Deliver material properly labeled, packaged and undamaged.
- B. Do not store exposed to weather; provide suitable material to protect from damage.

PART 2 PRODUCTS

2.1 APPROVED MANUFACTURERS

A. All insulation shall be as manufactured by Owens-Corning, Certainteed, Johns-Manville, or Armstrong. For the purpose of setting a standard of quality and thermal efficiency, the insulation materials specified hereinafter are materials as manufactured by Owens-Corning and Armstrong.

- B. All adhesives shall be as manufactured by Benjamin Foster or an approved equal.
- C. Except where otherwise insulation types and thickness specified are based on glass fiber insulating materials having a "K" value (BTU per hour per square foot per degree temperature difference per inch of thickness) as listed. Alternate insulation materials shall be estimated on the basis of thickness providing the equivalent heat transfer rates are obtained as herein specified. Insulating materials shall be resilient and moisture resistant so that the insulating properties will not be affected by rough handling, water damage and similar construction hazards.
- D. All adhesives, sealers and vapor barrier coatings shall be compatible with the materials to which they are applied, and shall not corrode, soften or attach such materials in either the wet or dry state.

2.2 INSULATION MATERIALS (PIPE AND FITTINGS)

A. Pipe Insulation:

- 1. Pipe insulation shall be one piece of half sectional UL rated and labeled non-combustible glass pipe insulation system with a "K" of .24 at 75°F mean temperature, except as otherwise specified.
- 2. All above pipe insulation shall be jacketed with Owens-Corning Fiberglass "Fiberglass 25 ASJ/SSL" (all service jacket) a vinyl coated, reinforced and embossed vapor barrier laminate for hot, cold, concealed and exposed piping operating at temperatures from -60°F to +450°F. Jacket shall have a water vapor permanence of not more than .02 Perms. Jacket and butt strips shall have factory-applied self-sealing pressure-sensitive adhesive.
- 3. In lieu of above jacket, in exposed areas, Contractor may furnish glass cloth jacket with vapor barrier for cold piping and glass cloth jacket without vapor barrier for hot piping.
- 4. Expanded closed cell, foam type insulation may be used for drain lines and refrigeration piping smaller than 2" where the piping is <u>not</u> located in return air plenums unless it is approved for such use. The insulation shall be type FRI Armaflex as manufactured by Armstrong. The "K" factor shall be .27 at 75°F mean temperature differential.

B. Fittings, Valves and Flanges:

1. Fiberglass Insulation:

- a. For fittings on all piping and for valves and flanges on cold piping, apply fiberglass molded or segmental insulation to fittings equal in thickness to that of the insulation to be applied to adjoining pipe. On steam piping, insulating cement may be used as the insulating material for fittings.
- b. Fittings, valves and flanges on cold pipe shall be protected by a vapor barrier. The barrier shall be of the vinyl segmented type made specifically for the application. The barrier shall be held in place with metal bands and the joint shall be taped. An alternate method of using fiberglass cloth and a glue sizing in two layers may be used as an alternate.

c. All fittings, valves, flanges, strainers, and steam traps located in mechanical equipment rooms and in conditioned spaces shall be fully insulated. Insulation shall be of the split type held in place with metal bands.

2. Expanded Form Insulation:

- a. Insulation for sweat fittings shall be miter-cut pieces of insulation of the same size and type as applied to adjacent piping.
- b. Insulation for screwed fittings shall be sleeve-type fittings covers made from miter-cut pieces of insulation of the same type as applied to adjacent piping. Inside diameter of insulation must overlap insulation on the adjoining piping.

2.3 INSULATION FOR HOT PIPE

A. Provide insulation for piping, fittings, flanges and valves of the thickness listed below:

Insulation Thickness In Inches for Pipe Sizes					
Service	Material	Less than 1-1/2"	1- 1/2" to 4"	5" to 6"	8" & Larger
Low Pressure Steam Supply	Fiberglass	1 1/2	3	3	3
Steam Condensate & Feed Water	Fiberglass	1	1 1/2	1 1/2	1 1/2

B. Insulation Jackets:

- 1. Concealed hot pipes shall have factory-applied white fire-retardant jacket, stapled and banded. Pipes banded with not less than three (3) bands per section.
- 2. Exposed hot pipes shall have factory-applied white fire-retardant jacket with butt strips stapled and banded. Pipes banded with not less than three (3) bands per section.
- 3. An acceptable alternative for both concealed and exposed hot piping shall be factory-applied white fire-retardant jacket with self-sealing lap and butt strip.
- Finish calcium silicate with glass cloth adhered with Benjamin Foster BS 30-36, Miracle-kingco, precision adhesives or approved equal. Cement shall be trowelled smooth on glass cloth and fire retardant coating.

2.4 INSULATION FOR COLD PIPE

A. Provide insulation for piping, fittings, flanges and valves of the thickness listed below:

		Insulation In Inches fo	r Pipe Sizes		On O Lawson
Service	Material	Less than 1- 1/2"	1- 1/2" to 4"	5" to 6"	8" & Larger
Domestic	Fiberglass	1/2	1/2		
Cold Water Chilled Water Supply &	Fiberglass	1	1 1/2	1 1/2	2
Return		 	1 1/2	1 1/2	2
Refrigerant Cooling Coil Condensate	Fiberglass Fiberglass	1/2	1/2		

B. Insulation Jackets:

- 1. Cold pipes concealed and exposed up to 14" shall have factory-applied white fire-retardant jacket with self-sealing lap and butt strip. Ends of pipe insulation sealed off at valves, fittings and flanged with Benjamin Foster 30-35, Miracle-kingco, precision adhesives or approved equal.
- 2. Cold pipes concealed and exposed over 14" shall have factory-applied white fire-retardant jacket sealed with Benjamin Foster 82-07 adhesive. All circumferential joints wrapped with a 3" wide strip of white fire-retardant jacket adhered with Benjamin Foster 72-07 adhesive, Miracle-kingco, precision adhesives or approved equal.. Ends of pipe insulation sealed off at valves, fittings and flanges with Benjamin Foster 30-35, Miracle-kingco, precision adhesives or approved equal..

2.5 INSULATION (DUCTWORK AND PLENUMS)

A. Provide insulation types for ductwork and plenums as indicated below:

		Type Description
1.	A	Minimum R-5 insulation, 1 1/2" thick, 6 lbs/cu. ft. rigid board with factory-applied white fire-retardant jacket applied with mechanical fasteners. Seal all joints and breaks with 5" wide matching self-sealing tape. Butter all punctures with I-C 501. Where stiffening angles are greater than 1 1/2", provide insulation thickness equal to the angle height.
2.	В	Minimum R-5 insulation, 1 1/2" thick, 0.75 lbs/cu. ft. density glass fiber blanket with factory-applied flameresistant glass fiber reinforced foil (FRK) and having a 2" flange, lapped and tied with copper-clad steel wire on 12" centers. All laps and joints sealed with Benjamin

Foster 85-20. Ducts having a width greater than 30" provide mechanical fasteners 18" on center to the underside of duct for horizontally run ducts and about the perimeter for vertically run ducts on 24" centers with all penetrations sealed.

Minimum R-8 insulation, 2" thick, 1.5 lbs/cu. ft. density glass fiber blanket with factory-applied flame-resistant glass fiber reinforced foil (FRK) and having a 2" flange, lapped and tied with copper-clad steel wire on 12" centers. All laps and joints sealed with Benjamin Foster 85-20, Miracle-kingco, precision adhesives or approved equal. Ducts having a width greater than 30" provide mechanical fasteners 18" on center to the underside of duct for horizontally run ducts and about the perimeter for vertically run ducts on 24" centers with all penetrations sealed.

4. E 2" thick calcium silicate block, wired over 1" high rib lath. Finish with two coats of cement over hexagonal wire to a total thickness of 1/2". Wire of copper-clad steel.

Fire resistant duct wrap shall be UL and ASTM listed and labeled, NFPA 96 compliant and approved for use in New York City. Duct wrap shall be a non-asbestos safer fiber inorganic blanket encapsulated with a scrim-reinforced foil. Blanket weight shall be 1.38 lbs./sq.ft. with a thermal conductivity of 0.417 at 500°F. Foil encapsulated blanket shall have a flame spread and smoke developed rating of 0/0. Duct wrap shall be 1.5 inches thick and shall provide a 2 hour fire rating. Duct wrap shall be 3M Fire Barrier Duct Wrap 15A, Fyrewrap, 3M or approved equal.

B. Provide insulation indicated above for the following duct services:

1.	Service Interior air conditioning supply ducts (concealed)	<u>Insulation Type</u> B
2.	Interior outside air ducts (concealed)	В
3.	Interior outside air and supply ducts located in the attic	D
4.	Flexible ducts between air conditioning and terminal units (VAV boxes, diffusers, etc.).	1" thick blanket with fiber- reinforced foil.
d Zoo Aquarium Reco	Instruction	

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5.	Heating supply ducts: -Exposed -Concealed	A B
6.	All return air ducts.	Insulated unless installed in return air plenum.
7.	Air conditioning return ducts (concealed)	В
8.	Stacks and breeching.	E

C. Whenever external duct insulation is specified and acoustical treatment of equivalent insulating effect is required, the external insulation may be omitted <u>ONLY</u> if internal acoustic lining provides a minimum resistance rating of R-5 for interior space and a minimum of R-8 for exterior space.

2.6 INSULATION (EQUIPMENT)

- A. Provide insulation as described below for equipment listed:
 - 1. Insulation shall be 1 1/2" rigid board, Type 705, 6 lb. density.
 - 2. Covering shall be either 1/2" thick finishing cement over copper-clad hexagonal wire or two layers of presized 6 oz. glass cloths.
- B. Apply the rigid 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 all pinheads with an adhesive, as approved. If vapor seal board is wired on, use tin edges to protect the corners of the board. Seal all edges and joints.
- C. For equipment with removable heads, (such as coolers and heat exchanger) provide insulation applied to the inside of easily removable sheet metal boxes.
- D. Provide insulation as described above including removable sheet metal enclosure where required (pumps, fans) for the following equipment:
 - 1. Condensate Tanks.
 - Feed water pumps.

PART 3 EXECUTION

3.1 INSTALLATION OF INSULATION (GENERAL)

A. Perform all work in strict accordance with the manufacturer's recommendations and the best practices of the trade and the intent of this specification.

- B. Apply all insulation over clean dry surfaces, butting all sections or surfaces firmly together and finishing as hereinafter specified.
- C. Seal all vapor barriers continuous and throughout against moisture penetration.

3.2 INSTALLATION – PIPE INSULATION

A. Protect of Insulation:

- 1. Protect insulation on hot pipes by saddles from hangers, guides, rollers and trapeze.
- 2. Protect insulation on cold pipes from hangers, guides and rollers by 16 gauge galvanized metal shields (at least three 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 by straps. Do not piece the insulation with hangers. Where glass fiber insulation is used on piping 3" and larger, provide half section of calcium silicate covering of equal thickness at metal shields.
- 3. Do not use staples on vapor barrier jackets.

B. Fiberglass:

- 1. Adhere jacket and butt strips by removing release paper after insulation is installed on pipe and sealing the lap starting in center of each section, working toward the ends. Lap and butt strips must be pressurized by rubbing with hard tool such as nylon sealing tool.
- Low temperature pipe insulation with vapor barrier jackets shall have all ends of each section buttered vaportight with sealant to prevent travel of moisture to adjacent sections of insulation if vapor barrier on any one section should leak. Ends of pipe insulation shall be sealed off with Foster 30-35, Miracle-kingco, precision adhesives or approved equal at all flanges and valves.
- 3. If glass cloth jacket is used, in lieu of pressure-sensitive adhesive, jacket and butt strips shall be sealed with Foster 82-07, Miracle-kingco, precision adhesives or approved equal. Staples shall not be used under any circumstances.
- 4. Where metal bands are used on pipe insulation, they shall be 3/4" wide brass or aluminum bands. Bands shall be spaced to hold the ends and center of each section, and in no case shall the spaces exceed 18". Bands shall not be visible on exposed work.
- 5. Fittings: Insulation shall be securely fastened to fittings using wire. Apply a skin coat of insulating cement to the insulated fitting if needed to produce a smooth surface. After cement is dry, apply a light coat of fitting mastic, UL labeled, Type C for low temperature pipe and Type H for hot pipe. Wrap the fitting with fiberglass reinforcing cloth by 2" on adjoining sections of pipe insulation. Apply second coat of mastic Type C or Type H over the reinforcing cloth, working into the mesh of the cloth. Smooth the surface. Mastic shall be applied at rate of not less than 40 square feet per gallon (approximately 3/64" wet film thickness for UL rated performance).

6. As an option to the above over fiberglass fittings, a polyvinylchloride fitting cover can be supplied, made of continuous one piece premolded, polyvinylchloride material. Low temperature lines shall have all seam edges of cover shall be wrapped with a vapor barrier pressure-sensitive color matching tape. Fittings to be Zeston, Speed-Line or approved equal.

C. Expanded Foam Insulation:

- 1. Wherever possible, slip pipe insulation onto piping before it is connected. Seal joints with Armstrong 520, or Foster 82-31 adhesive.
- 2. Where insulation cannot be slipped on, slit insulation lengthwise and apply to piping. Seal longitudinal seams and butt joints with adhesive.
- 3. Fittings: Joint slit seams and metered joints with adhesive. After the adhesive has dried, carefully slit the fitting over and snap over fitting, leaving seams and joints dry. After line has been tested, all joints shall be joined with Armstrong 520, or Foster 82-31 adhesive.

3.3 INSTALLATION – DUCT INSULATION

A. Rigid Board:

- 1. Insulation shall be cut to fit between standing seams and stiffeners and shall be secured to ductwork by impaling over mechanical fasteners. Attach pins to surface of duct and locate them not less than 3" from edge or corner to the board and on maximum 18" centers.
- 2. All joints shall be tightly butted. Apply joint sealing tape to all transverse and longitudinal seams after ensuring you have a dry, dust-free surface. Use nylon sealing tool to apply pressure to the joint and make a good bond and form a complete vaportight system.

B. Flexible Wrap:

- 1. The duct wrap shall be applied over clean, dry sheet metal ductwork. Duct wrap shall be installed to allow maximum fullness at corners (avoid excessive compression); minimum voids shall be filled with cement, wet troweled into openings.
- 2. Insulation shall be butted with facing overlapping all joints at least 2" and sealed with fire retardant vapor barrier adhesive and tied with copper-clad steel wire on 12" centers. Horizontal ducts having a width greater than 30" shall be secured on the underside with mechanical fasteners on 18" maximum center. Velocity run ducts shall be secured about the perimeter on 24" centers. All penetrations shall be sealed.

C. Fire Resistant Duct Wrap

- 1. Duct wrap shall be installed in accordance with manufacturer's recommendations.
- 2. Wrap shall be installed over clean, dry, frost-free and dust free ductwork.
- 3. Wrap shall be installed utilizing either telescoping or checkerboard techniques with 3" minimum longitudinal and perimeter overlaps or butt joints with 6" wide collars made of the same fire resistant duct wrap.

- 4. For ducts less than 24" in width, wrap shall be held in place by ½" x 0.015" carbon steel bands installed 10 ½" on centers (1 ½" from edge or wrap.)
- 5. For ducts 24" and larger in width, wrap shall be held in place with 12 gauge copper-coated steel insulation pins welded to duct, 1 ½" square or 1 ½" diameter round galvanized steel clips, installed 10 ½" on center and along perimeter and longitudinal overlaps (1 ½" from edges of wrap). Adhesive type insulation pins will not be accepted.

3.4 INSTALLATION – EQUIPMENT INSULATION

- A. Insulation shall be applied with staggered joints firmly butted and joined. The insulation shall be held in place by steel bands. Bands shall be 1" x 25 gauge galvanized steel spaced on not over 12" centers. All joints and voids shall be filled with Owens-Corning No. 110 cement Miracle-kingco, precision adhesives or approved equal, well troweled into openings. All joints and voids shall be FRK taped and vapor sealed. They shall be applied over the insulation surface 1" galvanized wire netting laced together at all edges and wired to steel bands with 16 gauge soft annealed wire. Over this shall be applied 1/2" thick layer of Owens-Corning No. 110 cement, Miracle-kingco, precision adhesives or approved equal, applied in two layers.
- B. Install metal corner beads at all corners and edges in order to provide a permanent installation. Onto the dry cement surface apply a brush coat of Foster Sealfast 30-36 Miracle-kingco, precision adhesives or approved equal at the rate of 60-70 sq. ft. per gallon. Embed into the wet coating a layer of 8 oz. canvas smoothed out to avoid wrinkles and lap all seams a minimum of 2".
- C. Apply a second brush coat of Sealfast 30-36, Miracle-kingco, precision adhesives or approved equal to the entire surface at the rate of 60-70 sq. ft. per gallon. Cleanouts, nameplates and manholes shall not be insulated and the insulation on surrounding surfaces shall be neatly beveled off at such openings.

3.5 INSPECTION

A. Upon completion of the installation, visually inspect each insulated area and verify that all insulation is complete and properly installed.

END OF SECTION

SECTION 230913

AUTOMATIC TEMPERATURE CONTROLS

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 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project:
 - 1. The Contract Drawings
 - 2. The Specifications
 - 3. The General Conditions
 - 4. The Addendum
 - 5. The Contract [City of New York Standard Construction Contract].

1.3 WORK INCLUDED

- A. Provide, completely ready for operation, an automatic temperature control system as described herein of the type using electric and electronic (digital) devices.
- B. Provide in addition to the controls specified in this Section, the installation of additional automatic controls, supplied with mechanical equipment as specified and all controls shown on drawings.
- C. The system shall consist of a combination of a microprocessor based direct digital control system supplied with the Air Handling Unit using electronic (digital) sensors and devices, electronic damper actuators, electronic valve actuators, and local electric controls as specified.

1.4 QUALITY ASSURANCE

A. Vendor Qualifications:

 Except as modified by the City of New York bodies and Contract Document, comply with UL, ASME, ASTM, ASHRAE, NEPA.

1.5 SUBMITTALS

- A. Submit shop drawings for approval by Commissioner before an field installation is started giving complete description of all control elements and showing complete system architecture, schematic wiring diagrams, indication control devices, control and interlock wiring, controller setpoints, sequence of operation, high and low alarm limits, details and installation requirements. Drawings to indicate specifically the type of finish of all room type controls, subject to Commissioner approval.
- B. Provide complete points list.
- C. Description of all application programs and their interaction with the specified sequence of operation.

1.6 DOCUMENTATION

- A. The Contractor shall provide complete system documentation at acceptance time, as specified herein. Documentation shall be provided in six (6) sets. Documentation shall include the following:
 - 1. Operator's Manual with keyboard pictures and step-by-step procedures. This manual shall be indexed, and shall be a separate tabbed section for each operator function.
 - 2. Operator's/Programmer's Manual with complete description of all keyboard programming functions including application data for all programs. Provide 12 sets of unused programming forms as shown in the manual and as used on this job.
 - 3. Carts showing equipment normal operating conditions and significant points such as electric test points.
 - 4. Routine preventive maintenance procedures and corrective diagnostic trouble shooting procedures.
 - 5. Part lists with manufacturer's catalog numbers and manufacturer's ordering information.
 - 6. List of tools, operating materials and supplies and test equipment recommended for operation and servicing.
 - 7. Detailed description of changes resulting from contract field installation and modification.
 - 8. A table of contents listing the sheets in the manual, illustration and tabulations, at the time of issuance.
 - a. Documentation shall be provided in vinyl plastic hard cover binders, silk screen-printing. If a single binder is too unwieldy for the material to be included, assemble material in multi-volume sets.

- b. Binder shall heavy duty and oversized to accommodate up to ½ inch thick set of additional information.
- c. Provide plastic printed tabs for major sections and apron foldouts for oversized pages.

1.7 OPERATOR INSTRUCTION

- A. The Contractor shall conduct formal operator instruction in accordance with the specification. In addition, instruction for shall be performed for two operator levels, and shall include the following with a minimum dedicated instructor time as specified:
 - Level 1: Basic data display and interpretation of graphics, addresses, and alarm and status descriptors. The operators shall be trained to interpret all alarm displays and printouts, request all data displays, and acknowledge and reset alarms.
 - 2. Level 2: Intermediate command and program change operations. This level of operators shall be trained to execute all manual commands (start/stop, control point adjustment), and request all logs, change analog alarm limits, and change time based on/off program times and load assignments.
- B. The instruction shall be structured as follows:
 - 1. Limit class size to a maximum of six (6) for classroom instruction.
 - 2. Class duration shall be limited to four (4) hours.
 - 3. Only formal instruction classes shall be included in the hour count; informal instruction during system set-up shall not be considered.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials protected and undampened, with cartons labeled as to manufacturer and contents.
- B. Store materials in locations and in a manner to protect same from damage of any kind as directed by Commissioner.

PART 2 PRODUCTS

2.1 GENERAL

- A. Provide as herein specified a complete and operational automatic temperature control system of the digital/electric type.
- B. The control system shall be complete with all necessary panels, computers control devices, thermostats, transmitters, switches, dampers, motors and relays, and software to provide the functions described under sequence of operation, regardless of whether or not specifically specified.

- C. All dampers of the automatic type shall be provided under this section for installation under sheet metal work. All control valves, fittings, and sensor wells, shall be furnished under this section for installation under piping work.
- D. Provide lamicoid identification plates for all control devices.

2.2 PROGRAMMING AND APPLICATION PROGRAMS

A. Provide programming as required to fulfill the intent of this specification and for all applications programs specified herein. Application programs shall include all features normally associated with such programs and any special features specified. Application program shall provide control features in addition to those specified as part of the Sequence of Operation. Equipment to be included under the control of application programs will be identified in the Point List. Where no points are indicated in the drawings or specifications to be included in a particular program, provide software programming for future points connections.

B. Programs shall include the following:

- 1. Schedule start/stop program.
- 2. Optimized start time/warm up/cool down cycle program.
- 3. Day/night setback program (where applicable).
- 4. Supply air temperature reset program.
- 5. Automatic temperature control (direct digital control).

2.3 MULTIBLADE DAMPERS AND CONTROLS

A. General:

1. Multiblade damper shown on the drawings in connection with outside air intake, exhaust air discharge, and air recirculation of the fan systems shall be the product of the manufacturer of the temperature control equipment.

B. Construction of Multiblade Dampers:

- 1. Frames: Frames shall be of steel, 1/8" thick channel shape or 1/4" thick flat bar. They shall be braced for rigid reinforcement. Frames shall be provided with boltholes for mounting and with stationary stops on the four sides to prevent air leakage.
- 2. Blades: Damper blades shall not be wider than 10", shall have formed interlocking edges, and shall have a 1/2" deep "V" pressed in the center to stiffen the blades. Open position of the blades shall be limited to 90 degrees. Damper blades for fan systems shall be not lighter than No. 16 gauge galvanized sheet steel. Unless shown otherwise on the drawing, damper blades for supply systems shall be of the opposed blade type, and those for exhaust systems shall be parallel type.

- 3. Bearings: Bearings on blade pivot points shall be fitted with stainless steel or non-ferrous metal sleeve (or ferrule type) pressed into damper frame. Bearings shall be accurately sized to fit blade axles, and shall provide smooth operation.
- 4. Linkage: Linkage or tie rod to interconnect blades shall be of non-ferrous metal and shall be secured to the blade lugs by means of cotter pins and washers.
- C. Dampers shall be manufactured by Ruskin, Pottorff, Greenheck or approved equal.

2.4 AUTOMATIC VALVES

- A. All automatic valves for low-pressure service (under 125 psi) are to be constructed of high grade bronze for valves 2" IPS and smaller, and cast iron for valves in excess of 2" IPS.
- B. Automatic valves up to 2-1/2" IPS are to have screwed globe bodies; valves in excess of 2-12" are to have flanged bodies. All valves to have bronze trim, stainless steel with self-adjusting Teflon packing.
- C. Water valve to be sized on the basis of 2 psi pressure drop unless otherwise indicated.
- D. Automatic control valves to be fully proportioning with modulating plug or V-port inner valves unless specified otherwise. Valves to be quiet in operation and fail-safe in either normally or open normally closed position in the event of control air failure. All valves capable of operating at varying rates of speed to correspond to the exact dictates of the controller and variable load requirements, and capable of operating in sequence when required by the sequence of operation.
 - 1. All control valves to be sized by the control manufacturer and guaranteed to meet the heating and cooling loads as scheduled.
 - 2. All control valves to be suitable for the pressure conditions and close against the differential pressure involved. Valve operators to be of the molded synthetic rubber diaphragm type. Body pressure rating and connection type construction suitable for the service.
- E. For all coils, no control valve shall be larger than 3" unless otherwise indicated. Where larger valves are required, provide two (2) in parallel. For multiple steam valves size for one-thirds sequenced operation.
- F. Cold water valves, throttling type and bypass valves to have linear flow characteristics. Valves to be single seated type, except where pressure and flow combination exceeds rating for commercial valve operators, double seated valves may be used.
- G. Steam control valves to be single seated type with linear flow characteristics. Heating coil control valves normally open. The valve discs to be composition type with bronze trim.

2.5 ELECTRICAL WIRING

A. Provide all control wiring under this Section regardless of voltage. All control wiring shall be installed under the direct control and supervision of the ATC contractor. Provide wiring for all

control devices specified herein, shown on drawings, or supplied with specified mechanical equipment.

- B. Provide interlock wiring.
- C. Provide all other wiring required for the complete operation of the specified systems including required transformers.
- D. Run ALL control wiring in conduit. Conduit running in the Aquarium or related mechanical space shall be 316 stainless steel. Conduit shall comply with the requirements of the Electrical Specification.

2.6 WIRE AND CABLE

- A. Wire and cable connection for the system shall be as follows:
 - 1. Communications cable shall be 20 AWG minimum, twisted and shielded in pairs, with shielding grounded.
 - 2. Coaxial cable shall be used if recommended by the manufacturer.
 - 3. Control wiring and sensor wiring shall be 22 AWG minimum with 600-volt insulation, shielded 2 or 3 wires, as recommended by the manufacturer.

2.7 ELECTRICAL ACTUATORS

- A. All control valve and damper actuators shall be electronic.
- B. Actuators shall sufficient torque to properly stroke valve or damper in all modes of operation.
- C. For automatic dampers provide as a minimum one (1) actuator for every 20 square feet of damper.
- D. Actuators shall be manufactured by Belimo, Johnson controls, ruskin or approved equal.

2.8 LOCAL CONTROL PANELS

- A. Provide adjacent to each air conditioning system, heating and ventilating system, water system and other mechanical systems not under microprocessor control, a local enclosed control panel of the steel cabinet type. Panel to meet with NEMA 1 requirements with proper bracing for rigid wall or floor mounting. Mount in this panel all associated temperature controls, time clock, transmitters, thermometers, relays, accessories, etc. for the electrical control and alarm functions of the system.
- B. Mark each control devices on the panel with nameplates describing its function and cross-referencing it to control diagrams. Provide system flow diagram on face of panel. Panel to have a hinged locked door. Mount controllers and relays internally to minimize unauthorized tampering. Identify all items mounted on or within local control panels by means of 1" X 3" black bakelite nameplates with white lettering.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install the system as recommended by the manufacturer, using only equipment recommended or acceptable to the manufacturer.
- B. Comply with the New York City Electrical Code for electrical work. Run all wiring in conduit. Run all wiring in finished spaces concealed. All equipment located outside shall be in suitable weather tight enclosure.
- C. Install all conduit, wiring, and cable, and install all equipment in first-class manner, using proper tools, equipment, hangers, and supports, and in locations as required for a neat, attractive installation. No material shall be exposed if it is possible to conceal it. Exposed materials shall be installed only with consent of the engineer.
- D. Support all sensors as recommended by the manufacturer where inside equipment such as ductwork. Sensors in the space shall be in small, attractive housings designed for that purpose and mounted on an electrical junction box.

3.2 SOFTWARE

- A. Load and debug the software to provide a complete operating system, and operate the system to prove function of each system. Where necessary, the sensors shall be heated or cooled to demonstrate the correct function.
- B. The contractor shall review the program with the Commissioner in the programming stage to make sure that the programmer understands the engineer's intent and the program will carry out that intent.
- C. Provide the Commissioner with a bound copy of the complete programming including flow charts and logic diagrams, annotated code, and all programming "tricks" as well as instruction books on reprogramming of the system for future modifications of the system, if desirable.
- D. Provide six bound copies of complete information on the equipment and all components, including programming, for the City of New York's use and records.

3.3 FIELD TESTS AND ACCEPTANCE

- A. The Contractor shall provide the services of both a control system serviceman who, in the presence of a representative of the City of New York will perform the tests. Tests will be witnessed after the Contractor is satisfied that the system has been adjusted and is operating in accordance with the Specification requirements. The City of New York may elect to hire an independent testing agent to verify all tests with their own recording and test instruments. This Contractor must coordinate the testing work and work in a timely fashion with the independent testing agent.
- B. A certified report listing the sensors that have been tested and stating that these points are operating within an acceptable range.

C. The City of New York will accept hardware and software only after system functions have been successfully demonstrate under all modes of operation. This included operating through a summer and winter. Vendor shall be responsible for system operation during trial operating period.

3.4 SEQUENCE OF OPERATION

A. Provide all controls to accomplish the sequence of operation as specified.

B. Freezestats:

1. Provide for all air handling, an electric freezestat of the manual reset type to shut down the unit whenever the temperature falls below its setting, 40°F (adjustable). The BAS shall annunciate any air handler unit shut down due to a freezestat.

3.5 FAN SHUT DOWN & SMOKE PURGE

A. Install smoke detectors (provided by electrical contractor) in main supply duct and exhaust duct or plenum of all air handling systems greater than 2000 cfm. Supply duct detector shall be located downstream of filters and ahead of any branch connections. Return duct or plenum detector shall be located upstream of filters, exhaust connections and outdoor air connections. Signal from the building fire alarm system will automatically shut down fans and close all associated combination fire/smoke dampers. The Mechanical Contractor shall provide terminals for the termination of the fire alarm signal for fan shutdown. Signal, interlock wiring, power wiring and final connections will be provided by electrical contractor. The interface with the fire alarm system shall be shown on the ATC wiring diagrams.

3.6 AIR HANDLING UNIT

- A. Install all controls supplied with the unit under Section 237000.
- B. The system shall be started and stopped by the unit's controller based on a occupancy schedule. The nature of the space requires that the unit run continuously. The system shall be interlocked with the Energy Recovery Unit (ERU). The ERU shall modulate its fan speed in unison with the AHU unit.
 - 1. With the SYSTEM indexed to OFF, the supply shall be off, the outside air damper shall be closed, the chilled water control coil valve, and the pre and post steam heating coil control valve shall be closed. The energy recovery unit shall be indexed off.
 - 2. The preheat steam coil shall be set to maintain a minimum 50F supply temperature to AHU-1. If the supply temperature leaving the energy recovery unit is below 50F as sensed by the discharge air temperature sensor, the pre-heat steam control valve through the controller shall modulate open to maintain a 50F discharge temperature. If the ERU discharge temperature is above 50F, the steam pre-heat coil shall modulate closed.
 - 3. With the SYSTEM indexed to NIGHT the outside air shall open, the energy recovery unit shall start. The supply fan shall run and the steam heating coil control valve and chilled

water control valve shall modulate in sequence to maintain the space set point (adj.) 70° F in winter and 85° F in summer.

- a. In NIGHT cycle the fans shall run at 50% speed.
- C. With the SYSTEM indexed to DAY, the unit shall run with the outside air damper open, the ERU shall start and the AHU supply fan shall start.

1. Summer

- a. The unit controller shall modulate chilled water control valve in sequence to maintain a fixed discharge air temperature of 52° F.
- b. The unit controller shall modulate the speed of the fans based on the space temperature. Upon a drop in temperature below the space temperature setpoint of 75° F, the controller shall modulate the fan VFDs to slow the fans down to maintain the setpoint. If the airflow reaches its minimum airflow of airflow and the space temperature continues to drop, the controller shall reset the fan discharge temperature upward. The system shall automatically reset the discharge temperature down to 52F if the indoor space humidity rises about 58% RH.
- c. Upon a rise in space temperature the reverse sequence shall occur.

2. Winter

- a. The unit controller shall modulate steam control valve in sequence to maintain a fixed discharge air temperature of 80° F (adj.); the chilled water control valve shall be closed.
- b. The unit controller shall modulate the speed of the fans based on the space temperature. Upon a rise in temperature above the space temperature setpoint of 72° F, the controller shall modulate the fan VFDs to slow the fans down to maintain the setpoint. If the airflow reaches its minimum airflow and the space temperature continues to be above set point, the controller shall reset the fan discharge temperature down
- c. Upon a drop in space temperature the reverse sequence shall occur.
- D. An electric freezestat of the manual reset type shall shut down the unit whenever the temperature falls below its setting, 40°F (adjustable). A remote audible alarm located in the Security Room shall annunciate.
- E. A leak detector in the auxiliary drain pan shall shut down the unit whenever there is a leak. A remote audible alarm located in the Security Room shall annunciate.
- F. Whenever the system is started, the controller will provide a "soft start" to minimize wear on the belts.

3.7 ENERGY RECOVERY UNIT

A. Install all controls supplied with the unit under Section 237000.

- B. The ERU exhaust fan VFD shall be set up to track the ERU supply fan. The ERU shall be set up to maintain a constant supply pressure in its supply ductwork to AHU-1.
- C. The system shall be started and stopped with the Air handling Unit (AHU). When the AHU is commended on the ERU shall start. The nature of the space requires that the unit run continuously.
- D. With the SYSTEM indexed to OFF, the supply and exhaust fans shall be off, the outside air and exhaust damper unit shall be closed.
- E. With the SYSTEM indexed ON, the unit shall run with the outside air and exhaust air damper open and the supply and exhaust fan shall start.
 - 1. The unit controller shall modulate the supply fan to maintain a constant static pressure in the supply duct to AHU-1. The exhaust fan VFD shall track the supply fan VFD.
- F. Whenever the system is started, the controller will provide a "soft start" to minimize wear on the belts.

3.8 VARIABLE REFRIGERANT FLOW SYSTEM

- A. Install all controls provided under Section 237000 and provide interlock wiring between fan coil units, BC controllers (if used), and condensing units.
- B. Units shall be automatically started and stopped via remote mounted programmable thermostats. Thermostat shall automatically index unit to "heat", "cool" or "dehumidification" based on desired setpoints.
- C. Indexed to "heat", supply fan shall start and thermostat shall stage compressor and reversing valve to maintain setpoint temperature.
- D. Indexed to "cool", thermostat shall stage compressor and reversing valve to maintain setpoint. Supply fan shall run a lower speed on the first stage of cooling. On the need for higher cooling performance the system will activate the second stage of cooling and automatically switch the fan to the higher fan speed setting.
- E. Indexed to "dehumidification", thermostat shall cycle reversing valve and compressor on the first stage of cooling. Fan shall run at low speed.
- F. Supply fan ECM motors shall provide soft starting, maintain constant CFM over its static operating range (adjustable) and provide airflow adjustment on its control board.

3.9 STEAM BOILER PLANT

- A. Install electric operating controls and safeties supplied with equipment under section 237000.
- B. The boilers shall provide steam for heating and domestic hot water.

- C. Boiler master control panel shall sequence and fire boilers to provide optimum efficiency and to maintain steam pressure in the header.
- D. When boilers are called to start the associated outside air damper shall open and be proven open before boilers are allowed to fire.
 - 1. When multiple boilers are to be installed in a common steam system, a sequencing control system shall be provided to stage and control firing rate of the boilers. To ensure proper integration with the steam boiler controls, the boiler manufacturer shall supply a Sequencing Control System (SCS) as designed by the boiler manufacturer. The steam boilers shall be sequenced as follows to maximize their operating efficiency:
 - a) The SCS monitors the steam header pressure using a pressure transducer. A PID Control Variable determines when the steam boilers will begin sequencing based on the difference between the actual header pressure and the steam pressure setpoint.
 - b) When a request for steam is determined by the SCS, the Lead Steam Boiler is energized. The initial firing rate (if applicable) is determined by the Lead Start Firing Rate variable set in the Lead/Lag configuration section.
 - c) If the steam pressure continues to decrease, the PID Control Variable will increase. The Lead Steam boiler's firing rate will reach 100% before the Lag Start CV value programmed. The SCS will enable a Lag Boiler when the Lag Boiler Start control variable value has been reached.
 - d) If additional steam is required, the SCS will enable each additional Lag Boiler stage determined by the Lag Stage Start CV value. Each Lag Stage will reach a 100% firing rate before the next stage is enabled.
 - e) As the steam pressure increases, the SCS will begin to decrease the firing rate and number of Steam boilers required to maintain the steam pressure
 - f) The Lead Boiler is disabled when the steam pressure reaches a selectable value referenced around the steam header setpoint.
 - 2. The SCS Sequencing Control System will be a microprocessor based Programmable Logic Controller with a Graphical User Interface and Touch Screen capabilities. Active display area will be a minimum of 4.7" with a display resolution of 320 x 240 pixels. Multiple Status and Configuration Screens will be available for easy interpretation of the steam loop status and configuration. The SCS enclosure will be NEMA 4X construction. Power required for the SCS will be 120/60/1.
 - 3. The SCS Sequencing Control shall include automatic rotation of the lead boiler based on a user configured cycle count.
 - 4. Multiple setback schedules shall be available based on whether Normal or Setback mode is active. Mode selection shall be determined by a user defined Time of Day / Day of Week Touchscreen entry. The System Mode will automatically change between Normal and Setback based on the user programmed day and times. Manual Building Mode

- control shall also be available via a Setup menu. System Mode shall be indicated on the Loop Status Screen for ease of reference.
- 5. The SCS Sequencing Control will provide alarm annunciation of each Boiler connected to the network. The SCS will automatically adjust the boiler sequencing schedule and remove the boiler from the sequencing logic if an alarm occurs. The boiler will automatically be added back into the rotation loop as soon as the SCS senses that the alarm has been cleared.
- 6. The SCS will stage the boilers based on a PID generated value. The Proportional, Integral and Derivative values shall be user defined through the Lead/Lag Configuration Screen. Each boiler stage will be enabled based on a user defined "Percentage from Setpoint" control variable. Boiler Sequencing Start and Stop parameters shall be user defined through the operator interface. A Manual Reset parameter will be provided to allow the Proportional Band to be shifted around setpoint.
- 7. The SCS shall provide capabilities to Enable/Disable the boilers through the operator interface. Boilers that are disabled will not be included in the sequencing logic.
- 8. A user defined time delay parameter will be provided that delays enabling of the next boiler stage. This helps to decrease cycling of the boilers when the steam load is close to being met.
- E. Boiler feed pump shall start upon the opening of any feed water boiler feed water valve. Feed water valves shall open based on signal from boiler water level controller.

F. Breakglass Stations:

- 1. Provide breakglass station the entrance to the boiler room.
- 2. Upon activation the breakglass station controls shall enact an orderly shut down of all boilers and annunciate an alarm.
- G. Carbon Monoxide and Methane monitor.
 - 1. Provide a carbon monoxide and methane monitoring and alarm system within the boiler room. Provide a MSA (Material Safety Company) 9010/9020 controller with Altima X Series sensors or approved equal; one for carbon monoxide and one for methane. The carbon monoxide sensor shall be mounted 4 feet AFF and the methane sensor shall be mounted near the ceiling.
 - 2. Upon activation gas alarm station controls shall enact an orderly shutdown of all boilers and annunciate an alarm.

3.10 Domestic Hot Water (existing):

A. The existing steam to domestic hot water system shall remain as is. New steam piping shall connect to the two services in the boiler room. under the new boiler plant design, both service shall be active.

B. Winter:

- 1. Boiler shall run as constant pressure as specified above.
- 2. The branch isolation valves on the main header shall be manually opened and the boilers shall run to maintain a constant pressure in the header.

C. Summer:

- 1. Boiler shall run as constant pressure as specified above. boiler shall be set up so that only one boiler shall operate at a time during in summer mode.
- 2. The branch isolation valves on the main header shall be manually closed and the boilers shall run to maintain a constant pressure in the branch header.

END OF SECTION

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SECTION 231123

FUEL GAS SYSTEM

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Specification as shown or specified should be in accordance with the requirements of the Contract Documents.

1.2 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project:
 - 1. The Contract Drawings
 - 2. The Specifications
 - The General Conditions
 - 4. The Addendum
 - 5. The Contract [City of New York Standard Construction Contract].

1.3 WORK INCLUDED

- A. Work of this Section includes all labor, materials, equipment and services necessary to provide a piped Fuel Gas System as shown on the drawings and as specified herein.
 - 1. Gas service.
 - 2. Piping and valves.
 - 3. Connection to existing piping.
 - 4. Piping to within 5'-0" of boilers.
 - 5. Gas regulators & vent piping.

1.4 RELATED WORK

- A. General Requirements for Plumbing Work
- B. Pipe, Tube and Fittings
- C. Valves
- D. Hangers and Supports
- E. Testing

1.5 **QUALITY ASSURANCE**

- A. A.N.S.I.
- -American National Standards
- В. F.S.
- -Federal Specifications
- C. N.F.P.A.
- -National Fire Protection Association -American Gas Association
- D. A.G.A. E.
- -Compressed Gas Association
- C.G.A.
- F. U.L.
- -Underwriters Laboratory
- N.Y.C.M.E.A.-New York City Materials Equipment Acceptance G.

1.6 **SUBMITTALS**

- A. Shop Drawings:
 - 1. Valves.
 - 2. Controls.
 - 3. Regulators.
 - 4. Pressure and Flow Control Modules ("PFCM").

PART 2 PRODUCTS

2.1 **BID MANUFACTURERS**

- Electrically Operated Valves A.
 - 1. Asco
 - 2. De Zuric
 - 3. Keystone
- B. Valves: See section 220523

2.2 **MATERIALS**

- A. Piping:
 - 1. Inside:
 - a. Schedule 40 steel pipe with fittings as follows:
 - 1. 3" and smaller: Threaded malleable iron.
 - 2. 4" and larger: Steel welding.
 - 2. Outside / Underground:

- a. Extra heavy, schedule 80 black steel pipe with fittings as follows:
 - 1. Steel butt welding conforming to ANSI B16.9.
 - 2. Mill-wrapped.

2.3 SOLENOID VALVES

A. ASCO Bulletin 8215, explosion proof, control voltage 80 to 90 volts D.C., two-way normally closed construction for low pressure city gas.

2.4 EXPANSION JOINTS

- A. AGA certified expansion joint/seismic connector.
- B. Schedule 40 steel, "U" shaped loop with stainless steel hose and braid, located at each building expansion joint.
- C. Welded or threaded ends, 150 psi working pressure.
- D. Provide guides each side of joint.
- E. Joints shall be manufacturered by Metraflex, flexicraft, usbellows or approved equal

2.5 GAS PIPING VENTING

- A. Gas service piping and gas meter piping shall have vent and relief piping installed and sized in full accordance with the requirements of the serving utility.
- B. Gas train venting (Boilers and Water Heater):
 - 1. Gas vents from one boiler shall not be manifolded to gas vents from other boilers.
 - 2. Normally open vent valve must be piped separately and directly to the outside.
 - 3. Vent piping from pilot system (firm gas) and main burner system (interruptible gas) cannot be combined.
 - 4. Gas vents from gas pressure regulator and high and low gas pressure switches can be manifolded.
 - 5. Gas vents shall terminate a minimum of 18" above outside grade and shall be equipped with a utility approved weather proof vent cap. Vents shall terminate at least 2 feet laterally from any building opening, window or door.
 - 6. Vents outlets shall not be located under a window, overhang, projection or any opening leading back into the building.

7. The size of the vent lines shall be as indicated on the Drawings. If the installation of the vent lines differ from the Drawings, the Contractor shall increase the size of the vents as directed by the Engineer at no additional cost to the City of New York.

PART 3 EXECUTION

3.1 GENERAL

- A. The contractor shall examine the latest National Grid regulations governing gas service installation and all work must be in strict accordance with such regulations.
- B. Branch piping shall be installed to a point close to each boiler burner, as indicated, and left ready for the connections to the gas burners, which connections will be provided under the Heating and Ventilation Division. Branch piping shall be provided with shut-off valve.
- C. All outlets shall be left capped until connected to fixtures and all stoppages shall be removed.

3.2 INSTALLATION

- A. Piping:
 - 1. Free of traps with drain pocket consisting of nipple and cap at low points.
- B. Union or right and left nipple coupling:
 - 1. Equipment side of individual gas cock.
- C. LP threaded Joints: Special LP gas-resistant pipe dope.
- D. Stop Cocks: Connection to each piece of equipment.
- E. Where gas pipes are exposed to freezing, they shall be insulated under this division.
- F. All gas fittings shall be subject to the approval of National Grid and the City of New York.
- G. All gas piping and system installation shall conform to NFPA, "National Fuel Gas Code" and "New York City Plumbing Code" Part 1, latest editions.

3.3 WELDED JOINTS

- A. Provide for high-pressure systems and for low pressure, sizes 5" and larger.
- B. Oxyacetylene torch process or electric arc.
- C. Open "V" butt welds for joints between pipe and fittings.
- Ground welding equipment to prevent induced current in structural steel, piping or other metals within the building.

- E. Welding procedure: Conform with Section VIII Pressure Vessels, Division I, of the ASME Boilers and Pressure Vessel Code.
- F. Branch Connections:
 - 1. Full size or one size smaller than main: tees.
 - 2. Two or more sizes smaller than main: Shaped connectors similar to Bonney Forge "Weldolets" or "Threadolets".

END OF SECTION

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SECTION 231553

IDENTIFICATION FOR HVAC 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.

1.2 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project:
 - 1. The Contract Drawings
 - 2. The Specifications
 - 3. The General Conditions
 - 4. The Addendum
 - 5. The Contract [City of New York Standard Construction Contract].

1.3 WORK INCLUDED

- A. The atmosphere within the aquarium and its related mechanical spaces shall be considered a corrosive environment. All ferrous metal, except coated ductwork, including galvanized steel either exposed or concealed above a hung ceiling shall be painted for protection.
- B. Paint apparatus, equipment, piping prior to insulating, hangers, supports, and foundations, except otherwise specified. For performing this work, employ an experienced subcontractor specializing in painting work and approved by the City of New York.
- C. Where a priming coat or other painting is specified under other sections of the specification, such coat shall not be considered as one of the coats of paint specified in this section.

1.4 RELATED WORK

- A. HVAC equipment.
- B. Piping.
- C. Ductwork.
- D. Insulation.

1.5 QUALITY ASSURANCE

- A. New York City Building Code, ASTM, Federal Specifications.
- B. All paint shall be free of lead.

1.6 SUBMITTALS

A. Paint samples, it requested.

1.7 DELIVERY, STORAGE AND HANDLING

A. Painting materials shall be stored only in assigned spaces which shall be maintained in a clean condition, safe from fire hazards and meeting regulations of the Fire Department. The floors of assigned spaces shall be protected from paint damage by use of drop cloths or building paper. Any waste material such as oil rags, empty paint cans, etc. shall be removed from site each night. City of New York to be provided with one (1) key for each of these spaces if they are to be locked.

PART 2 PRODUCTS

2.1 PAINTING MATERIALS

- A. Painting materials shall be factory mixed and shall be delivered to the premises in original sealed containers, with unbroken seals. Containers shall bear the name and trade brand of the paint. Materials shall be approved by the City of New York before they are used.
- B. The paint system shall be as follows:
 - 1. High Performance Coating On Galvanized Ferrous Metals
 - a. First Coat: "27 Typoxy" or "N69 Epoxoline II" by Tnemec; "Intergard 345" by International Protective Coatings; "Carboguard 893 SG" or "Carboguard 888" by Carboline; "Devran 203 WB Epoxy Primer" by Akzo; or "Recoatable Epoxy Primer 867-45" by Sherwin Williams.
 - b. Second Coat: "V73 Endura Shield" or "1074/1075" by Tnemec; "Interthane 870UHS" or "990 UHS" by International Protective Coatings; "Carbothane 133 LH" by Carboline; "Devthane 379H Aliphatic Vizethne" by Akzo; or "Hi-Solids Urethane B65-300/350" by Sherwin Williams.
 - 2. High Performance Coating On Non-Galvanized Ferrous Metals
 - a. Prime Coat: "Tneme-Zinc 90/97" by Tnemec; "Interzinc 52" or "315" by International Protective Coatings; "Carbozinc 859, Class B" by Carboline; "Cathacoat 302V Reinforced Inorganic Zinc Primer" by Akzo; or "Zinc Clad II Plus Inorganic Zinc Rich Coating B69V212" by Sherwin Williams.

- b. Second Coat: "27 Typoxy" or "N69 Epoxoline II" by Tnemec; "Intergard 345" by International Protective Coatings; "Carboguard 893 SG" or "Carboguard 888" by Carboline; "Bar-Rust 231V Multi Purpose Epoxy Mastic" by Akzo; or "Macropoxy G46 I.C. Epoxy B58-600" by Sherwin Williams.
- c. Third Coat: "V73 Endura Shield" or "1074/1075" by Tnemec; "Interthane 870UHS" or "990 UHS" by International Protective Coatings; "Carbothane 133 LH" by Carboline; "Devthane 379H Aliphatic Urethane" by Akzo; or "Hi-Solids Polyurethane B65-300/350" by Sherwin Williams.

PART 3 EXECUTION

3.1 WORKMANSHIP

- A. Paints shall be applied in a careful manner by painters experienced and skilled in their trade. Materials or work to which paint is to be applied, whether in factory, in shop, or at the site, shall be properly prepared to receive the same. The surfaces shall be dry, free from foreign matter, dirt, cement, plaster, grease, oil, loose paint, scale, scratches, finger marks, pencil marks, etc. The various surfaces shall be sandpapered or rubbed before and between coats as required to produce a satisfactory surface. No paint, etc. shall be applied until the preceding coating is thoroughly dry. Paint shall be evenly spread and well brushed out. It shall be so applied as to eliminate drops, runs or sagging of materials. Enamel shall be evenly and smoothly flowed on. Painting at the site shall not be commenced until ordered by the City of New York.
- B. Drop cloths shall be used to prevent drops of paint, oil, etc. from defacing the painted walls, woodwork, floors, stairs, convectors, furniture, etc. Contractor shall be particularly careful not to get paint on nameplates, valve tags, and on other finished surfaces. Paint spots shall be properly removed from glass floors and finished surfaces.
- C. Each separate application or coat of paint or enamel shall be left until it has been inspected and approved by the City of New York before another coat is applied. Each coat of paint applied prior to finishing coat shall be of a shade different from preceding coat, as directed, and from final coat.
- D. Where the finish of the woodwork, plaster, etc. of the building has become discolored, marred, damaged or otherwise destroyed in the performance of this Contract, the same shall be refinished, painted or varnished (as the case may be) in the best manner of such work and in every respect equal to the work previously existing.

3.2 PIPING IDENTIFICATION

- A. All piping systems to be color coded by paint identification.
- B. Piping of each given layout first to be neatly painted with two coats of flat enamel in a buff color if existing paint is not satisfactory.
- C. The identification scheme shall be as follows:

- 1. Pipes identified by a 6" wide colored band located near strategic points such as valves, items of equipment, intersections with wall, etc.
- 2. The colored band to consist of a background color designating the major classification of the material carried by the pipe.
- 3. An arrow to be stenciled on each colored band indicating the direction of flow through the pipe. This arrow to be placed in such a location of the perimeter of the pipe as to be readily visible to operating personnel from the floor in the area. The arrow to be black, approximately 3" long: 2" for the "shaft" and approximately 1" for the "head" formed by an equilateral triangle having a base equal to twice the width of the "shaft". The width of the "shaft" to be 1" (½" on pipes 3" or less in diameter).
- D. Stencil a lettered legend in black to further identify the pipe contents. Lettering to be stenciled in the band on the lower quarters of horizontal piping. Size of letters to be 7/8".
- E. For pipes smaller than 3/4" use tape bands or metal tags with lettering etched and filled with colored enamel to identify the pipe contents.
- F. Comply with the requirements of the New York City Building Code.
- G. Use the following scheme for the identification of piping systems:

3.3 PAINTING FOR BOILER EQUIPMENT, ETC.

A. The boiler front, fixtures and fittings around boilers, steel supports, platforms, ladders, railings, hoists, etc. furnished under this contract shall be given a prime coat of red oxide paint for zinc chromate paint, and a finish coat of aluminum paint, applied after completion of the installation.

3.4 PAINTING FOR MASONRY FOUNDATIONS

A. Masonry foundations built by this Contractor shall be painted above the floor with two (2) coats of latex paint, color selected.

3.5 PAINTING FOR UNINSULATED PIPING

A. Except for finish brass piping and chrome plated piping which shall not be painted, all piping prior to insulating, including hangers, installed by this Contractor where required, shall be

- cleaned and then given one (1) coat of rust inhibitor epoxy primer, one (1) coat of epoxy based basecoat paint, and one (1) coat of epoxy based topcoat coat paint, color as required.
- Galvanized piping shall be cleaned with an emulsifiable solvent cleaner prior to painting. B.
- Piping in floor trenches within the building shall be painted after fabrication with one (1) coat C. of black asphaltum paint.
- Piping buried in the ground including the underground piping shall be protected with one (1) D. coat of black asphaltum paint.

PAINTING FOR DUCT HANGERS 3.6

- Duct hangers, installed by this Contractor where required, shall be cleaned and then given one A. (1) coat of rust inhibitor epoxy primer, one (1) coat of epoxy based base coat paint, and one (1) coat of epoxy based topcoat coat paint, color as required.
- Galvanized piping shall be cleaned with an emulsifiable solvent cleaner prior to painting. B.

END OF SECTION

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SECTION 232113

PIPING SYSTEMS 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. Piping, fittings, valves and accessories shall be suitable for the pressure and temperature of service.
- C. The Contractor shall be responsible for establishing grades and elevations, and checking of all interferences, and shall verify size and locations of all piping in the field prior to the start of installation of equipment and piping. Certain items such as rises and drop in piping, piping offsets, valves, access doors, fittings, sleeves, drain valves, traps, air vents, are indicated on the contract drawings for clarity for a specific location requirement and shall not be interpreted as the extent of the requirement for these items. The Contractor shall, at his expense, perform all minor rerouting of piping around obstructions from new or existing construction whether or not such conditions are indicated on the plans. Minor rerouting of piping is defined as any rerouting which requires less than 10 linear feet of additional piping (measured along the centerline) over and above that shown on the drawings with piping of a size equal to that shown in the original routing. Whenever an obstruction requires more than a minor rerouting as defined above, the Contractor shall report the condition to the Commissioner prior to the start of pipework on the affected system. The Contractor shall be responsible for neglect of checking all elevations, clearances, dimensions and locations of piping systems to prior to the start of work on same.
- D. All piping shall be installed above hung ceiling unless otherwise noted. Contractor shall coordinate with Architectural drawings for all ceiling elevations.
- E. Where connections to existing piping systems are required, the Contractor shall be responsible for draining down and refilling the existing systems and for all costs associated with such drain downs, refilling and water treatment. If the building is occupied, the Contractor shall schedule and perform the drain down and refill in accordance with City of New York's requirements. If allowed by the City of New York, the Contractor may elect not to drain down the system and to connect to the existing piping using a freeze plug or hot tap online pipe tapping system. If such a system is to be used, the Contractor must be able to demonstrate that he has used such a system successfully for a minimum of three years.

1.2 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project:
 - 1. The Contract Drawings
 - 2. The Specifications
 - 3. The General Conditions
 - 4. The Addendum
 - 5. The Contract [City of New York Standard Construction Contract].
- 1.3 WORK INCLUDED

- A. Work of this Section includes all labor, materials, equipment and service necessary to complete the Pipe and Pipe Fitting Materials, Hangers and Supports as shown on the drawings and specified herein, including, but not limited to, the following:
 - 1. Refrigerant
 - Low pressure steam supply and low pressure return
 - Chilled water return.
 - 4. Drain
 - 5. Gas

1.4 RELATED WORK

- A. Insulation.
- B. HVAC Equipment.
- Automatic temperature controls.

1.5 QUALITY ASSURANCE

- A. ANSI, ASTM, ASME, AWS.
- B. Comply with requirements of the City of New York.
- C. No welder shall be employed who has not been fully qualified and certified by an approved, nationally certified, welding bureau or similar recognized testing agency.
- D. The competent and experienced welders who have qualified shall be retained at the job at all times when welding is done. Once qualified, they shall not be removed from the job. Each welder shall be in possession of a stamp to identify work performed by him.
- E. Welding material and labor shall be in accordance with the welding procedures of ANSI piping codes. Mark of welder shall be stamped on each welded joint of pipe.

1.6 SUBMITTALS

- A. Shop drawings indicating pipe layout (3/8" scale), sizes, types of materials, details, attachment and installation. Coordinate the work with other trades doing sheet metal work, electrical work and general construction.
- B. Product Data: Manufacturers' printed data, catalog cuts, recommended connections and installation methods. Submit for valves, fittings, strainers, supports, sleeves, anchors and guides.
- C. Samples, when requested.
- D. Manufacturer's test data.
- E. Reports of pipe field hydrostatic test.
- 1.7 DELIVERY, STORAGE & HANDLING

- A. Deliver materials properly identified as to type, size, manufacturer's name, specification code, etc., and undamaged.
- B. Do not store exposed to weather; cover with suitable type material to protect from damage.
- C. Properly protect all piping so as to prevent damage to the pipe or the introduction of foreign material into the pipe. For the purpose of protecting piping from pre-installation contamination, all piping shall be shipped to the jobsite with suitable caps, sheet metal covers or plugs. Pipe caps, etc. shall not be removed until just before installation.
- D. Cap or plug all openings in pipe and pipe fittings during installation.
- E. During loading, transporting and unloading, use care to prevent injury to pipes and pipe fittings. Do not drop pipe or fittings. Examine all pipe and fittings before laying. Do not install any piece that is found to be defective.
- F. Store and protect all materials from injury prior to installation. Do not store any materials directly on the ground or floor. Keep materials as clean and dry as possible and free from damage or deteriorating elements.
- G. Remove and replace with sound pipe any defective pipe and pipe fittings discovered after installation without additional expense to the City of New York.

PART 2 – PRODUCTS

2.1 MATERIALS FOR PIPE

A. Pipe for the various services shall be as follows:

Service	Size	Material	Type	Weight	<u>Standard</u>
Steam:	2220				
-15 psig & below	1 1/2" & below	Steel	Black	Schedule 80	ASTM A53A, S, ERW
		Steel	Black	Schedule 40	ASTM A106, seamless
	2" & above	Steel	Black	Schedule 40	ASTM A53A, S, ERW
Condensate Return, Drips & Pumped Condensate	All	Steel	Black	Schedule 80	ASTM A53A, S, ERW
Chilled Water:					
Mains, Risers, Branches, etc.	2" & below	Steel -OR-	Black	Schedule 40	ASTM A53A, S, EWR
		Copper	Hard	Type L	ASTM B-88

<u>Service</u>	Size	<u>Material</u>	Type	Weight	Standard
	2-1/2" & above	Steel	Black	Schedule 40	ASTM A53A, S, EWR
Condensate from Cooling Coils	All	Plastic	PVC	Schedule 40	ASTM D1785
Gas	All	Steel	Black	Schedule 40	ASTM A53A, S, EWR
Refrigerant	All	Copper	Hard	Type ACR refrigerant	ASTM B-88
Refrigerant Containment Conduit	All	Copper -OR-	Hard	Type L	ASTM B-88
		Steel	Black	Schedule 10	ASTM A53A, S, ERW
Automatic Air Vents	All	Copper	Soft	Type L	ASTM B-88
Chemical Feed	1 1/2" & below	Plastic	Polyproplene	Schedule 80	
	2" & above	Stainless Steel		Schedule 40	
Cold Water	All	Copper	Hard	Type L	ASTM B-88

- B. All steel pipe shall be new, Grade A, unless noted above and free from rust or scale.
- C. All refrigerant pipe shall be shipped to site capped and filled with nitrogen.
- D. Reinforce piping at all anchor points.

2.2 MATERIALS FOR PIPING FITTINGS

A. Valves, strainers, gauges, air vents, specialties, and other piping accessories shall be rated for the system pressures as indicated below. Fittings for various services shall be as follows:

Service	Size	<u>Material</u>	<u>Type</u>	Weight	<u>Standard</u>
Steam: -below 15 psig	2" & below	Cast Iron	Screwed	125 psig	ANSI B16.4
	2 1/2" & above	Steel	Welding	Standard	ASTM A234
Condensate Return, Drips & Pumped Condensate	2" & below	Cast Iron	Screwed	300 psig	ANSI B16.4
		Malleable Iron	Screwed	300 psig	ANSI B16.4
	2 1/2" & above	Steel	Welding	Standard	ASTM A234
Condensate from Cooling Coils	All	Wrought Copper	Solder	Standard	ANSI B16.24
Chilled Water:	2" & below	Cast Iron	Screwed	125 psig	ANSI B16.4
		-OR-	•		
		Wrought Copper	Solder	Standard	ANSI B16.22
	2 1/2" & above	Steel	Welding	Standard	ASTM A234
Refrigerant	All	Wrought Copper	Brazed	Standard	ANSI B16.22
Refrigerant Containment Conduit	All	Wrought Copper	Solder	Standard	ANSI B16.22
		-OR-			
		Cast Iron	Screwed	125 psig	ANSI B16.4
Automatic Air Vents	All	Wrought Copper	Solder	Standard	ANSI B16.22
		-OR-			
		Bronze	Compression	Standard	ASTM A40-2

<u>Service</u>	Size	<u>Material</u>	Type	Weight	Standard
Chemical Feed	2" & below	Stainless Steel	Screwed	300 psig	
	2 1/2" & above	Stainless Steel	TIG Welding	Schedule 80	
Cold Water	All	Wrought Copper	Solder	Standard	ANSI B16.22

- B. Weights of fittings shall be as specified above.
- C. All screwed couplings and shoulder nipples not exceeding 5" in length shall be of the same material as the pipe but of dimensions conforming to Schedule 80.
- D. All fittings used at expansion loops or bends shall be of 250 lb. WSP Class.
- E. Cast iron and malleable iron fittings shall be of Crane, Walworth or approved equal.
- F. Welding fittings shall be of the same material and schedule as the pipe to which they are welded. Welding elbows shall be long radius pattern unless clearance conditions necessitate the use of standard radius pattern. Welded tees shall be used where difference between main and branch are two (2) standard pipe sizes or less. Branch connections shall be reinforced with Weldolets by Bonney Forge and Tool Works or welding saddles by Tube-Turn, Walworth or approved equal. Welding fittings shall be Tube-Turn, Walworth or approved equal.
- G. Unions 2" and smaller shall be screwed unless otherwise noted. Unions 2 1/2" and larger shall be flanged. Screwed unions on wrought iron and steel pipe, unless otherwise specified, shall be of malleable iron with bronze ground seats suitable for 300 lbs. WSP. Screwed unions on brass pipe shall be brass, ground joint suitable for 300 lbs. WSP. Flanged unions shall be malleable iron, gasket type suitable for 150 lbs. WSP. Unions shall be as manufactured by Crane, Walworth or approved equal.
- H. Flanges shall be of the same weight as the fittings and valves in each service category. Welding neck flanges shall be used with flanged equipment, etc., on welded lines. All flanges shall be drilled in conformance with ANSI B16.5, 125 lb. or 300 lb. standard steel. Welding flanges shall be of steel. Laps shall be machined on front, back and edge and loose flanges have face and bore machined. Screwed flanges shall faced perpendicular to adjoining pipe.
- I. Flange joints shall be faced true, packed and made up perfectly square and tight. Each flange joint shall be provided with best grade steel bolts with square forged heads and with cold-pressed semi-finished hexagon nuts. Bolts and nuts shall be dripped in a mixture of graphite and oil, just before installation. All threads shall be U.S. Standard Gaskets shall be one-piece ring type 1/16" thick full face, suitable for temperature, pressure and service of systems.
- J. Solder for solder-type fittings shall be of 95% tin and 5% antimony.
- K. Brazing material for refrigerant piping shall be 15% silver, 5% phosphorous, 8% copper, brazing filler as manufactured by J.W. Harris.

L. Dielectric Fitting: Dissimilar connections shall be made with an insulating dielectric material such as Teflon or neoprene (i.e., between copper and black steel pipe).

2.3 PIPE SUPPORTS, HANGERS AND INSERTS

- A. Products of B-Line Systems, Fee and Mason Mfg. Co., Grinnell Co., Inc. or MIFAB. Co. will be acceptable in place of particular manufacturer's catalog figure number specified herein. Submit shop drawings, bulletins, catalog figure numbers, or samples as may be requested, of supports, hangers, inserts, toggle bolts, proposed to be used for various conditions; obtain approval before installing same.
- B. Provide one of the following types of hanger for overhead support of horizontal piping:
 - 1. For copper tubing where hangers are in direct contact with tubing, use clevis type steel hanger, copper plated, Fee and Mason Fig. 364, with supporting rod to suit.
 - 2. For all piping 6" and smaller, use clevis type hangers, Fee and Mason Fig. 239.
 - 3. Provide supporting rods for hangers of diameter and of lengths as required, with double locknuts for each.
- C. Where hanger rods leave unsightly holes in ceilings in finished areas, provide steel ceiling plates, Fee and Mason Fig. 279 or cast iron ceiling plates with set screw, Fig. 290.
- D. Provide one of the following to support horizontal piping from wall:
 - 1. Where no provision for expansion and contraction is required and pipe can be located close to wall, use steel J-hook, suitable for pipe sizes up to 3", Fee and Mason Fig. 146.
 - For hanger suspension, 750 lb. maximum loading, use light welded steel bracket with hole for one rod up to 3/4" diameter, Fee and Mason Fig. 153. For additional rod suspension, use with this bracket steel clip Fig. 153C for pipe sizes up to 3".
- E. Provide one of the following to support horizontal piping on Roofs:
 - Provide two (2) Bases Bridged with 12 gauge Galvanized Channel (1 5/8" high) similar to MIFAB cport model CB, Duroblock, Miro or approved equal
- F. Vertical piping supports for copper tubing where hangers are in direct contact with tubing, use copper tubing riser clamps Fig. 368. For steel or cast iron pipe use steel extension pipe clamps Fee and Mason Fig. 241.
- G. Where beam clamps are required, use malleable iron "C" clamps with case hardened cup pointed set screw and retaining strap, Fee and Mason Fig. 255 or beam clips, Fee and Mason Fig. 254 or Fig. 388 as required or directed.
- H. Concrete inserts shall be approved for local use and shall be black malleable iron universal type, for threaded connections with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms, Fee and Mason Fig. 2570.
- I. Where piping is to be supported from Terra-Cotta tile construction, provide toggle bolts as manufactured by Rrawl, Hilti, or approved equal.
- J. All insulated pipe shall be protected at supports by pipe saddles. Pipe saddles for use on hangers shall be Insul-Shield pipe saddles as manufactured by Insul-Coustic Corp. or approved equal.

- K. Steel anchors of an approved design shall be provided where indicated or required for proper control of stress in piping due to expansion. Anchors shall be made of structural materials of heavy cross section and securely fastened to building construction. Submit detail drawings for approval before installation.
- L. Provide pipe alignment guides where indicated, required or directed, to guide the expanding pipe to move freely from anchor points in expansion joints, loops or bends. Construct with angles or channels. Submit detail drawings for approval before installation.

2.4 SLEEVES

- A. Make sleeves of galvanized steel pipe when they are located in concrete beams of concrete fireproofing, water proofed floors or where subject to moisture.
- B. In all other locations, sleeves shall be constructed of galvanized sheet steel with lock seam joint of following minimum gauges: 24 gauge for 2" and smaller; 22 gauge for 4" to 6" inclusive; 20 gauge for sizes over 6".
- C. Sleeve flashing shall be 16-ounce soft sheet copper, or a 4-pound lead flashing.

2.5 ESCUTCHEONS

- A. Escutcheons shall be one piece with set screw except where otherwise noted, constructed of the following material.
 - 1. White painted sheet brass or steel for pipes passing through white prefinished ceilings.
 - 2. Cast iron, deep cut type project above finished floor.
 - 3. Heavy, solid pattern steel or cast iron with set screw for all other piping.
- B. Provide escutcheons on all pipes passing through floors, walls, partitions and ceilings where exposed to view in occupied areas. Also provide escutcheons within custom or factory-fabricated cabinet enclosures.

2.6 VALVES – GENERAL

- A. Provide all valves and piping accessories required to complete the installation of all heating, ventilating and air conditioning systems indicated on the drawings and as specified.
- B. Provide valve tags and charts 2" diameter, 18 gauge aluminum or brass, embossed numbers filled in with black paint, fastened by heavy aluminum or brass hooks/chains on all valves and controls (except equipment shutoff valves).
- C. Valve design, material of component parts, workmanship and other features shall be similar to the following Hammond Valve Corporation catalog numbers for various types listed, SARCO Co., Mueller, Crane or approved equal.
- D. Automatic motorized valves for temperature control shall be furnished under AutomaticTemperature Control section for installation under this section.

2.7 GATE VALVES

A. Steam service (15 psig and lower) 2 1/2" and larger; condensate and boiler feedwater service 2 1/2" and larger – flanged, iron body, bronze trim, OS&Y, 125 psi wsp, Fig. IR-1140.

B. Steam service (15 psig and lower) 2" and smaller; condensate and boiler feedwater service 2" and smaller – screwed, bronze body, inside screw, non-rising stem, 200 psi wsp, Fig. IB-656.

2.8 GLOBE VALVES

- A. Steam service 2 1/2" and larger flanged, iron body, bronze trim, 250 psi wsp, Fig. IR-313.
- B. Steam service 2" and smaller screwed, bronze, union bonnet, renewable plug type seat and disc, 300 psi wsp, Fig. IB-444.
- C. Water service (40°F to 200°F) 2" or smaller screwed, bronze, composition disc, union bonnet, 150 psi wsp, Fig. IB-413 or soldered, bronze, union bonnet, renewable Teflon disc, 150 psi wsp, Fig. IB-423.
- D. Water service (40°F to 200°F) 2 1/2" and larger, flanged, iron body, bronze trim, 125 psi wsp Fig. IR-116.

2.9 CHECK VALVES

- A. Steam service (15 psig and lower) 2 1/2" and larger; condensate and boiler feedwater service 2 1/2" and larger; flanged, iron body, bronze trim, 125 wsp, Fig. IR-1124.
- B. Steam service (15 psig and lower) 2" and smaller; condensate and boiler feedwater 2" and smaller; screwed, bronze, 125 psi wsp, Fig. IB-940 or soldered, bronze body, bronze disc, 125 psi wsp, Fig. IB-941.
- C. Water service (40°F to 200°F) 2" and smaller screwed, bronze 125 psi wsp, Fig. IB-940 or soldered bronze 125 psi wsp Fig. IB-941.
- D. Water service (40°F to 200°F) 2 1/2" and larger flanged, iron body, bronze trim, 125 wsp, Figure IR-1124.

2.10 LUBRICATED PLUG VALVES

- A. Lubricated plug valves for water service (40°F to 200°F) 2" and smaller tapered lubricated plug, lever operated, bolter cover, screwed ends, Teflon coated plug, fixed adjustment gland, semi-steel body, suitable for 175 psi service. Rockwell Fig. 142, FMC Corporation or Walworth or approved equal.
- B. Lubricated plug valves for water service (40°F to 200°F) 2 1/2" and larger USAS B16.1, 125 psi cast iron flanged, semi-steel body, tapered Teflon coated lubricated plug, lever operated, fixed adjustment gland, bolted cover, 200 psi wsp, Rockwell Fig. 143. Sizes 3" and larger shall be worm gear operated, Rockwell Fig. 149, FMC Corporation or Walworth.
- C. Valves shall be suitable for installation between USASI 125# or 150# weld-neck or slip-on flanges without special preparation.
- D. Lubricated plug valves shall be as manufactured by Rockwell International, FMC Corporation or Walworth.

2.11 BUTTERFLY VALVES

- A. Valves shall be resilient lines with Hi-strength Cast Iron body, bronze alloy disc, 14-4PH Stainless Steel shafts, and with EPDM elastomer seats and seals.
- B. Valves through 8" shall have Infinite Position throttling handles equipped with memory stops. Valves 10" and larger shall have gear operators with adjustable memory stops. All valves shall have extended necks allowing clearance for 2" of insulation over the OD of the flanges.

- C. Valves shall be suitable for installation between USASI 125# or 150# weld-neck or slip-on flanges without special preparation.
- D. Butterfly valves for water service (40°F to 200°F) in lines 2 1/2" and larger shall be Series 1200 as manufactured by Norris, Crane, Center Line or approved equal.

2.12 BALL VALVES

A. Ball valves for water service (40°F to 200°F) 2" and smaller shall be top entry, screwed or soldered bronze with double Teflon torsion seats; Crane Fig. 702 & 702SW discs, nibco, apollo or approved equal.

2.13 COMBINATION CHECK, BALANCING AND SHUT-OFF VALVES (TRIPLE DUTY VALVE)

- A. Provide and install in the pump discharge piping of hydronic (chilled, hot and condenser water) systems, combination silent check, balancing, and shut-off valves.
- B. Valves shall be cast iron construction with chatter resistant stainless steel springs, bronze seats, stems and discs and asbestos-free graphite and Teflon packing.
- C. Valves shall have a calibrated stem indicator, a disc designed for silent operation at low flow rates and shall be designed for repacking while under pressure.
- D. Valves shall be designed for (175 psig) working pressure at 250°F, and shall be individually hydrostatically tested at double the rated working pressure.
- E. Valves shall be manufactured by Bell & Gossett, Armstrong, or approved equal.

2.14 MANUAL BALANCING VALVES

- A. Provide manual balancing valves on the return side of each piece of air conditioning equipment at the junction of all return mains and where indicated or required to balance water flow.
- B. For piping 2" and smaller, balance cocks shall be screwdriver or wrench operated, designed for 125 psi working pressure, Type 10 through Type 60, as manufactured by Sarco, Taco, Thrush or as approved.
- C. For piping 2 1/2" and larger, provide balancing cocks of lubricated plug valve type.
- D. Where a shutoff valve and a balancing cock is required, the Contractor may provide a combination balancing, indicating, shutoff valve similar to type IBW Balance Master manufactured by Sarco Co., Dezurick, Fairbanks Co. or as approved.

2.15 COMBINATION BALANCING/SHUT OFF VALVE AND FLOW MEASURING STATION

- A. Provide, where indicated, calibrated valves for balancing hydronic (chilled, hot and condenser water) systems. Valves shall be Illinois Series 6000, Bell & Gossett Model "CB" or approved equal combination balancing flow measuring valves. Valves 1/2" through 3" shall be of all bronze construction, complete with nameplate, indicating pointer, meter connections with built-in check valves, internal seals around rotating element. Valves 4" and above shall be cast iron body and bronze disc. Valves shall be rated for 300 psi at 250°F.
- B. Provide differential meter, Illinois Model PG-1 or Bell and Gossett Model RO-2, for measuring pressure drops across units and all necessary conversion charts and tables. When water flow balancing is complete, meter, charts and tables shall be turned over to the City of New York.

2.16 SAFETY VALVES

- A. Provide safety valves for steam pressure relief, of sizes and in locations as indicated and as specified herein. Safety valve shall be ASME Standard with certified capacity rating, for steam pressures to 250 psi; enclosed spring, side outlet sealed cap, bronze body, screwed inlet, for 2 1/2" and over; Ferris Eng. Co., J.E. Lonergan Co., Lunkenheimer or approved equal and installed in accordance with requirements set forth by ASME and the local building code.
- B. Where safety valve sizes are not given, provide required size and relieving capacity as approved. Unless otherwise specified, set valves to relieve at about 15 psi above operating pressure. Extend valve discharge with pipe, full size of opening to a point where it will not constitute a hazard.
- C. Provide cast iron safety valve drip pan elbows on each steam safety valve, discharge connection and run drain lines to floor drain. Drip pan elbows shall be as manufactured by Crane Co., or approved equal.

2.17 STRAINERS FOR STEAM AND WATER SERVICE

- A. Strainers of the "Y" patter 2" and smaller shall be bronze screwed; 2- 1/2" and larger sizes shall be cast iron flanged. Provide each strainer with blow-off valve and hose bibb. Strainers shall be Type "SB" screwed or type "D", flanged as manufactured by SARCO Co., Mueller or Crane.
- B. Strainers shall have a stainless steel or monel screen with 1/32" perforations and a maximum pressure drop of 1 psi at design flow.

218 PRESSURE GAUGE

- A. Provide pressure gauge on supply and return pipe connections to all equipment.
- B. Pressure gauges shall be white faced with black numerals, coppery alloy brass bourbon tube, 4 1/2" aluminum case, black finish, stainless steel or monel movement, brass socket and pressure snubber where required.
- C. Connect each gauge through a tee handle cock.
- D. Gauges shall be manufactured by Weiss, Trerice, Helicoid or Marshalltown.
- E. Pressure gauges shall have a range at least twice the working pressure but in no case less than 0 to 30 pounds.

2.19 THERMOMETERS

- A. Provide thermometer on supply and return pipe connection to all equipment.
- B. Thermometers shall be of the red reading, industrial, adjustable angle type with 9" cast aluminum case, enamel finish, brass stem and brass union type separable sockets.
- C. Thermometers shall be Vari-Angle as manufactured by Weiss, Trerice or Marshalltown.

2.20 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, this Contractor shall 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, slop sink or other approved point of discharge.
- C. Access door shall be provided for installation by Contractor where access to vents is required.

2.21 STEAM TRAPS – THERMOSTATIC TRAPS

- A. A thermostatic trap shall be provided in the condensate return connection from each convector, radiator, cabinet heater or other heat source as indicated on the drawings or in the specifications.
- B. Thermostatic traps shall be of volatile liquid expansion, multiple bellows or corrugated disc type, having the expansion member well above the trap inlet, but always exposed to the conditions of temperature and pressure in the heating source controlled thereby. The expansion member shall be in contact with the cover of the trap and held firmly in a fixed position so as to be positive in action and function without noise. A valve piece shall close against seat. Seats shall be renewable. Thermostatic traps shall be non-adjustable, without bypass, and shall have been made up at the factory for the working conditions.
- C. Thermostatic traps shall have bodies and caps of bronze or best steam metal. Seats and valve pins shall be made of stainless steel and/or monel. The multiple bellows or corrugated disc shall be made of copper alloy or other corrosion-resistant metal of sufficient thickness and construction to prevent collapse. The maker's name or trademark shall be cast in the cap and the designation number cast in the body of the traps for identification purposes.
- D. Traps shall be manufactured by Sarco, Hoffman, Armstrong or approved equal.

2.22 STEAM TRAP – FLOAT – THERMOSTATIC TRAP (COMBINATION)

- A. A float-thermostatic trap shall be provided on each steam main drip, main riser drip, on each air heating coil drip, reheater drip, and unit heater return connection, on the return connections from the heating element of each water storage heater and hot water converter, and elsewhere as shown on the drawings, or where the maximum condensate load to be handled exceeds fifty (50) pounds per hour.
- B. Float-thermostatic traps shall be designed to operate at any pressure between 10" (mercury-gauge)vacuum and 15-pounds /square inch steam pressure (gauge), permitting air and water to escape and preventing the passage of steam to the return lines, or from the return lines to the equipment or piping being dripped.
- C. Float-thermostatic traps shall consist of a ball-float trap provided with an automatic bellows thermostatically controlled air bypass. Each trap shall have a large size tapping with screwed plug at the lowest point of trap body for drainage and test purposes.
- Traps shall be manufactured by Sarco, Hoffman, Armstrong or approved equal.

2.23 EXPANSION AND BALL JOINTS

- A. Expansion Joints of the Bellows Type:
 - 1. Hydraulically formed, packless, stainless steel bellows type, self-equalizing, internally guided, full bore size, fully enclosed with flanged connections. Expansion joint flange ratings to those required for the traverse, the temperature rating, the pressure rating and the test pressure rating of the service.
- B. Expansion Joints of the Flexible Ball Type:
 - 1. Install in strict accordance with manufacturer's instructions. Torque flange bolts on the ball joints at the factory for the required duty and furnish with seals on all flange bolts to prevent any

unauthorized readjustment. Rate all joints for the traverse, the temperature rating, the pressure rating, offset and gasket type of the service.

C. Expansion joints shall be manufactured by ADSCO, Barko, Flexiolics, or approved equal.

2.24 FLOW SWITCHES

A. Provide a flow switch in each location shown on the drawings and shall be wired as directed. Flow switches shall be the approved equal of McDonnell & Miller Inc. No. FS4-3.

2.25 VACUUM BREAKERS

A. Provide vacuum breakers to automatically relieve vacuum from pipe or vessels installed. Vacuum breakers shall be constructed of bronze or stainless steel with 3/4 inch threaded connection. Vacuum breakers shall be adjustable from 1/4" to 20" Hg vacuum relief setpoint. Maximum working pressure shall be 150 psig and maximum operating temperature shall be 240°F. Vacuum breakers shall be manufactured by Hoffman, Bell & Gossett, or approved equal.

PART 3 EXECUTION

3.1 INSTALLATION OF PIPING

A. General:

- Piping shall be installed in neat and workmanlike manner parallel to walls, column center lines but sloped to drain. Work of each trade shall be fully coordinated to provide the design systems without interference between systems. Piping shall be accurately cut, reamed and threaded with sharp dies. Copper piping work shall be performed in accordance with best practices requiring accurately cut clean joints and soldered in accordance with the recommended practices for the materials and solder employed.
 - a. Piping shall be dripped to drain at a constant slope of 1" in 40 feet. Steam condensate, trap discharge, drip, drain, air, and blowdown piping shall pitch up in direction of flow. All air pockets at top of risers shall be vented, all low points shall be drained to permit full system draindown.
- 2. Minor piping and electrical facilities associated with instrumentation and control are not shown. Interconnection of sensors, transducers, control devices, instrumentation panels, etc. is the responsibility of the Contractor and is included by reference in the plans and specifications. Small piping associated with water cooling, drips, drains, and other minor piping may not be indicated to avoid confusion in the plan presentation but shall be provided as part of the contract work.
- 3. Piping shall be installed so as not to interfere with plumbing fixtures and electrical lighting outlets which must be accurately centered and located. Special attention shall be given to piping above ceilings, which must be kept a sufficient distance from the lighting outlets to permit later installation of the lighting fixtures and their reflectors. Consult with other trades for exact locations of their fixtures, piping and equipment.
- 4. Arrange and install piping as indicated, straight, plumb and as direct as possible, form right angles on parallel lines with building walls. Keep pipe close to walls, partitions and ceilings, offset only where necessary to follow walls, as directed.
- 5. Locate groups of pipes parallel to each other and space them at a distance to permit access for servicing valves. Risers shall not have couplings in runs from one floor outlet to the next.

6. The installation of copper tubing shall be accomplished in such a way as to not touch or come in contact in any way with ferrous metals. Where copper tubing piping or fittings may come in contact with ferrous metal anchors, supports or construction, an insulating non-conductor spacer, similar to lead, rubber, or an approved equal, shall be installed to assure prevention of electrolysis.

B. Fittings:

1. Pipe blending shall be in accordance with the recommended practices of the Pipe Fabrication Institute. Only material conforming to ASTM A106S and A53A may be bent. Sizes below 2" may be bent if filed; sizes 2" and larger shall have factory-fabricated bends. Minimum radius and tangent lengths for field bent piping are indicated in the following table:

3/4" 3 3/4" 1 1" 5" 2 1 1/4" 6 1/4" 2	., 1/2"
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- 2. Piping size change shall be accomplished by reducing ell, reducing tee. Eccentric reduction shall be applied in all piping requiring continuous drainage such as steam, condensate and blowdown piping. Concentric increasers shall be used where flow is in direction of increased size. Provide eccentric reduction, top flat, at pump suction reductions.
- 3. All welded piping shall be butt welded at circumferential joints. Flanges shall be weld-neck type or slip-on type flanges. Materials and methods for each type and class of piping are generally specified for particular services in this specification.
- Companion flanges at equipment or valves shall match flanges construction of equipment or valve. Raised face shall be removed at companion flanges when attached to flanges equipped for flat face construction.
- 5. Gaskets and bolting for steam systems shall be applied in accordance with the recommendations of the gasket manufacturer and bolting standards of the Code for Pressure Piping (ANSI B31.1.0-1967 par. 108, 135). Strains shall be evenly applied without overstress of bolts.
- Screw threads (ANSI B31.1.0 par. 135.4) shall be made up with piping compound or other sealing method approved to assure tight joints without overrun of thread into fittings. Compounds shall be approved for service application.
- 7. Threaded pipe shall be carefully cut, reamed or filed out to size of bore removing all chips, worked into place without springing. Provide Teflon tape on the male thread only. Threaded joints when tight shall not expose more than two full threads.
- 8. Reduction in horizontal water circulation piping shall be made with eccentric reducers with the straight side at the top and the reduction in horizontal steam and condensate return piping shall be made with eccentric reducers with the straight side at the bottom. Use of bushings shall not be permitted.
- Copper tubing shall be carefully cut, reamed or filed out to size of bore and worked into place without springing.
- 10. Dielectric couplings or brass adapters suitable for dielectric service shall be provided at pipe connections between steel or cast iron piping and copper piping.

C. Expansion Requirements:

- 1. All piping shall be installed throughout the project with due regard for expansion to prevent damage to the building, equipment and piping. Provide anchors, loops or approved type expansion joints where indicated or required for the accurate control of movement.
- 2. Branch connections to mains for heating risers, and radiation shall be made with minimum of three 90° elbows.
- 3. Bullhead connections in any piping service are expressly prohibited.
- Expansion pipe loops shall be supplemented with adequate guides as close to loops as possible to preserve alignment and pitch.
- Securely support pipe anchors, constructed of steel angles and channels, required to keep pipe
 movement within area of expansion provision. Submit anchor details for approval before
 installation.
- Provide adequate expansion allowance for service temperatures and piping materials.
- 7. When installing piping with loop or bend expansion, subject piping to cold spring, which will take care of about half of total expansion between hot and cold conditions. Make riser offsets in manner to avoid pocket forming due to expansion. Submit anchor details for approval before installation.

D. Sleeves:

 Mechanical trades shall set all sleeves for their pipes, and equipment. Contractor shall build sleeves in during construction.

E. Concealed Piping:

- Where so indicated or specified, piping shall be concealed in building construction. Install such
 piping in time so as not to cause delay to work of other trades, and allow simple time for tests and
 approval, do not cover before approval is obtained. Wherever possible, run branches passing
 through floor into partitions, offset above floor close to equipment and expose only as much as
 necessary for final connection.
- Where furred spaces are indicated, keep pipes as close to structural members as possible so as to require minimum furring. In case of furred beams, obtain approval of resulting headroom clearance before installing pipes. This Contractor is cautioned to check clearances on the architectural Drawings.

F. Relief Vent Piping:

- 1. Provide relief vent piping for relief valves, tanks, pressure reducing stations, receivers, chillers, etc., as indicated.
- 2. Pipe size shall be such that cross sectional area is equal to the sum of the areas of the discharge connections of relief valves.
- 3. Terminate relief vent piping so as to avoid injury to life or property.

3.2 STEAM SYSTEMS:

A. Mains, risers, branches and connections shall be of sizes and arrangements as indicated. Grade steam and return mains down at uniform slope 1" in 40 feet minimum in direction of flow; branches and riser

- offsets 1" in 10 feet minimum. Take stream supply branches off top of main, either vertically or at 45° angle, as space permits.
- B. Where horizontal steam pipe is reduced in size in direction of flow, use eccentric reducing couplings with pipe flush on bottom. Provide drip points in steam lines at ends of mains, at points where required, and where indicated. Each drip point shall have gate valve, Y-type strainer and trap. Provide dirt pocket at bottom of stream risers, consisting of full size pipe, 6" long minimum with pipe cap.
- C. Mechanics employed in the work shall be skilled in their work or trade. Welders on pressure vessels or steam piping shall show evidence of prior qualification of be qualified in accordance with the methods prescribed by ANSI B31.1 Code for Pressure Piping and ASME Boiler and Pressure Vessel Code.

3.3 REFRIGERANT SYSTEMS:

- A. Provide all refrigerant piping required for a complete refrigeration system, with all valves fittings and specialties, etc. necessary for satisfactory operation. Installation of system shall conform to U.S.A. Standards Association B9.1 Safety Code for Mechanical Refrigeration Piping shall include adequate facilities for charging, draining and purging the system.
- B. Joints in refrigeration piping shall be brazed. The outside of the copper tube and the inside of the fitting where solder will be applied shall be cleaned and burnished with fine crocus cloth until all dirt and oxide is removed. A light coat of non-corrosive brazing flux shall be applied to both pipe and fittings. (Acid flux shall not be used). Joint shall be uniformly heated to proper brazing temperature and the brazing material appears around the pipe at the end of the fitting. The brazing material shall be a hard solder such as silver solder or Silfos. Brazing shall be done only by mechanics who are qualified for brazing refrigeration piping. Purge piping with dry nitrogen during brazing.
- C. Horizontal piping of the compressor suction and discharge lines and the condenser discharge lines shall be pitched a minimum of ½" in 10 feet, in the direction of refrigeration flow. Each suction gas vertical riser shall be trapped at its evaporator with a trap as recommended by the compressor manufacturer.
- D. Valves shall be designed for refrigerant services. Shut-off valves shall be brass packless type. Unions, flanged valves or fittings shall be provided for disconnecting equipment, controls, etc. for making repairs. Piping shall be run in a single layer, with each line isolated from another to prevent rubbing. Provision shall be made for expansion and contraction of piping. All piping passing through walls, partitions, etc. shall be furnished with sleeves as specified.
- E. Install refrigerant piping to prevent excessive oil from being trapped in the system. Any additional risers or equalizer lines which may be required by the manufacturer of packaged equipment for the proper functioning of the system shall be installed as part of this section. Refrigerant piping shall be of the size recommended by the manufacturer and as approved by the Commissioner.
- F. Unless otherwise noted, refrigerant piping passing through rated floors or demising walls shall be enclosed in a rigid and tight continuous fire-resisting refrigerant containment conduit or pipe duct vented to the outside or within the space served. Pipe conduit shall be copper tube Type L hard with soldered fittings or black steel Schedule 10 with screwed fittings.

3.4 HYDRONIC SYSTEMS (CHILLED WATER):

- A. Mains, risers, branches and connections shall be of sizes and arrangements as indicated. Provide shut-off valves in feed and return main branches and where indicated. Provide valved drains at all low points and air vents at all high points in system.
- B. The HVAC sub-Contractor shall provide cold-water piping from valved outlets, provided by Plumbing sub-Contractor, to fill hydronic systems. Provide approved combination back flow preventer and automatic feed water pressure regulator on make up water lines, Watts or approved equal.

C. Grade piping so that when system is filled, air in mains and risers will be carried up and discharged at venting points. Feed connections shall come off bottom of mains. Provide swing loops as indicated for expansion. Changes in sizes of horizontal runs of piping shall be made with inverted eccentric fittings.

3.5 PIPE SUPPORTS, HANGERS AND INSERTS

A. Support horizontal piping in accordance with the following schedule:

Pipe Size		Maximum Hanger Spacing	Rod Size	
1" and smaller 1 1/4" to 2" 2 1/2" to 4" 6" to 8" Larger than 8"	6'-0" 10'-0"	9'-0'' 10'-0''	3/8"	3/8" 1/2" 1"

- B. Support vertical piping with clamps attached to the pipe, resting on the floor slab. In general, one clamp for each two floors, one clamp at each floor for copper tubing. Where pipes are in open shaft, provide forged steel bar brackets to wall.
- C. Support hangers from concrete inserts, toggle bolts, or beam clamps. Furnish, locate a set such inserts and make sure that such inserts are in place when the concrete is poured. Construct inserts of malleable iron or pressed steel with space for rods of all sizes. Install all inserts for pipes 3" and larger in size with a reinforcing rod 5/8" in diameter, run through a slot in the insert specifically provided for this purpose.
- D. If any pipe has to be hung in spaces where no inserts have been provided, drill holes in the slab and provide rods and hanger attached to an approved fishplate or install 2 Star No. 7000 double expansion shields connected by a 2" x 2" angle, from which suspended the hanger rod. For pipe size 2" and under use single No. 7000 shields, but the hanger spacing defined hereinbefore reduced to 5'-0". The carrying capacity and size of each shield to be calculated on the basis of the spacing indicated above the minimum size to be 3/8". Install additional shields of the same size so that the number of hangers are of adequate size to support the loads which they carry. Shields may be used in concrete slabs only.
- E. Regardless of the type of construction (i.e., concrete, concrete-deck-steel, terra-cotta tile or other variations) take particular care to support all main lines and all large and heavy pipes in an approved manner, including the furnishing and installation of supplementary steel, if required. Submit shop drawings, indicating support methods, point loadings to the building structure and hanger locations for review sufficiently in advance of concrete pouring schedules to permit evaluation, critique and any necessary changes to handling and support methods.
- F. Set all inserts for all pipes in ample time to allow concrete work to be performed on scheduled time.
- G. Hangers may be directly bolted to steel beams of building construction, where they occur. Smaller pipes may be suspended from cross-pieces of pipe or steel angles, which in turn, to be securely fastened to building beams or hung from building concrete construction by means of rods and inserts, or hung from building terra-cotta tile construction by means of toggle bolts and rods. The intention is to provide supports which, in each case, shall be amply strong and rigid for the load, but which will not weaken or unduly stress the building construction.
- H. Provide approved roller support, floor stands, wall brackets, etc. for all lines running near the floor or near walls, which can be properly supported or suspended by the floors or walls, which can be near walls may also be hung by hangers carried from approved wall brackets to a higher level than the pipe.

- I. Do not hang piping from other piping. Support of hangers by means of vertical expansion bolts is not permitted.
- J. Whenever hangers using pipe rolls are used provide approved steel pipe covering protection saddles, spot welded to the piping at each hanger location.
- K. Anchor piping where required to localize expansion or to prevent undue strain on piping and branches. Anchors to be entirely separate from hangers and of heavy forged or welded construction of approved design. All anchor designs, when submitted for approval, to include piping reactions which respective anchors are capable of supporting. Provide all indicated or required expansion loops.
- L. Support all line of copper tubing individually by approved type hangers not more than 6' apart, or as shown on the drawings. Hangers for Uncovered Tubing: Broad straps fitting outside of covering.
- M. Hangers for cold piping to support the pipe without piercing the insulation. Use insulation shields to protect the insulation on cold pipes. Weld insulation protection saddles to insulated hot pipes at roller supports. Wherever fibrous glass pipe insulation is installed install calcium silicate of equal thickness in lieu thereof wherever hangers and insulation shields shall bear only on an insulation material which is of such density that it will not compress, crush or deform.
- N. This sub-Contractor may coordinate with other sub-Contractors to use common means of support. Submit for approval all pertinent design data relating to the support as well as verification of the responsibility for the support.
- O. Support vertical water piping at approximately the mid-height of the riser (unless otherwise indicated) using a clamp, installed so that expansion and contraction does not cause trapping of air or prevent drainage.
- P. For piping 4" and larger, support the elbows of the piping adjacent to the pumps with steel supports from the floor, and from the inertia base where pump is on such a base, to prevent loading heavy weights of piping on pump casings.

3.6 SLEEVES

- A. Provide sleeves for all pipes passing through floors, walls or partitions, hung or furred ceilings, etc. (of sufficient diameter to accommodate pipe covering where such is required). Set sleeves for concrete floors, walls and other masonry work in place so that space all around the pipes, after the pipes are installed in place, are about equal.
- B. Protect pipes passing through floors with membrane waterproofing and roofs with Schedule 40 pipe extensions (not sheet metal) and provide "Zurn Z-197" or "Josam 1880" with cast iron integral flashing flange and clamping ring waterproof type pipe sleeves. For membraned floors, fill void between sleeve and pipe with mineral wool and then seal the top with mastic to prevent sound transmission.
- C. Sleeves for Penetrations of the Metal Deck (where applicable): Nail, Cut or drill the metal deck after the deck is poured. Set sleeves in such a manner so that no concrete fills their interior during the concrete pouring and screening operations.
- D. Sleeves for Reinforced Concrete Walls and in Concrete Beams: Standard weight galvanized steel pipe with anchor flanges. Sleeves through Toilet Rooms and any other such Wet Area Floors: Iron pipe size brass. Caulk floor sleeves for exposed pipes watertight and project approximately 2" above the finished floor so that the plate will properly fit over the same. Finish sleeves flush with the bottom of slab and also with the finished faces of wall.
- E. Provide sleeves with an inside diameter at least 1/2" greater than out-side of pipe served, including pipe insulation which must be continuous through sleeve.

- F. Do not support pipes by resting clamps on sleeves. Clamps must extend beyond sleeve and be supported outboard of sleeve in an approved manner.
- G. Provide escutcheon plates of the proper size for all piping in sleeves passing through walls, furrings, partitions, hung ceilings, etc. throughout the building where exposed to public and/or tenant view. All exposed escutcheons of cast brass, bell type, with set screws and chromium plated and of sufficient diameter to include any required pipe insulation.
- H. Provide counterflashing for all piping passing through waterproof wall or roof construction consisting of steel rainhood welded all around to pipe and overlapping flashing.
- I. Where space for future pipe and conduits is required, provide sleeves and fill with lightweight concrete.
- J. Firestopping and grouting around pipes and ducts through concrete slabs and walls, and masonry walls with Portland cement grout in the sleeved opening extending full depth through wall or floor slab, with sheet metal over the insulation before grouting in. Around pipes and ducts through drywall construction wrap mineral rope and finish with sheet metal collar on ducts and escutcheons on pipe. Attach escutcheons to wall, not pipe. Use at all fire-rated walls and floors.
- K. Where piping penetrates mechanical room floor slabs provide 4" concrete curb around pipe penetrations.

3.7 VALVES

- A. No valve shall be installed with stem pointing down below the horizontal without the approval of the Commissioner.
- B. Install valves so that they are accessible for repacking. Install with operating clearance for handle and stem.
- C. On equipment isolation valves install so that valve and piping do not interfere with equipment removal or maintenance. Install unions or flanges on equipment side of valves unless valve is flanged type.
- D. Provide valves of a design permitting packing while open and under pressure.
- E. Provide shutoff valves in supply and return to reach item of equipment such as pumps, tanks, coils, traps, automatic valves and similar items. Valves shall be suitably located to isolate each unit to facilitate maintenance or removal of all equipment and apparatus. Valves 2 1/2" and larger shall be flanged 2" and below shall have a union installed between valve and equipment.
- F. Provide a gate valve in the common supply line and an individual combination balancing/shut-off valve and flow measuring station in the return line from each water coil, and all water using heat transfer elements.
- G. Provide a gate valve on supply risers near main and a combination balancing/shut-off valve and flow measuring station in each return riser near main.
- H. Provide drains at low points of all liquid piping systems including each riser. Locate drain valves in Mechanical Equipment Rooms not higher than 6' above floor and pipe to nearest floor drain. Provide capped drain cocks with threaded ends for hose connections at all other drain points. Provide one 100' length of heavy duty 1" hose.
- I. Provide all valves 8" and larger with a rating of over 150 lbs. with a 1" bypass valve of same pressure rating as the bypassed valve.

- J. Provide renewable bronze seat rings and bronze spindles for all cast iron body valves.
- K. Use combination balancing/shut-off valve and flow measuring station for all throttling service, and where noted on the drawings.
- L. Provide lubricated tapered plug cocks with the manufacturer's proper lubricant for water service before shipment to the job site. Furnish four (4) hand wrenches for each size valve, where gear operators are not required.
- M. Butterfly valves of the lug type are permitted in lieu of valves indicated above for chilled water, condensing water and hot water services only. 150 lb. construction with totally enclosed weather-proof operator replaceable packing bonnet and material combination as follows: Iron body, stainless steel stem and disc, steel ring and Buna seat.
- N. Safety valve discharges shall be piped and extended through the roof. At the bottom of the riser provide a drip pan elbow. From the drain and the elbow provide a common 3/4" drain line extended to discharge down 6" above the nearest floor drain.
- O. Provide chain-operated sheaves and chains where indicated on drawings and for all valves which are more than 6' above the floor in Mechanical Equipment Room.
- P. Provide all other hand valves, check valves, cocks, etc., as required for the complete and proper valving of the entire installation.

3.8 WELDING

- A. Welding Process: All welding shall be done by the oxyacetylene or electric arc welding process in accordance with the requirements set forth in Welding or Pipe Joints of the ASME Code for Pressure Piping.
- B. Beveling and Welding: All steel pipe 2 ½" and larger may be purchased mill beveled or shall be machine beveled on both ends before welding. On odd lengths of pipe, beveling may be accomplished by means of the oxyacetylene cutting torch providing all paint, rust, scale and oxide are carefully removed with hammer, chisel or file. Joints shall be prepared and welded to assure thorough fusion with bare metal, complete penetration, maintenance of alignment, and the production of a joint that shall develop the full strength of the pipe and shall be leakproof in service.
- C. Welding Rods: The welding rod used for welding shall be Oswald No. BT or approved equal.
- D. All foreign matter shall be removed from the ends if pipe lengths before tacking and welding. Pipe lengths shall be lined up straight and abutting pipe ends shall be concentric. Spacing and tack welding shall be such as to prevent the pipe from lapping or getting out of alignment during welding operation.
- E. All welding shall become in accordance with the latest accepted practice applicable to the particular service and shall be performed only by welders who have been tested and qualified in accordance with the requirements of the ACA Piping Code for Welding. The Contractor shall furnish a certificate for each welder, certifying that the welder complies with these Specifications and of the National Certified Pipe Welding Bureau.
- F. All welded pipe connections shall be painted in an approved rust inhibitor ("extend" by Permatex or equal) prior to insulating.
- G. Welders shall be licensed by New York City.

H. The welding of high pressure piping shall be tested in accordance with Section MC 1210.4 of the New York City Mechanical Code and require Special Inspections in accordance with Section BC 1704.17 of the New York City Building Code.

3.9 STRAINERS

- A. Provide approved self-cleaning strainers in inlet connections to each feeder and make-up connection, each automatic control valve and all automatic devices whose proper functioning would be affected by solids in the fluid.
- B. Except as noted, strainers in water lines to be Y-pattern set in a horizontal (or vertical downward) run of the pipe. Where it is not feasible, strainers may be of enlarged cross-section flat type. In all cases, arranger strainers as not to "trap" pipes, and to facilitate disconnection and opening-up for cleaning.
- C. Provide approved valved dirt blowout connection for each strainer. Each valve located at hand-height and piped to the nearest floor drain, at a point where there is no risk of flooding or damage.
- D. Clean the strainers as necessary until accepted by the City of New York.
- E. Install strainers upstream of automatic control valves with the same size as the inlet pipe serving the control valve.

3.10 AIR VENTS

- A. Provide soft temper copper tube pigtail on manual vents so that end can be placed over a bucket.
- B. Provide all manual air cocks and automatic air vents required throughout the water circulating system for the removal of air, of ample strength for the pressure to which they will be subjected. Provide automatic air vents at all high points.
- C. Provide air vents of the compression type, all bronze construction, key operated. Provide each heat transfer element supplied with water with not less than 1/2" manual air vent. Furnish ten (10) keys. Provide air chambers where indicated.
- D. Use inverted ball float traps for vent water risers, mains and branches and where required. Trap Size: 3/4" with inlet an overflow connections, both valved.
- E. Provide manual air vent valves in the piping connections to each hot water heating coil and each chilled water coil (both supply and return where such are not automatically vented). Provide a 1/4" vent line from each air vent to nearest floor drain, or as directed, to suit job conditions.
- F. Provide gate valves with capped bibb connections at all drain points. Hose bibbs only will not be acceptable. Install capped drains at all low points of the systems. Threads of hose bibbs to fit standard rubber hose connection.

3.11 STEAM TRAPS

- A. Size steam traps for three (3) times the condensing capacity of connected load unless otherwise shown. Provide separate full size strainers, 15 degree swing check valve, unions on both inlet and outlet and gate valves on both inlet and discharge sides.
- B. Provide all condensate return traps required throughout the steam condensate system for automatically trapping condensate and expelling air from all steam-using elements, as well as from riser heels and ends of steam mains and branches.

C. Provide high and medium pressure traps for dripping high and medium pressure mains; inverted bucket type, or as approved.

3.12 SENSOR PIPE WELLS

A. Provide sensor wells in piping system for automatic temperature controls.

3.13 SEISMIC REQUIREMENTS

- A. Piping systems which are required by code to be seismically supported shall be supported and properly braced in accordance with 2008 New York City Building Code. Transverse and longitudinal bracing shall be provided as per 2008 New York City Building Code.
- B. Seismic plans and calculations shall be prepared and signed by a Professional Engineer with a minimum of three years experience in seismic design.

3.14 PIPING SYSTEM TESTS-GENERAL

- A. Each piping system shall be tested prior to being concealed and prior to application of insulation, painting or placing of backfill. Testing as stipulated herein shall be considered minimum, and where tests stipulated by the City of New York exceed these requirements, such more stringent tests shall be performed.
- B. All materials and equipment for testing shall be furnished by the installer of the system. Concealed work shall remain uncovered until required tests have been completed. In the event that the project construction schedule requires it, make arrangements and insert proper sectionalizing devices so that a portion of a system may be tested.
- C. All piping, unless otherwise specified, shall be tested to a hydro-static pressure at least 2 ½ times the maximum designed working pressure (but not less than 50 psig) for a sufficiently long time to detect all leaks and defects, and after testing, shall be made tight in the most approved manner.
- D. Where controls and accessories are not designed to withstand pipe test pressures, they shall be properly protected against damage during such tests.
- E. Compressed air piping for temperature control line shall be subjected to an air pressure test of 50 psig and connections checked with soap suds.
- F. If in any tests leaks are observed, the defective work or material shall be replaced. No caulking of screw joints or holes will be acceptable. Repetition of the entire test will be required as many times as leaks can be observed from the tests, until no leaks result in successful completion of the test.
- G. Make all provisions for removal of test equipment and draining of pipes after tests have been completed. Insulation work shall not be performed prior to inspection and testing of piping.
- H. The Contractor shall inform the Commissioner in writing when a section of piping is to be tested and subsequently insulated or otherwise concealed. Such notice shall be given a minimum of five (5) working days prior to the start of testing.
- Where possible, arrange to conduct tests under constant ambient temperature conditions in order that compensation for temperature change is not necessary.

3.15 PIPING SYSTEM TEST – STEAM SYSTEM

- A. After erection of piping systems, all piping systems shall be capable of withstanding a hydrostatic test pressure of 1 ½ times design pressure, as stipulated in par. 121 (b) of Code for Pressure Piping, ANSI B31.1-1955.
- B. Hydrostatic tests will be required only on boiler leads, utilizing water as the test medium. Hydrostatic tests will be required on other piping if operating tests described are unsatisfactory, or if inspection of welds leads Commissioner to believe that welding performance indicates poor workmanship and it subject to question by him.
- C. In the event of failure on hydrostatic tests showing leaks, the Commissioner shall require that the Contractor make necessary repairs (in accordance with ANSI B31.1.0, par. 127.4.7) to provide satisfactory welding at Contractor's cost.

3.16 PIPING SYSTEM TEST – REFRIGERANT SYSTEMS

- A. Test refrigerant piping for tightness and leaks under pressure and vacuum. The duration of each test shall be twenty-four (24) hours.
- B. Prior to test isolate all equipment, coils, controls, fittings, etc., not rated for test procedure.
- C. Test joints by filling system with refrigerant at 5 psig and inspecting each joint with a Refrigerant Leak Detector.
- D. There shall be no observable leaks or changes in pressure. If either is observed, seal leaks and repeat test procedures.

3.17 PIPING SYSTEM TEST – HYDRONIC SYSTEMS (CHILLEDWATER)

- A. All equipment and piping shall be thoroughly cleaned of iron cuttings and other refuse during assembly and installation.
- B. Pressure tests shall be performed on all piping before equipment is hooked up to the piping.
- C. Before testing piping systems, remove or otherwise protect from damage control devices, air vents, other parts which are not designed to stand pressure used in testing piping.
- D. Test welded piping systems, under 100 psi pressure (air) with soap suds.
- E. After air tests have been performed and all leaks repaired, test piping hydrostatically to one and one half times the maximum working pressure, but in no case to less than 150 psi. Hydrostatic test pressure shall remain constant without pumping for at least two (2) consecutive hours.

END OF SECTION

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SECTION 232500

WATER TREATMENT AND CLEMICAL CLEANING

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 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project:
 - 1. The Contract Drawings
 - 2. The Specifications
 - 3. The General Conditions
 - 4. The Addendum
 - 5. The Contract [City of New York Standard Construction Contract].

1.3 WORK INCLUDED

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the Chemical Cleaning as shown on the drawings and specified herein, including, but not limited to, the following:
 - 1. Steam piping.
 - 2. Boilers
 - 3. Chilled water piping

1.4 QUALITY ASSURANCE

A. Mechanical equipment, cleaning chemicals, treatment chemicals, control equipment and services by a single water treatment consulting firm for undivided responsibility.

1.5 SUBMITTALS

A. Shop Drawings: System installation drawings, wiring and piping diagrams and sequence of operation.

B. Product Data:

- 1. For each component, device, pump, time clocks, storage tanks, controller, valve etc.
- 2. Chemical products being supplied, including cleaning chemicals.

C. Test Report:

- 1. Obtain analysis of raw water from the City water.
- D. Manufacturer's Instructions:
 - 1. Recommended feed rates of each chemical product.
 - 2. Recommended operating conditions for each system including cycles of concentration, chemical test limits and limits of water treatment system set points.
 - 3. Certificate of Cleaning: By the cleaning chemical supplier.

1.6 CHEMICAL SUPPLIES

A. Provide adequate chemicals for pipe cleaning.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Chemical cleaning and pretreatment:
 - 1. Provide all dispersants, scale inhibitors and corrosion inhibitors as required for cleaning and treating all piping systems. Chromates shall not be used.

PART 3 EXECUTION

3.1 CHEMICAL CLEANING AND PRETREATMENT

- A. Flush piping systems with the approved cleaning chemicals to remove pipe dope, slushing compounds, cutting oils and other loose extraneous materials. Seal ends after cleaning.
- B. The chemical supplied shall:
 - Satisfy the proper feed rates.
 - 2. Check that the cleaning solution is actually in each system.
 - Satisfy when to flush the system.
 - 4. Check each system following flushing to ensure cleaning chemicals have been removed from each system.

- C. Block modulating valves, zone valves and other system restrictions.
- D. Provide portable pumps to circulate water for cleaning purposes at respective flows for four (4) hours. Remove and clean strainers. Blow off low points with steam after cleaning and before traps are installed. Drain entire system.
- E. Chemical used for cleaning of systems shall comply with the recommendations of the manufacturers of the major components in the system and shall be approved for use.
- F. Upon initial fill (following system flushing) the approved chemicals which provide a protective coating to prevent oxidation of the cleaned system shall be added.

3.2 FIELD QUALITY CONTROL

- A. Instruct maintenance personnel in the operation of systems installed. Secure written confirmation that instruction has been provided.
- B. Perform field test procedures and issue reports of such test.

3.3 CLEANING OF HEATING PLANT

- A. After the entire heating plant has been erected and vacuum traps have been installed, the plant shall be cleaned by operating it for a period of three (3) consecutive 8-hour working days with the boilers on low fire. During this period, the return condensate being wasted to the sewer. At the end of this period all float and thermostatic traps throughout the building shall be thoroughly cleaned and left in perfect working order. At this time, the mud leg drains of each boiler shall be opened and the mud legs shall be flushed out by means of water hose.
- B. After the boilers are cleaned the fire chambers, tubes and breechings of boilers shall be completely wire brushed and all soot shall be removed with a vacuum cleaning machine suitable for this purpose. In the event that the outside of boilers, piping, breeching, etc., have an accumulation of dirt, the dirt shall be removed with the vacuum cleaner.

3.4 EQUIPMENT INSTALLATION

A. Install all equipment specified herein in accordance with manufacturers instruction.

END OF SECTION

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SECTION 233113

SHEET METAL DUCTWORK

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. Ductwork, fittings, dampers and accessories shall be suitable for the pressure and temperature of device.
- Ductwork design drawings are diagrammatic to indicate design intent. The Contractor shall be C. responsible for establishing grades and elevations, checking of all interferences, providing all fittings, whether or not shown, required accommodating changes in direction or elevation and as necessary to accomplish the intent of the drawings. The Contractor shall verify size and locations of all ductwork in the field prior to the start of installation of equipment and ductwork. The Contractor shall, at his expense, perform all minor rerouting of ductwork around obstructions from new or existing construction whether or not such conditions are indicated on the plans. Minor rerouting of ductwork is defined as any rerouting which requires less than 10 linear feet of additional ductwork (measured along the centerline or its equivalent in fittings) over the above that shown on the drawings in order to avoid an obstruction. Such rerouting shall be performed with ductwork of size equal to that shown in the original rerouting. Whenever an obstruction requires more than a minor rerouting as defined above, the Contractor shall report the condition to the Commissioner prior to the start of ductwork on the effected system. The Contractor shall be responsible for neglect of checking all elevations, clearances, dimensions and locations of ductwork systems prior to the start of work on same.

1.2 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project:
 - 1. The Contract Drawings
 - 2. The Specifications
 - 3. The General Conditions
 - 4. The Addendum
 - 5. The Contract [City of New York Standard Construction Contract].

1.3 WORK INCLUDED

A. Work of this Section includes all labor, materials, equipment and services necessary to complete the Sheet Metal Ductwork as shown on the drawings and specified herein, including, but not limited to, the following:

- 1. Sheet metal ductwork and plenums.
- 2. Access doors in sheet metal work and ceiling.
- 3. Dampers.
- 4. Flexible connections.

1.4 RELATED WORK

- A. Insulation.
- B. HVAC Equipment.
- C. Grilles, Registers and Diffusers.
- D. Automatic Temperature Controls.

1.5 QUALITY ASSURANCE

- A. SMACNA.
- B. ASHRAE.
- C. NFPA.
- D. UL.

1.6 SUBMITTALS

- A. Shop drawings 3/8" scale, showing ductwork layout indicating size, shop construction details, gauges and installation requirements.
- B. Test Reports: Field testing of air outlet flow.
- C. Samples, when requested.
- D. Reproducible as-built mylar after job completion.

1.7 DELIVERY, STORAGE AND HANDLING

A. Protect shop-fabricated and factory-fabricated ductwork, accessories and purchased products from damage during shipping, storage and handling. Prevent end damage and prevent dirt and moisture from entering ducts and fittings by installing temporary closure pieces or shrink-wrap on open ends. B. Where possible, store ductwork inside and protect from weather. Insulation and acoustic material either loose or installed within ductwork or equipment can absorb damaging moisture and become soiled if left outdoors prior to being installed. Absorbed moisture can foster biological growth and can lead to indoor air quality problems at a later date. Where necessary to store outside, store above grade. To minimize damage all such material or equipment stored outdoors shall be shrink-wrapped prior to shipment to the project. The shrink-wrap shall only be removed once the materials and equipment have been move into enclosed spaces within the building.

PART 2 PRODUCTS

2.1 GENERAL – DUCTWORK AND ACCESSORIES

- A. All ductwork, plenums, dampers and all auxiliary work of any kind, necessary to make the various air conditioning, ventilating and heating systems complete and ready for operation, shall be provided.
- B. The sheet metal work shall be fabricated and installed in accordance with SMACNA Duct Construction Standards and the ASHRAE Handbook. The SMACNA and ASHRAE recommendations shall be considered as mandatory requirements.
- C. The duct system shall comply in strict accordance with NFPA 90A, NFPA 96, the New York City Building Code, New York City Mechanical Code and the ECCCNYS.
- D. Furnish and install, in an approved workmanlike manner, all the sheet metal work indicated on the drawings and specified herein and required for the heating, ventilating and air conditioning systems. All ductwork indicated on drawings is schematic. Therefore, changes in duct size and/or location shall be made where necessary to conform to space conditions, without additional cost to the City of New York.
- E. Ductwork shall be constructed of galvanized sheet metal unless otherwise noted.
- F. Construct all longitudinal joints with Pittsburgh type seams. A snap lock seam shall not be permitted as a substitute for the Pittsburgh lock at corners of ducts unless factory assembled or if shipped knocked down joints are sealed with duct seal and ends of each section are riveted.
- G. All ducts shall be true to dimensions indicated, and dimensions shall be clear inside dimensions unless otherwise specified. Dimensions given on drawings of all acoustically lined ducts shall be the <u>clear inside dimensions</u>. Smooth transactions shall be installed where acoustic lining ends and non-lined duct begins. Ducts shall be straight and smooth on the inside with neatly finished joints.
- H. Shape all changes in direction, both horizontal and vertical, to permit the easiest possible air flow, using full sized bends wherever possible. All short radius elbows where the center line radius is less than 1 ½ times duct width and square corner elbows shall be fitted with directional flow air turning vanes on both supply, return, intake and exhaust systems.
- Fresh air intake plenums and exhaust plenums shall be made watertight at all bottom seams and up to 12" on bottom seams by soldering. Where plenums connect to louvers the bottom pans

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- shall pitch down toward the louver. When bottom pan of plenum connects to drain outside, a 1" drain connection shall be fitted at the lowest point in the bottom pan.
- J. Fresh air plenums, exhaust plenums and mixed air plenums shall be constructed of 16 gauge galvanized steel for ducts 85" and larger and 18 gauge for 84" and smaller.

2.2 GALVANIZED SHEET METAL

- A. Galvanized sheet metal shall comply with ANSI/ASTM A527, lockforming quality, with ANSI/ASTM A525; G90 zinc coating; mill phosphatized for exposed locations.
- 2.3 STAINLESS STEEL (all exhaust ductwork; Supply Ductwork located in Aquarium Room.)
 - A. Where indicated, provide stainless steel sheet complying with ANSI/ASTM A167; ANSI Type 316. Protect finished surfaces with mill-applied adhesive protective paper, maintained through fabrication and installation.
 - B. All ductwork exposed to outdoors shall be fabricated of stainless steel.
 - C. See 2.6 for PVC coated duct alternative.

2.4 LOW PRESSURE DUCTWORK

- A. Low-pressure ductwork shall conform to the latest SMACNA "Low Pressure Duct Construction Standards."
- B. Low pressure ductwork shall be defined as all duct with velocities less than 2,500 fpm and static pressures of 0" to 2" (positive or negative).
- C. Ducts with static pressure ranging from 0" to 1" w.g. shall be provided with a Class A seals, Leakage Class 6, however, all joints must be sealed. Seal classification shall be as described in the SMACNA tables. Type and method of sealer shall be as described in this section of specifications.

2.5 SUPPLY AND EXHAUST DUCTWORK

- A. Ductwork either located within or serving the Aquarium Room shall be either 316 Stainless steel or galvanized steel coated inside and out with two coats of protective coating for a chlorine atmosphere. Coating shall be POXY Coat II, non-toxic alkyd/acrylic epoxy, air dried, as manufactured by Calibre Corp., Ridgefield, Conn., or 4 mil Polyvinly-chloride plastic coating such as PVD air distribution ductwork manufactured by Foremost Duct, , or equal.
- B. All fittings, volume dampers, turning vanes, etc. shall also be 316 stainless steel or coated as described above.

2.6 BOILER BREECHING AND CHIMNEY – PREFABRICATED

- A. Provide prefabricated boiler breeching complete with all fittings and accessories required for complete installation.
- B. Breeching shall be constructed of sectionalized double wall construction consisting of 304 stainless steel inner shell and 20 ga. galvanized sheet metal outer. Inner shell shall have 2" 8 lb. density high temperature ceramic wool insulation with 1" air space between insulation and outer shell.
- C. The complete Breeching I Chimney System shall be fabricated as follows:
 - Inner wall
 a. 0.035 inch type 304 stainless steel for all diameters.
 - 2. Outer wall
 - a. 5 inch through 24 inch diameter O.Q18 inch galvalum (Alu-Zinc) steel.
 - b. Alt. Material- 304 stainless steel.
 - 3. Insulation:
 - 2 inch 8 PCF mineral wool between inner and outer wall
 - 4. Clearance to combustible:
 - From outer diameter, four inches minimum air gap to combustibles for sizes 5 inches to 36 inches.
- D. Breeching shall be U.L. listed to satisfy local codes.
- E. The vertical expansion joint shall have a 1 1/2" overlap and shall be filled with non-setting, low-shear grout. The external joint shall consist of a metal band and refractory felt, the band to be secured to the floor support section.
- F. High temperature sealants and draw bands shall be provided for inner shell to be suitable for positive pressure and 1000°F operating temperatures.
- G. Supports shall be per manufacturer's recommendations.
- H. Connection between boiler and prefabricated breeching shall be 10 gauge black steel welded with slip joint at connection to breeching tee.
- A hinged cleanout door shall be provided at end of each breeching tee and as shown on drawings.
- J. Chimney shall be provided with ventilated roof support, storm collar, cone flashing, chimney top, guy section and guy wires.

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K. Breeching and chimney shall be provided with extended 10-year warranty.

L. Breeching shall be model CIX as manufactured by Security Chimney, Metalbestos, Van Packer or approved equal.

2.7 CHIMNEY LINER

- A. Provide prefabricated chimney liner complete with all fittings and accessories required for complete installation.
 - 1. Liner shall be constructed of sectionalized construction consisting of 304 stainless steel .040 inch shell.
 - 2. liner shall be U.L. listed to satisfy local codes.
 - 3. The vertical expansion joint shall have a 3" overlap and shall be filled with non-setting, low-shear grout. The external joint shall consist of a metal band and refractory felt, the band to be secured to the floor support section.
 - 4. High temperature sealants and draw bands shall be provided for inner shell to be suitable for positive pressure and 1000°F operating temperatures.
 - 5. Supports shall be per manufacturer's recommendations.
 - A hinged cleanout door shall be provided at end of each breeching tee and as shown on drawings.
 - 7. liner shall be provided with rain hood.
 - 8. liner shall be provided with extended 10-year warranty.
 - Liner shall be model CT as manufactured by Security Chimney, Metalbestos, Van Packer or approved equal.

2.8 VOLUME DAMPERS

- A. Provide all dampers required for all systems to accomplish the intent of the drawings and specifications. Dampers are to be installed in frames properly caulked to prevent leakage.
- B. Provide manual balancing dampers as required to properly balance the air distribution system. If location of balancing dampers is not defined on the drawings, the following minimum standards shall govern:
 - 1. All supply air main branches from truck, each split, and all subbranches from mains shall have balancing dampers.
 - 2. Exhaust and return main branches from trunk, each split and all subbranches from mains shall have balancing dampers. Balancing dampers shall not be installed in kitchen exhaust, fume hood exhaust, or breeching unless otherwise indicated.
 - 3. Locate damper as far as possible from air outlet to avoid noise transmission.

- 4. Provide and./or coordinate with Contractor for easy access to damper, or otherwise furnish remote damper actuator.
- 5. If damper is not accessible, or is located above a plaster, drywall or millwork ceiling, provide a remote damper actuator and damper as manufactured by Young regulator Model 896-C with No. 1200A right angle worm gear and Model 820 respectively or approved equal.
- C. Splitter dampers shall <u>not</u> be used. Use opposed blade dampers after all splits for balancing.
- D. Opposed blade dampers shall be a minimum of 5" deep and fabricated of 14guage 316 stainless steel blades with an 11 gauge 316 stainless steel frame. Blades shall have opposed action and shall ride in bronzed bushings on 1/2" steel shafts. Damper blades shall be operated by a common linkage. Units shall be Model CD-400 as manufactured by Louvers and Dampers or approved equal. Manual operated dampers shall have a quadrant-locking device.
- E. Single blade dampers shall <u>not</u> be used for balancing unless otherwise shown.
- F. Parallel blade damper shall be of the parallel blade type with 14 gauge 316 stainless steel blades and 11 gauge 316 stainless steel frame. Blades shall ride on bronze bushings with 1/2" stub aluminum shafts. Blades shall be connected by a common linkage. Units shall be as manufactured by Louvers and Dampers, Model CD-500, or approved equal.

2.9 FIRE DAMPERS

- Fire dampers shall be installed in all rated construction and as shown on the drawings.
- B. Fire damper shall be of the folding blade type, Fire/Seal as manufactured by Air Balance, Inc., or equivalent and shall bear the Underwriters' Laboratories label. Dampers shall meet the requirements of NFPA Bulletin No. 90A and shall be tested in accordance with UL 555.
- C. Fire damper blades shall be located outside of the air stream.
- D. The number of damper sections and location of doors for access to fusible links shall be approved by the Commissioner prior to construction.
- E. End connections to the damper section shall be of the breakaway type to prevent the damper from being pulled out of the wall by a duct failure.
- F. Fire dampers shall be manufactured by Ruskin or approved equal.

2.10 FLEXIBLE CONNECTIONS

- A. Provide flexible connections to all supply and exhaust fans to prohibit the transfer of vibration from fans to connecting ductwork. Flexible connections shall comply with UL 181 (Class 0 or Class 1) per the NYC Mechanical Code, Section 603.6.
 - 1. Install airtight flexible connections where ductwork or casings connect to fans. Fasten connection securely with bolted clamps. Make the unclamped portion of the connection not less than 6" long, crimped for flexibility.

- 2. For fans to 4" w.g. static pressure, 20-ounce chemically impregnated fire-retardant canvas, Ventfabrics, Inc. "Ventfab" or approved equal.
- 3. For fans with 4" w.g. static pressure and greater and for all corrosive exhausts, 30 ounce closely woven glass fabric, double-coated with neoprene, Ventfabrics, Inc. "Ventglass" or approved equal.
- 4. For connections exposed to sun and weather, provide "Ventlon" glass fabric coated with "Hypalon" by Ventfabrics, Inc., or approved equal.

B. Provide flexible connection to terminal units and outlets.

- 1. At air troffers, provide inlet connections of neoprene-coated and impregnated fiberglass cloth reinforced with continuous galvanized wire helix and preinsulated with 1 1/4" thick fiberglass covered with reinforced aluminum foil, Flexible Tubing Corp. "Thermalflex" Type M-KN (temperature range 0-250°F). Cut back insulation 4" from each end. Seal all insulation ends and joints vaportight.
- 2. Use the flexible connections to break direct sheet metal contact and to correct small misalignments. Do not use flexible runouts in place of elbows and/or fittings. Changes in direction shall not be more than 22.5° made with gradual sweep. Limit the flexible connection length to 18" maximum.
- 3. Securely fasten the flexible runouts to the ductwork. Slip the flexible connection over a 4" long matching sheet metal sleeve or fitting in the duct prepared with sealing compound. Clamp the flexible runout securely to the duct with a 1" wide, 18 gauge galvanized steel, bolted clamping collar. Reinforce the joint with sheet metal screws and sealing compound.
- 4. Where ductwork used with flexible connection is not to be insulated, use equivalent uninsulated flexible connection.

2.11 TURNING VANES

- A. Construct turning vanes of the same material as the ducts in which they are installed.
- B. Construct turning vanes for low and medium pressure systems of 20 gauge 316 stainless steel or the equivalent thickness for other duct materials as shown in the specification tables.
- C. Turning vanes shall be double vanes as manufactured by Ductmate or approved equal or shop fabricated turning vanes constructed to the same standards. Submit samples of shop-fabricated units for approval.
- D. Reinforce joints to frames for turning vanes for high-pressure system by welding or brazing.

2.12 ACCESS DOORS

A. Provide access doors in ductwork, equipment housings and connections thereto for access to all apparatus and accessories, air filters, coils, automatic controls, air monitoring and air flow devices, automatic dampers, damper motors, fire dampers, combination fire/smoke dampers and all other areas and equipment requiring periodic inspection or service.

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- B. Construct and install access doors of the same materials and to withstand the same test pressure without deformation, vibration or leakage as the ductwork and casings in which they are provided.
- C. Provide doors in insulated casings and insulated ductwork of the double insulated type with a minimum of 18 gauge sheet metal on both sides of a core of 6-pound density mineral fiber rigid insulation. Gasket doors airtight.
- D. Provide access doors in ductwork, which are less than 24" in height and two (2) CAM type latches.
- E. Provide access door, in casing and ducts 24" in height and over, with four (4) CAM type latches.

2.13 ACCESS PANELS

- A. Furnish access panels to the Contractor for installation, for access to all concealed valves and to all other concealed parts of the HVAC systems that require accessibility for the proper operation and maintenance of the systems.
- B. All access panels shall be located in closets, storage rooms and/or other non-public areas. Panels shall be positioned so that the equipment can be easily reached and the size opening shall be sufficient for this purpose (minimum 18" x 18"). When access panels are required in corridors, lobby or other occupied areas, they shall be located as directed by the Commissioner.
- C. Access panels shall be prime painted with cylinder lock and two (2) keys as manufactured by Milcor, or equal. Type shall be as follows:

1. Acoustical tile ceiling - Milcor Type "A"

2. Gypsum board surfaces - Milcor Type "K"

3. Masonry construction - Milcor Type "M"

2.14 BACKDRAFT DAMPERS

A. Provide balanced backdraft dampers of the self-operating type where indicated on the drawings. Frames of galvanized steel. Blades 1/8" thick aluminum, pivot rods 1/2" diameter cadmium plated steel. Bearings for pivot rods and tie bars to be of the self-lubricating type. Blades of the bulb type with vinyl stripping on the edge for tight closing. Maximum blade length 44"; for dampers wider than 44", use multiple sections with the frames full height for stability. Blades to have brackets with tie bar of 1 1/4" x 1/4" aluminum. Dampers must shut tight under all operating conditions.

2.15 AIR CHAMBERS AND PLENUMS

A. Provide air chambers and plenums for exhaust or return fans of "Single casing" construction of No. 16 gauge galvanized iron braced and stiffened on the outside by means of 2" x 2" x 1/4" steel angles, or with standing seam panels not to exceed 26" in width. Provide standing seams with additional right angle bend and cap with No. 18 gauge galvanized "U" cap over entire length of seam.

B. Provide discharge and intake air chambers and plenums required herein for connecting up the fresh air intake openings to the various systems as shown on the Drawings, of No. 16 gauge galvanized sheet steel construction, braced and stiffened on outside by means of 2" x 2" x 1/4" steel angles, or with standing seam panels not to exceed 26" in width. Standing seams shall have additional right angle bend and shall be capped with No. 18 gauge galvanized "U" cap over entire length of seam. Provide drain pan construction for air intake and discharge plenums bottom portion of 16 gauge aluminum sheet metal constructed and braced to support a man's weight with (2) coats mastic sealant all joints. Pitch bottom of plenums connected to outdoors for drainage.

2.16 COMBINATION FIRE/SMOKE DAMPERS

- A. Provide at locations shown on plans or as described in schedules, combination fire/smoke dampers meeting or exceeding the following specifications. Each combination fire/smoke damper shall be 1 ½ hour fire rated under UL standard 555, and shall further be classified by Underwriters Laboratories as a leakage rated damper for use in smoke control systems under the September 1983 or latest version of UL 555, and bear a UL label attesting to same. Damper manufacturer shall have tested, and qualified with UL, a complete range of damper sizes covering all dampers required by this specification; having a single damper size tested and UL qualified is not acceptable. The leakage rating under UL555S shall be no higher than leakage class 1 (4 cfm/sq. ft. at 1" w.g.).
- B. As part of the UL classification, dampers shall have demonstrated a capacity to operate (to open and close) under HVAC system operating conditions, with pressures of at least 4" w.g. in the closed position, and 3,500 fpm air velocity in the open position.
- C. In addition to the leakage ratings already specified herein, the smoke dampers and their operators shall be qualified under UL555S to an elevated temperature of 250°F or 350°F depending upon the operator. Appropriate electric/pneumatic operators shall be installed by the damper manufacturer at time of damper fabrication OR damper and operator shall be supplied as a single entity, which meets all applicable UL555S qualifications for both dampers and operators.
- D. Firestat: Each combination fire/smoke damper shall be equipped with a UL Classified Firestat. Firestat shall function to electrically lock damper in a closed position when duct temperatures exceed 165°F and still allow appropriate authority to override Firestat and operate damper as may be required for smoke control functions. The high limit sensor shall prevent the damper from reopening when duct temperature exceeds 350°F. Firestat package shall include a damper position indicator switch package linked directly to damper blade to provide capability of remotely indicating damper position. One switch shall close when damper is fully open; the other switch shall close when damper is fully closed. Firestat and position indicator switches shall be capable of interfacing electrically with smoke detectors, building fire alarm systems, and remote indicating/control stations.
- E. Overide Dampers for purging which are from a central fire command station shall be provided with a 165f heat sensor with normally closed contacts to close damper or a PRESETTABLE BIMETALLIC link which opens on temperature reaching 165f permitting damper to close and lock it open.

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F. Provide end switches.

G Dampers shall be manufactured by Ruskin, Pottorff,, Greenheck or approved equal..

PART 3 EXECUTION

3.1 INSTALLATION OF DUCTWORK

- A. Adhere to drawings as closely as possible. The right is reserved to vary the runs and sizes of ductwork and to make offsets, where necessary to accommodate conditions arising at the building. Coordinate duct installation with installation of accessories, dampers, coil frames, equipment, controls and other associated work of ductwork system.
- B. Provide all ductwork built with approved joints and seams smooth on the inside and a neat finish on the outside. Duct joints as near airtight as possible with laps made in the direction of airflow and no flanges projecting into the air stream. Provide ducts adequately braced to prevent vibration; additional bracing shall be provided where necessary.
- C. Ducts shall be securely fastened to the building construction. Provide all hanger inserts as required. Inserts shall be approved for use. Contractor shall furnish and install supplementary steel as required to support ductwork. Strap or trapeze hangers may be attached to building steel using approved bolted beam clamps. Where ductwork is covered in vermiculite plaster, wire lath or lead wrapping, provided additional duct hangers and inserts as required.
- D. All ducts passing through floors shall have an angle iron flange around the floor at the duct opening to act as a dirt seal and duct support. Openings between floor and duct shall be sealed airtight. Where ducts pass through interior partitions and exterior walls, conceal space between construction opening and duct or duct-plus-insulation with sheet metal flanges of same gauge as duct. Overlap opening on four sides by at least 1 1/2".
- E. Do not run ductwork through electrical equipment spaces, above electrical panels, transformer vaults or enclosures.
- F. Provide No. 18 gauge galvanized iron safing around all ducts which, penetrate floor slabs, completely closing off shafts terminating at mechanical room walls, floors and ceiling slabs.
- G. Seal all joints airtight with 3M Co. Type EC-800 sealing compound. Where the duct is pierced for any reason, seal with 3M Co. Type EC-800 sealing compound.
- H. Adequate space shall be provided around all ductwork to permit installation of insulation when specified.
- I. Whenever it is necessary to penetrate the ductwork, with piping or structures, the Contractor shall receive permission from the Commissioner. Streamliner fittings, as detailed in the SMACNA Manuals shall be adhered to.
- J. Except as otherwise indicated, all angle irons required for any ductwork construction and supporting shall be galvanized.
- K. Exact dimensions of register boxes must await approval of grilles, and exact locations shall be submitted for approval; otherwise, any changes directed after installation shall be made without

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- additional cost. All register boxes and other openings of the ductwork must be tightly closed during construction to keep out rubbish.
- L. Care shall be taken to prevent metal scraps and debris from entering the ductwork. All foreign material shall be removed from the duct prior to installation and after installation. During construction, all open ends of ductwork shall be covered with canvas.
- M. Do not suspend any device or work items installed by <u>any</u> trade from ductwork (for example lighting conduit, lighting fixtures, piping, ceiling construction, etc.).
- N. Where duct risers are indicated to be offset from shaft to shaft, wrap the entire horizontal offset in a 2-hour fire resistant duct wrap (see Section 230700).
- O. Where duct penetrate mechanical room floor slabs, provide a 4" concrete curb around duct penetration.

END OF SECTION

SECTION 233117

ACOUSTICAL TREATMENT

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 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project:
 - 1. The Contract Drawings
 - 2. The Specifications
 - 3. The General Conditions
 - 4. The Addendum
 - 5. The Contract [City of New York Standard Construction Contract].

1.3 WORK INCLUDED

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the Acoustical Treatment work as shown on the drawings and specified herein, including, but not limited to, the following:
 - 1. Sound linings.

1.4 RELATED WORK

- A. Sheet metal ductwork.
- B. HVAC equipment.
- C. Diffuser, grilles and registers.

1.5 QUALITY ASSURANCE

- A. Applicable Standards:
 - 1. ASHRAE Standard 36-72, NFPA 90-A.
 - All insulation, and adhesives including fittings and butt strips, shall have non-combustible fire and smoke hazard system rating and label as tested by ASTM E-84, NFPA 255 and UL 723 not exceeding Flame Spread 25, Smoke Developed 50.

- 3. UL 18 ASTM C 1071 ASTM G21 and G22.
- 4. Accessories such as adhesives, mastics, cements, tapes and cloth for fittings shall have the same ratings as listed above.
- 5. All products or their shopping cartons shall bear the Underwriters' label indicating that flame and smoke ratings do not exceed the above criteria.
- B. Acoustical Performance Warranty: Guarantee that all equipment will comply with applicable noise level limits specified, when tested in accordance with standards. Provide compliance with applicable noise limits. For equipment operation at pressures, flows, etc., as per plans and specifications.

1.6 SUBMITTALS

- A. Product Data: Manufacturer's data sheets.
- B. Instructions: Erection and installation instructions.
- C. Test Reports: Factory performance data anti-microbial agent tests and field tests.
- D. Certification: Submit certified test data for sound power produced by fans, grilles, registers, diffusers. Measurements in accordance with above standards.

1.7 DELIVERY, STORAGE & HANDLING

- A. Deliver materials protected and undamaged with cartons labeled as to manufacturer and contents.
- B. Store materials in locations and in a manner to protect same from damage of any kind.
- C. Acoustic material and acoustic material installed within ductwork, sound attenuators, air handling equipment, etc. can absorb damaging moisture and become soiled when shipped and if left outdoors prior to being installed. Absorbed moisture can foster biological growth and can lead to indoor air quality problems at a later date. To minimize damage all such material or equipment shall be shrink-wrapped prior to shipment from the factory. The shrink-wrap shall only be removed once the materials and equipment have been move into enclosed spaces within the building.

PART 2 PRODUCTS

2.1 ACOUSTICAL PERFORMANCE REQUIREMENTS

- A. Noise levels of air conditioning and/or ventilating equipment ducts, units, grilles, registers and diffusers to conform to the following NC curves per ASHRAE.
 - 1. All spaces other than Mechanical RoomsNC-35

2.2 LOW VELOCITY DUCT AND PLENUM LINING (CELL FOAM)

- A. Duct and plenum liner shall be a fiber-free, flexible cell foam thermal and acoustical insulation, black in color, 2" thick as herein specified. Liner shall have a density of 3 to 6 lbs/cu. ft and "K" value of 0.25 at 75°F mean temperature.
- B. Liner shall be manufactured without the use of CFCs, HFCs or HCFCs. Liner shall be provided with a scrim-reinforced pressure sensitive acrylic adhesive (PSA) and tear-resistant release liner on the opposite side
- C. Liner shall be non-porous, non-fibrous and resistant to mold growth. An EPA registered and approved antimicrobial agent shall be incorporated into the product for additional protection against mold, fungal and bacterial growth.
- D. Liner shall be listed as mold resistant.
- E. Liner shall meet the flammability requirements of UL94-5V/ASTM E84, 25/50 for nominal 1" and below.
- F. Liner shall meet the requirements of NFPA 90A and 90B for air distribution systems and UL 181 for mold growth and air erosion at 10,000 FPM.
- G. Liner shall meet the requirements of ASTM C411 for high temperature thermal insulation and ASTM C 1534 for use in air plenums.
- H. Where acoustic lining is specified thermal insulation may be deleted if the acoustic lining meets the minimum R-value requirements of the New York City Energy Conservation Construction Code (NYCECCC). If the thickness specified for acoustic performance does not meet the thermal performance, increase the thickness of the acoustic lining accordingly or provide additional external thermal insulation.
- I. Liner shall be applied with current water-based adhesives and secured with metal fasteners in accordance with SMACNA guidelines "HVAC Duct Construction Standards, Metal and Flexile". If installed with manufactured provided adhesives, no pinning shall be required.
- J. Liner shall have the following minimum sound absorption co-efficients:

Thickness	125 HZ	250 HZ	500HZ	1000HZ	2000HZ	4000HZ	NRC
1"	0.08	0.22	1.03	0.37	0.68	0.50	0.60

- K. Schedule: As a minimum, acoustically line the following unless otherwise noted:
 - 1. Line Ductwork with 2" liner where indicated on drawings.
- L. Duct liner shall be AP Coilflex as manufactured by Armacell, K-FLEX, AEROCEL or approved equal.
- 2.3 PERFORATED METAL LINER (where fiberglass duct liner is used)

- A. Provide a 22 gauge inner perforated metal liner over acoustic lining.
- B. In addition to perforated metal liner, cover acoustic lining with mylar-type covering having the required flame and smoke rating.

2.4 SOUNDPROOFING METHOD

- A. Soundproofing construction is required for opening between ductwork and all walls, floors, ceilings.
- B. Openings to be filled with fibrous-glass blanket or board for full depth of penetration; caulk each side of opening with permanently elastic, non-aging caulking compound.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Dimensions of lined ducts indicated are the inside dimensions of the duct after the liner has been installed.
- B. Adhere liner with 100% coverage of adhesive.
- C. Mechanical fasteners which do not pierce the sheet metal:
 - 1. On 16" centers on top sections when widths exceed 12".
 - 2. On sides when heights exceed 24".
 - 3. Weld pins and 2" diameter washers. Edges coated with sealant.
- D. Abutting edges of acoustic linings, folded under and stapled to ensure that raw edges are sealed.
- E. Install exposed edges of acoustic linings provided with sheet metal nosing.

3.2 SOUNDPROOFING CONSTRUCTION

- A. Required for penetrations of ductwork, pipes and conduits through walls, floors and ceilings of mechanical rooms and Sound-Critical Spaces (Theaters, rehearsal space, control rooms), 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. Ductwork:

- a. Install a metal sleeve at the penetration. Size the sleeve to allow for 1" thick sheet insulation and normal duct clearances. Line the sleeve with 1" thick elastomeric closed cell neoprene sheet insulation (AP Armaflex Sheet and Roll Insulation from Armstrong, or approved equal.
- b. Install duct 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 duct to wall with angles.

2. Pipe/Conduit diameter = 1" or larger:

- a. Install metal sleeve at the penetration. Size the sleeve to allow for 1/2" thick pipe insulation and normal pipe clearances. Line the sleeve with 1/2" thick elastomeric closed cell neoprene pipe insulation (AP Armaflex SS Self-Seal pipe insulation from Armstrong, or approved 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.

3. Pipe/Conduit diameter < 1":

- a. Wrap pipe/conduit with 1/2" thick elastomeric closed cell neoprene pipe insulation (AP Armaflex SS Self-Seal Pipe Insulation from Armstrong, or approved equal). Extend wrapping a minimum of 2" beyond the width of the partition on either side.
- b. Grout tightly to the neoprene pipe insulation on the pipe/conduit.
- c. Trim neoprene pipe insulation 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.

D Penetrations of Single Stud Drywall Constructions

1. Ductwork:

- a. Wrap duct with 1" thick elastomeric closed cell neoprene sheet insulation (AP Armaflex Sheet Insulation by Armstrong, or approved equal). Extend sheet insulation a minimum of 2" beyond the width of the partition on either side.
- b. Install drywall tight to the sheet insulation.
- c. Trim sheet insulation to the width of the partition, and seal airtight with acoustical sealant or fire-rated acoustical sealant (3M Corportaion CP 25 or equal) if partition is fire-rated.
- 2. Pipe/Conduit diameter equal to 1" or larger:

- a. Wrap with 1/2" thick elastomeric closed cell neoprene pipe insulation (AP Armaflex SS Self-Seal Pipe Insulation by Armstrong, or approved equal). Extend wrapping a minimum of 2" beyond the width of the partition on either side.
- b. Install a metal pipe sleeve around and spackle tightly to a full thickness of partition.
- c. Install the drywall around the sleeve and spackle tightly to full thickness of partition.
- d. Trim pipe insulation 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.

3. Pipe/Conduit diameter less than 1".

- a. Wrap with 1/2" thick closed cell neoprene pipe insulation (AP Armaflex SS Self-Seal Pipe Insulation by Armstrong, or approved equal). Extend wrapping a minimum of 2" beyond the width of the partition on either side.
- b. Install the drywall tight to the neoprene pipe wrap.
- c. Trim neoprene insulation 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.

E. Multiple Duct/Pipe/Conduit Penetrations

- 1. 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.
- 2. Multiple duct/pipe/conduit penetrations at one location (i.e. one large opening for a series of pipe runs) is not recommended.
- F. Penetrations of Double-Wythe Masonry/Concrete and/or Double Stud Drywall and/or Combination Constructions
 - Use same techniques described above EXCEPT do not bridge the two studs or withes with solid members such as sleeves or stud frames. Each sleeve or frame must be completely separate for each individual wythe or stud.

3.3 DUCTWORK ENCLOUSURE FOR SOUNDPROOFING

- A. Where indicated on drawings, duct shall be enclosed on all four sides (or air-tight to the slab above) with a separate 2-1/2" sheet stud filled with 2" thick, 3 pound density fiberglass and covered with 2 thicknesses of 5/8" thick gypsum wallboard. Wherever possible, joints between the base and face layers shall be staggered by a minimum of 6 inches. All gypsum board joints on both the base and the face layers shall be taped. Use acoustical caulking to seal all interfaces with structure. Treatment shall be applied to elbows, transitions, branch-takeoffs, etc. that are included in the applicable duct section.
- B. Where access is required, approved gypsum board covered metal access panels shall be installed with perimeter gaskets.

C. Where enclosure intersects a metal deck, insure that the gypsum wallboard is cut to the shape of the flutes and caulked air-tight.

END OF SECTION

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SECTION 233713 GRILLES, REGISTERS AND DIFFUSERS

PART 1 GENERAL

GENERAL REQUIREMENTS 1.1

Work of this Section, as shown or specified, shall be in accordance with the requirements of the A. Contract Documents.

RELATED DOCUMENTS: 1.2

- The following documents apply to all required work for the Project: A.
 - 1. The Contract Drawings
 - 2. The Specifications
 - 3. The General Conditions
 - 4. The Addendum
 - 5. The Contract [City of New York Standard Construction Contract].

WORK INCLUDED 1.3

Provide where shown on the drawings all metal diffusers, grilles and registers of the sizes and A. capacities indicated.

RELATED WORK 1.4

Sheet metal ductwork. A.

1.5 **SUBMITTALS**

- Shop Drawing: Shop retail drawings indicating location and anchoring methods. A.
- B. Product Data:
 - 1. Manufacturer's printed data, catalog cuts and schedule.
 - 2. Submit engineering data in a manner to facilitate convenient review of the following factors.
 - 3. Aspiration ability, including temperature and velocity transverse, throw and drop of each unit, noise criteria ratings for each unit, sizes, free area and quality of construction.
- Samples, when requested. C.
- Instructions: Erection and installation instructions. D.

PART 2 PRODUCTS

2.1 MATERIALS

- A. All grilles, diffusers, and registers located within the Aquarium space shall be made of 316 stainless steel.
- B. Select ceiling diffusers and top registers to diffuse the air uniformly throughout the occupied space, and to comply with noise criteria specified under acoustical treatment section. The air shall be diffused at the 5' level to a velocity of not greater than 50 fpm and a temperature differential of not greater than 2°F, when compared with mean room temperature.
- C. Provide all ceiling diffusers with an equalizing deflector and opposed blade volume damper.
- D. Provide air return ceiling outlets with opposed blade dampers.
- E. All diffusers, grilles and registers, unless otherwise noted, shall be factory coated with baked enamel finish of color to be selected by Commissioner. All grilles and registers shall be furnished with a 1/4" sponge rubber gasket around the grille frame.
- F. Exceptions to foregoing types of grilles, registers and diffusers shall be as indicated on the drawings.
- G. In all cases, a schedule of grilles, diffusers and registers shall be prepared and submitted to the Commissioner for approval of size and design of outlets before they are ordered for installation.
- H. Each air supply outlet shall have the required capacity and shall be guaranteed to give the required draft with draftless diffusion.
- I. Install all air outlets, supply, return and exhaust, in the exact locations indicated on the architectural reflected ceiling plans.
- J. All air outlets shall be provided with border frames to match ceiling, soffit or wall construction, and as approved by the Commissioner.
- K. All air distribution equipment shall be as manufactured by Price, Anemostat, Titus or approved equal.
- 2.2 SCHEDULE (models based on Anemostat, acceptable manufacturer's listed in 2.1, k)
 - A. Ceiling exhaust registers (CR) shall be Model S3HD with Model OB-1 opposed blade damper. All registers shall be 316 Stainless steel.
 - B. Linear ceiling diffusers shall be Model SLSD with frame and border to match ceiling construction, slot sizes and number as indicated on drawings. Provide cable operated dampers, Model OBASL with a minimum 3 feet of cable. See floor plans for actual cable lengths. All Liner ceiling diffusers shall be 316 Stainless Steel.

- Top supply registers (TR) shall be Model S2V with Model OB-1 opposed blade damper. All C. registers shall be 316 Stainless steel.
- Top return registers (TR) shall be S3HD with Model OB-1 opposed blade damper. All registers D. shall be 316 Stainless steel.

ACOUSTICAL PERFORMANCE REQUIREMENTS 2.3

- Noise levels of air conditioning and/or ventilating equipment ducts, units, grilles, registers and A. diffusers to conform to the following NC curves per ASHRAE:
- Grilles, Registers and Diffusers: Maximum permissible sound power levels in octave bands B. where operated in an installed condition per plans and specifications:

Octave Band	Maximum PWL re: 10-12 watts (NC-35)
1	64
2	56
3	49
4	46
5	43
6	42
7	41
8	42

PART 3 EXECUTION

INSTALLATION 3.1

- Install grilles, registers and diffusers in accordance with approved detail installation drawings A. and manufacturer's recommendations.
- Install and locate per Architectural Drawings. В.

END OF SECTION

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SECTION 237000

HVAC 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.

1.2 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project:
 - 1. The Contract Drawings
 - 2. The Specifications
 - 3. The General Conditions
 - 4. The Addendum
 - 5. The Contract [City of New York Standard Construction Contract].

1.3 WORK INCLUDED

- A. Work of this Section includes all labor, materials, equipment and services necessary to furnish and install the HVAC equipment as shown on the drawings and specified herein, including, but not limited to, the following:
 - 1. Vertical steam boilers
 - 2. Boiler feedwater pumps
 - 3. Air handling
 - 4. VRF split air conditioning system
 - 5. Radiators.
 - 6. Exhaust fans
 - 7. Steam heating coil
 - 8. Energy Recovery Unit
- B. Access into the building is limited. It is the Contractors responsibility to determine how equipment can be disassembled for entry into the building. Equipment shall be disassembled into individual components for entry into the building or its location in the building. The

equipment shall then be reassembled. A factory representative shall issue a certification report that the equipment has been reassembled and all warranties will be honored.

1.4 RELATED WORK

- A. HVAC equipment.
- B. Automatic Temperature Controls.
- C. Sheet Metal Ductwork.
- D. Piping.
- E. Vibration Control and Seismic Restraint.
- F. Motors and starters.
- G. Electrical specifications for installation of motor starters and power wiring.

1.5 QUALITY ASSURANCE

- A. ANSI, ARI, ASME, AMCA, ASHRAE, ICC, NFPA, UL.
- B. Comply with requirements of all governing authorities having jurisdiction.

1.6 SUBMITTALS

- A. Make submittals on all items listed above in Article 1.03, Work Included.
- B. Shop drawings indicating size, location, details and installation requirements.
- C. Product Data: Manufacturers' printed data, catalog cuts, test data, performance curves, manufacturer's recommendations.
- D. Wiring Diagrams: Submit manufacturer's electrical requirements for power supply wiring for HVAC equipments. Submit manufacturer's ladder-type wiring diagrams for interlock and control wiring. Clearly differentiate between portions of wiring that are factory-installed and portions to be field-installed.
- E. Operational and Maintenance Manuals: Manufacturer's instructions for operation and maintenance.

1.7 ENERGY RECOVERY UNIT

A. Quality Assurance

 The energy recovery cores used in these products shall be third party Certified by AHRI under its Standard 1060 for Energy Recovery Ventilators. AHRI published certifications shall confirm manufacture's published performance for airflow, static pressure, temperature and total effectiveness, purge air (OACF) and

- exhaust air leakage (EATR). Products that are not currently AHRI Certified will not be accepted.
- 2. Manufacturer shall be able to provide evidence of independent testing of the core by Underwriters Laboratory (UL), verifying a maximum flame spread index (FSI) of 25 and a maximum smoke developed index (SDI) of 50 thereby meeting NFPA 90A and NFPA 90B requirements for materials in a compartment handling air intended for circulation through a duct system. The method of test shall be UL Standard 723.
- 3. Unit shall be Listed under UL 1812 Standard for Ducted Air to Air Heat Exchangers. Some exceptions to UL Listing may apply.
- 4. The ERV core shall be warranted to be free of manufacturing defects and to retain its functional characteristics, under circumstances of normal use, for a period of ten years from the date of purchase. The balance-of-unit shall be warranted to be free of manufacturing defects and to retain its functional characteristics, under circumstances of normal use, for a period of two years from the date of purchase.

PART 2 PRODUCTS

2.1 AIR HANDLING EQUIPMENT – GENERAL REQUIREMENTS

- A. Construct all apparatus of materials suitable for the conditions encountered during operation.
- B. Where corrosion can occur, appropriate corrosion-resistant materials and assembly methods must be used including isolation of dissimilar metals against galvanic interaction.
- C. All factory-applied acoustical and thermal insulation, including faceting and adhesives, shall be fire-resistant and to conform to requirements of NFPA and local codes.
- D. Where in contact with the air stream, protect insulation against erosion or flaking by a factory-applied plastic or mat facing.
- E. Locate and arrange motors, eliminators, filters, cooling and heating coils and other components and accessories so that they are accessible for repair, maintenance and replacement.
- F. Mount grease fittings directly on bearings unless the latter are not readily accessible. Where equipment bearings are not visible or are inaccessible, provide easily accessible extensions to bearing lubrication fittings.
- G. Thoroughly clean the entire system before installing filters or operating the fans.
- H. On systems containing filters, install filters and permanently seal the filter frames airtight before operating the fans. The Contractor, at his own expense, shall replace all dirty filters before turning over the system to the City of New York.
- I. Furnish a second set of sheaves and belts of the diameters required for Final System Balancing as specified in Section 230593 and install same if required. If a sheave and belt change is not required, a duplicate set of sheaves and belts shall be turned over to the City of New York.

- J. Insulation and acoustic material within air handlers can absorb damaging moisture and become soiled when shipped and if left outdoors prior to being installed. Absorbed moisture can foster biological growth and can lead to indoor air quality problems at a later date. To minimize damage all air handling equipment shall be shrink-wrapped prior to shipment from the factory. The shrink-wrap shall only be removed once the units have been move into enclosed spaces within the building.
- K. Steam heating coils in air handling casings shall be mounted a minimum of 30" above floor to bottom of coil. Mounting height in all cases shall be adequate to permit return of condensate.

2.2 **AIR HANDLING UNITS**

A. Provide factory-built and factory-tested air handling units as indicated, of sizes, configuration, and capacities as scheduled, and as specified herein. Units shall consist of fan section, coil sections, adjustable fan motor mounting, and drain pan.

B. Unit Casing

- 1. Construct casings of 18 gauge minimum mill galvanized steel, designed to withstand specific operating pressures. Provide casing panels and/or access doors that are easily and quickly removable for inspection and access to internal parts. Lifting brackets shall be factory installed on single piece units. On multiple section units, removable lifting hangers shall be provided to permit unit to be lifted without slings.
- C. Provide sloped, self-cleaning stainless steel drain pan, located under cooling coil section and humidifier section, extensive enough to catch condensate leaving coil at highest catalogued face velocity. Provide at least one drain connection at low point in drain pan. Provide reinforced points of support for either setting or hanging units. Coil and fan sections shall be insulated with 2-lb. density fiberglass insulation. Drain pans shall be insulated with 5/8" foil-faced foam insulation.

D. Coils:

- 1. Coils shall be designed with continuous configured aluminum plate fins and seamless 5/8" O.D. copper tubes, .025" thick.
- 2. Fins shall have collars drawn, belled and firmly bonded to the tubes by means of mechanical expansion of the tubes. No soldering or tinning shall be used in the bonding process. Coils shall have a galvanized steel casing. Coils shall be mounted in the coil casing with the same end connections to be accessible for service and can be removed from the unit through the roof, pipe chase or fan door. Capacities, pressure drops and selection procedure shall be certified in accordance with ARI Standard 410-72.
- 3. All coils shall be of the cartridge type, removable from coil connection side of casing and supported in tracks over the entire length of the coil.
- 4. Provide individual casing for coils as required. Design internal structure of coil section to allow for removal of coils, and provide suitable baffles to assure no air bypass around coils. provide Stainless steel coil casings.

- 5. Steam Heating Coils (Non-Freeze Type): Reheat Position
 - a. Non-freezing steam coils (Type NS) shall be pitched in unit casing for proper drainage.
 - b. Coils shall be double tube type having accurately sized steam distribution tubes and evenly spaced orifices.
 - c. Orifices shall discharge steam in the direction of condensate flow to ensure even distribution of steam over full length of each tube.
 - d. Coils shall be proof (150 psig) and leak (100 psig) tested with air pressure under water.

6. Chilled Water Coils:

- a. All coils shall be enclosed in an insulated coil section.
- b. Coil headers and U-bends shall not be exposed.
- c. All cooling coils shall be proof (300 psig) and leak (200 psig) tested with air pressure under water.

E. Fan Section:

- 1. Provide fan specifically designed and suitable for the class of service indicated. Fan shall be Forward curved.
- 2. Provide adjustable motor base, adjusted with mounting bolts to provide variation in center distance. Provide locking nuts, or similar devices, to secure base in proper position. Provide belt-driven fans with adjustable pitch pulley permitting fan speed to be varied. Select pulley for midpoint of adjustable range.
- 3. Design fan shafts so as not to pass through first critical speed when unit comes up to rated FPM.
- 4. Provide grease lubricated fan bearings with externally accessible fittings for lubrication.
- 5. Statically and dynamically balance fan assemblies in fan housing after final assembly.
- 6. Provide unit with factory-supplied variable frequency speed drives, controlled by factory-furnished static pressure sensor for duct mounting. Drive shall conform to requirements of Section 230513.
- 7. Provide High efficiency motors

F. Filters:

1. Provide factory built flat filter section complete with Class I filters as specified herein. The filter area shall be as scheduled.

2. Disposable Type:

- a. Provide disposable type air filters 2" thick, consisting of viscous coated fibers media encased in fireboard cell sides having perforated metal grids on each side to provide media support.
- b. Provide filters with clean resistance not exceeding 0.10" w.g. at face velocity of 300 fpm, and ASHRAE weight resistance efficiency of Merv 8, based on final operating resistance of 0.5" w.g.
- G. Provide mixing boxes of physical size to match basic unit, and include equal-sized flanged openings capable of handling full airflow. Arrange openings as indicated. Provide dampers of balanced construction, rotating in centered bronze or nylon bearings.
- H. Units shall be manufactured by Johnson Controls, Carrier, McQuay, Trane, or approved equal.

2.3 ENERGY RECOVERY UNIT

A. Energy Transfer

1. The ERV shall be capable of transferring both sensible and latent energy between airstreams. Latent energy transfer shall be accomplished by direct water vapor transfer from one airstream to the other, without exposing transfer media in succeeding cycles directly to the exhaust air and then to the fresh air.

B. Passive Frost Control

1. The ERV core shall perform without condensing or frosting under normal operating conditions (defined as outside temperatures above -10°F and inside relative humidity below 40%). Occasional more extreme conditions shall not affect the usual function, performance or durability of the core. No condensate drains will be allowed.

C. Continuous Ventilation

1. Unit shall have the capacity to operate continuously without the need for bypass, recirculation, pre-heaters or defrost cycles under normal operating conditions.

D. Positive Airstream Separation

- 1. Water vapor transfer shall be through molecular transport by hydroscopic resin and shall not be accomplished by "porous plate" mechanisms. Exhaust and fresh airstreams shall travel at all times in separate passages, and airstreams shall not mix.
- 2. Unit shall be set up to provide zero cross contamination between air streams.

E. Laminar Flow

1. Airflow through the ERV core shall be laminar over the products entire operating airflow range, avoiding deposition of particulates on the interior of the energy exchange plate material.

F. Construction

- 1. The energy recovery component shall be of fixed-plate cross-flow construction, with no moving parts.
- No condensate drain pans or drains shall be allowed and unit shall be capable
 of operating in both winter and summer conditions without generating
 condensate.
- 3. The unit case shall be constructed of G90 galvanized, 20-gauge steel, with lapped corners and zinc plated screw fasteners.
- 4. Access doors shall provide easy access to blowers, ERV cores, and filters. Doors shall have an airtight compression seal using closed cell foam gaskets. Pressure taps, with captive plugs, shall be provided allowing cross-core pressure measurement allowing for accurate airflow measurement.
- 5. Case walls and doors shall be insulated with 1 inch, 4 pound density, foil/scrim faced, high-density fiberglass board insulation, providing a cleanable surface and eliminating the possibility of exposing the fresh air to glass fibers, and with minimum R-value of 4.3 (hr·ft2·°F/BTU).
- 6. The ERV cores shall be protected by a MERV-8 rated, 2" nominal, pleated, disposable filter in both airstreams.
- 7. Unit shall have single-point power connection and a single-point 24 VAC contactor control connection.
- 8. Blower motors shall be Premium Efficiency, EISA compliant for energy efficiency. The blower motors shall be totally enclosed (TEFC) and be shall be supplied with factory installed VFDS.
- 9. Blowers shall be quiet running, forward curve type and be or belt drive. Belt drive motors shall be provided with adjustable pulleys and motor mounts allowing for blower speed adjustment, proper motor shaft orientation and proper belt tensioning.
- 10. The unit electrical box shall include a factory installed, non-fused disconnect switch and a 24 VAC, Class II transformer/relay package.
- 11. The ERV shall be provided "inverter-ready" allowing for applications of inverters supplied and installed by others.
- G. Required factory options
 Staten Island Zoo Aquarium Reconstruction
 CAPITAL PROJECT NUMBER: PV175AQUA

- 1. Provide double wall construction with 24-gauge galvanized steel liner.
- 2. Provide factory installed disconnect fuses.
- 3. Provide factory installed filter monitors for each airstream.
- 4. Provide MERV-13 filters for final installation after construction phase.
- 5. Provide factory installed Variable Frequency allowing either preset or variable speed operation with appropriate 0-10 volt DC or Direct Digital control signal.

H. Vibration Isolation

- 1. Provide rubber isolators appropriately sized for corner weights of the specific unit.
- 2. Provide flexible duct connections at unit duct flanges.
- I. Units shall be manufactured by Renewaire, Venmar, Trane, McQuay or approved equal.

2.4 VARIABLE REFRIGERANT FLOW (VRF) SYSTEM

A. System Description

- 1. The variable capacity, heat pump air conditioning system shall consist of outdoor unit, controller or 3-pipe refrigerant piping distribution, specialty refrigerant fittings, multiple indoor units and direct digital controls. System shall be capable of changing mode (cooling to heating, heating to cooling) with no interruption to system operation.
- 2. The entire system shall be from a single manufacturer.

B. Outdoor Unit

- 1. The outdoor units shall be equipped with multiple circuit boards that interface to the controls system and shall perform all functions necessary for operation. Each outdoor unit module shall be completely factory assembled, piped and wired and run tested at the factory.
- 2. All units requiring a factory supplied twinning kits shall be piped together in the field, without the need for equalizing line(s).
- 3. Outdoor unit shall have a sound rating no higher than 60 db(a) individually or 64 db(a) twinned. Units shall have a sound rating no higher than 50 db(a) individually or 53 db(a) twinned while in night mode operation.
- 4. Refrigerant lines from the outdoor unit to units shall be insulated.

- The outdoor unit shall have an accumulator with refrigerant level sensors and 5. controls.
- The outdoor unit shall have a high pressure safety switch, over-current protection, 6. crankcase heater and dc bus protection.
- The outdoor unit shall be capable of operating in heating mode down to -4°F ambient 7. temperature or cooling mode down to 23°F ambient temperature, without additional low ambient controls. If an alternate manufacturer is selected, any additional material, cost, and labor to meet low ambient operating condition and performance shall be incurred by the contractor.
- The outdoor unit shall not cease operation in any mode based solely on outdoor 8. ambient temperature.
- The outdoor unit shall have a high efficiency oil separator plus additional logic 9. controls to ensure adequate oil volume in the compressor is maintained.
- The casing(s) shall be fabricated of galvanized steel, bonderized and finished. 10.

11. Fan:

- Each outdoor unit module shall be furnished with one direct drive, variable a. speed propeller type fan. The fan shall be factory set for operation under 0 in. Wg external static pressure, but capable of normal operation under a maximum of 0.24 in. Wg external static pressure via dipswitch.
- All fan motors shall have inherent protection, have permanently lubricated b. bearings, and be completely variable speed.
- All fan motors shall be mounted for quiet operation. c.
- All fans shall be provided with a raised guard to prevent contact with moving d.
- The outdoor unit shall have vertical discharge airflow.
- R410a refrigerant shall be required for outdoor unit systems. 12.

Coil: 13.

- The outdoor coil shall be of nonferrous construction with lanced or a. corrugated plate fins on copper tubing.
- The coil fins shall have a factory applied corrosion resistant blue-fin finish. b.
- The coil shall be protected with an integral metal guard. c.
- Refrigerant flow from the outdoor unit shall be controlled by means of an d. inverter driven compressor.

e. The outdoor coil shall include 4 circuits with two position valves for each circuit, except for the last stage.

14. Compressor:

- a. Each outdoor unit module shall be equipped with inverter driven scroll hermetic compressors or a combination of invertor and non inverter-driven compressors.
- b. A crankcase heater(s) shall be factory mounted on the compressor(s).
- c. The outdoor unit compressor shall have an inverter to modulate capacity. The capacity shall be completely variable with a turndown of 19%-5% of rated capacity, depending upon unit size.
- d. The compressor will be equipped with an internal thermal overload.
- e. The compressor shall be mounted to avoid the transmission of vibration.

15. Electrical:

- a. The outdoor unit electrical power shall beas scheduled.
- b. The outdoor unit shall be controlled by integral microprocessors.
- c. The control circuit between the indoor units, be controller and the outdoor unit shall be 24vdc completed using a 2-conductor, twisted pair shielded cable to provide total integration of the system.

C. Air Handling Unit

- 1. The indoor unit shall be a ducted fan coil design with a fixed bottom return, a fixed vertical discharge supply, and a modulating linear expansion device. The unit shall have the capability to integrate into systems with various types of indoor units connected.
- 2. 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.
- 3. The cabinet shall be pre-painted, pre-insultated, 22 gauge galvanized steel.
- 4. Fan:
 - a. The indoor unit fan shall be an assembly with a single direct drive fan with a high efficiency dc motor.

- The indoor fan shall be statically and dynamically balanced and run on a b. motor with permanently lubricated bearings.
- The indoor unit shall have a ducted air outlet system and ducted return air c. system.
- The fan shall have 3-speeds with the capability to operate between 0.3-0.5 d. in.w.g. selectable.

Filter: 5.

Provide a filter rack and filter. a.

Coil: 6.

- The indoor coil shall be of nonferrous construction with smooth plate fins on a. copper tubing.
- The tubing shall have inner grooves for high efficiency heat exchange. b.
- All tube joints shall be brazed with phos-copper or silver alloy. c.
- The coils shall be pressure tested at the factory. d.
- A condensate pan and drain shall be provided under the coil. e.
- The condensate shall be gravity drained from the fan coil. f.

Electrical: 7.

The unit electrical power shall be as scheduled.

D. Controls

- Provide an integrated control system for each VRF system including individual wall-1. mounted Remote Controllers for each fan coil units capable of being interconnected with each respective outdoor condensing unit.
 - The manufacturer's unit controller shall be provided with a remote a. temperature sensor.
- The controls network shall operate at 24vdc. Controller power and communications 2. shall be via a common non-polar communications bus.

3. Wiring

Control wiring shall be installed in a system daisy chain configuration from a. indoor unit to remote controller to indoor unit, 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.

- b. Wiring shall be 2-conductor (16 awg), twisted shielded pair, stranded wire.
- E. The system shall be manufactured by LG, Daikin AC, Mitsubishi City Multi, or approved equal.

2.5 PUMPS – GENERAL REQUIREMENTS

- A. Construct all pumps of materials and pressure ratings suitable for the conditions encountered during continuous operation.
- B. Where corrosion can occur, appropriate corrosion-resistant materials and assembly methods must be used including isolation of dissimilar metals against galvanic interaction.
- C. Where components are or may come in contact, although the materials may basically be similar, use hardness differentials of at least 50 Brinnell to prevent seizure and reduce wear.
- D. Balance impellers and all other moving components statically and dynamically.
- E. Provide shaft packing or seals compatible with the pump design, fluid handled and in accordance with the manufacturer's recommendations.
- F. Provide pump with coupling and shaft guard in accordance with ANSI B15.1 Section 8.
- G. Match centrifugal pump impellers and casings so that at specified operating conditions the impeller diameter is not more than 72% of the cut water diameter of 85% of the maximum catalogued impeller size, whichever is less.
- H. Pumps must operate quietly, smoothly and stably without cavitation, pulsation, vibration or internal recirculation. Pump operating characteristic curves must meet the following requirements:
 - 1. The pump NPSH requirement must be less than the available system NPSH.
 - 2. The pump operating point must fall below the point of no flow head pressure.
 - 3. Pump shall be furnished to operate at or near the point of peak efficiency. Pump curve shall be continuously rising from design capacity up to shut-off point to ensure stable operation and prevent any possibility of hunting.
- I. Furnish pumps so that when operating at rated rpm the pump motor cannot be overloaded despite variations in pumping head over entire range of curve. Brake horsepower and motor horsepower shall conform with the equipment schedule. If a particular manufacturer's selection cannot conform to the above, any mechanical or electrical adjustments necessitated by a larger motor shall be at no cost to the City of New York and shall be subject to approval by the A/E.
- J. Where initial and ultimate operating conditions are specified, these shall be achievable by changing the pump impeller with no modifications to the casing.
- K. Provide namplates attached to pumping unit showing the following information:
 - 1. Maker's name, date of manufacturer, size and type.

- 2. Rated capacity, head and RPM at full load.
- 3. Rated horsepower, full load amperes.
- 4. Voltage, number of phases, frequency.
- 5. Temperature rise or class of insulation.
- 6. Service factor, if other than 1.0.
- 7. Impeller diameter, impeller model and stages.
- L. The variable speed pumping system shall be manufactured by Aurora Pump, Bell and Gossett, ABB or approved equal.
- M. Shafts shall be Type 316 stainless steel, ground smooth.
- N. Shaft seals shall be mechanical, hardened ceramic and carbon sealing faces.
- O. Bearing shall be oil lubricated, external cups.
- P. Couplings shall be self-aligning, flexible type.
- Q. Provide built-in motor thermal overload protection (with automatic restart).
- R. Pumps shall be rated for 100 psi and 225°F.

2.6 BOILER FEED PUMPS WITH RECEIVER

- A. Provide as indicated boiler feed pumps of capacity as scheduled, consisting of steel receiver, inlet strainer, multiple water pumps, water make-up assembly, NEMA 2 control panel, and accessories as specified herein. Factory-test complete unit and furnish certified test report, including NPSH characteristics.
 - 1. The unit shall be disassembled into individual components for entry into the boiler room. The unit shall then be reassembled. A factory representative shall issue a certification report that the unit has been reassembled and all warranties will be honored.
- B. Provide horizontal welded steel construction condensate receiver, elevated on fabricated steel frame. Equip with inlet cascade baffle; provide dished heads. Provide water level gauge, dial thermometer, companion flanges, and low-water cutoff switch. Provide isolation valve between receiver and each pump.
- C. Construct inlet strainer of cast iron, with removable screen and dirt pocket.
- D. Provide two-stage centrifugal design, permanently aligned and flange-mounted for vertical operation. Provide bronze fitted pump with enclosed bronze impeller, axial flow bronze first-stage impeller, bronze straightening vanes, renewable bronze case ring, and stainless steel shaft. Provide mechanical seals suitable for 250°F operation. Factory-assemble to fabricate steel frame, including pipe, fittings, and shutoff valve between each pump and receiver. Manifold

- pump discharges, including non-slam check valves, plug cocks, and automatic feed valves. Provide solenoid pilot valves connecting back to receiver.
- E. Provide a 1-inch extra heavy weight black steel connection from the pump discharge line back into the top of the receiver, equipped with gate valve and union type orifice designed to pass between 3 and 5 gpm when all boiler feed regulators are closed. Provide in parallel a pressure relief valve to relieve feedwater pressures to the motorized valve on reduction in boiler plant operation. Provide a bleeder cock on each boiler feed pump casing.
- F. Receiver of boiler feed pump set shall be of size listed on Drawings and shall be constructed of tank steel, with 5/16 inch shell and 3/8 inch heads unless otherwise noted on the Drawings. Provide outlets (as detailed on the drawings including but not limited to pump suction, vent, condensate returns, make-up, recirculating line, steam drips and two spares. Outlets shall be sized in accordance with the details on the Drawings. All lines discharging into the condensate receiver shall be terminated below the water level, approximately 6 inches from the bottom of the receiver. Supply an 18" diameter flanged access manhole in end of tank, two (2) overlapping gauge glasses, with guards and brass try-cocks and outlets.
- G. Suction line shall be not less than diameter of suction outlet fittings on pumps.
- H. Tank shall be installed with supports and saddles. Mount tank on steel saddles supported on steel supports. Saddles and supports shall be furnished and set by this Contractor. The tank shall be set high enough above the inlet of the new pumps to provide not less than the minimum net positive suction head required for proper pump operation.
- I. Supply automatic controllers complete with 3-valve bypass for make-up water supply to tanks. Controller and bypass shall be of full size of water supply outlet. Automatic make-up control shall open when water in the tank reaches a low level approximately 1 foot above bottom of tank and shall close at approximately 1 foot seven inches (1'-7") above bottom of tank. One of the bypass valves shall be used to fill the tank above the high level of the automatic valve. The automatic valve shall be McDonald Miller 25A, Watts Industries, Caleffi or approved equal. Size of valves shall not be less than 1-inch. Valve shall be rated for a maximum inlet pressure of 250 psi. Provide float low level controller and piping as detailed for BAS alarm.
- J. Supply in each discharge line a 4 1/2" diameter pressure gauge graduated 0 to 100 psi.
- K. Boiler feed water pumps shall be installed on 4" concrete pads.
- L. Provide NEMA 2 control panel mounted on receiver, factory wired, and enclosing the following:
 - 1. Combination magnetic starters for each pump, with overload relays, circuit breaker, and cover interlock.
 - 2. Automatic-Off-Continuous selector switch for each pump.
 - 3. Circuit breaker for control circuit with cover interlock.
 - 4. Numbered terminal block.
 - 5. Removable control mounting plate.

- 6. Control transformer.
- 7. Terminals on terminal block for remote annunciator to indicate when standby pump as been actuated.
- 8. Contractor shall provide control wiring and conduits from pump controller of each boiler through end switches of feedwater value to respective pump starters. Provide relays and pump selection switches.
- M. Units shall be manufactured by Shipco, Domestic Pump ITT, Dunham-Bush or approved equal.

2.7 BOILERS – GENERAL REQUIREMENTS

- A. Construct all apparatus of materials suitable for the conditions encountered during operation.
- B. Where corrosion can occur, appropriate corrosion-resistant materials and assembly methods must be used, including isolation of dissimilar metals against galvanic interaction. Resistance to corrosion must be achieved by the use of the appropriate base materials and coatings resorted to only when specifically permitted by the specifications.
- C. Match and balance all system components to achieve compatibility of equipment for satisfactory operation and performance throughout the entire operating temperature and control range. Installation shall be in accordance with manufacturer's recommendations.
- D. Provide all controls, wiring, piping, valves, tubing, accessories and other components necessary to make a complete operating system.
- E. Provide emergency boiler shut off breakglass stations at all entries or exits from the boiler room.
- F. Boilers shall be not less than the rating as shown, and the height shall fit the space available, leaving ample allowance for drawing tubes, smoke connections, piping, etc.
- G. Comply with all codes and regulations as follows:
 - 1. Construct, install, test and certify all equipment in accordance with requirements of all regulating bodies having jurisdiction and the recommendations of the equipment manufacturers.
 - 2. Construct and install boilers, safety devices, pressure vessels and all other components and accessories that fall within the scope of the ASME Boiler and Pressure Vessel Code to conform to the code and bear the code stamp.
 - 3. Construct and install fuel burning equipment and control devices to conform to the requirements of Factory Mutual, FIA.
 - 4. Combustion performance shall comply with NYC Environmental Protection air regulations and rules and NY state department of environmental conservation smoke and air pollution ordinances.

- 5. Construct and install electrical items to conform to National Fire Protection Association, and National Electrical Code and NEMA Standards.
- 6. Boiler and components shall comply with latest State Boiler Code.
- 7. Boilers and burners shall have been approved by the New York City Department of Environmental Protection (Air Resources). They shall also have been approved by the Materials and Equipment Acceptance (MEA) Division of the Department of Buildings. The MEA approval number shall be indicated on the shop drawings.

2.8 VERTICAL STEAM BOILER

- A. Provide a pre-piped, skid mounted system consisting of low pressure steam boiler system of a vertical tubeless steam boiler, fittings, gas burner equipment, gas train, controls and wiring. Equipment type and capacities shall be as scheduled.
 - 1. The unit shall be disassembled into individual components for entry into the boiler room. The boiler shall then be reassembled. A factory representative shall issue a certification report that the boiler has been reassembled and all warranties will be honored.
 - 2. Boilers shall be provided with a minimum 10 year warranty

B. BOILER CONSTRUCTION

- 1. The boiler shall be completely factory assembled as a self-contained unit. Each boiler shall be neatly finished, thoroughly tested and properly packaged for shipping.
- 2. The primary pressure vessel design and construction shall be in accordance with Section I of the ASME code for steam boilers. The maximum allowable working pressure shall be 100 psig. Boiler shall also comply with CSD-1 Code requirements.
- 3. The boiler will require a stack and any components associated with the stack to be rated for 1000° F. The boiler can draw combustion air from inside the boiler room or ducted outside air using Schedule 40 PVC or equivalent. The boiler shall be capable of operating with an exhaust draft of negative 0.02 to 0.04"WC.
- 4. The furnace shall be constructed of SA-53B ERW Pipe or SA-516 Grade 70 Plate.
- 5. The shell shall be constructed of SA-53B ERW Pipe or SA-516 Grade 70 Plate.
- 6. The heads shall be SA-516 Grade 70 Plate.
- 7. The boiler shall have a maximum width, including casing, not to exceed 26" and a stripdown height not to exceed 73.5". The boiler shall be capable of being maneuvered through a 36" doorway.

.C. BOILER DESIGN

1. The boiler shall be a vertical tubeless design. The burner location and firing method shall be such that combustion takes place within the water-backed furnace of the boiler.

- 2. Hand-holes and cleanout openings shall be provided at the lower part of the boiler so that the entire bottom of the boiler may be cleaned.
- 3. The boiler will make use of welded convection fins to enhance heat transfer and distribute the flow of flue gases.
- 4. All necessary refractories shall be installed in the boiler.
- 5. The boiler shall be insulated with compatible high temperature castable mixtures. Insulation thickness shall be a minimum of 3 1/2" thick.
- 6. The outside jacket shall be polished stainless steel. The remainder of the boiler shall be acid etched and receive a finish coat of paint.
- 7. The trim shall include a steam pressure gauge.

D. CONTROLS:

- 1. The flame safeguard shall be capable of providing full modulation and provide the following:
 - a. The control shall provide a 30 second pre-purge and 15 second post-purge time.
 - b. The control shall maintain a running history of operating hours, number of cycles, and the most recent 25 control lockouts.
 - c. The control is connected to a display module, which is capable of retrieving the information listed above.
- 2. Boiler shall be equipped with a 5.4" color touch screen HMI. The HMI shall:
 - a. Annunciate the most recent 100 control lockouts with time and date stamps.
 - b. Allow user to view Steam Pressure, Boiler Set Point, Boiler Status, % Modulation, Flame Signal, and Stack Temperature via the home screen.
 - c. Allow user to adjust boiler modulation / set point; view total number of boiler cycles; and view run hours.
- 3. Boiler shall be equipped for fully modulating operation with 4:1 turndown ratio. The blower—shall be controlled by a PWM signal. Published burner modulation configurations with turndown ratios greater than 4:1 must be proven in public field installations prior to the—purchase and installation of the boilers.
- 4. Compensation for changes in ambient temperature shall be performed automatically.
- 5. Boiler safety controls shall include:
 - a. Operating Pressure Controller for automatic start and stop.
 - b. High Limit Pressure Control.

- c. Two Low Water Cutoff Probes; auxiliary probe in the boiler shell, primary probe in the Water Column.
- d. Air Safety Switch to prevent operation unless sufficient combustion air is assured.
- e. Air Filter Switch to ensure sufficient air flow through filter.
- f. Flame detector to prove combustion.
- 6. All controls are to be panel mounted and located on the boiler as to provide ease of servicing the boiler without disturbing the controls. All controls shall be mounted and wired according to UL requirements. Electrical power supplied shall be 120/1/60.
- 7. Boilers shall be provide with the manufacturers multiple boiler sequencing controller. The controller shall be fully capable of controlling all boilers.

E. Control Panel:

- 1. One panel pack complete control center. All components shall be housed in a NEMA #1 enclosure and contain the following:
 - a. Magnetic across-the-line starters having 3 phase protection, running light, and circuit breaker with external operator and door interlock. One control circuit transformer. One set of relays for remote alarm. The entire panel will be a UL listed industrial control panel and bear the proper certification.

F. Wiring:

- 1. All wiring and panels shall be factory-installed in accordance with the New York City Electrical Code.
- 2. Wiring shall be installed in conduit and shall be neatly labeled.
- 3. Provide for a single point of connection. Provide all factory mounted transformers to provide control panel as required.

G. BURNER AND GAS TRAIN DESIGN

- 1. The gas burner shall be a low emissions type and the material shall be an alloy of Iron and Chromium (100S material type). The 100S material shall weigh 1.4 kg per square meter. The burner shall produce an even 360° flame pattern during combustion.
 - a. Burner shall be premix type and have a minimum turndown capability of 4:1.
 - b. Burner shall have no dampers or linkage.
 - c. Burner shall not require Flue Gas Recirculation.
- 2. The blower motor fan shall be D/C brushless, suitable for premix combustion, and shall be controlled by a variable speed drive.

- a. Burner shall have a minimum turndown capability of 4:1.
- b. Blower motor shall emit noise levels <70 db.
- 3. The boiler shall have an integral gas train, factory assembled and installed. The main gas train shall comply with the following:
 - a. Minimum incoming gas pressure shall be 4" w.c.; maximum incoming gas pressure shall be 14" w.c.
 - b. The gas train shall include an easily-tuned zero-governing pressure regulator and a dual safety shut-off main gas valve, integrated into a single body. The gas train shall also include high and low gas pressure switches.
 - c. Boiler shall initiate combustion with a natural gas pilot.
 - d. The gas train shall comply with current CSD-1 fuel train codes. Other code compliances available upon request.

H. BOILER FITTINGS

- 1. The boiler shall be supplied with an ASME Section I approved side outlet type steam safety relief valve. The safety relief valve shall be in accordance with ASME code requirements and set at 100 psi.
- 2. A water column shall be piped to the boiler at the factory. A gauge glass and drain valve will be supplied. The gauge glass shall be protected by four brass rods as an additional safety feature. The water column shall contain two water level probes, one to "start" and one to "stop" the feed water pump.
- 3. A steam pressure gauge shall be included with the boiler, mounted on the water column, and shall be complete with test connection.
- 4. Feed water stop and check valves shall be supplied at factory, and shall be piped in line to an internally baffled feed water connection in the boiler shell to prevent thermal shock.
- 5. Additional standard trim shall include Y-type slow opening blow down valve, fast opening blow down valve and water column blow down valve.

I. EMISSIONS

- 1. The low emissions burner shall be design certified to SCAQMD Rule 1146.2.
- 2. The low emissions burner shall be capable of operating at less than 20 ppm NOx, 50 ppm CO, corrected to 3% O₂ throughout the range of operation.

J. Multiple Boiler Sequencing Control

1. A sequencing control system shall be provided to stage and control firing rate of the boilers. To ensure proper integration with the steam boiler controls, the boiler

- manufacturer shall supply a Controller Sequencing Control System. The steam boilers shall be sequenced as follows to maximize their operating efficiency:
- 2. The control system shall monitor the steam header pressure using a pressure transducer supplied with the system. A PID Control Variable determines when the steam boilers will begin sequencing based on the difference between the actual header pressure and the steam pressure setpoint.
- 3. When a request for steam is determined by the Controller, the Lead Steam Boiler is energized. The initial firing rate (if applicable) is determined by the Lead Start Firing Rate variable set in the Lead/Lag configuration section.
- 4. If the steam pressure continues to decrease, the PID Control Variable will increase. The Lead Steam boiler's firing rate will reach 100% before the Lag Start CV value programmed. The Controller will enable a Lag Boiler when the Lag Boiler Start control variable value has been reached.
- 5. If additional steam is required, the Controller will enable each additional Lag Boiler stage determined by the Lag Stage Start CV value. Each Lag Stage will reach a 100% firing rate before the next stage is enabled.
- 6. As the steam pressure increases, the Controller will begin to decrease the firing rate and number of Steam boilers required to maintain the steam pressure
- 7. The Lead Boiler is disabled when the steam pressure reaches a selectable value referenced around the steam header setpoint.
- 8. The Sequencing Control System will be a microprocessor based Programmable Logic Controller with a Graphical User Interface and Touch Screen capabilities. Active display area will be a minimum of 4.7" with a display resolution of 320 x 240 pixels. Multiple Status and Configuration Screens will be available for easy interpretation of the steam loop status and configuration. The Controller enclosure will be NEMA 4X construction. Power required for the Controller will be 120/60/1.
- 9. The Controller will have the ability to communicate to a Building Management System using Modbus (RS-485) or accept a 4-20mA Remote Setpoint signal. BacNet and LonWorks protocols can be used through a gateway, if requested.
- 10. The Controller Sequencing Control shall include automatic rotation of the lead boiler based on a user configured cycle count.
- 11. Multiple setback schedules shall be available based on whether Normal or Setback mode is active. Mode selection shall be determined by a user defined Time of Day / Day of Week Touchscreen entry. The System Mode will automatically change between Normal and Setback based on the user programmed day and times. Manual Building Mode control shall also be available via a Setup menu. System Mode shall be indicated on the Loop Status Screen for ease of reference.
- 12. The Controller Sequencing Control will provide alarm annunciation of each Boiler connected to the network. The Controller will automatically adjust the boiler sequencing schedule and remove the boiler from the sequencing logic if an alarm occurs. The boiler

- will automatically be added back into the rotation loop as soon as the Controller senses that the alarm has been cleared.
- 13. The Controller will stage the boilers based on a PID generated value. The Proportional, Integral and Derivative values shall be user defined through the Lead/Lag Configuration Screen. Each boiler stage will be enabled based on a user defined "Percentage from Setpoint" control variable. Boiler Sequencing Start and Stop parameters shall be user defined through the operator interface. A Manual Reset parameter will be provided to allow the Proportional Band to be shifted around setpoint.
- 14. The Controller shall provide capabilities to Enable/Disable the boilers through the operator interface. Boilers that are disabled will not be included in the sequencing logic.
- 15. A user defined time delay parameter will be provided that delays enabling of the next boiler stage. This helps to decrease cycling of the boilers when the steam load is close to being met.
- K. Steam boiler and control system shall be manufactured by Fulton Steam Boiler, Latner, Hurst or approved equal.

2.9 CAST IRON RADIATOR

- A. Provide column type cast iron heating elements of the sizes, capacities and heating medium as indicated on plans and as scheduled and specified.
- B. Provide the appropriate length of right and left hand sub-assemblies for the complete assembly lengths as indicated on drawings.
- C. Provide all necessary right and left hand valve enclosures, end caps, splice plates and filler pieces for a complete finished assembly.
- D. Element shall be manufactured by Burnham, Weil-McLain, Governale or approved equal.

2.10 STEAM HEATING COILS (NON-FREEZE TYPE)

- A. Provide steam heating coils where shown on the drawings of sizes and capacities as scheduled and as specified. All coils to be of the steam distributing type, tube-within-a-tube construction, and guaranteed non-freeze. Provide coils with outlets for complete drainage of condensation from the coils and heated return headers.
- B. Each coil section to have its individual combination float and thermostatic trap.
- C. Construct coils of 5/8" O.D. copper tubes, .020" thick, with aluminum fins per manufacturer's standard.
- D. Orifices shall discharge steam in the direction of condensate flow to ensure even distribution of steam over full length of each tube.
- E. Mount coils in suitable galvanize steel flanged frame arranged for connection to unit casing. Provide additional steel supports as required to mount coils in arrangements as shown.

- F. Thoroughly test each coil before shipping. Coils shall proof at 300 psig and be leak tested with 200 psig air under water.
- G. Coils shall be manufactured by Trane, Aerofin, McQuay or approved equal.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS FOR ALL HVAC EQUIPMENT

A. Examination

- 1. Examine areas to receive equipment for compliance with requirements for installation tolerances and other conditions affecting performance.
- 2. Examine roughing-in for ductwork, piping, and electrical connections to verify actual locations before installation.
- 3. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Installation

- 1. Secure all equipment to building structure and install equipment in accordance with approved detail drawings, manufacturer's instructions, and all codes and regulations which apply.
- 2. Install all accessories not factory installed.
- 3. Install equipment level and plumb unless otherwise noted.
- 4. Install equipment with required access and clearances. If there are field condition that prevent providing access and clearances notify the A/E. If the equipment is installed before rectifying the access and clearance issues the Contractor shall be require to remove and re-install the unit as required and make any associated changes to the associated ductwork, piping, wiring and controls at no cost to the City of New York.
- Where required suspend equipment from structure or mount on concrete base or stand with vibration isolators. Vibration isolators are specified under Section "Vibration Isolation and Seismic Restraints."
- 6. Install sensors and controls supplied with the equipment and as called for under Sections related to Automatic Temperature Controls.

C. Connections

- 1. Piping and ductwork installation requirements are specified in other sections.
- 2. Drawings indicate general arrangement of piping, ductwork, fittings, and specialties. Arrange connections as per approved shop drawings.
- 3. Unless otherwise indicated, install shutoff valve and union or flange at each connection. Staten Island Zoo Aquarium Reconstruction

- 4. Install piping and ductwork adjacent to equipment to allow service and maintenance.
- 5. Ground equipment.
- 6. Tighten electrical connectors and terminals according to manufacturer's published torquetightening values.

D. Field Quality Control

- 1. Testing: Perform the following field quality-control testing and report results in writing:
- a. After electrical circuitry has been energized, start units to confirm proper motor.
- b. Test and adjust controls and safeties
- 2. Repair or replace malfunctioning units. Retest as specified above after repairs or replacements are made.

E. Cleaning

- 1. After installing units, inspect equipment for damage to finish. Remove paint splatters and other spots, dirt, and debris. Repair damaged finish to match original finish.
- 2. After installing equipment, clean internally according to manufacturer's written instructions.
- 3. Install new filters in air handling equipment within two weeks after start up.
- 4. Basket strainers shall be initially cleaned two week after start-up with a second cleaning two weeks after that. If there is still excessive debris in the strainers the Contractor shall being the water treatment subcontractor back to re-flush the system.

F. Start Up

- 1. Verify that equipment is installed and connected according to approved shop drawings and contract drawing.
- 2. Adjust flows and controls.
- 3. Test and adjust controls and safeties. replace damaged and malfunctioning controls and equipment.

G. Factory Start Up Service

- 1. Engage a factory-authorized service representative to perform startup service for the following equipment or as specified under Commissioning:
 - a. Air handling unit with
 - b. Energy Recovery Unit

- c. VRF air conditioning system
- d. Boilers
- 2. Inspect field-assembled components, equipment installation, and piping and electrical connections for proper assemblies, installations, and connections.
- 3. Complete installation and startup checks according to manufacturer's written instructions.
- 4. Prepare a written startup report that records results of tests and inspections.

H. Demonstration

1. Engage a factory-authorized service representative to demonstrate the equipment's operation and to instruct City of New York's maintenance personnel to adjust, operate, and maintain units as specified under Commissioning.

3.2 BOILERS – REQUIREMENTS

- A. Provide the following inspections:
 - 1. The boilers and pressure vessels shall be inspected at Contractor's expenses during construction and testing and the entire installation inspected after completion by an authorized agent of a recognized boiler inspection and insurance company approved by the City of New York and by the inspectors of the City of New York.
 - 2. Deliver certified inspection reports, in duplicate, to the City of New York before shipment of equipment.
 - 3. Deliver certified field inspection reports, in duplicate, to the City of New York as they are completed.
- B. Provide hydrostatic test as follows:
 - 1. Before shipment, test all components hydrostatically at the manufacturer's plant to a pressure of at least 12 times the maximum allowable working pressure and a minimum of 60 psig.
 - 2. After installation, test the boilers hydrostatically to at least 12 times the maximum allowable working pressure and a minimum of 60 psig for a minimum of 8 hours with no loss of pressure or evidence of leaks.
 - 3. If leaks develop, repair them in conformance with Recommended Rules for Repairs by Fusion Welding to Power Boilers and Unfired Pressure Vessels issued by the National Board of Boiler and Pressure Vessel Inspectors. Upon completion of repairs, repeat the test.

END OF SECTION

SECTION 260500

COMMON WORK RESULTS FOR ELECTRICAL 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.

1.2 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project:
 - 1. The Contract Drawings
 - 2. The Specifications
 - 3. The General Conditions
 - 4. The Addendum
 - 5. The Contract [City of New York Standard Construction Contract].

1.3 WORK INCLUDED

- A. Work of this Section includes all labor, materials, equipment, hoisting and rigging, scaffolding and services necessary to complete the Electrical Work as shown on the drawings and specified herein, including, but not limited to, the following:
 - 1. Equipment supports and miscellaneous steel for electrical equipment including seismic restraints per applicable code.
 - 2. Complete 120/208 volt light and power distribution system, including emergency system, and all distribution switchboards and panelboards.
 - 3. Lighting fixtures, lamps, convenience outlet systems, and miscellaneous wiring devices.
 - 4. Fire Alarm System modifications.
 - 5. Motor power wiring.
 - Miscellaneous electrical equipment and systems, unless otherwise noted.
 - 7. Telephone and miscellaneous empty conduit systems.
 - 8. Lighting panels and power panels.
 - 9. Balancing loads.

- 10. Grounding system.
- 11. Sealing of sleeves and other electrical openings.
- 12. Electric heaters.
- 13. Lighting control system.
- 14. Motor control system.
- 15. Temporary electrical facilities.
- 16. Access doors in general construction.
- 17. Hoisting, rigging and scaffolding.
- 18. All necessary permits, certificates agency approvals and related fees.
- 19. Special Inspections for all work installed by this contractor per New York City Building Code and Section 101-06 of the Rules of the City of New York.

1.4 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project:
 - 1. The Contract Drawings
 - The Specifications
 - 3. The General Conditions
 - 4. The Addendum
 - 5. The Contract [City of New York Standard Construction Contract].

1.5 CONTRACTOR'S RESPONSIBILITY

- A. Contract drawings for Electrical work are in part diagrammatic, intended to convey the scope of work and indicate general run of conduit and approximate location of outlets. Electrical trades shall follow these drawings in layout of their work, consult general construction, structural and mechanical drawings to familiarize themselves with all conditions affecting their work, and shall verify spaces in which their work will be installed.
- B. The Contractor shall be responsible for establishing grades and elevations, checking of all interferences, and shall verify all dimensions and locations in the field prior to the start of any work and/or installation of equipment, conduits and fixtures. The contractor shall, at his expense, perform all minor rerouting of conduit around obstructions from new or existing construction whether or not such conditions are indicated on the plans.

- 1. Minor rerouting of conduit and wiring is defined as any rerouting which requires less than 10 linear feet of additional conduit and wire (measured along the centerline) over and above that shown on the drawings in order to avoid an obstruction. Such rerouting shall be performed with conduit and wire of a size equal to that shown in the original routing. Whenever an obstruction requires more than a minor rerouting as defined above, the Contractor shall report the condition to the Commissioner prior to the start of work on the affected system. The Contractor shall be responsible for his neglect in checking all elevations, clearances, dimensions and locations of piping equipment and ductwork systems prior to the start of the work. Contractor shall be responsible for all remedial work, as directed by Commissioner, associated with the Contractors failure to check items described above prior to commencement of his work.
- C. All trades shall cooperate and confer with each other as to locations of their materials and equipment before erecting work, so as to avoid interference as much as possible, and in such a manner that will in no way retard progress of construction. In instances where interferences develop, the Contractor shall relocate the work as required by the Commissioner, regardless of which work was installed first.
- D. Additional and supplemental drawings may, from time to time, be furnished and the same when made are to constitute part of the original contract. These drawings will be made to clarify the contract drawings and will not depart materially therefrom.
- E. The Commissioner specifically reserves the right, up to the time of rouging, to exactly define the position of the equipment to be installed and connected to an arrangement of these connections.
- F. Special attention is called to the contract drawings and specifications involving general construction, mechanical work and details thereon. Bidders are notified to carefully scrutinize these documents for the details affecting the performance of the electrical trade.

1.6 DEFINITIONS

- A. The following definitions of terms and expressions used in this Section are in addition to listing given in General Conditions:
 - 1. "Herein" shall mean the contents of a particular section where this term appears.
 - 2. "Indicated" shall mean "indicated on contract drawings".
 - 3. "Scheduled" shall mean "as scheduled on contract drawings".
 - 4. "Concealed", where used in connection with conduit and wiring and accessories, shall mean that they are hidden from sight, as in trenches, chases, furred spaces, pipe shafts or hung ceilings.
 - 5. "Exposed", where used in conjunction with conduit and wiring and accessories, shall mean that they are not "concealed" as defined herein above.

- 6. "Conduit" or "wiring" includes, in addition to conduit and wire also fittings, outlet boxes, pull boxes, hangers, and other accessories which comprise a system.
- 7. "Singular Number": In all cases where a device or part of the equipment or system is herein referred to in the singular number (such as lighting fixture, fire alarm pull station, etc.), it is intended that such reference shall apply to as many such items as are required to complete the installation.
- 8. "Remove" shall mean "remove from site" unless otherwise noted.

1.7 SITE INSPECTION

A. All bidders on this work shall visit the job site and become thoroughly familiar with the conditions under which the work will be performed. The submission of a proposal shall be construed as evidence that the bidder has visited the site and has knowledge of site conditions. Any later claim for extra payment because of difficulties encountered will not be allowed.

1.8 CARE OF WORK AND SAFEGUARDS

- A. Contractor shall protect the work from damage by any cause until it is completed and accepted by the City of New York.
- B. The Contractor shall protect from damage any underground service or structure exposed by the execution of this work.
- C. Any damaged property resulting from work performed either by this Contractor, his subcontractors, or anyone in his employ shall be repaired and restored to its original state at no cost to the City of New York.

1.9 SCHEDULE OF WORK

A. Schedule all work to conform to the job progress schedule as submitted to and approved by the Commissioner.

1.10 SUBMITTALS

- A. Approval shall be obtained for all equipment and material before delivery to the job site. Delivery, storage or installation of equipment or material which has not had prior approval will not be permitted at the job site.
- B. All submittals shall include adequate descriptive literature, catalog cuts, shop drawings, operation, maintenance manuals and instructions and other data necessary to ascertain that the proposed equipment and materials comply with specification requirements. Catalog cuts submitted for approval shall legible and shall clearly identify equipment being submitted.
- C. A minimum period of ten (10) working days, exclusive of transmittal time, will be required in the Commissioner's office each time a shop drawing, product data and/or

- samples is submitted for review. This time period must be considered by the Contractor when scheduling his work.
- D. Submittals for individual systems and equipment assemblies which consist of more than one item or component shall be made for the system or assembly as a whole. Partial submittals will not be considered for approval.
- E. Submittals shall be marked to show specification reference, including the section and paragraph numbers.
- F. Submit each section separately and include the following:
 - 1. Information which conforms to contract requirements. Include the manufacture's name, model or catalog numbers, catalog information, technical data sheets, shop drawings, pictures, nameplate data and test reports as required.
 - 2. Submittals on all systems shall be complete with sequence of operation indicating intended function and applicable capacities, sizes, ratings, etc. indicating compliance with design.
 - 3. Submittals on all equipment shall be complete with all power and control wiring diagrams.
 - 4. Name, manufacturer, catalogue number, and finish of the following devices and appurtenances shall be submitted in list form for approval, unless otherwise directed.
 - a. Cover Plates.
 - b. Each Receptacle Type.
 - c. Each Switch Type.
 - d. Each Special Outlet Type.
 - e. Conduit and Fittings Indicating Application.
 - f. Each Outlet Boxes Type Indicating Application.
 - g. Each Wire and Cable Type Indicating Application.
 - h. Grounding System Hardware.
 - i. Each Lamp Type Indicating Application.
 - G. Submit as directed for items called for in specifications; samples of the materials which the manufacturer will actually ship. Materials shall be submitted for approval after award of contract and be properly labeled or identified.

1.11 CODES AND STANDARDS

- A. Work performed under this Contract shall conform to the New York City Building Code.
- B. Wherever requirements of such laws, codes, regulations differ from the drawings or specifications, they shall take precedence over the drawings or specifications, and are expressly made part of the contract, except where the drawings or specifications are more stringent or require better materials, which would also be acceptable to authorities (i.e., the more stringent code shall always apply).
- C. Any portion of work which is not subject to the approval of the City of New York shall be provided in accordance with National Fire Protection Association requirements.
- D. Comply with applicable utility company rules and regulations.
- E. Comply with Occupational Safety and Health Act (OSHA) requirements.
- F. All equipment shall be equal to or exceed the minimum requirements of N.E.M.A, I.E.E.E. and Underwriters Laboratories.
- G. The electrical installation shall be in compliance with the requirements of New York City Electrical Code.
- H. Seismic Restraints shall be provided per 2008 New York City Building Code including Section 1621 Architectural, Mechanical, and Electrical Component Seismic Design Requirements.

1.12 GUARANTEE

- A. In addition to the requirements stated in the specifications, the Contractor must guarantee all equipment, materials and appurtenances installed by him to be free from all defects. Upon written notice from the Commissioner, the Contractor shall promptly correct all defects without additional cost to the City of New York. The Contractor shall adjust each part of the entire installation for proper working order.
 - 1. Reports are to be submitted to the Commissioner and adjustments repeated until the entire system is satisfactory. The Contractor must make good, at his own expense, any defects in materials or workmanship that may appear. The guarantee period shall be for one (1) year after final inspection and acceptance of the project.

1.13 SEISMIC RESTRAINTS

A. Design and provide restraints per New York City Building Code for all equipment installed by this contractor. Submit calculations and details to Commissioner for approval.

PART 2 PRODUCTS

2.1 PRODUCT HANDLING

- A. In addition to the requirements of the General Conditions, the contractor shall be responsible for the following:
 - 1. Responsibility for care and protection of Electrical work rests with the contractor until it has been tested and accepted.
 - 2. After delivery, before, during and after installation, protect equipment and materials against theft, injury and damage from all causes.
 - 3. Protect equipment outlets and pipe openings with caps.
 - 4. At the completion of the work, clean and polish fixtures, equipment, and materials.
- B. The contractor shall receive, properly house, handle, hoist, deliver to proper location, equipment and other materials required for the contract. Save materials in a manner which will protect them from damage, weather, and entry of debris.
- C. 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.

2.2 MATERIALS

A. Design:

- 1. Unless otherwise specified, equipment or material of same type of classification, used for the same purpose, shall be products of the same manufacturer. All material shall be new and of the latest design of manufacturer providing equipment or materials. All materials are to be free of defects and corrosion.
- 2. Equipment and accessories not specifically described or identified by manufacturer's catalog numbers shall be designed in conformity with NEMA, IEEE, or other applicable technical standards, suitable for maximum working voltage, current and available short circuit current and shall have neat and finished appearance.

3. NOMINAL VOLTAGES (UNLESS OTHERWISE NOTED)

- a. Secondary distribution: 120/208 volt, 3-phase, 4-wire.
- b. Convenience outlets: 120 volt, single phase, 2-wire.
- c. Lighting: Incandescent 120 volt for fluorescent and HID sources, single phase, 2-wire.
- d. Motors: ½ horsepower and larger; 208 volt, 3-phase. All fan powered VAV boxes to be 120 volt, single phase, 2-wire.
- e. Motors smaller than ½ horsepower: 120 volt, single phase.
- f. Provide equipment of sufficient poles and voltage rating to correctly function at the above voltage.

4. WIRE TERMINATIONS

a. All terminations shall be U.L. approved for use with minimum 75°C wire.

2.3 FIRE STOP PROTECTION

- A. Provide systems or devices listed in the U.L. Fire Resistance directory under categories XHCR (firestop devices) and XHEZ (firestop systems) as applicable, providing they conform to the construction type, penetrant type, annular space requirements and fire rating involved in each separate instance, and that the system is symmetrical for wall applications. Materials must be asbestos-free.
- B. Provide fire stop protection for penetrations to all fire rated construction.
- C. Provide Special Inspection for all Fire Stop protection provided by contractor.

PART 3 EXECUTION

3.1 SUPERVISION

A. All work shall be performed by competent mechanics under supervision of an experienced supervisor. The Contractor shall, upon initiation of construction, keep a suitable force of men (including supervisory personnel) on the site at all times in order to place all sleeves, inserts, outlet boxes and fixtures, and all other openings as are required for the satisfactory installation of equipment.

3.2 COORDINATION

- A. Contractor's attention is directed to scheduling of construction and time limitations for each phase of the work. Work shall be coordinated to permit proper setting of the work of other trades.
- B. Where conduit work and electrical equipment are in place prior to completion of adjacent concrete and masonry work, they must be protected against damage and displacement until construction is completed.
- C. Provide all anchor bolts, sleeves, inserts and supports for the required Work.
- D. Adjust locations of pipes, ducts, electrical raceways, switches, panels, equipment, fixtures, etc., to accommodate the Work and to prevent interferences anticipated and encountered. Determine the exact route and location of each pipe, duct and electrical raceway prior to fabrication.
- E. Lines which pitch shall have the right-of-way over those which do not pitch. For example: Plumbing drains normally have the right-of-way. Lines whose elevations cannot be changed shall have the right-of-way over lines whose elevations can be changed.
- F. Make offsets, transitions and changes in direction in pipes, ducts, and electrical raceways as required to maintain proper headroom and ceiling heights as shown on

- architectural drawings and pitch of sloping lines whether or not indicated on the Drawings.
- G. Install all Work to permit removal (without damage to other parts) of all parts requiring periodic maintenance or replacement. Arrange pipes, ducts, raceways, to clear the openings of swinging doors and of access panels.
- H. Where Work is to be installed in close proximity to Work of other Contractors, and there is evidence that the Work will interfere with Work of other Contractors, assist in working out space conditions to make a satisfactory adjustment.
- I. Equipment installed by the electrical trade shall be installed in accordance with the requirements of approved manufacturers submittals or shop drawings. This Contractor shall carefully review approved shop drawings of all equipment to be installed by him to ascertain particular requirements. Any equipment or work installed which is not in accordance with the manufacturers shop drawings or installation instructions will be removed, replaced and installation corrected by this Contractor to comply with the manufacturers shop drawings at no additional cost.
- J. The locations of lighting fixtures, outlets, panels and other equipment indicated on the wiring plans are approximately correct, they are understood to be subject to such revision as may be found necessary or desirable at the time the work is installed in order to meet field conditions or to coordinate with modular requirements of ceilings, or to simplify the work, or for other legitimate causes.
- K. The drawings show only the general run of conduits and approximate location of outlets. Any significant changes in location of outlets, cabinets, etc., necessary in order to meet field conditions shall be brought to the immediate attention of the Commissioner and receive his approval before such alterations are made.
- L. Obtain from the Commissioner in the field the location of such outlets or equipment not definitely located on the drawings.
- M. Circuit "tags" in the form of arrows are used where shown to indicate the home runs of conduit to electrical distribution panels and switchboards. These tags show the circuits in each home run and the panel distribution. Show the actual circuit numbers on the finished record tracing and on panel directory card. Where circuiting is not indicated, contractor shall provide required circuiting in accordance with the loading indicated on the drawings.
- N. The drawings generally do not indicate the exact number of wires in each conduit for the branch circuit wiring of fixtures and outlets or the actual circuiting. Conduit runs shall contain quantity of circuits as shown on plans. Combining circuits or wiring to effect a reduction in conduit home runs to panel will not be permitted. Provide the correct wire size and quantity as required by the indicated circuiting and/or circuit numbers indicated and control wiring diagrams, if any, specified voltage drop or maximum distance limitations, and the applicable requirements of the New York City Electrical Code.

3.3 CUTTING AND PATCHING

- A. All cutting and patching associated with the installation of the Electrical work is the responsibility of this contractor.
- B. No cutting of bearing walls, beams, etc. shall be done without the approval of the Commissioner. All materials, patching and finishing, etc. shall match the surroundings. All cutting and patching shall be done by workmen skilled in the trades and in the employ of the Contractor for the project. All cutting shall be done with saw-type edges to give a neat and workmanlike appearance. All pipe and sleeve holes shall be core drilled unless specified otherwise.
- C. The work shall be carefully laid out in advance. Where cutting, channeling, chasing or drilling of floors, walls, partitions, ceilings or other surfaces is necessary for the proper installation, support or anchorage of raceway, outlet or other electrical equipment, the work shall be carefully done. Any damage to the building, piping, equipment or defaced finish plaster, woodwork or metalwork shall be repaired by skilled mechanics of the trades involved at no additional cost.

3.4 TEMPORARY OPENINGS

- A. Temporary openings not indicated which may be required or purpose of bringing equipment into building shall be as approved. The contractor will perform work of providing and maintaining openings and of restoring structure, as required to facilitate installation of equipment within building at locations indicated.
- B. Holes provided in General Construction work to permit installation of lines for temporary Electrical services will, after removal of such lines, be patched as specified.

3.5 CLEAN-UP

A. The Contractor shall be held responsible for the general clean-up of all areas affected by the work in the Contract. All rubbish and accumulative material shall be removed from the premises and the premises left "broom clean" upon completion.

3.6 CLEARANCES FOR ELECTRICAL EQUIPMENT

A. No electrical equipment, panels, switchboards, disconnect switches, splice boxes, starters, etc., shall be installed where less than required working space clearances, as defined by applicable National or Local Electrical Code, can be maintained. Bring such conditions to attention of Commissioner immediately. Equipment found to be installed with less than required clearances shall be relocated as directed by Commissioner at no additional cost.

3.7 TESTING, ADJUSTING AND BALANCING LOADS

- A. Make all required adjustments to electrical systems until all specified performances are met. Contractors shall furnish necessary labor to test for conformance to specifications. Include manufacturer's representative. Test shall be witnessed by Commissioner. The following system shall be tested for conformance to specifications:
 - 1. Fire Alarm System.

- B. Phase legs of all existing and/or new panels shall be balanced at supply point. Any panel with unbalanced loads shall have its circuits rearranged as required to balance phase legs.
- C. Check all motors for correct rotation on initiated start-up.

3.8 ACCEPTANCE TESTING

- A. This contractor shall provide all Acceptance Tests required by applicable codes including the following:
 - 1. Fire Alarm Systems per New York City Building Code Sections 907.16 and 907.17, and New York City Fire Code Sections 901.5, 907.17, and 907.18.
 - 2. Carbon Monoxide Alarms per New York City Building Code Sections 907.2.10.2 thru 907.2.10.4.
 - 3. Public Assembly Emergency Lighting per New York City Building Code 28-116.2.2.
- B. Contractor shall include the following as applicable for all required Acceptance Testing:
 - 1. Obtain services of licensed Special Inspector to provide certificate of completed Inspections and Tests.
 - 2. Notification of appropriate City Agencies when tests are to be witnessed by either the Department of Buildings or the New York City Fire Department, and coordination of time and date of test with respective agencies.
 - 3. Provide sign-off on contractor's letterhead, signed and sealed certifying system has functioned properly in all required tests.
 - 4. Provide detailed documentation of tests as prescribed by applicable code.
 - 5. Provide labor and material, as required, to demonstrate performance of each system component and compliance with all mandatory tests.
- C. This contractor shall provide labor as required to facilitate acceptance testing performed by other contractors, including the following items:
 - 1. Smoke Control System.
 - 2. Smoke Exhaust System
 - 3. Fire/Smoke Dampers.

3.9 EQUIPMENT SUPPORTS AND HOUSEKEEPING PADS

A. Where supports, for equipment are indicated or specified in electrical work sections, perform as follows:

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- 1. Provide structural supports for the proper attachment of electrical equipment supplied and also for equipment, such as motor controllers, supplied by others, for mounting, connection, and installation under this Division.
- 2. Mount wall-mounted equipment directly to wall by means of steel bolts. Maintain at least 1/2" air space between equipment and supporting wall. Mount groups or arrays of equipment on adequately sized steel channels, such as those manufactured by Kindorf and Unistrut.
- 3. Support equipment suspended from ceiling by adjustable threaded steel rods of adequate diameter and strength anchored to the floor arch or the structural steel. Support auxiliary steel, if required, from the building steel. Do not secure hangers to furred ceilings, ductwork, or other piping.
- 4. Secure equipment and steel to solid masonry by means of screw and bolt anchors and expansion bolts. On structural steel use clamps that do not depend primarily on set-screw pressure for security.
- 5. Do not drill or pierce structural and pre-stressed concrete members without prior approval.
- 6. Unless otherwise indicated, where equipment is indicated or specified to be floor mounted on stands or legs, brace and fasten with flanges bolted to floor.

B. Housekeeping Pads:

- 1. Where concrete housekeeping pads are indicated or specified, use concrete mix reinforcement where required.
 - a. Where floor is waterproofed, construct foundation so that anchor bolts will not pierce waterproofing hardener; paint to match finished floor.
 - b. Where pad design is not indicated on the drawings, provide housekeeping pads for all floor-mounted equipment. Pad dimensions, size of foundation bolts, methods of setting, aligning and anchoring of equipment shall be as recommended by manufacturer of equipment and as approval. Make minimum height above finished floor 4" and extend outer edges 2" minimum beyond machinery bedplate. Submit shop drawings for approval.
 - c. For equipment on pad, provide foundation bolts, sleeves, washers, nuts and templates to locate position of bolts. Make sleeves of steel pipe; finish flush with top of rough concrete. For anchorage, make embedded end of bolts hooked, or threaded with nut and square plate.
 - d. Provide 1" thick grouting between machinery base plate and concrete pad; fill completely the space between them. Clean top of pad; wet if before grouting. Do not remove leveling wedges before grout wedges before grout reaches its final set. Fill voids left by removal of wedges with grout; finish exposed surface to grout to make neat appearance.

3.10 SEISMIC REQUIREMENTS

- A. Conduit, cable tray and equipment shall be supported and properly braced in accordance with 2008 New York City Building Code Section 1621.
- B. Seismic plans and calculations shall be prepared and designed by a Professional Engineer with a minimum of three years experience in seismic design.

3.11 PAINTING AND FINISHING

- A. Except as specified herein, the finished painting of Electrical Work within the building and on the roof shall be as specified in Division 9.
- B. All Electrical equipment shall have a factory applied prime and finish coat of paint. Galvanized surfaces shall be considered as finished surfaces for equipment rooms and items concealed from view. Plastic products shall be acceptable without a finish coat of paint. All items of equipment marred or rusted, even though factory finished, shall be repainted.
- C. Where conduits, outlet, junction, or pull boxes are mounted on a painted surface, or a surface to be painted, they shall be painted to match the surface. Whenever support channels are cut, the bare metal shall be cold galvanized.

3.12 IDENTIFICATION

- A. Furnish a nameplate for each fuse cutout, disconnect switch, relay, bus duct, and equipment enclosure including all panelboards and switchboards. Unless otherwise noted, use aluminum minimum size, 2 ½ x ¾, with black enamel background with etched or engraved upper case letters, enclosed by natural aluminum border, or black and white laminated Acrylic plate with beveled edges and same size and lettering. Inscribe name and number of equipment as shown on the Drawings include feeder size and identify source of power (panel and circuit) and as approved by the Commissioner. Secure to equipment with brass or stainless steel screws. Approved: Seton Nameplate Company, or approved equal.
- B. Tag each conductor passing through a splice or pullbox with a gray, fire retardent rigid polyethylene tag indicating point of origination and termination of the conduit. Use minimum #2 font. Brady or approved equal.
- C. Nameplates for equipment which is part of the emergency system are to be yellow backgrounds with black lettering, permanently affixed with brass or stainless steel screws to equipment, including all transfer switches, and emergency distribution equipment.
- D. Nameplates for equipment which is part of the Fire Alarm and Emergency Communication system are to be red background with white engraved lettering, permanently affixed to equipment including all fused cutouts, remote alarm lights, and equipment panels.

E. Nameplates for enclosures which contain accessible grounding bus for low voltage systems, equipotential grounding system, or external accessible ground bus in Electric Service room, are to be green backgrounds with black lettering, permanently affixed with brass or stainless steel screws to the enclosure.

3.13 FIRE-STOP PROTECTION

- A. Where conduits, troughs, cable tray, cables, bus duct, etc. pass through fire rated partitions, fire rated walls, ceilings or floors, install a firestop that provides an effective barrier against the spread of fire, smoke and gases. Fire-stop material shall be packed tight, and completely fill clearances between pipe and sleeves. Provide escutcheon plates on both sides of all rated construction in accordance with U.L. listing.
- B. Install through penetration fire stop systems in accordance with manufacturers written installation instructions and published drawings for products and applications. Install in accordance with all requirements of U.L. listing.

3.14 ACCESS PANELS

A. The Contractor shall furnish access panels for installation by the Contractor concealed junction boxes, pull boxes and other parts requiring accessibility for operation and maintenance. Location of all access panels to be shown on coordinated shop drawings. Location to be approved by Commissioner prior to installation.

3.15 TEMPORARY SERVICE

A. Temporary services are specified under DDC General Conditions.

END OF SECTION

SECTION 260519

BASIC MATERIALS AND METHODS

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 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project:
 - 1. The Contract Drawings
 - 2. The Specifications
 - 3. The General Conditions
 - 4. The Addendum
 - 5. The Contract [City of New York Standard Construction Contract].

1.3 WORK INCLUDED

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the Electrical Work as shown on the drawings and specified herein, including, but not limited to the following:
 - 1. Provide basic materials and methods.

1.4 RELATED WORK

- A. Finish painting.
- B. Transient Voltage Surge Suppression

1.5 QUALITY ASSURANCE

- A. Manufacturers Instructions:
 - 1. In addition to the requirements of these Specifications, comply with manufacturers instructions and recommendations for all phases of the work.
- B. Except as modified by governing codes and by the Contract Documents, comply with the applicable provisions and recommendations of the following:

- 1. American National Standards Institute, Institute of Electrical and Electronic Engineers, National Electrical Manufacturers Association and Underwriters' Laboratories, New York City Electrical Code.
- 2. Electrical Metallic Tubing: Comply with the latest edition of Underwriters' Laboratories Standard UL-797, American National Standards Institute C80.3.
- 3. Intermediate Metal Conduit: Comply with the latest editions of Underwriters' Laboratory Standard UL-1242 and ANSI C80.6.
- 4. Rigid Conduit: Comply with the latest edition of Underwriters Laboratories Standard UL-6, and American National Standards Institute C80.1.
- 5. Conductors: Comply with American Society of Testing Materials and International Power Cable Engineering Associations.
- 6. Rigid Non-Metallic Conduit: Comply with latest editions of UL-651, and NEMA TC-3.
- 7. Surface Metal Raceways: Comply with latest edition of UL-5, and NEMA.
- 8. Electrical Wireways: Comply with latest edition of UL-870.
- 9. Dimmers (Wall Box Type): Comply with latest edition of UL-20.
- C. Manufacturer Seismic Qualification Certification: Submit certification that equipment specified in this Section, accessories, and components will withstand seismic forces as indicated elsewhere. Include the following:
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - a. The term "withstand", for equipment with Importance factor = 1.5 means "the items remains operable following design earthquake and in addition is in compliance with section 9.6.3.14.1 of ASCE-7-02."
 - b. The term "withstand" for equipment with Importance factor = 1.0, means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
 - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

1.6 SUBMITTALS

- A. Shop Drawings: Submit shop drawings for the following items:
 - 1. Approved fire stop.

- 2. Wire and Cable: Identify for what purpose each type will be used.
- 3. Raceways: Catalog Cuts of each type, with proposed use identified.
- 4. Switch and Wiring Devices: Sample of each type.

1.7 TESTS

- A. Test all conductors for continuity and proper connection after installation.
- B. Perform standard 500-volt insulation test with "Megger" tester on all wiring AWG #8 and larger installed. Tests are to show insulation resistance in excess of 50 megohms. Replace any conductors failing to meet this test.

PART 2 PRODUCTS

2.1 RACEWAY SYSTEM

- A. Provide raceway as required for all wiring systems. Provide conduits whose sizes are not noted on the Drawings in accordance with the requirements of the New York City Electrical Code for the quantities and size of wire installed therein, including required ground conductors.
- B. Provide Type 316 Stainless Steel Rigid Metal Conduit (SS RMC) for feeders to all new panels and for all branch circuits to aquarium equipment. SS RMC shall be by Allied Tube and Conduit type 316 or approved equal.
- C. Provide electrical metallic tubing manufactured of steel, galvanized and coated with a chromate coating on the outside and a silicone epoxy-ester lubricant on the inside. Use steel compression gland fittings, as manufactured by O.Z Gedney or approved equal where running exposed within building. Set screw type fittings may be used for concealed work. EMT shall be Allied Tube and Conduit type EMT or approved equal.
 - 1. Where installed in slab or fill, provide concrete tight fittings. Utilize rigid heavy wall conduit bends and elbows where exiting from slab.
- D. Provide intermediate metal conduit manufactured of hot dipped galvanized steel, all threads shall be galvanized after cutting, and shall have chromate coating on the outside and a silicone epoxy-ester lubricant coating on the inside. Intermediate metal conduit shall be Allied Tube and conduit type IMC, or approved equal.
- E. Provide rigid conduit manufactured of hot-dipped galvanized rigid steel, with chromate coating. All threads shall be galvanized after cutting. Rigid conduit shall be Allied Tube and Conduit type GRC or approved equal.
- F. Flexible Steel Conduit: Maximum length, 6 feet, unless specifically noted elsewhere. Single strip, continuous, flexible, interlocked, double wrapped steel, galvanized inside and outside forming smooth internal wiring channel, as manufactured by National Electric Products, Triangle, Clifton Conduit or approved equal. Flexible metal conduit must contain an equipment bonding jumper wire bonded at each end or an equipment ground conductor, sized as required, except as permitted by code for 20 ampere branch circuits only. Provide connectors with insulated grounding type

bushings.

- G. Liquid-Tight Flexible Electrical Conduit.
 - 1. Same as flexible steel conduit except with tough, inert watertight plastic outer jacket, "Seal-Tite" Type U.S. (American Brass Company) "Flexible Seal Type LX", (Columbia Cable and Electric Corporation), "Electric-Flex" (International Metal Hose) or approved equal.
 - 2. Fittings: Cast malleable iron body and gland nut, cadmium plated with grounding lug cast integrally with gland nuts. Spiral molded nylon or vinyl-sealing ring between gland nut and bushing and nylon-insulated throat, as manufactured by Gedney type 4QL, Appleton, Thomas & Betts or approved equal.
- H. Non-Metallic Conduit: Rigid, heavy wall, Schedule 40, polyvinyl chloride (PVC) plastic conduit, suitable for direct burial and Underwriters' Laboratory listed. Acceptable manufacturers are: Borg Warner, Corlon, Ethyl, Karloy, Triangle or approved equal. Provide offsets and 90° of rigid steel plastic coated or painted (2 coats) conduit. Where exiting slab provide rigid steel plastic coated conduit and extend a minimum of 2 inches above floor or equipment foundation. PVC may be utilized to exterior luminaries. Provide Ground wire in accordance with code requirements in addition to wiring indicated on drawings.
- I. Wireways: Hinged or screw-cover type of sizes indicated or as required by the New York Electrical Code for the quantity and size of wires contained within, complete with elbows, tees, connectors, adapters, etc., with all parts factory-fabricated and of the same manufacturer. Acceptable wireways are Square D "Lay-In-Duct", General Electric Co. "Type HS", Square D "Square Duct", or ITE "KBL-Duct", or approved equal.
- J. Surface Metal Raceway: Minimum .040 inches thick steel construction. Two-piece systems shall have galvanized base. Two piece unless otherwise noted on drawings. Provide compatible transition and adaptor fittings from conduit to surface metal raceway. Provide necessary fittings, boxes, elbows, ground clamps, connectors to facilitate complete installation. Surface metal raceway system shall be Wiremold or approved equal.
- K. Expansion Fittings: Provide at all building expansion joints or where required by NYC Building Code to compensate for raceway expansion and contraction. Provide with bonding jumper. Shall be 0.Z/Gedney Type AXB, TX, EXE, AXDX or DXX as required, with type BJ, bonding Jumper or approved equal.
- L. Sleeves through fire-rated floors and walls: Conform to New York Electrical Code and New York City Building Codes to prevent fire spread. All floors are fire rated. Refer to Architectural Drawings for fire walls.
 - 1. Where approved for use by local authorities utilize O.Z. Gedney CFS series fire seal or approved equal for conduit penetration and CAFS series or approved equal for cable penetrations of fire rated structure up to 3 hour rating. Utilize O.Z. Gedney PTFS series fire seal or approved equal for non-fire rated, power or telephone service heads supplied via flexible steel conduit.
- M. Special seals shall be provided where penetrating roof slab. A malleable iron, watertight entrance sealing device, gland sealing assembly shall be pressure type permitting tightening by wrench after concrete has been poured. Unit to be similar to OZ Gedney type FSK, or approved equal. Install

copper tubing or brass pipe sleeve through the roof. Solder 20 oz. copper or 6 lb. lead plate to the sleeve and mount on roof membrane waterproofing. Plate shall extend a minimum of 12" all around from the outside of the sleeve. After conduit is installed, fill space between conduit and sleeve with oakum or untarred, unoiled jute and seal the top and bottom to a depth of at least 1-1/2" with "Special Condensed" Duxsealer 4951 or other compound as acceptable to Commissioner.

- N. A malleable iron watertight entrance sealing device shall be provided where conduits enter exterior walls. Unit shall be gland sealing assembly on inside and outside of wall of pressure type, capable of being tightened with wrench after concrete is poured. Unit OZ Gedney type WSK or approved equal.
- O. Raceway fittings shall be malleable iron and steel galvanized or cadmium plated for steel conduit.
- P. Bushings shall be insulated type made of iron, threaded type with conduit end stop and integrally molded, non-combustible phenolic insulated surfaces rated 150°C. Grounding type bushings shall, in addition, have tin plated copper grounding path. Bushings shall be O.Z. Gedney type HB or approved equal. Grounding type shall be O.Z. Gedney type HBLG or approved equal.

Q. Raceway Supports

1. Support raceways on accepted types of wall brackets, specialty steel clips, or hangers, ceiling trapeze hangers, or malleable iron straps. Plumbers perforated straps are not permitted. Acceptable manufacturer's brackets or hangers are Kindorf, Elcan, Binkley, Multi-Frame, Power-Strut, or Unistrut, or an approved equal. Do not suspend raceways or equipment from other raceways, steam, water, or other piping or ductwork. Provide independent and secure support methods.

2.2 OUTLET, JUNCTION AND PULL BOXES

- A. Provide zinc coated or cadmium plated sheet steel outlet boxes not less than 4 inches octagonal or square, unless otherwise noted. Use shallow outlet boxes in columns millwork, mullions, and other areas where structural or physical conditions prohibit use of ordinary outlet boxes. Equip fixture outlet boxes with 3/8" no-bolt fixture studs. Where fixtures are mounted on or in an accessible type ceiling, provide a junction box and extend flexible conduit to each fixture. Outlet boxes in finished ceilings or walls shall be fitted with appropriate covers, set to come flush with the finished surface. Where more than one switch or device is located at one point, use gang boxes and covers unless otherwise indicated. Sectional switch boxes or utility boxes will not be permitted. Provide Steel City Series "GW" tile box, or as accepted, or a 4" square box or for multi-gang Steel City Series "G", with tile ring in masonry walls which will not be plastered or furred, or where "Drywall" type materials are applied. Provide outlet boxes of the type and size suitable for the specific application.
- B. Construct junction or pullboxes not over 150 cubic inches in size as standard outlet boxes, and those over 150 cubic inches shall be code gauge galvanized steel with screw on covers of same gauge metal. Provide cable supports (3/4" conduit covered by loose fitting fiber tubes) for two (2) or more horizontal rows of conduit entering box. Provide ground lug in all junction/pull box, larger than 4" X 4" standard outlet, box O.Z. Gedney type "KG" or approved equal for each conduits pair.
- C. Plug any open knockouts not utilized.
- D. Provide surface mounted outlet and junction boxes of cast metal with threaded hubs in unfinished indoor locations and where exposed to moisture and all outdoor locations.

E. Provide barriers in all boxes with ganged devices when voltage between adjacent devices exceeds 300 volts.

2.3 WIRE AND CABLE

A. Provide wire with a minimum insulating rating of 600 volts. Communications, circuits, and low tension systems, including fire alarm system wiring is specified elsewhere.

B. Conductor:

1. Electrical grade, annealed copper, and fabricated in accordance with ASTM standards. Minimum size number 12 for branch circuits; number 14 for control wiring.

C. Stranding and Number of Conductors

- 1. Number 12 and 10 solid.
- 2. Cables larger than number 10, stranded, in accordance with ASTM Class B stranding designations.
- 3. Control wires stranded in accordance with ASTM Class B stranding designations.
- 4. Cables, multi-conductor, and as specified elsewhere for low-tension systems.

D. Insulation

- 1. Type THWN/THHN insulation suitable for use in wet locations up to 90°Centigrade. Use for lighting, receptacles and motor circuits and for panel, switchboard, service and equipment feeders, unless otherwise noted on drawings.
- 2. Type THHN or THWN/THHN Flame retardant: Heat-resistant thermoplastic insulation, nylon jacket rated for 90° Centigrade operation. Use for lighting branch circuit wiring installed and passing through the ballast channels of fluorescent fixtures, wiring in metal roofdecks in or near roof insulation, in joist spaces, or in raceways exposed to the sun.
- 3. Type FEP: Fluorinated Ethylene Propylene insulated heat resistant wire suitable for 200°C operation. Use for any wiring within 3 feet horizontally or 10 feet above any furnace, boiler or similar appliance, or where high temperature wire is indicated.
- 4. Type RHW- Polymer insulated U.L. listed, 2 hour, fire rated cable when installed in conduit accordance with manufacturers instructions for installation and listing procedures. Cable shall meet all requirements of an "Electrical circuit protective system" as referred to in NEC articles 695 and 700. Shall be suitable for use on wet locations to 75°C and dry locations to 90°C. Cable shall have low toxicity index per NES-713. Cable shall be used for all Emergency System feeders in Rigid Steel Conduit.
- E. Manufacturers: General Electric, Phelps-Dodge, Triangle, Anaconda, Kaiser, General Cable, Okonite, Simplex, National Electrical Products, Collyer, Kerite, Raychem, or approved equal.
- F. Color code all wiring for control systems installed in conjunction with mechanical and/or Staten Island Zoo Aquarium Reconstruction CAPITAL PROJECT NUMBER: PV175AQUA 260519-6 BASIC MATERIALS AND METHODS

miscellaneous equipment sections of this Specification in accordance with the wiring diagrams furnished with the equipment. Color code all branch circuit wiring, including circuits to motors, and all feeders by line and/or phase.

120/208 V 3-Phase

Phase A Black Phase B Red Phase C Blue

Neutral White

Ground Green

1. Factory color code wire No. 2 and smaller. Wire No. 1 and larger may be color coded by field color taping of the entire length of the exposed ends.

G. Connectors:

- General: Make all connections, splices, taps and joints with solder less devices, mechanically
 and electrically secure. Protect exposed wires and connecting devices with electrical tape or
 insulation to provide insulation values not less than on conductor. Make splices only in
 junction pullboxes, or panelboards with oversized wiring gutters to accommodate tap. All
 splices, taps, terminations, shall be approved for the temperature rating of the conductor.
- 2. Large Cables (No. 8 and larger):
 - a. Use compression type connectors, taps and splices specifically designed for the particular connection. Insulate splice with "Bake-lite" covers designed to fit around splice.
 - b. Manufacturer: Burndy Engineering Co., Inc; Thomas & Betts, or approved equal.
- 3. Branch Circuit Wires (No. 10 and smaller): Use any of the following type of terminals and connecting devices:
 - a. Hand Applied: Coiled tapered, spring wound devices with a conducting corrosion-resistant coating over the spring steel and a plastic cover and skirt providing full insulation for splice and wire ends. Screw connector on by hand. Manufacturer: Ideal Industries "Wing Nut"; Thomas & Betts "Piggy"; 3M Co. "Scotch-Lok", or approved equal.
 - b. Tool Applied: Steel cap, with conducting and corrosion resistant metallic plating, open at both ends, fitted around the twisted ends of the wire and compressed or crimped by means of a special die designed for the purpose. Specially fitted plastic or rubber insulating cover wrap over each connector. Manufacturer: Thomas & Betts "Stakon"; Ideal Industries" No. 410 Crim Connector" and "Wrap Cap"; Buchanan; Burndy or approved equal.

H. Electrical Tape:

- 1. Specially designed for use as insulating tape.
- 2. Manufacturer: Johns-Manville; Minnesota Mining, or approved equal.

I. Lubricant: Use lubricant only where the possibility of damage to conductors exists. Use only a lubricant which is inert to cable and conduit and in no way restrict ease of pulling through conduit with passage of time.

J. Cable Systems:

1. Type MC

a. Approved cable consisting of plastic insulated, 90°C rated copper conductors, insulated grounding conductor per UL 1569 plus additional grounding and/or isolated ground conductors as specified elsewhere. Conductors shall be twisted and covered with a polyethylene terephthalate (polyester) assembly tape. A galvanized steel armor shall be applied over the inner cable assembly in compliance with U.L. 1569 Section 10. Cable shall comply with NEC article 330, U.L. 1569 and UL 83. Cable shall be as manufactured by AFC cable systems type MC and Super Neutral MC or approved equal.

2. Mineral-Insulated, Metal-Sheathed cable (Type MI)

- a. MI cable shall consist of a factory assembly of one or more conductors insulated with a highly compressed refractory mineral insulation and enclosed in a liquid tight and gas tight continuous copper sheath. Cable shall have a fire rating as classified by Underwriters laboratories Inc. (U.L.) and shall be listed in the U.L. Building materials directory as follows: One (1) hour for all emergency system feeders. MI cable shall not exceed 350 MCM.
- b. MI cable shall be pyrotenax system 1850 or approved equal. Cable shall be approved by the New York City Advisory Board for the application.
- c. Factory installed fire-rated joints or field installed fire-rated joints installed by manufacturers field technician shall be used where circuit length exceeds coil length.

d. Lug Connection

1. When connecting MI cable to panel boards, motor starters, circuit breakers, etc. ILSCO lugs, approved for solid conductors, will be used as follows:

CONDUCTOR SIZE ILSCO CATALOGUE NUMBER

#1-250 kcmil Lo-250 350 CRA-300 Or approved equal

2. If manufacturers termination kits are used to provide a solid copper conductor to 90°C standard conductor connection, standard 90°C rated lugs may be used in lieu of specified ILSCO solid conductor lugs.

2.4 <u>SWITCHES AND WIRING DEVICES</u>

A. General (Device colors and style shown for information only. Commissioner to specify.):

1. All devices shall be specification grade flush mounting. Duplex receptacles shall have

<u>Standard</u>	Decora Line
Brown	Brown
Ivory	Ivory
Gray	Gray
White	Black

a. Face, local wall switches shall have

Standard (Handle)	Decora Line (Rocker)
Brown	Brown
Ivory	Ivory
Gray	Gray
White	Black
White	Black

- 2. Cover Plates: Provide cover plates for all wall receptacles outlets, including telephone and switches. Submit sample to Commissioner and obtain approval prior to installation. When two (2) or more switches or devices are shown at one location, mount under a common plate. Plates shall be
 - a. Smooth plastic with (Brown) (Ivory) (White) (Black) finish.

B. Local Wall Switches:

- 1. Quiet operating, alternating current type, with rocker operator and heat resistant plastic housing. Silver alloy contacts. Rated 20 Amperes, for use at 120 Volts, and capable of full capacity on tungsten, fluorescent, or HID lamp load. Designed for wiring with up to AWG No. 10 wire.
- 2. Use single pole, double pole, 3-way, 4-way, pilot or keyed type as shown on drawings.
- 3. Local wall switches shall be Hubbell whose catalog numbers are indicated below unless otherwise noted, Pass & Seymour or approved equal.

	<u>Device</u>	Standard Line Catalog #	<u>Decora Line</u> <u>Catalog #</u>
c.	Single Pole Toggle Switch Three Way Switch Four Way Switch Single Pole Switch and	HBL1221 HBL1223 HBL1224 HBL1221-IL	5621-2 5623-2 5624-2 5628-2
e.	Single Pole Switch and	HBL1221-IL	5629-2

	Pilot Light		
f.	Three Way Switch with	HBL1223-IL	5638-2
	Pilot Light (120V)		3030 2
g.	Single Pole Locking	HBL1221-L	NA
	Toggle Switch	_	1171
h.	Single pole, momentary	HBL1557	5657-2
			3031-2

Space Saver Switches: Use smaller compact switches where specifically shown on drawings or where required to facilitate installation of switch. Switches shall be Pass and Seymour Series 201, 2, 3, 4 or approved equal.

D. Duplex Convenience Receptacles:

- 1. Three-pole, National Electrical Manufacturers Association and American National Standards Institute standard type, with bronze contacts which accept plug with two (2) parallel blades and one (1) grounding blade. Heat-resistant plastic enclosure. Two (2) grounding screws. Break-off terminals for two (2) circuit wiring. Rated at 120 volts alternating current.
- 2. Manufacturers: Hubbell Cat. # 5362 (20 Ampers) In damp or wet locations protected by GFI type C.B., use 5362WR, equivalent Pass and Seymour or Leviton or approved equal.
- 3. Isolated Ground Receptacles shall be Hubbell Cat. #IG5362 or equivalent of Pass & Seymore or Leviton or approved equal.
- 4. Ground Fault protection Type (GFI-Tamper resistant) shall be Hubbell Cat # GFTR20, or equivalent of Pass & Seymore or Leviton or approved equal.
- 5. Surge Protection duplex receptacles shall be Hubbell Cat # HBL 83621SA or approved equal.

E. Floor Outlets:

1. Flush floor outlets for power and or telephone shall be made up of single, double or triple gang box, B-2436, B4233, and/or B-4333 with S-3825 plate over duplex 20 A power section(s) and S-2625 plate over Telephone/Data sections and S-3425 plate over power section, with 30 AMP or larger outlets. Provide with SB-3083, SB-3084, and/or SB-3085 carpet flange in carpeted areas. Receptacle shall be Hubbell 5362, DR20WRTR or as required to match indicated circuiting if over 20 Amperes.

F. Outdoor Locations and Ground Fault Interrupter Receptacles:

- 1. Protect receptacles located outdoors or where indicated to be weatherproof by a GFI receptacle, Hubbell Catalog #GF-5362, GFTR20 or approved equal.
- 2. Protect exterior receptacles by a cast aluminum weatherproof metal plate with a stainless steel spring-loaded, casketed lift cover. Plate shall be U.L. listed for wet locations with cover open and with cover closed.
- G. Special Receptacles: Furnish and install special purpose receptacles to match cord and plug of equipment supplied or indicated circuiting, including twist lock type where indicated. Receptacles shall be Specification grade as manufactured by Hubbell or approved equal.

PART 3 EXECUTION

3.1 RACEWAY SYSTEMS

A. General:

- 1. Securely fasten all raceways at intervals and locations required by the New York City Electrical Code. Install capped bushings on conduits as soon as installed and remove only when wires are pulled. Securely tie embedded raceway in place prior to embedment. Conduits installed below or in floor slabs must extend minimum of 6 inches above the finished slab to the first connector. Lay out the work in advance to avoid excessive concentrations of multiple raceway runs. Locate raceways so that the strength of structural members is unaffected and they do not conflict with the services of other trades. Install 1-inch or larger raceways in or through structural members (beams, slab, etc.) only when in the manner accepted by the Commissioner. Draw up couplings and fittings full and tight. Protect threads from corrosion with one (1) coat red lead or zinc chromate after installation. Where galvanized conduit is used, use only steel pullboxes or malleable iron fittings.
- 2. Where a space of over 24 inches to suspended ceilings occurs, the suspending hangers may be utilized to support conduits of 1 inch or less trade size. Where suspended ceilings are 24 inches or less below the structure, provide independent support from the structure for all raceways.
- 3. Mount conduits a minimum of 8 inches above any accessible type ceiling or with spacing as required to permit relocation of recessed fixtures to any location.
- 4. Provide insulated grounding type bushings for all feeder conduits and for all branch circuit conduits entering enclosures, panels, pull/splice box etc. grounding bushings not required for branch circuit conduit terminations at standard 4" X 4" or smaller outlet box. Provide insulated bushings for all conduits not requiring insulated grounding type bushings. Secure conduit to all boxes and enclosures, by means of double locknuts one on inside and one on outside. Provide appropriate connectors, couplings for use with EMT to utilize specified bushings.
- 5. Minimum size conduit shall be 1/2" except 3/4" minimum shall be utilized for homerun from panel to first outlet box.
- B. Above Grade Define as the area above finished grade for a building exterior and above top surface of any slabs (or other concrete work) on grade for a building interior. Above-grade raceways to comply with the following:
 - 1. Install raceways concealed except at surface cabinets and for motor and equipment connection in electrical and mechanical rooms. Install a minimum of 6 inches from insulation when crossing or 12 inches from insulation when running parrallel to flues, steam pipes, or other heated lines. Do not install within 36" from uninsulated flues, steampipes, or other heated lines. Provide flashing and counter-flashing for waterproofing of raceways, outlets, fittings, etc., which penetrate the roof. Route exposed raceways parallel or perpendicular to building lines with right-angle turns and symmetrical bends. Run concealed raceways in a direct line and, where possible, with long sweep bends and offsets. Provide sleeves in forms for new concrete walls, floor slabs and partitions for passage of raceways. Waterproof sleeved raceways where required. Seal in an approved manner all raceway openings and sleeves

through fire rated walls, floors, and ceilings after raceway installation.

- 2. Provide raceway expansion joints with necessary bonding conductor at building expansion joints and where required to compensate for raceway or building thermal expansion and contraction.
- 3. Provide raceway installation (with appropriate sealoffs, explosion-proof fittings, etc.) in all special occupancy areas, as defined and classified in Article 500 of the National Electrical Code, in accordance with that article. Provide conduit sealoffs where portions or an interior raceway system pass through walls, ceilings or floors which separate adjacent rooms having substantially different maintained temperatures, as in refrigerated or cold storage room.
- 4. Rigid Galvanized Steel Conduit: Install in the following above grade areas:
 - a. Embedded concrete walls and floor slabs.
 - b. Where exposed to mechanical injury.
 - c. For fire alarm, communication and smoke detection systems.
 - d. Circuits supplying power to jockey pumps, booster pumps, fire alarm, communication and smoke detection system, smoke exhaust fans, and all other feeder and branch circuits supplied by emergency transfer switch and supplying power to emergency transfer switch; shall utilize specified RHW wire in rigid galvanized steel conduit for U.L. listed 2 hour rating.
 - e. Where specifically required by the New York Electrical Code.
 - f. For underground or exterior work.
 - g. All remaining areas except as permitted or specifically required in the following paragraphs.

5. Intermediate Metal Grade Conduit:

a. IMC conduit with fittings as approved by the Commissioner may be utilized when permitted by NYC Building Code in all areas listed under Item 4 Rigid Conduit except for items listed in paragraphs 4c and 4d which shall be rigid conduit.

6. Electric Metallic Tubing:

- a. EMT may be used in lieu of rigid conduit or IMC for areas listed in sub paragraphs 4a and 4g only, provided that where installed in slab or fill, conduit is protected on all sides by a layer of non-cinder concrete at least 2 inches thick and concrete tight fittings shall be utilized and rigid conduit or IMC conduit bends and elbows shall be employed where exiting slab. EMT shall not be used for underground or exterior installations.
- 7. Provide flexible metal conduit in sufficient lengths not exceeding 6 feet for:
 - a. Branch circuits serving makeup of motor, transformer and/or raceway connections where isolation of sound and vibration transmission is required. For connections in locations

- exposed to weather and in interior locations subject to moisture, and motor connections use liquid-tight flexible metal conduit.
- b. Connections to recessed lighting fixtures.
- c. Provide separate grounding conductor. Securely grounded on each end of sections of flexible raceways. Size in accordance with New York City Electrical Code.
- C. Below Grade: Defined as the area below finished grade for a building exterior and below or within the bottom floor slab for a building interior. Below grade raceways to conform to the following:
 - 1. Extend below-grade raceways two (2) inches minimum above the floor or equipment foundation.
 - 2. Install exterior underground conduits 24 inches minimum below finished grade. Do not penetrate waterproof membranes unless proper seals are provided and penetration is approved by the Commissioner.
 - 3. Below grade raceways shall be rigid steel. Where permitted by local codes and local authorities, contractor may utilize type IMC metal conduit or raceways.
 - 4. Underground raceways run on site shall have a continuous warning ribbon installed 12" above raceway. Ribbon shall be a minimum 3" wide, with "Electric Line" in black letters on a bright red background.
 - 5. Underground raceways containing service entrance conductors shall be concrete encased, 2" thickness minimum.
- D. Provide separate code size ground conductor in surface metal raceways.

3.2 OUTLET, JUNCTION AND PULL BOXES

- A. Provide all outlet, junction cable support and pullboxes as indicated on the Drawings and as required for the complete installation of the various electrical systems, and to facilitate proper pulling of wires and cables. In general, install pull boxes, or pull fittings, no less than every 100 feet of straight horizontal run conduit or three (3) 90° bends, unless otherwise noted. Junction boxes and pullboxes shall be sized and supported per New York City Electric Code, unless otherwise noted. Provide barriers in boxes to separate wiring from different services per NYC Electrical Code Requirements.
- B. Provide bare copper ground wires, in all junction/pull box, larger than 4" X 4" interconnecting each conduit pair grounding bushings via ground lug. Size ground wire as follows:

<u>Feeder</u>	Ground Wire
up to #2	#8
#1 thru 1/0	#6
2/0 thru 3/0	#4
4/0 thru 350 MCM	#2
400 MCM thru 600 MCM	1/0

- C. The exact location of outlets and equipment is governed by structural conditions and obstructions, or other equipment items. When necessary relocate outlets so that when fixtures or equipment are installed, they will be symmetrically located according to the room layout and will not interfere with other work or equipment. Verify final location of all outlets, panels, equipment, etc., with Commissioner.
- D. Back-to-back outlets in the same wall, or "thru-wall" type boxes not permitted. For non-fire rated walls provide 12 inches (minimum) long nipple to offset for all outlets shown on opposite sides of a common wall to minimize sound transmission. Provide 24" (minimum) horizontal separation for outlets shown on opposite sides of a common, rated, fire wall or party wall. Where Commissioner dimensioned drawings call for back to back spacing less than 24", provide listed putty pads in each box.
- E. Where outlets are installed in steel stud type systems, provide additional cross bracing, bridging, and/or straps to make the outlet completely rigid prior to the application of the wall facing material.
- F. Unless otherwise noted on Architectural plans, locate outlets as follows. Heights listed are from finished floor to center of device. Mounting heights for other equipment are as shown on the Electrical or Architectural Plans or as herein further indicated.
 - 1. Convenience and signal outlets: 15 inches above finished floor unless otherwise noted.
 - 2. Lighting Switches: 3 feet, 6 inches, unless otherwise noted.
 - 3. Clock Outlets: Below ceiling.
 - 4. Wall Telephone Outlets: 4 feet 6 inches.
 - 5. Exit Lights: Wall mounted nine inches below ceiling to center line.
 - 6. Wall Mounted Fixtures: As indicated on drawings.
 - 7. Where counters occur, mount outlets above counter.
 - 8. Where bookcases occur, mount outlets in toe space.
 - 9. Fire Alarm Pull Stations: 4 feet, 0 inches to handle.
 - 10. Fire Alarm Strobes: Wall mounted, minimum 80" AFF; maximum 96" AFF but minimum 6" below ceiling. When ceiling mounted, no other devices or building appurtences within 5'-0".
 - 11. Wall Mounted Fire Alarm System Sounding Device: The centerline shall be a minimum of 8'-0" above floor, except in locations where ceilings prevent installation at this height, the centerline of the device shall be 6" below ceiling.
 - 12. Wall Mounted Battery Packs for Emergency Lighting: 8'-0" minimum above floor.
 - 13. Wall Mounted Fixtures: 7 feet, 6 inches or over mirrors as applicable or 1 foot below ceiling lower than 8 inches. Stairwell fixtures shall be 8 feet, 6 inches above finished floor or 1 foot below ceiling.

G. Provide a standard access panel, having a hinged metal door neatly fitted into a flush metal trim, where a junction box or equipment is located above non-accessible ceilings or behind finished walls. Coordinate location and type with the Commissioner. Removable covers must be accessible at all times.

3.3 WIRES AND CABLES

- A. Provide a complete system of conductors in raceway system. Mount all wiring through a specified raceway, regardless of voltage application, unless specifically noted elsewhere.
- B. Drawings do not indicate size of branch circuit wiring. Unless specifically noted elsewhere in this Specification, minimum wire size is to be No. 12 except for motor starter control circuit which may be No. 14. For branch circuits whose length from panel to first outlet exceeds 75 feet for 120 volt circuits, use AWG No. 10.
- C. Do not install wire in incomplete conduit runs nor until all moisture is swabbed from conduits. Insulation resistance to ground is not to be less than that approved by the New York City Electrical Code. Eliminate splices wherever possible. Where necessary, splice in readily accessible pull, junction, or outlet box. Clear interior of raceway of burrs, dirt, and obstructions before wires are pulled.
- D. Provide cable supports for all vertical risers in accord with New York City Electrical Code requirements.
- E. Flashover or insulation value of joints is to be equal to that of the conductor. Provide Underwriters' Laboratories listed connectors rated at 600 volts for general use, and 1,000 volts for use between ballasts and lamps of gaseous discharge fixtures.
- F. Use terminating fittings, connectors, etc., of a type suitable for the specified cable furnished. Provide compression equipment connectors, terminals or splices for all terminations or splices. Make bends in cable at termination prior to installing compression device. Make up all fittings tight. Recheck all splices and terminations and make mechanically and electrically tight during a fifteen (15) day period immediately prior to final acceptance of the work.
- G. Install wire in raceways and make up all terminations in strict accordance with manufacturer's recommendations using special washers, nuts, etc., as required.
- H. Extend wire sizing for the entire length of a circuit unless otherwise noted.
- I. Conduit runs shall contain quantity of circuits as shown on drawings. Combining circuits or wiring to effect a reduction in conduit homeruns will not be permitted except as per paragraph M this section.
- J. Type MC Metal Clad Cable:
 - 1. Application: May be utilized concealed in hollow spaces of building for receptacle and lighting branch circuiting. May not be used where prohibited by code.
 - 2. Install only with approved bushings.
- K. Common Neutral:

- 1. Panel schedules are based upon utilizing separate neutral conductors for each 120 volt branch circuit. Contractor, at his option, may substitute multi-wire branch circuits, utilizing common neutral, where permitted by their specifications; provided the single pole circuit breakers are regrouped in panel and replaced with two (2) pole and three (3) pole circuit breakers for all multi-wire branch circuits utilizing a common neutral. A Common Neutral will be permitted for two or three, single pole, 15 Ampere or 20 Ampere branch circuits, except as noted below:
 - a. Common Neutral will not be permitted on circuits served via a dimmer.
 - b. Common Neutral will not be permitted on circuits serving any duplx receptacles.
 - c. Common Neutral will not be permitted on circuits supplied via a Arc-fault circuit Interrupter Type C.B.
 - d. Common Neutral will not be permitted on circuits supplied via a Ground Fault interrupter Type C.B.
- L. Circuiting indicated on drawings is diagrammatic and intended to show devices on a common branch circuit. Contractor may, at his option regroup indicated single pole 20 amp circuits into homeruns of his choice within the following criteria:
 - 1. Circuits requiring individual neutral: Maximum of four (4) circuits per homerun. Contractor may increase quantity to a maximum of nine (9) circuits per homerun provided all conductors are increased to #10 AWG, when homerun contains more than four (4) circuits.
 - 2. Circuits utilizing a common neutral: Maximum of six (6) circuits per homerun. Contractor may increase quantity to a maximum of nine (9) per homerun provided all conductors are increased to #10 AWG, when homerun contains more than six(6) circuits.
 - 3. All homerun conduits shall be minimum 3/4"C up to six (6) circuit homeruns, increase size as required by code for ground and/or isolated ground conductors. For seven to a maximum of 9 circuits per homerun. Minimum size conduit shall be 1". Increase size as required by code for ground and/or isolated ground conductors as indicated on drawings or specified elsewhere.
 - 4. When homeruns are regrouped from those indicated on drawings, contractor shall provide 20% of the eliminated homeruns, but not less than one (1) per panel, as spare, empty conduit, for future use. Run from electric panel locations to centrally located, uniformly spaced locations on floor as directed by Commissioner. Terminate in junction box with Nylon pull cord.

M. MI Cable

- 1. Installation shall be in accordance with the latest edition of the New York City Electrical Code the authority having jurisdiction and the manufacturer's recommendations.
- 2. Application
 - a. MI cable up to 350 MCM, may be used for any application permitted by code and may be used for all emergency system feeders in lieu of feeders specified elsewhere.

3. Storage

- a. Cables shall be shipped form the manufacturer with ends temporarily sealed against moisture ingress.
- b. When cables are cut in the field, the ends are to be sealed by means of standard sealing compound and PVC tape.
- c. Cables shall be stored in a dry location.

4. Handling

- a. Cable shall be uncoiled by rolling, or by means of a supply reel obtained from the manufacturer, rather than pulling from the periphery or the center of the coil.
- b. Reasonable precautions shall be taken to prevent damage to the cable from damaging blows with sharp instruments and pulling over sharp objects.

5. Cable Installation

- a. Contractor shall comply with manufacturers installation instructions.
- b. Exposed or Surface Installations
 - 1. Cable shall be clipped directly to walls, beams pr ceilings using clips or straps of a type acceptable to the manufacturer.
 - 2. Cable shall be supported at a maximum of every thirty-six (36) inches on center horizontally and every seventy-two (72) inches on center vertically to a two-hour rated surface using steel anchors.
- c. When using conductor cables in parallel cables shall be run in groups having one of each phase in each group. Each set of paralleled conductors shall be separated by at least two single cable diameters.
- d. Cables shall be installed paralleled to building lines to present a neat appearance.
- e. Cables exposed below 8'-0" AFF shall be protected by angle iron, channel or rigid steel conduit.
- f. Cable tray when used to support cable in fire rated applications will be of construction that will function at temperature up to and including 1850°F for a period of two hours.

6. Embedded Installations

- a. Cables embedded in concrete shall be protected against puncture damage from the medium itself or the pouring equipment and have an overall protection of a PVC jacket.
- b. Where cables emerge from a slab, protection against shear damage shall be provided by means of a short PVC conduit stub, metal plate or angle, at the point of egress. This protection shall extend from 18 inches below finish grade to 8 feet above finished grade.

7. Bending

a. The cable can be bent to a minimum radius of five times (5X) the cable diameter of the cable up to 250 kcmil and ten times (10X) the cable diameter for 350 kcmil.

8. Pulling

- a. Non-stretch pulling rope should be used with swivels between cable and pulling rope.
- b. Use sheaves of diameter recommended by manufacturers.

9. Single Conductor Cables

- a. When single conductor cables are installed they should run in a tri-foil configuration with the sheaths of each cable touching the entire length of the run except when entering the enclosure. Each group of cables shall be fastened tightly together, at least once between each cable support on horizontal runs and twice on \vertical runs, using ½ inch wide by 0.030 inch thick stainless steel straps.
- b. Where parallel runs are required each bundle will contain a conductor form each phase plus a neutral if required. Each bundle will be spaced two (2) cable diameters apart and will be installed in accordance to NEC 310-4.
- c. Where single conductor cables enter a ferrous metal enclosure protection must be taken to prevent heating by induction. This will be done by removing a section of the box and replacing it with a brass plate.

10. Wall or Floor Penetrations

- a. When cable penetrates a wall or floor, a sleeve will be placed in the opening to protect the cable during pulling. Once the cable is in place, the opening will be fire stopped using an approved fire-stop system. A list of Underwriters Laboratories approved system, appears in the "Through Penetration Fire stop Systems" in the UL Fire Resistance Directory, Guide XHEZ.
- N. All emergency circuits as defined in section 700.9 of the New York City Electric Code shall be a listed electric circuit protective system with a minimum 1 hour rating.

3.4 GROUNDING

- A. Provide grounding in accordance with the New York City Electrical Code and as noted on Drawings, and described elsewhere in specifications.
- B. In addition, furnish a separate insulated green equipment ground conductor for the following branch circuits:
 - 1. Circuits serving any wall box dimmer.
 - 2. Circuits serving any Isolated Ground receptacles.

- 3. Circuits serving any duplex or simplex Computer Terminal Receptacles.
- 4. Any circuit served via an isolation transformer.
- 5. All circuits serving equipment, fixtures, receptacles, etc. located in pool and/or pool equipment rooms, including low voltage circuits.

END OF SECTION

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SECTION 260533

EMPTY CONDUIT SYSTEMS

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 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project:
 - 1. The Contract Drawings
 - The Specifications
 - 3. The General Conditions
 - 4. The Addendum
 - 5. The Contract [City of New York Standard Construction Contract].

1.3 WORK INCLUDED

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the Electrical Work as shown on the drawings and specified herein, including, but not limited to, the following:
 - 1. Terminal boards and outlets.
 - 2. Telephone empty conduit system.
 - 3. Data empty conduit systems.
 - 4. Cable TV empty conduit systems.

1.4 RELATED WORK

- A. Equipment supports
- B. Basic materials and methods
- 1.5 QUALITY ASSURANCE

- A. Comply with applicable requirements of the local telephone utility company.
- B. Except as modified by governing codes and by the Contract Documents, comply with the provisions and recommendations of the following:
 - 1. American National Standards Institute.
 - 2. National Electrical Manufacturers Association.
 - 3. Underwriters' Laboratories.
 - 4. Applicable National Fire Protection Association Standards.
 - 5. Comply with New York City Electric Code Article 770 for Optical Fiber Cables and Raceways.
 - 6. Comply with New York City Electric Code Article 800 for Communications Circuits.
 - 7. Comply with New York City Electric Code Article 820 for Cable TV Distribution System.
 - 8. Comply with New York City Electric Code Article 830 for Network-Powered Broadband Communications Systems.
- C. Manufacturer Seismic Qualification Certification: Submit certification that equipment specified in this Item, accessories, and components will withstand seismic forces defined in Item 118 "Seismic Supports. Restraints and Attachment". Include the following:
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - a. The term "withstand", for equipment with Importance factor = 1.5 means "the items remains operable following design earthquake and in addition is in compliance with section 9.6.3.14.1 of ASCE-7-02."
 - b. The term "withstand" for equipment with Importance factor = 1.0, means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
 - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

PART 2 PRODUCTS

2.1 TERMINAL BOARDS

A. Minimum 8' high by 3/4" thick plywood of size indicated on Drawings.

2.2 TELEPHONE OUTLETS

A. Galvanized steel box 4" X 4" X 2 1/2" minimum dimensions. Cover plate with bushed hole. Plate finish same as wiring devices.

2.3 DATA OUTLETS

A. Same as telephone except with blank face plate.

2.4 CABLET TV OUTLETS

A. Same as telephone except with blank face plate.

2.5 PULL LINES

A. 3/32" outside diameter, 200 pound strength, polyethylene.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Provide all raceways, outlets, device plates, and terminal boards in conformance with the Contract Documents. Consult with the telephone company and comply with their requirements.
- B. Work by others: Furnishing all wires, instruments, relaying, switching equipment and making all connections.
- C. Incoming Service: Provide incoming service conduits for telephone cable TV, data at the location shown on the drawings.
- D. Arrange conduit runs less than 100 feet from point-to-point so that they contain no more than two (2) 90° bends. Conduit runs exceeding 100 feet from point-to-point, with more than one (1) 90° bend, must contain square or oval conduit fittings ("Condulets") or conduit slip sleeves. All empty conduits to terminal boards are to enter top or bottom on the extreme right or left side.
- E. Provide empty conduit and conduit sleeves as indicated on drawings. Provide pullboxes in accessible positions for every 150 feet of straight raceway for all empty conduit.

- F. Provide pull lines in all raceways.
- G. Provide terminal boards of sizes as indicated on the Drawings for mounting by others of terminal strips, key equipment, etc. Locate where 3 foot (minimum) front access space is available. Provide supports when not located directly on wall.
- H. For each telephone, data and TV outlet, provide 3/4" E.C. from outlet to a junction box located above the nearest available accessible hung ceiling. Provide nylon pull cord.
- I. Telephone Equipment Room: Outlets and devices shown in the telephone equipment room drawings are intended to indicate quantities only. Contact the telephone company for exact locations and make adjustments as required. Provide specified plywood backboard on all walls of equipment room as directed by service providers.
- J. Provide ground cable in conduit from cold water main at building service entrance to all telephone terminal boards and to all other communication systems terminal board locations. Provide minimum #6 awg ground, except to main frame room which shall be 1/0.

END OF SECTION

SECTION 262416

ELECTRICAL DISTRIBUTION SYSTEM

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown and specified, shall be in accordance with the requirements of the Contract Documents.

1.2 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project:
 - 1. The Contract Drawings
 - 2. The Specifications
 - 3. The General Conditions
 - 4. The Addendum
 - 5. The Contract [City of New York Standard Construction Contract].

1.3 WORK INCLUDED

- A. Work of this Section includes all labor, materials, equipment, hoisting rigging and services necessary to complete the Electrical Work as shown on the drawings and specified herein, including, but not limited to, the following:
 - 1. Provide electrical distribution system in accordance with the Contract Documents.

1.4 RELATED WORK

- A. Equipment supports and nameplates as specified in 260500.
- B. Networkable Low Voltage Lighting Control System as specified either give the actual Item numbers or remove.

1.5 QUALITY ASSURANCE

- A. Manufacturers Instructions:
 - 1. In addition to the requirements of the specifications comply with manufacturers instructions and recommendations for all phases of work.

- B. Except as modified by governing codes and by the Contract Documents, comply with the applicable provisions of the New York City Electrical Code, and recommendations of the following:
 - Panelboards: Comply with latest versions of, Underwriters Laboratories Standards UL 50 for cabinets and boxes, UL 67 for panelboards, and UL 98 for enclosed and Dead front switches. National Electrical Manufacturer's Association Standard PB-1, PB-1.1 and KS1 for enclosed distribution switches; and Federal Specifications W-P-115C.
 - 2. Circuit Breakers: Comply with latest versions of, Underwriters' Laboratories Standards UL-489, and National Electrical Manufacturers' Association Standard AB-3, and Federal Specifications W-C-375B, and IEC 157-1.
 - 3. Transformers: Transformers shall meet the latest applicable standards of NEMA, ANSI, and U.L., including NEMA ST20 or TR27, ANSI C57-110-1986, and NEMA TP-1.
 - 4. Contactors: Comply with Underwriters Laboratories standards UL 508.
 - 5. Fusible switches: Federal Specification W-C-865C.
- C. Manufacturer Seismic Qualification Certification: Submit certification that equipment specified in this Section, accessories, and components will withstand seismic forces defined in "Seismic Supports. Restraints and Attachment". Include the following:
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - a. The term "withstand", for equipment with Importance factor = 1.5 means "the items remains operable following design earthquake and in addition is in compliance with section 9.6.3.14.1 of ASCE-7-02."
 - b. The term "withstand" for equipment with Importance factor = 1.0, means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
 - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.

1.6 SUBMITTALS

- A. Shop Drawings: Submit shop drawings and manufacturers' data for the following items:
 - 1. Panelboards:

- a. Show main devices and lug sizes; branch circuit device sizes and arrangement; bus ampacities; dimensions and construction; gutter dimensions; protective coating; and all pertinent details of panel, enclosure, cover, and method of securing cover and lock.
- b. Nameplates, as specified in Section 260500, paragraph 3.12 Identification.
- c. Panel directory.
- d. Short Circuit Ratings: Indicate device short circuit ratings, indicate UL listed series ratings with integral or remote upstream overcurrent device. Indicate all bus short circuit bracing.
- e. Prepare printed table for each panel for approval of Commissioner listing trip rating, and frame/switch rating, of each overcurrent device including main device if applicable. Also list device and panel U.L. listed short circuit rating, including series ratings with integral or remote upstream device.
- 2. Dry Type Transformers: Dimensions, nameplate, and catalogue data.
- 3. Contactors: Dimensions, catalogue data, number of poles, coil voltage and contact ratings.
- B. Test Reports. Submit certified test reports showing compliance of the following items in accordance with the contract documents.
 - 1. All panelboards specified by this section shall be given a 60 Hz A.C., dielectric test. Dielectric test shall be phase to phase, and phase to ground, at twice rated voltage plus 1000 volts, but not less than 1500 volts, for one (1) minute, prior to shipment from factory. A test voltage which is 20% higher than that in the one minute test may be applied for one (1) second as an alternative to the one (1) minute test. The date of the test and the name and title of the individual certifying the test shall be clearly shown on a label affixed to the equipment.

C. Instructional Materials

1. Manufacturer shall supply installation instructions and NEMA Standard PB1.1.

PART 2 PRODUCTS

- 2.1 LIGHTING AND POWER PANELS (CIRCUIT BREAKER TYPE)
 - A. Provide panels consisting of an assembly of branch circuit switching and protective devices mounted inside a dead front NEMA 4X Stainless Steel enclosure. Provide the number and size of these branch circuit devices as indicated on drawings.
 - B. Provide the following modifications and additional equipment as shown on the drawings or called for in specifications:

- 1. Main circuit breakers.
- 2. Split buses.
- 3. Subfeed switches.
- 4. Feed-through lugs. Provide for all two (2) section panels with one (1) main circuit breaker to facilitate connection to second section.
- 5. Sub feed lugs. Provide for all two (2) section panels with no main circuit breaker to facilitate connection to second section.
- 6. Integral remote control switches, and contactors.
- 7. Transient Voltage Surge Suppression Devices.

C. Panelboard Interior:

- Rigid removable assembly of copper bus bars and interchangeable bolted branch circuit devices. Bus current rating shall be determined by heat rise test conducted in accordance with UL 67, or as required by applicable code whichever is more stringent.
- 2. Bus bars drilled to permit branch circuit devices of all sizes and number of poles to be interchangeable and installed in any spare space of sufficient size, without disturbing adjacent units, removing main bus or branch circuit connectors, and without machining, drilling or tapping.
- 3. Arrange bus in sequence or distributed phasing so that multipole circuit breakers can replace any group of single pole circuit breakers of the same size.
- 4. Main bus current capacity shall be sized according to feeder switch size or panel main C.B. frame size where applicable.
- 5. Provide full size ground and neutral buses unless otherwise noted on drawings in each panel. Provide isolated ground bus and 200% rated neutral bus as noted on drawings.

D. Enclosure:

- 1. Code gauge NEMA 4X stainless steel box.
- 2. Weld a ground connector (O.Z. QGL) to inside of box, for all panels with isolated ground bus or no ground bus.
- 3. Flush mounted in finished areas and where indicated. Surface mounted elsewhere.
- 4. 20 inches wide minimum. Provide gutter space in accordance with applicable codes. Where feeder cable supplying the mains of a panel are carried thru its box,

or where two (2) section panels are furnished with main circuit breakers in each section, the box shall be sized to provide the additional required wiring space for feeder and feeder tap to panel.

E. Front:

1. Heavy code gauge NEMA4X stainless steel as required to maintain panel face flat. Hinged door in door construction. Power panels may have hinged side gutters to provide access to interior in lieu of door in door construction. Doors shall have flush type cylinder lock.

F. Terminal Lugs:

1. Locate main lugs properly at top or bottom, depending on where main feeder enters. Terminations shall be approved for 75°C rated wire.

G. Circuit Breaker Overcurrent Devices:

- Plastic molded case. Completely sealed enclosure. Toggle type operating handle.
 Trip ampere rating and ON/OFF indication clearly visible. Tested and labeled per
 UL-489.
- 2. Silver alloy contacts with auxiliary arc-quenching devices.
- 3. Bolt in place to main bus.
- 4. Bolted type terminals Underwriters' Laboratories approved for copper conductors.
- 5. 100 A to 400 A frame circuit breakers shall be thermal-magnetic trip-free, trip-indicating, quick-make, quick-break, with inverse time delay characteristics. Single handle and common tripping multipole breakers.
- 6. 600 A frame and larger circuit breakers shall be solid-state trip, trip-free, trip indicating, quick-make/quick-break, with adjustable inverse time characteristics; Siemens Sensitrip Type, Square D, Cutler Hammer or approved equal.
- 7. Locate next to each breaker or space unit an individual number button. Where multiple-section panelboards occur, no two sections are to have like numbers.
- 8. All circuit breakers shall be capable of being padlocked in the "OFF" position. Provisions for locking shall not be removable when the lock is removed.

H. Minimum Frame and Electrical Panel Ratings:

- 1. Minimum Frame Size shall be 100 Amperes.
- 2. Circuit breaker interrupting capacity shall be as indicated on drawings, if no indication on drawings minimum shall be as specified herein.

- 3. To obtain required A.I.C. capacities, panel branch and main circuit breakers shall be fully rated. Where permitted by Code, Contractor may utilize a U.L. listed series rating with the upstream overcurrent device protecting the panel feeder, equal to or greater than the required A.I.C. When U.L. listed series ratings with indicated upstream overcurrent device protecting the panel feeder are not permitted by Code, or do not meet the requirements specified on the drawings, contractor shall furnish a fully rated panel, or current limiting Main Circuit breaker in the panel and branch breakers which have a U.L. listed series A.I.C. which meets or exceeds the requirements. Minimum AIC shall be as follows:
 - a. No 120/208 volt C.B. shall be rated less than 10,000 AIC.
 - b. Panels whose feeders are protected with fused overcurrent device.

	Lighting Panel	Power Panel
120/208	200,000 AIC up to 100A, Fuse 100,000 AIC over 100A Fuse	100,000 AIC
277/480	50,000 AIC	100,000 AIC

c.	Panels whose feeders are protected with circuit breakers	
	Lighting Panel	Power Panel
120/208	22,000 AIC	42,000 AIC
277/480	30,000 AIC	42,000 AIC

- 4. Panels requiring main circuit breakers of the current limiting type, as noted on panel schedules or elsewhere in this specification shall have main breakers as follows in lieu of those specified under Item 2, above.
 - a. Circuit breakers shall be Siemens, Square D, Cutler Hammer or approved equal fuseless type and shall be current limiting.
 - b. Breakers 100 ampere frame shall be thermal magnetic trip with inverse time current characteristics. Breakers 400 amp and 250 ampere frame shall be solid-state trip complete with built in current transformers solid-state trip unit and flux transfer shunt trip. Breakers shall have easily changed trip rating plugs with trip ratings as indicated on the drawings. Rating plugs shall be interlocked so they are not interchangeable between frames and interlocked such that the breaker cannot be latched with rating plug removed. In lieu of rating plugs, 20%-100% adjustable continuous current rating is acceptable. Adjustment screw shall be concealed. Breakers shall have built in test points for testing long delay and instantaneous and ground fault (where applicable) functions of the breaker by means of 120 volt operated test kit.
 - c. Current limiting circuit breakers shall protect all molded case breakers down stream as shown on the drawings. No deviations from this provision shall be acceptable. Manufacturer shall submit copy of UL series rated listing with

downstream device, proving the protection, from both peak currents and I squared T energy. Utilize breakers providing the following UL Series listed short circuit ratings.

Main C.B. Trip	Short Circuit Rating
120/208 Volt	
Lighting Panel	
Up to 250 A	200,000 AIC
120/208 Volt	
Power Panel	
Up to 400 A	200,000 AIC
277/480 Volt	
Lighting Panel	
Up to 400 A	150,000 AIC
277/480 Volt	
Power Panel	

5. For lighting circuits controlled at panel, provide C.B.'s rated for switching load controlled i.e. fluorescent, HID etc.

150,000 AIC

- 6. Provide personal ground fault protection type C.B. (1 or 2 pole 5 ma type) where required by code or called for on drawings and for all 125 volt single phase 15 and 20 ampere receptacles in bathrooms, on rooftops, in crawl spaces, within 6' of outside edge of sinks, located outdoors, and on kitchen countertops.
- 7. Provide equipment ground fault protection type C.B. (30 ma Type) where required by code or called for on drawings and for all pipe trace heating systems.
- I. Provide main breakers in sections of multi-section panels and when two (2) or more panels are served by a common conductor or over-current device.
- J. Panelboards shall be labeled with UL listed, series, short circuit rating. Series rating shall cover all trip ratings of installed frames. It shall state conditions of UL series rating including:
 - 1. Size and type of upstream device.

Up to 400 A

- 2. Branch devices which can be used.
- 3. UL listed rating.
- K. Panelboards shall be Siemens Sentron Type, Square D, Cutler Hammer as modified by these specifications or approved equal.

2.2 FUSIBLE PANELBOARDS

- A. Provide fusible panelboards consisting of an assembly of branch circuit switching and protective devices mounted inside a dead front enclosure. Provide the number and size of branch circuit devices as indicated on the drawings.
- B. Main bus current capacity shall be sized according to feeder switch size. Bus shall be copper, sized to limit maximum temperature rise to 50°C above 40°C ambient, when conducting 100% of rated current, or as required by local code whichever is more stringent.
- C. Bus Bracing: 100,000 ampere (Root Mean Square) continuous symmetrical short circuit current, unless otherwise noted on drawings.
- D. All bus connections shall be made with two bolts or more.
- E. The switch to bus connector links shall have current-carrying capacity equal to the maximum rating of the switch.
- F. Switches shall be quick-make, quick-break type.
- G. Fuseholders shall be of the high pressure type using a compression coil spring.
- H. All switches shall be provided with an operating handle which can be triple padlocked in the "OFF" position.
- I. A cover interlock shall prevent opening the switch door unless in the "OFF" position.
- J. All switches shall be heavy duty type, horsepower rated.
- K. All wire terminations shall be rated for minimum 75°C wire.
- L. Enclosure:
 - 1. Code gauge steel box galvanized.
 - 2. Weld a ground connector (O.Z. Type QGL) to inside of box for all panels without ground bus.
 - 3. Surface mounted.

- 4. Front shall be heavy code gauge steel as required to maintain panel face flat. Hinged door in door construction, or hinged side gutters. Front shall be primed and a finish coat of gray ANSI 61 paint applied.
- 5. Siemens Sentron Type F1 or F2 as modified by these specifications or approved equal.
- M. Manufacturer: Siemens, Square D, Cutler Hammer or approved equal.

2.3 DRY TYPE TRANSFORMERS (UP TO 400KVA)

A. Insulation: 220°C temperature class insulation system with an average temperature rise not to exceed 150°C. Temperature rise will be based on 40°C maximum ambient 30°C average ambient over 24 hours, with 100% of the rated nameplate load connected to the secondary of the transformer. Transformer shall be able to supply non-linear loads with a K-factor, as listed by UL, equal to 4. Transformer shall be 277/480 Volts 3 phase, 3 wire, delta primary, to 120/208 volts 3 phase 4 wire wye secondary.

B. Coils:

- 1. Electrically separate windings. Wind with copper or aluminum magnet wire, vacuum impregnated with non-hydroscopic, thermosetting varnish. Provide each layer with end-fillers or tie-downs to provide maximum mechanical strength. Brace tap termination to magnet wire. Brace primary and secondary magnet wire directly to bus studs or lugs firmly mounted.
- 2. Windings continuous from start to finish. No splicing acceptable in windings. Materials incorporated to have at least a minimum of one year of proven field usage. Accelerated laboratory tests not acceptable.

C. Magnetic Circuit:

- 1. Manufacturer cores from a high-grade, non-aging 29 gauge silicon steel with high magnetic permeabilities, low hystersesis and eddy current losses. Keep magnetic flux densities well below saturation to allow for a minimum of 10 percent overvoltage excitation.
- 2. Cut laminations with the direction of the grain and free from burrs. Core plate and stack without gaps.
- 3. Clamp cores with structural angles (formed angles not acceptable) and bolt to the enclosure to prevent damage during shipment or rough handling.
- D. Taps: Provide four (4) taps on the primary. Two (2) 2 1/2 % FCAN and two (2) 2 1/2 % FCBN.

E. Enclosures:

1. Provide lifting brackets on all sizes.

- 2. Design ventilated openings in a manner as to prevent accidental access to live parts.
- 3. Degrease, clean, phosphatize, and paint the entire enclosure with one (1) coat of zink chromate primer and two (2) coats of gray enamel.

F. General Construction:

- 1. Mount core and coil on vibration mounting pads designed to suppress transmission of 120-cycle frequencies and harmonics thereof. Arrange and select pads in consideration of core and coil weight (for 30-KVA and over).
- 2. Ground the core and coils to the frame of the transformer cubicle by means of a flexible grounding strap of adequate size.
- 3. Maximum case temperature not to exceed 35°C above ambient. Maximum terminal compartment temperature rise shall be 5°C.
- 4. All wire terminations shall be rated for use with maximum 75°C wire.
- 5. Provide transformers, both single-and 3-phase, up to and including 112 1/2 KVA, interchangeable for floor, wall, or ceiling mounting.

G. Efficiency:

1. Comply with New York City Building Code requirements for energy efficiency.

H. Sound Levels:

- 1. Sound levels, guaranteed by the manufacturer, substantiated, by certified test on each unit furnished not to exceed standard NEMA ratings.
- I. Manufacturers: Sorgel, Square D, Heavy Duty, ACME, Cutler Hammer or approved equal.

2.4 CONTACTORS

A. Ratings and Features:

- 1. Mechanically held, opened and closed by electrical impulse to coils.
- 2. Rated to amperes for all classes of loads to 600 volts alternate current.
- 3. Interrupting capacities: Six (6) times rated current.
- 4. No derating required for use on high inrush loads.
- 5. Current coil magnetic blowouts on all poles.

- 6. Solderless lugs. All terminations shall be suitable for minimum 75°C wire.
- 7. Provide sufficient poles to operate on system as indicated.
- 8. Provide two (2) auxiliary contacts, field reversible.

B. Construction:

- 1. Pressure assembled electromagnets of laminated low-loss electric steel.
- 2. Machine-ground pole faces and shading coils for minimum alternating current hum level.
- 3. Current coil magnetic blowouts on all poles to insure high interrupting capacity with minimum contact erosion.
- 4. Self-cleaning, self-aligning contacts and including adjustable contact action and pressure.
- 5. Silver tungsten contact materials.

C. Operation:

1. Contactor coils close the contacts at minimum of 85% of normal voltage and withstand 10% over-voltage without damage to coil windings. Provide all contractors as alternate current coil operated or supplied with appropriate power supply. Provide all supplementary relays which are required to properly interface with control devices. Coil voltage as indicated by circuiting on drawings. Provide with auxiliary relay, or interface control module, for 2-Wire control where drawings indicate control via single pole toggle switch in lieu of momentary contact switch.

D. Enclosure:

- 1. NEMA 1 cabinet for surface mounting, front connected with flush dead back construction. Arrange contacts to be renewable from front of panel. Panel or switchboard mount when so indicated.
- E. Momentary contract, remote control switches for operating contactors: ASCO Cat. #173A2 (Flush Mount), #173A3 (Surface Mount) or approved equal.

F. Manufacturers:

1. Automatic Switch Co. #911 (225-1000 amperes), #920 (30-225 amperes), #1255-166 (30 amperes); #917 (20 amperes or less) or approved equal.

PART 3 EXECUTION

3.1 PANELBOARDS

A. Installation:

- 1. Install in accordance with manufacturers installation instructions and these specifications.
- 2. Mount Panel 4 feet to panel center but with maximum height of six (6) feet six (6) inches to handle of topmost switching device.
- 3. Mount surface type panels 1/4" off wall.
- 4. Where feeder cable supplying the mains of a panel are carried thru its box, or where two (2) section panel is furnished with main circuit breakers in each section; connect panels to main feeder by insulated parallel gutter taps (O.Z. Electrical Manufacturing Company Type XTP with XTPC cover). Full size tap for two panels on a common feeder, half the main cable capacity for three or more panels per feeder.
- 5. Neatly arrange branch circuit wires and tie together in each gutter with waxed twine or Thomas & Betts nylon "Ty-Raps", or approved equal at minimum intervals.
- 6. Plug all knockouts removed and not utilized.

B. Indexing and Identification:

- 1. After installations are complete, provide and mount under sturdy transparent shield in the directory frame of each panel door, a neat, accurate and carefully typed directory properly identifying the lighting, receptacles, outlets and equipment each branch circuit breaker controls.
- 2. Include on directory, the panel identification, the cable and conduit size of panel feeder, and the feeder origination point.
- 3. In addition to identification nameplates described elsewhere, where current breakers or fuses are applied in compliance with listed series combination ratings, the supply feeder overcurrent device and the load equipment (panelboard, distribution panel, MCC, etc.) shall have an additional nameplate with marking: CAUTION. SERIES COMBINATION SYSTEM RATED ______AMPERES. IDENTIFIED REPLACEMENT COMPONENTS REQUIRED.

C. Grounding

1. Bond grounding bushing on feeder conduit to ground lug (ground bus where specified) in panel with a copper ground conductor. Ground conductor shall be sized as follows:

Feeder

Required Ground Conductor

Up to 1/0	#6
2/0 - 3/0	#4
4/0 – 350 MCM	#2
400 – 600 MCM	1/0

2. Tie all branch circuit grounding bushings together by running a copper ground conductor through them and connecting to the panel grounding lug (ground bus where provided). Grounding conductor shall be sized as follows: based upon largest branch circuit.

Branch Circuit	Required Ground Conductor
Up to #2	#8
#1 thru 1/0	#6
2/0 thru 3/0	#4
4/0 thru 350 MCM	#2
400 thru 600 MCM	1/0

3.2 DRY TYPE TRANSFORMERS

- A. Resiliently suspend each dry type transformer on double deflection neoprene in shear hanger rod isolators, capable of providing minimum 3/8" static deflection.
 - 1. Mountings: Type HD Mason Industries, Inc. or approved equal
 - 2. Type CD Vibration Eliminator Company or approved equal

B. Grounding:

1. Provide grounding electrode conductor for dry-type transformer secondaries. Also ground neutral to transformer case. Ground transformer secondary neutral to grounding electrode conductor, nearest available cold water pipe and local building steel. Utilize Burndy type GSTUD-HY or approved equal listed compression type grounding connector. Weld connector to structural steel.

3.3 CONTACTORS

A. Install in accordance with manufacturers installation instructions and these specifications.

3.4 GROUNDING

A. Provide grounding in accordance with the New York Electrical Code requirements, and as noted on drawings and described elsewhere in specifications.

END OF SECTION

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SECTION 262923

ELECTRICAL POWER 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.

1.2 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project:
 - 1. The Contract Drawings
 - 2. The Specifications
 - 3. The General Conditions
 - 4. The Addendum
 - 5. The Contract [City of New York Standard Construction Contract].

1.3 WORK INCLUDED

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the Electrical Work as shown on the drawings and specified herein, including, but not limited to, the following:
 - 1. Disconnect switches.
 - 2. Manual motor starters.
 - 3. Power wiring to devices.
 - 4. Control wiring as indicated on contract documents or called for herein.

1.4 RELATED WORK

- A. Equipment supports and nameplates as specified in 260500.
- B. Basic materials and methods as specified in 260519.

1.5 QUALITY ASSURANCE

A. Manufacturer's Instructions:

- 1. In addition to the requirements of these Specifications, comply with manufacturer's instructions and recommendations for all phases of work including installation of equipment furnished by others.
- B. Except as modified by governing codes and the Contract Documents, comply with the applicable provisions and recommendations of the following:
 - 1. Disconnect Switches: Comply with National Electrical Manufacturer's Association Standard KS-1, Federal Standard W-S-865C, U.L.98, and U.L. 50.
 - 2. Motor Controllers: Comply with Underwriters' Laboratories' Standard UL-508, and National Electrical Manufacturers' Association Standard ICS-2.
- C. Manufacturer Seismic Qualification Certification: Submit certification that equipment specified in this Item, accessories, and components will withstand seismic forces defined in Item 118 "Seismic Supports. Restraints and Attachment". Include the following:
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - a. The term "withstand", for equipment with Importance factor = 1.5 means "the items remains operable following design earthquake and in addition is in compliance with section 9.6.3.14.1 of ASCE-7-02."
 - b. The term "withstand" for equipment with Importance factor = 1.0, means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
 - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.

1.6 SUBMITTALS

- A. Shop Drawings: Submit shop drawings and manufacturers data for the following items:
 - 1. All disconnect switches.
 - 2. All motor controllers.

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 to the approval of the Commissioner and at no additional cost to the City of New York.

PART 2 PRODUCTS

2.1 DISCONNECT SWITCHES

- A. Provide for each motor 1/2 horsepower and above, a rated disconnect switch.
 - Heavy-duty, single-throw knife switch with quick-make, quick-break mechanism, capable of full load operations. Horsepower rated and meeting National Electrical Manufacturers Association and U.S. Government Specifications for Class A switches.
 - 2. Provide with contact arc-quenching devices, such as magnetic blowouts or snuffing plates. Provide self-aligning switchblades with silver alloy contact areas, designed so that arcing upon making and breaking does not occur on the final contact surfaces. Provide with high pressure, spring loaded contact. Mount switch parts on high grade insulating base. For disconnect switches serving hydraulic elevators provide one N.O. and one N.C. auxiliary contact rated for 10 Amperes Continuous.
 - 3. Enclosure: National Electrical Manufacturers Association I with multiple knockouts on all sides and back, hinged door, and cover interlock which prevents door opening when switch is in ON position. Provide triple padlocking capability. Utilize National Electrical Manufacturers Association 3R (rain-tight) enclosure for exterior. Provide nameplate on each disconnect switch denoting equipment served.
 - 4. Size, fusing and number of poles as shown on plans or as required by code for motor installed. Provide horsepower rated switch to match motor load if no size is shown. Use 3-pole plus solid neutral switches unless otherwise noted. Provide where indicated and where required by code.
 - 5. Provide a ground lug, O.Z. Gedney type "KG" or approved equal for each disconnect and mount to enclosure.
 - 6. Approved Manufacturers: Square D, Siemens, Cutler-Hammer or approved equal

2.2 MANUAL MOTOR STARTERS (Thermal Switch)

- A. Provide each motor below ½ horsepower with a manual motor starter as indicated on drawings.
 - 1. Starters shall have quick-make, quick-break toggle mechanism. Overload shall have field adjustment allowing up to $\pm 10\%$ variation in ratings at nominal heater value. Cutler Hammer MSTOI or approved equal for single pole and MSTO2 or approved equal for two pole application.

- 2. The Contractor shall obtain full load current data from approved shop drawings and furnish and install appropriate plug-in heater unit in accordance with manufacturer's recommendations.
- 3. Enclosure: NEMA 1 enclosures with knockouts. Cutler Hammer MSTOISN or approved equal for surface mounting or MSTOIDN cover or approved equal for flush mounting. Provide nameplate for each starter indicating equipment served. Provide NEMA 4 enclosure for outdoor application or where indicated to be weatherproof, Cutler Hammer MSTOIAH or approved equal.

PART 3 EXECUTION

3.1 MOTOR POWER AND CONTROL WIRING

A. General:

- 1. Provide all motor power wiring, for both large and fractional HP motors, unless otherwise noted.
- 2. Install and wire all control devices that are part of the motor power circuit.
- 3. The requirements of this Section are applicable to all other power consuming devices.
- 4. Provide all control wiring for fan shutdown via fire alarm system and for smoke purge fan(s) via smoke purge panel and as indicated on contract documents, or specified elsewhere. Control wiring for fan shutdown and smoke purge functions shall be terminated in starters and/or control panels per approved control wiring diagrams furnished by mechanical contractor.

B. Motor Power and Control Wiring

- 1. Install motor controllers where shown. Obtain the individual motor controllers, including approved manufacturers shop drawings, from the contractor who supplies them, and mount where shown on the plans. Check with other Contractors, Commissioner and approved shop drawings to make certain mounting location is correct and does not interfere with other equipment, and is in accordance with all manufacturer's requirements for mounting.
- 2. Insure that motor rotation is correct and reconnect if necessary.
- 3. Provide motor feeder to starter and from starter to motor, including connections and wiring to and from disconnect switch. Support conduit feeder descending from ceiling on flanged floor fitting with condulet type fitting connecting to motor with 24-inch minimum of liquid-tight flexible steel conduit. All electrical field connections to motors and package machinery shall be made with liquid-tight flexible conduit.

4. Motor disconnect switches shall be mounted on adjacent wall or from the floor with unistrut supports. Switches shall not be mounted on fan housings.

3.2 MISCELLANEOUS EQUIPMENT CONNECTIONS

- A. All miscellaneous equipment will be provided under another Division; however, provide wiring for same, and make up all final electrical connections in accordance with manufacturer's recommendations. Where equipment in open areas is fed from wiring in the slab, terminate conduit in a flush coupling at the floor or suitable watertight box with telephone ell, from which point extend a rigid conduit nipple at least 8 inches above the floor, and provide flexible conduit connection to the equipment. Make all conduit connections at the floor watertight.
- B. Provide flexible metal conduit or Type "S" rubber cords, pigtails, caps, etc., to provide an operating system. Provide all flexible cords with a grounding conductor. Ground all equipment.
- C. See "OUTLETS" Section for mounting heights.
- D. Refer to all equipment manufacturer Shop Drawings for details of equipment connections. Provide receptacles to match the cord and plug on the equipment furnished.
- E. Provide a disconnect switch for all fixed appliances in accordance with Electrical Code.
- F. No extra will be granted contractor for removal of indicated receptacle and reinstallation of correct receptacle due to contractors failure to ascertain actual receptacle configuration requirements of equipment furnished prior to installation of receptacles.

3.3 ELEVATOR CONNECTIONS

A. The elevators and associated equipment will be furnished, installed, and connected under a separate division of the specification. Provide disconnect switches and extend feeders from the disconnects to the equipment controllers. Provide (emergency) power outlets and disconnect switch for the control of each car fan and lights and for lights and receptacles in elevator shaft and in machine room where directed. Provide a receptacle, switch, and light for service at the bottom of each elevator pit. Provide empty conduits as called for in elevator specifications. Provide necessary equipment and wiring in conjunction with the elevator operation under power failures and fire conditions.

3.4 TESTING

A. Be available during tests of mechanical, miscellaneous equipment and elevator systems. Cooperate with all other contractors and make all electrical adjustments and changes required in the Work described above until equipment and systems are operating satisfactorily in the opinion of the Commissioner.

3.5 GROUNDING

- A. Provide grounding in accordance with the New York City Electrical Code requirements, and as specified herein.
- B. Grounding of Motors: Bond grounding bushing on feeder conduit to ground log at starter and disconnect switch. Bond grounding bushing on feeder conduit and/or ground conductor to motor frame. If this is not feasible, extend ground conductor through an insulated bushed opening in the connection box and connect to motor base. Bond motor frame or base to metal piping or ductwork of system served by motor. Connection to piping or ductwork shall be accessible. Provide additional bonding jumper around any non-metallic fittings within 15'-0" of motor. Utilize Caudweld or approved equal listed compression type ground connections.
- C. Provide full size equipment ground conductor for each variable frequency drive and associated motor. Provide full size equipment ground to each elevator motor. Increase indicated conduit size to accommodate same.

END OF SECTION

SECTION 265100

INTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].
- B. Provisions of Section 260500 "Basic Electrical Requirements" apply to this Section.
- C. Lighting Control Schedule

1.2 SUMMARY

A. General: Provide luminaires in accordance with requirements of the Contract Documents

1.3 SECTION INCLUDES

- A. Luminaires and Accessories
- B. Lamps
- C. Lampholders
- D. Ballasts
- E. Transformers for lighting
- F. Emergency lighting

1.4 REFERENCE STANDARDS

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. ANSI C78.379

Classification of the Beam Patterns of Reflector Lamps

2. ANSI C82.11

High Frequency Fluorescent Lamp Ballasts

3. ANSI/IEEE C62.41

Guide on Surge Voltages AC Circuits Rated up to 600V

4. ANSI C82.4

Ballasts for High-Intensity Discharge and Low Pressure Sodium Lamps (Multiple Supply Type)

5. ANSI/NFPA 70

National Electrical Code

6. ANSI/NFPA 101

Life Safety Code

7. IEC 60921

Ballasts for Fluorescent Lamps – Performance Requirement

- B. All luminaires and components shall be manufactured in accordance with the National Electric Code (NEC) and bear the Underwriter's Laboratories (UL) or Factory Mutual label.
 - 1. All luminaires installed shall be UL listed for installation in their specific locations and shall comply with article 410 of the National Electric Code.
 - 2. All luminaires shall comply with local, state or federal codes, regulations and building inspection standards. Contractor to verify and provide all required labels indicating compliance with above standards, affixed to each luminaire in a position concealing it from normal view.

1.5 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Conform to requirements of ANSI/NFPA 101.
- C. Furnish products listed and classified by Underwriters Laboratories, Inc., ETL, or testing firm acceptable to authority having jurisdiction (AHJ) as suitable for purpose specified and shown.
- D. Conform to the applicable version of ASHRAE/IESNA Standard 90.1.
- E. Conform to requirements of State of New York, City of New York, and related building codes, NEC, and ADA.

1.6 CONTRACT DOCUMENTS

- A. All work of this section shall comply with the requirements of the DDC General Conditions, the drawings and with all other contract documents.
- B. These documents outline design intent for the electric lighting. Where design intent is unclear, the Contractor shall contact the Commissioner in writing prior to proceeding with the specific item that requires clarification.

1.7 INITIAL SUBMITTALS

A. Submittal Information:

1. Contractor shall submit itemized list of all equipment proposed to be supplied. Itemized equipment listings must include all equipment necessary to develop the complete functioning systems, whether or not the equipment is specifically identified in this specification.

- 2. Contractor shall submit a Warranty Statement clearly identifying any exclusions or conditions affecting warranty of the lighting system. Minimum warranty coverage (Basic Warranty) is defined in the Scope of Work.
- 3. Contractor shall identify any long lead equipment items that may adversely affect the project schedule.
- 4. Manufacturers listed in the fixture schedule shall be assumed capable of supplying the listed fixtures unless exceptions are set forth. Any such exceptions shall immediately be brought to the attention of the Commissioner.
- 5. Manufacturer shall have not less than 3 years' experience in the manufacture of lighting fixtures of the type and quality shown, unless otherwise noted and approved.
- 6. Manufacturer shall also submit a prototype sample of each fixture for review by the Commissioner. Prototype samples shall be sufficiently detailed and operational to allow evaluation of compliance with the salient features of the specification. Preliminary design or shop drawing shall not be accepted in place of prototype samples.
- 7. The Commissioner shall be the sole judge in determining whether the prototype sample complies with the specifications.
- 8. Within 21 days of award, successful contractor shall submit a complete list of lighting products intended to be furnished with manufacturer and catalog designations, along with currently quoted lead times for delivery of same. Should the contractor anticipate that the delivery schedule of any specified product may adversely impact the construction schedule, it shall be brought to the attention of the Commissioner at this time.
- 9. Within 21 days of award, contractor shall provide a complete list of all lamps, which will be furnished on the project. This list shall be organized alphabetically by the luminaire type indicated on the luminaire schedule, and include the manufacturer and exact model number of each lamp. Up to three samples of any listed lamp shall be supplied at no additional cost to the project, if so requested by the Commissioner.

1.8 SUBMITTALS

- A. The Contractor shall submit shop drawings, samples and prototypes as specifically instructed below. Shop drawings shall include but not be limited to:
 - 1. Manufacturer's dimensioned scale drawings showing in complete detail the fabrication of all Luminaires including overall and detail dimensions, finishes, metal thickness, glass thickness, type, fabrication methods, support method, ballasts, transformers, sockets, type of shielding, reflectors, trims, hinges, gaskets, provisions for re-lamping and all other information to show compliance with the contract documents.
 - 2. Installation instructions.
 - 3. Certified independent laboratory test data and reports including photometric data rendered by an independent testing laboratory developed according to methods of the Illuminating Engineering Society of North America as follows:
 - a. For down and semi-down lights used for general illumination: (1) coefficients of utilization (2) visual comfort probability for reflectances of 80% (ceiling), 50% (walls) and 20% (floor), including a (20 foot by 20 foot) room with 10 foot ceiling and luminaires lengthwise (3) candlepower data, presented graphically and numerically, in 5 degree increments (5 degree, 10 degree, 15 degree etc.) Data

- developed for up and down quadrants normal, parallel and at 22-1/2 degree, 45 degree, 167-1/2 degree to lamps if light output is asymmetric (4) zonal lumens stated numerically in 10 degree increments (5 degree, 15 degree etc.) as above.
- b. For area and roadway luminaires iso-candela charts, coefficients of utilization and IES roadway distribution classification.
- 4. Maintenance and operating instructions, including tools required, types of cleaners to be used, replacement parts identification list, and final as-built shop drawings
- B. All drawings shall clearly indicate the contract drawing number of luminaire details used as reference in the development of the shop drawings and the name of the project and Commissioner.
- C. Submittals shall not be submitted piecemeal through the project
- D. Submittal log showing all luminaire designations shall be submitted with each submittal showing the current review status of each fixture type.
- E. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, finishes, and the following:
 - 1. Physical description of lighting fixture including dimensions.
 - 2. Emergency lighting units including battery and charger.
 - 3. Ballast.
 - 4. Energy-efficiency data.
 - Air and Thermal Performance Data: For air-handling lighting fixtures. Furnish data required in "Submittals" Article in Division 23 Section "Diffusers, Registers, and Grilles."
 - 6. Sound Performance Data: For air-handling lighting fixtures. Indicate sound power level and sound transmission class in test reports certified according to standards specified in other Division 23 Sections.
 - 7. Life, output, and energy-efficiency data for lamps.
 - 8. Photometric data, in IESNA format, based on laboratory tests of each lighting fixture type, outfitted with lamps, ballasts, and accessories identical to those indicated for the lighting fixture as applied in this Project.
 - a. Testing Agency Certified Data: For indicated fixtures, photometric data shall be certified by a qualified independent testing agency. Photometric data for remaining fixtures shall be certified by manufacturer.
- F. Shop Drawings: Show details of nonstandard or custom lighting fixtures. Indicate dimensions, weights, methods of field assembly, components, features, and accessories.
 - 1. Shop drawings shall be submitted within ninety (90) days of award of contract, unless otherwise indicated in DDC General Conditions.
 - 2. Drawings for fabrication and installation of all products; Drawings will show all information necessary to explain fully the design features, appearance, function, fabrication, installation and use of system components in all phases of operation.

- 3. Fabrication Installation and Erection shall not commence until shop drawings have been approved by the Commissioner.
- 4. All sheets in the submittal shall be of the same size.
- 5. Submittals shall include a title sheet listing all sheets in the submittal.
- 6. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
- 7. Wiring Diagrams: Power and control wiring.
- 8. Physical Supports: Dimensions and types of cables, stems, brackets, etc.
- 9. Lamp configuration: Size, model, and location of each lamp, circuit or control zone, and detail of any stagger or overlap.
- 10. Connections: Joints, end caps, wiring connections, lens seams.
- 11. Load schedule which indicates connected load and load type per circuit, circuits and their respective control zones, circuits that are on emergency (if applicable), and the capacity, phase, and corresponding circuit numbers (per the electrical drawings.)
- G. Samples for Verification: For each lighting fixture indicated in the Lighting Fixture Schedule, as well as all LED luminaires, even if not noted. Each sample shall include the following:
 - 1. Lamps: Specified units installed.
 - 2. Accessories: Cords and plugs, and all other specified accessories.
 - 3. Ballasts: Ballast for 120V operation.
 - 4. Mounting System.
 - 5. Control: Specified dimming ballast and compatible 120V dimming switch wired in line with cord and plug.
 - 6. Technical Information.
- H. Product Certificates: For each type of ballast for bi-level and dimmer-controlled fixtures, signed by product manufacturer.
- I. Installation Instructions.
- J. Qualification Data: For agencies providing photometric data for lighting fixtures.
- K. Field quality-control test reports.
- L. Operation and Maintenance Data: For lighting equipment and fixtures to include in emergency, operation, and maintenance manuals.
 - 1. Provide a list of all lamp types used on Project; use ANSI and manufacturers' codes.
- M. Warranties: Special warranties specified in this Section.
- N. Control System Submittals
 - 1. Manufacturer shall provide one set of full system submittals. Submittals shall include:

- a. Full system riser diagram(s) illustrating interconnection of system components, wiring requirements, back box sizes and any special installation considerations.
- b. Full set of printed technical data sheets.
- c. Detailed set of dimmer schedules
- d. Detailed set of circuit and control schedules, including a complete list of all deviations from specifications.
- 2. Manufacturer shall provide any additional information, including equipment demonstrations, as required by the engineer or specifier to verify compliance with specifications.

1.9 SAMPLES

- A. Samples may be requested for any or all of the luminaires specified herein and are required for all luminaires designated as 'custom luminaires' and all Commissioner approved equals.
- B. Submit for review samples called for to the Commissioner when and where directed, the components tagged with the name of the project and provided with a cord and plug and specified lamps. Samples will not be returned. Allow 2 weeks from the date of receipt for thorough examination and review by the Commissioner.
- C. Luminaires under the contract shall be identical with the approved sample Luminaire. No luminaire used as a sample will be allowed to be installed on the project.
- D. In the event the submissions are disapproved, the luminaires will be returned to the Contractor to immediately make a new submission of luminaire or luminaires meeting the contract requirements.
- E. All charges for these shipments are to be paid by the Contractor.
- F. Prototypes: All custom luminaires require a submission of material finish samples, component review and a complete operating prototype luminaire to be reviewed at the fabricator's shop prior to shipment of any material to the project.
- G. The Contractor shall submit shop drawings for all luminaires no later than 60 days after award of contract. The Contractor shall be responsible for coordinating submittal reviews to allow timely delivery to the project site.
- H. Shop drawings and samples requested shall be submitted for review before fabrication. Any material produced prior to the review of shop drawings or samples and not in conformance with the contract documents shall be disapproved with the Contractor bearing full responsibility and cost.
- I. When required and requested by the Commissioner, samples submitted as per above shall be subjected to photometric, thermal, mechanical, electrical or water testing at an independent test laboratory, at no additional expense to the City of New York.
- J. Luminaire sample submittals shall include an operable 120 volt non-returnable sample, complete with lamp(s), 72 inch grounded cord and plug, and specified finish.

K. No variation from the general arrangement and details indicated on the drawings shall be made on the shop drawings unless required to suit the actual conditions on the premises and then only with the written acceptance of the Commissioner. All variations must be clearly marked as such on the drawings submitted for review.

1.10 WORK INCLUDED

- A. The contractor shall furnish and install a luminaire of the type indicated by designation at each location shown on the drawings. All materials, accessories, and any other equipment necessary for the complete and proper installation of all luminaires included in the contract shall be furnished by the contractor.
- B. Luminaires shall be manufactured in strict conformance with the contract drawings and specifications. Specifications and scale drawings are intended to convey the salient features, function, and character of the luminaire only, and do not undertake to illustrate or set for the every item or detail necessary for the work. Minor details not usually indicated on the drawings or nor specified, but that are necessary for the proper completion of luminaire installation, shall be included as if they were herein specified or indicated on the drawings.
- C. The City of New York shall not be held responsible for omission or absence of any detail, construction feature, etc., that may be required in the production of the luminaires. This responsibility lies with contractor and lighting manufacturer to coordinate.
- D. The responsibility of accurately fabricating and installing the luminaires to the fulfillment of this specification rests with the contractor.

E. Lighting Control

- 1. The Electrical Subcontractor, as part of the work of this section, shall provide, install and test a complete lighting control system as specified herein for areas indicated on the drawings and circuit schedules.
- 2. The Electrical Subcontractor shall furnish all conduit, wire, connectors, hardware and other incidental items necessary for the complete and proper operation of the lighting control system.
- 3. The Electrical Subcontractor shall coordinate all work described in this section with all other applicable plans and specifications, including but not limited to:
 - a. General Conditions
 - b. Electrical Section General Provisions
 - c. Conduit
 - d. Wire and Cable

1.11 QUALITY ASSURANCE

A. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by manufacturers' laboratories that are accredited under the National Volunteer Laboratory Accreditation Program for Energy Efficient Lighting Products.

- B. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by an independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7.
- 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 NFPA 70.
- E. Certified to comply with safety standards for dry or wet locations, and listed by a Nationally Recognized Testing Laboratory such as UL or ETL.
- F. Materials, equipment and appurtenances as well as workmanship provided under this section shall conform to the highest commercial standards and as specified and as indicated on drawings. Luminaire parts and components not specifically identified or indicated shall be made of materials most appropriate to their use or function and as such resistant to corrosion and thermal and mechanical stresses encountered in the normal application and function of the luminaires.
- G. FMG Compliance: Lighting fixtures for hazardous locations shall be listed and labeled for indicated class and division of hazard by FMG.
- H. All luminaires shall be manufactured to a consistent level of quality. Size, color and components parts shall be identical for all Luminaires.
- I. All new luminaires and related materials shall be new.
- J.The Contractor shall coordinate all luminaires, mounting hardware, and other items, including work of other trades.
- K. Mockups: Provide interior and exterior lighting fixtures for room or module mockups, complete with power and control connections as coordinated with architectural mockups identified elsewhere and as listed in Section 2.1.
 - 1. Obtain Commissioner's approval of fixtures for mockups before starting installations.
 - 2. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - 3. Approved fixtures in mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- L. Lighting control system quality assurance requirements are as follows.
 - 1. Manufacturer shall be one who has been continuously engaged in the manufacturer of lighting control equipment for a minimum of three years.
 - 2. The manufacturer shall have a factory authorized stocking service center with at least one full time service technician on staff located within proximity of the job site. In addition, the manufacturer shall have a toll free 24-hour hotline with a maximum response time of 20 minutes, 24 hours a day and 365 days a year.

3. All equipment, where applicable standards have been established, shall be built to the standards of Underwriters Laboratories, Inc., the National Electric Code and the United States Institute for Theater Technology. Permanently installed power distribution equipment such as dimmer racks and distribution shall be UL and C-UL Listed, and/or CE marked (where applicable) and bear the appropriate labels. Portable equipment such as consoles and fixtures shall be UL and C-UL Listed, ETL Listed and/or CE marked (where applicable) and bear the appropriate labels.

1.12 COORDINATION

A. Coordinate layout and installation of lighting fixtures and suspension system with other construction that penetrates ceilings or is supported by them, including HVAC equipment, fire-suppression system, and partition assemblies.

1.13 WARRANTY

- A. Special Warranty for Emergency Lighting Batteries: Manufacturer's standard form in which manufacturer of battery-powered emergency lighting unit agrees to repair or replace components of rechargeable batteries that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period for Emergency Lighting Unit Batteries: 10 years from date of Substantial Completion. Full warranty shall apply for first year, and prorated warranty for the remaining nine years.
 - 2. Warranty Period for Emergency Fluorescent Ballast and Self-Powered Exit Sign Batteries: Seven years from date of Substantial Completion. Full warranty shall apply for first year, and prorated warranty for the remaining six years.
- B. Special Warranty for Ballasts: Manufacturer's standard form in which ballast manufacturer agrees to repair or replace ballasts that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period for Ballasts: Five years from date of Substantial Completion.
- C. Special Warranty for T5 and T8 Fluorescent Lamps: Manufacturer's standard form, made out to the City of New York and signed by lamp manufacturer agreeing to replace lamps that fail in materials or workmanship, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
 - 1. Warranty Period: One year(s) from date of Substantial Completion.
- D. Special Warranty for LEDs on complete luminaire assembly (driver, LED module, fixture housing) shall be a minimum of 5 years. Warranty shall be by luminaire manufacturer as the sole source of service.
 - 1. Warranty Period for LEDs and Driver Assembly: Five years from date of Substantial Completion.
- E. Special Warranty for Lighting Control Equipment: Dimming and Control equipment to be free from defects of material or workmanship for a period of two (2) years from the date of acceptance. During the period of this warranty, equipment, which proves to be defective,

shall be repaired or replaced within thirty (30) days at no charge to the City of New York. Unauthorized local repairs of the equipment during the warranty period shall relieve the manufacturer of its responsibilities under the warranty.

1.14 CONTROL SYSTEM WARRANTY

- A. Manufacturer shall warrant products under normal use and service to be free from defects in materials and workmanship for a period of two years from date of delivery.
- B. Warranty shall cover repair or replacement of such parts determined defective upon inspection.

1.15 OPERATING PARAMETERS

A. All components shall be designed to operate properly between 50°F and 115°F without increased failure rate; in addition to any stated conditions below such as cold weather starting / ballasts.

1.16 PROJECT/SITE CONDITIONS

A. All lighting and control head end equipment exposed to a salt water environment shall operate in accordance with salt water climate conditions. All material must be corrosion resistant

1.17 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Fixtures: 10 for every100 of each type and rating installed. Furnish at least one of each type.
 - 2. Lamps: 10 for every 100 of each type and rating installed. Furnish at least one of each type.
 - 3. Diffusers, Lenses, and Accessories: 1 for every 100 of each type and rating installed. Furnish at least one of each type.
 - 4. Battery and Charger Data: One for each emergency lighting unit.
 - 5. Ballasts/Drivers: 1 for every 100 of each type and rating installed. Furnish at least one of each type.

PART 2 - PRODUCTS

LIGHT FIXTURE MANUFACTURERS (BASIS OF DESIGN) 2.1

- A. Refer to fixture information and notes below for each type designation.
 - 1. Type AC1

a. Manufacturer: iO Lighting

Model: b.

0.03.I.3KVHO.55.102.2.X.2.3.X

Lamp: c.

LED 5.1W/ft

d. Color: 3000K, 85+CRI

Ballast/Xfmr: e.

Electronic Dimmable to 1%

f. Fixture Rating:

UL

g.

Approved Equals: Luminii: KXL-XX-30K-SO-H-C-ADJ-WH;

LED Linear: HD15+Contour 004+LinearOptic 004 Diffuse 60°

- h. Notes:
 - Provide length as indicated on drawings. 1)
 - Fixture located in light cove. Cove to be painted white with reflectance > 2) 85%.
 - Provide robust adjustable mounting harware including mounting bracket and 3) blocking for aiming in field..
 - Blocking to mount into unistrut for slide adjustablility. Refer to archiectural 4) details for mouting locations and details.
 - Provide with electronic dimming driver for dimming to minimum 1% light 5) output.
 - Locate driver remotely within ceiling cavity. Refer to detail for mounting 6) locations and details.
 - Fixture runs indicated in the drawings set with '-EM' designation are to be 7) programmed to turn on to full output via dimming system programming on loss of utility power.
 - Confirm fixture finish with Commissioner. 8)
 - Contractor to arrange mockup one full length of a single side of exhibition 9) corridor run on site prior to full install of type AC1 for final approval.
 - Coordinate exact mounting location and aiming of mockup with 10) Commissioner and Commissioner prior to full installation of all type AC1.
 - Contractor to use the resulting aiming of the mockup for a basis for the 11) installation of the remaining AC1 fixtures.
 - Contractor to coordinate final focus and minor adjustments of exact fixture 12) aiming and location in field with direction by the Commissioner.

2. Type AC2

Manufacturer: a.

Luminii

Model: b.

LL18-B-F-M-XX-LTEA4U1UKL-CV240

Lamp: c.

LED 1.5W/ft

Color: d.

Blue

Ballast/Xfmr: e.

Electronic Dimmable to 1%

Fixture Rating: UL f.

Approved Equals: iO Lighting: 0.03.I.B.55.102 g. Acolyte LED: RB241.5B

- Notes: h.
 - Provide in channel with clear lens. 1)
 - Provide with Hi-lume A series LTE 2 wire forward phase dimming driver or 2) equivalent for dimming to 1%.

- Provide with adjustable mouting bracket and blocking for aiming in field. 3) Refer to archiectural drawings for mouting details.
- 4) Locate driver remotely within ceiling cavity. Refer to details for mounting locations and details.
- Confirm fixture finish with Commissioner. 5)
- Contractor to arrange mockup of one full length of a single side of 6) exhibition corridor run on site prior to full install of type AC2 for final approval at same location of AC1 mockup.
- Coordinate exact mounting location and aiming of mockup with 7) Commissioner and Commissioner prior to full installation of all type AC2.
- Contractor to use the resulting aiming of the mockup for a basis for the 8) installation of the remaining AC1 fixtures.
- Contractor to coordinate final focus and minor adjustments of exact fixture 9) aiming and location in field with direction by the Commissioner.

3. Type AD1

Manufacturer: a. **USAi** Lighting

b. Model: 331A30-B1-21-LRLA4-8412-C2-30KS-30-IC-120V-DIML3-

LMD60F-MODPOCBLUE c.

d. Lamp:

12 W LED

e. Color: 3000K, 85+ CRI

f. Ballast/Xfmr: Electronic Dimmable to 1%

Fixture Rating: g.

h. Approved Equals: Lucifer: DL8ZP-IC-B-XX-8007-30-3 Juno: IC943L-830F-L-430NB-FM

i. Notes:

- Provide with Hi-lume A series LTE 2 wire forward phase dimming driver or 1) equivalent for dimming to 1%.
- Provide with minimum 40° tilt and 360° rotation for adjutability 2)
- Provide with removable blue lens or gel/filter accessory. Coordinate exact 3) color with Commissioner. Color to match gel/filter used in type fixture type AT1.
- 4) Contractor to coordinate final focus in field with direction by the Commissioner for no direct light or reflections on aquarium tank.

Type AR1

Manufacturer: a. Linear Lighting

b. Model: IB24-D-ET5-UNV-MBPCC-Sxx-CC-EM-4

c. Lamp: (1) 28W T5 Fluorescent

Color: d.

3000K, 85+ CRI

Ballast/Xfmr: e.

Electronic

f. Fixture Rating:

UL

g.

Approved Equals: Selux: M60-1T5-MA-RS-004-BK

Architectural Ltg Works: LPLD-4'-FSO-STD-UNV-LV-BK-EM

h. Notes:

- Provide with Hi-lume A series LTE 2 wire forward phase dimming driver or 1) equivalent for dimming to 1%.
- Provide with minimum 40° tilt and 360° rotation for adjutability 2)
- Provide with removable blue lens or gel/filter accessory. Coordinate exact 3) color with Commissioner. Color to match gel/filter used in type fixture type AT1.

- Contractor to coordinate final focus in field with direction by the 4) Commissioner for no direct light or reflections on aquarium tank.
- Fixtures indicated in the drawings set with '-EM' designation are to be 5) programmed to turn on to full output via control system programming on loss of utility power.

5. Type AT1

a. Manufacturer: Selecon

Model: b.

PAC1-575-4575-20IRIS-2-CFSF12-GTL

Lamp: c.

(1) 575W GLA

Color: d.

3000K

Ballast/Xfmr: e.

N/A

Fixture Rating: f.

UL

Approved Equals: ETC: 470 g.

Altman: S6 h.

Notes: i.

- Provide threaded rod to unistrut for fixture mounting to allow for 1) adjustability of exact fixture location and rotation for aiming. Refer to architectural drawings for details.
- Provide fixture with the maximum dimmer trim set at 90%. 2)
- Provide dimming and DMX control to fixture and accessory components. 3)
- Provide with Twist-Lock power connector. 4)
- Provide plug-in station adjacent to fixture within ceiling cavity DMX and 5) Twist-Lock receptacle.
- Provide (1) type AT1A DMX dual gobo rotator for each type AT1 fixture. 6)
- Provide (2) glass gobos for each AT1: (1) type AT1B for Ripple effect and 7) (1) type AT1C Reflections effect for use in each DMX dual gobo rotator.
- Provide with removable blue lens or gel/filter accessory. Confirm exact 8) color with the Commissioner. Color to match gel/filter used in type fixture type AT1.
- Contractor to confirm fixture compatibility to fulfill basis of design intent to 9) accept DMX dual gobo rotator, two glass gobos and color filter or gel.
- Provide (1) operational fixture sample with all specified accessories for final 10) approval and sign-off.

6. Type AT1A

Manufacturer: a.

Rosco

Model: b.

Dual Indexing Rotator: REVO 205 64200 0000

Lamp: c.

N/A

Color: d.

N/A

Ballast/Xfmr: e.

N/A

f. Fixture Rating:

UL

- Approved Equals: Apollo: Smart Move DMX Rotator: SM-MOVE-DMX g.
- Chroma-Q: Twin DMX Gobo Rotator: CHGR2DFX h.
- Notes:
 - Provide (1) AT1A DMX dual gobo rotator for each type AT1 fixture. 1)
 - Provide with DMX control. 2)
 - Provide with (2) glass gobo inserts as defined by AT1B and AT1C. 3)
 - Gobos to be adjusted on site including order if both are to be used. 4)
 - Provide 24V DC power supply to be located adjacent to fixture in accessible 5) location.

- 6) Provide 1 full set of spare drive belts.
- 7) Provide DMX cables as required.
- 8) Provide with (2) glass gobos: for Ripples and Reflections effect for use in dual gobo rotator.

7. Type AT1B

- a. Manufacturer: Rosco
- b. Model: 33619 Ripples
- c. Lamp: N/A
- d. Color: N/A
- e. Ballast/Xfmr: N/A
- f. Fixture Rating: UL
- g. Approved Equals: Apollo
- h. Gam
- i. Notes:
 - 1) Provide (1) glass gobo for Re effect for each type AT1.
 - 2) Contractor to confirm gobo compatibility with type AT1A DMX dual gobo rotator for each type AT1.

8. Type AT1C

- a. Manufacturer: Rosco
- b. Model:
- 33623 Reflection
- c. Lamp:
- N/A
- d. Color:
- N/A
- e. Ballast/Xfmr:
- N/A
- f. Fixture Rating:
 - g: UL
- g. Approved Equals: Apollo
 - Gam
- h. Notes:
 - 1) Provide (1) glass gobo for Reflection effect for each type AT1.
 - 2) Contractor to confirm gobo compatibility with type AT1A DMX dual gobo rotator for each type AT1.

9. Type AU1

- a. Manufacturer:
- Metalux
- b. Model:
- VT3-254T5DR-UNV-EBT1-WL-M4 + V2-CHAIN/SET-U
- c. Lamp:
- (2) 54W T5HO Fluorescent
- d. Color:
- 3000K
- e. Ballast/Xfmr:
- Electronic
- f. Fixture Rating:
- UL, Wet Listed, IP67, Suitable for Corrosive Salt Environment
- g. Approved Equals: Lumax: VW25448-EO9 + 45026
 - H.E. Williams: 96-4-2-54T5H-EB2-UNV
- h. Notes:
 - 1) Fixture and all associated materials and mounting accessories are to be wet listed suitable for a corrosive salt water environment.
 - 2) Provide fixture with chain mounting kit.
 - 3) Fixtures indicated in the drawings set with '-EM' designation are to turn on loss of utility power.
 - 4) Provide emergency ballast for fixtures indicated in the drawings set with 'EM' designation.

10. Type DL-1

Manufacturer: a.

Ecoxotic

Model: b.

6804

Lamp: c.

N/A

Color: d.

12000k White

Ballast/Xfmr: e.

N/A

f. Fixture Rating:

UL

Approved Equals: Orphek DIF 110XP- V5 g.

Kessil A360N

Notes: h.

> Provide dimmable 100W Remote LED Driver for each DL-1 fixture 1)

11. Type DL-2

Manufacturer: a.

Orphek DIF

b. Model: **DIF 100 XP-V5**

Lamp: c.

N/A

Color: d.

12000k White

Ballast/Xfmr:

N/A

Fixture Rating: f.

UL

Approved Equals: Ecoxotic 6804 g.

Kessil A360N

h. Notes:

Provide dimmable 100W Remote LED Driver for each DL-2 fixture 1)

Provide 60 degree lens with each DL-2 fixture 2)

2.2 LIGHTING CONTROL SYSTEM

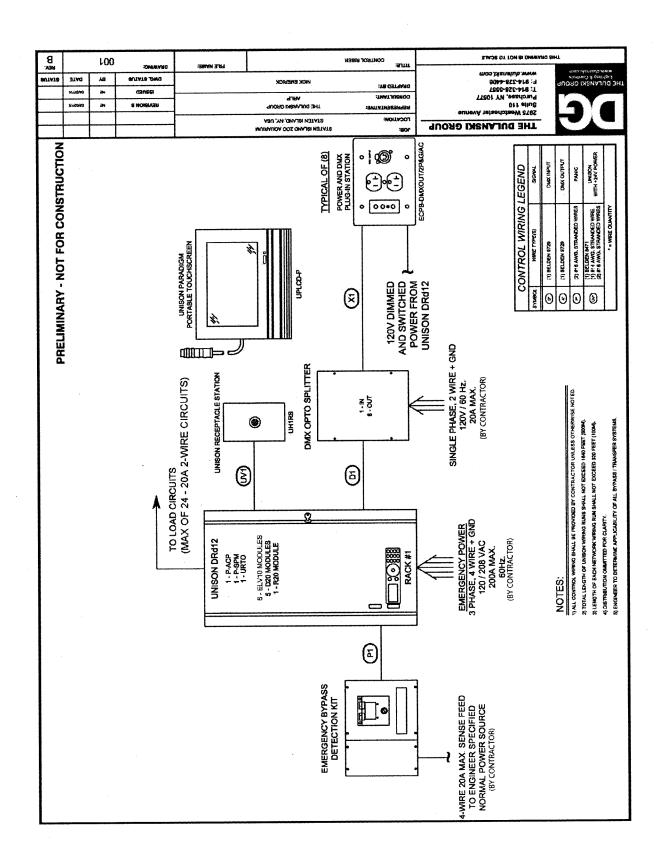
A. SYSTEM DESCRIPTION

- 1. The system shall be designed for the control of architectural and theatrical lighting and shall consist of factory pre-wired dimming and processing rack enclosures containing dimmers, relays, power supplies, breakers, terminals and/or control electronics.
- 2. System shall work in conjunction with specified low-voltage control stations.
- 3. Refer to basis of design riser for control intent of the system.

B. LIGHTING CONTROL NARRATIVE

- 1. The lighting control intent is to provide programmable system with dimming and DMX lighting control for architectural and theatrical lighting systems.
 - All linear LED fixtures should include dimming to 1%. a.
 - All LED downlights shall be capable of dimming to 1% b.
 - Provide all incandescent types with maximum dimmer trim set at 90%. c.
 - Provide dimming and DMX control to all theatrical fixtures and associated components.
 - Provide emergency ballasts, drivers, and transfer devices as necessary for fixtures e. designated by '-EM' for emergency lighting.

- f. Provide occupancy sensors in all back of house locations.
- 2. The control system is to include emergency detection for Emergency Lighting.
 - a. The system should accept a voltage sensing line as an input.
 - b. The dimmer panel should be UL listed for use of emergency lighting.
 - c. The system must be programmed such that once the panel's EM contact is triggered it will shed all loads not designated for emergency, and push EM loads to full brightness.
- 3. Control Riser (see following page)



C. CONTROL SYSTEM MANUFACTURER (BASIS OF DESIGN)

1. Type CTRL

a. Manufacturer:

ETC

b. Model:

Unison Paradigm Control System

c. Rating:

UL

d. Approved Equals: E:cue

Crestron

e. Notes:

- 1) Provide basis of design lighting control system for DMX and dimming capabilities per the control riser in the construction documents
- 2) Locate control rack in nearest electrical room.
- 3) Locate portable touchscreen control station in Office.
- 4) Provide all DMX and control wiring as required.
- 5) Refer to control narrative and schedule for lighting control intent.
- 6) Contractor to confirm fixture and driver compatibility for any alternate lighting control systems.
- 7) The system shall be designed for the control of architectural and theatrical lighting and shall consist of factory pre-wired dimming and processing rack enclosures containing dimmers, relays, power supplies, breakers, terminals and/or control electronics.
- 8) System shall work in conjunction with specified low-voltage control stations.
- 9) Manufacturers must submit a full pre-approval package ten days prior to bid date.
- 10) Permission to bid does not imply acceptance of the manufacturer. It is the sole responsibility of the electrical contractor to ensure that any price quotations received and submittals made are for controls systems that meet or exceed the specifications.

2. Type CTRL.1

a. Manufacturer:

ETC

b. Model:

Unison Rack Enclosure DRd12

c. Rating:

UL

d. Approved Equals: E:cue

Crestron

- e. Notes:
 - 1) Locate control rack in nearest electrical room.
 - 2) Include with low voltage panic contact fed from the emergency bypass detection kit.
 - 3) Provide with Unison Ride Thru Option kit.

3. Type CTRL.2

a. Manufacturer:

ETC

b. Model:

Paradigm Architectural Control Processor P-ACP+P-DRd-TD

c. Rating:

UL

d. Approved Equals: E:cue

Crestron

- e. Notes:
 - 1) Provide with Unison DRd termination kit for Paradigm

4. Type CTRL.3

a. Manufacturer:

ETC

b. Model:

Dimmer Modele D20

c. Rating:

UL

d. Approved Equals: E:cue

Crestron

- e. Notes:
 - 1) Provide dimmer modules as required by lighting layout and control intent.
 - 2) Refer to electrical drawings for fixture quantities.

5. Type CTRL.4

a. Manufacturer:

ETC

b. Model:

Relay Module R20

c. Rating:

UL

d. Approved Equals: E:cue

Crestron

- e. Notes:
 - 1) Provide relay modules as required by lighting layout and control intent.
 - 2) Refer to electrical drawings for fixture quantities.

6. Type CTRL.5

a. Manufacturer:

ETC

b. Model:

Plug-In Station

c. Rating:

UL

- d. Approved Equals: E:cue
- e. Crestron
- f. Notes:
 - 1) Locate next to each Type AT1 light fixture at nearest accessible location.
 - 2) Provide each Plug in station iwth DMX and twist lock power connection.

7. Type CTRL.6

a. Manufacturer:

ETC

b. Model:

Handheld Touchscreen P-LCD-H

c. Rating:

UL

- d. Approved Equals: E:cue
- e. Crestron
- f. Notes:
 - 1) Locate Handheld Touchscreen in office, exact location to be confirmed.
 - 2) Provide with wireless access and docking station.

8. Type CTRL.7

a. Manufacturer:

ETC

b. Model:

Emergency Bypass Detection Kit EBDK

c. Rating:

UL

d. Approved Equals: E:cue

Crestron

- e. Notes:
 - 1) Locate emergency bypass detection kit next to control rack in nearest electrical room.

2) Provide with Emergency Bypass Restore Switch to manually return the control system to normal operation following the event of loss of power.

2.3 LIGHTING FIXTURES AND COMPONENTS, GENERAL REQUIREMENTS

- A. Recessed Fixtures: Comply with NEMA LE 4 for ceiling compatibility for recessed fixtures.
 - B. Incandescent Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5A.
 - C. Fluorescent Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5 and NEMA LE 5A as applicable.
 - D. HID Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5B.
 - E. Metal Parts: Free of burrs and sharp corners and edges.
 - F. Sheet Metal Components: Steel, unless otherwise indicated. Form and support to prevent warping and sagging.
 - G. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit re-lamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during re-lamping and when secured in operating position.
 - H. Reflecting surfaces shall have minimum reflectance as follows, unless otherwise indicated:
 - 1. White Surfaces: 85 percent.
 - 2. Specular Surfaces: 83 percent.
 - 3. Diffusing Specular Surfaces: 75 percent.
 - 4. Laminated Silver Metallized Film: 90 percent.
 - I. Plastic Diffusers, Covers, and Globes:
 - 1. Acrylic Lighting Diffusers: 100 percent virgin acrylic plastic. High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
 - a. Lens Thickness: At least 0.125 inch (3.175 mm) minimum unless different thickness is indicated.
 - b. UV stabilized.
 - 2. Glass: Annealed crystal glass, unless otherwise indicated.
 - J. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps and ballasts. Labels shall be located where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.
 - 1. Label shall include the following lamp and ballast characteristics:
 - a. "USE ONLY" and include specific lamp type.

- b. Lamp diameter code (T-4, T-5, T-8, T-12, etc.), tube configuration (twin, quad, triple, etc.), base type, and nominal wattage for fluorescent and compact fluorescent luminaires.
- c. Lamp type, wattage, bulb type (ED17, BD56, etc.) and coating (clear or coated) for HID luminaires.
- d. Start type (preheat, rapid start, instant start, etc.) for fluorescent and compact fluorescent luminaires.
- e. ANSI ballast type (M98, M57, etc.) for HID luminaires.
- f. CCT and CRI for all luminaires.
- K. Electromagnetic-Interference Filters: Factory installed to suppress conducted electromagnetic-interference as required by MIL-STD-461E. Fabricate lighting fixtures with one filter per ballast indicated to require a filter.
- L. Air-Handling Fluorescent Fixtures: For use with plenum ceiling for air return and heat extraction and for attaching an air-diffuser-boot assembly specified in Division 23 Section "Diffusers, Registers, and Grilles."
 - 1. Air Supply Units: Slots in one or both side trims join with air-diffuser-boot assemblies.
 - 2. Heat Removal Units: Air path leads through lamp cavity.
 - 3. Combination Heat Removal and Air Supply Unit: Heat is removed through lamp cavity at both ends of the fixture door with air supply same as for air supply units.
 - 4. Dampers: Operable from outside fixture for control of return-air volume.
 - 5. Static Fixture: Air supply slots are blanked off, and fixture appearance matches active units.

2.4 BALLASTS FOR LINEAR FLUORESCENT LAMPS

- A. Electronic Ballasts: Comply with ANSI C82.11; programmed-start type, unless otherwise indicated, and designed for type and quantity of lamps served. Ballasts shall be designed for full light output unless dimmer or bi-level control is indicated.
 - 1. Sound Rating: A.
 - 2. Total Harmonic Distortion Rating: 10 percent.
 - 3. Transient Voltage Protection: IEEE C62.41, Category A or better.
 - 4. Operating Frequency: 20 kHz or higher.
 - 5. Lamp Current Crest Factor: 1.7 or less.
 - 6. BF: 0.87 or higher.
 - 7. Power Factor: 0.95 or higher.
 - 8. Parallel Lamp Circuits: Multiple lamp ballasts shall comply with ANSI C 82.11 and shall be connected to maintain full light output on surviving lamps if one or more lamps fail.
- B. Electronic Programmed-Start Ballasts for T5 and T5HO Lamps: Comply with ANSI C82.11 and the following:

- 1. Lamp end-of-life detection and shutdown circuit for T5 diameter lamps.
- 2. Automatic lamp starting after lamp replacement.
- 3. Sound Rating: A.
- 4. Total Harmonic Distortion Rating: Less than 20 percent.
- 5. Transient Voltage Protection: IEEE C62.41, Category A or better.
- 6. Operating Frequency: 20 kHz or higher.
- 7. Lamp Current Crest Factor: 1.7 or less.
- 8. BF: 0.98 or higher, unless otherwise indicated.
- 9. Power Factor: 0.95 or higher.
- C. Electromagnetic Ballasts: Comply with ANSI C82.1; energy saving, high-power factor, Class P, and having automatic-reset thermal protection.
 - 1. Ballast Manufacturer Certification: Indicated by label.
- D. Single Ballasts for Multiple Lighting Fixtures: Factory-wired with ballast arrangements and bundled extension wiring to suit final installation conditions without modification or rewiring in the field.
- E. Ballasts for Low-Temperature Environments:
 - 1. Temperatures 0 Deg F (Minus 17 Deg C) and Higher: Electronic type rated for 0 deg F (minus 17 deg C) starting and operating temperature with indicated lamp types.
 - 2. Temperatures Minus 20 Deg F (Minus 29 Deg C) and Higher: Electromagnetic type designed for use with indicated lamp types.
- F. Ballasts for Low Electromagnetic-Interference Environments: Comply with 47 CFR, Chapter 1, Part 18, Subpart C, for limitations on electromagnetic and radio-frequency interference for consumer equipment.
- G. Ballasts for Dimmer-Controlled Lighting Fixtures: Electronic type.
 - 1. Dimming Range: 100 to 3 percent of rated lamp lumens, unless otherwise noted.
 - 2. Ballast Input Watts: Can be reduced to 26 percent of normal.
 - 3. Compatibility: Certified by manufacturer for use with specific dimming control system and lamp type indicated.

2.5 BALLASTS FOR COMPACT FLUORESCENT LAMPS

- A. Description: Electronic programmed rapid-start type, complying with ANSI C 82.11, designed for type and quantity of lamps indicated. Ballast shall be designed for full light output unless dimmer or bi-level control is indicated:
 - 1. Lamp end-of-life detection and shutdown circuit.
 - 2. Automatic lamp starting after lamp replacement.
 - 3. Sound Rating: A.

- 4. Total Harmonic Distortion Rating: Less than 20 percent.
- 5. Transient Voltage Protection: IEEE C62.41, Category A or better.
- 6. Operating Frequency: 20 kHz or higher.
- 7. Lamp Current Crest Factor: 1.7 or less.
- 8. BF: 0.95 or higher, unless otherwise indicated.
- 9. Power Factor: 0.95 or higher.
- 10. Interference: Comply with 47 CFR, Chapter 1, Part 18, Subpart C, for limitations on electromagnetic and radio-frequency interference for nonconsumer equipment.
- 11. Ballast Case Temperature: 75 deg C, maximum.
- B. Ballasts for Dimmer-Controlled Lighting Fixtures: Electronic type.
 - 1. Dimming Range: 100 to 5 percent of rated lamp lumens, unless otherwise noted.
 - 2. Ballast Input Watts: Can be reduced to 28 percent of normal.
 - 3. Compatibility: Certified by manufacturer for use with specific dimming control system and lamp type indicated.

2.6 BALLASTS FOR HID LAMPS

- A. Electronic Ballast for Metal-Halide Lamps: Include the following features unless otherwise indicated:
 - 1. Minimum Starting Temperature: Minus 20 deg F for single-lamp ballasts.
 - 2. Rated Ambient Operating Temperature: 130 deg F.
 - 3. Lamp end-of-life detection and shutdown circuit.
 - 4. Sound Rating: Class A.
 - 5. Total Harmonic Distortion Rating: Less than 20 percent.
 - 6. Transient Voltage Protection: IEEE C62.41.1 and IEEE C62.41.2, Category A or better.
 - 7. Lamp Current Crest Factor: 1.5 or less.
 - 8. Power Factor: 0.90 or higher.
 - 9. Interference: Comply with 47 CFR 18, Ch. 1, Subpart C, for limitations on electromagnetic and radio-frequency interference for nonconsumer equipment.
 - 10. Protection: Class P thermal cutout.
 - 11. Bi-Level Dimming Ballast: Ballast circuit and leads provide for remote control of the light output of the associated fixture between high- and low-level and off.
 - a. High-Level Operation: 100 percent of rated lamp lumens.
 - b. Low-Level Operation: 50 percent of rated lamp lumens.
 - c. Compatibility: Certified by ballast manufacturer for use with specific bi-level control system and lamp type indicated. Certified by lamp manufacturer that ballast operating modes are free from negative effect on lamp life and color-rendering capability.

2.7 QUARTZ LAMP LIGHTING CONTROLLER

- A. General Requirements for Controllers: Factory installed by lighting fixture manufacturer. Comply with UL 1598.
- B. Standby (Quartz Restrike): Automatically switches quartz lamp on when a HID lamp in the fixture is initially energized and during the HID lamp restrike period after brief power outages.
- C. Connections: Designed for a single branch -circuit connection.
- D. Switching Off: Automatically switches quartz lamp off when HID lamp reaches approximately 60 percent light output.

2.8 EMERGENCY FLUORESCENT POWER UNIT

- A. Internal Type: Self-contained, modular, battery-inverter unit, factory mounted within lighting fixture body and compatible with ballast. Comply with UL 924.
 - 1. Emergency Connection: Operate 1 fluorescent lamp(s) continuously at an output of 1100 lumens each. Connect unswitched circuit to battery-inverter unit and switched circuit to fixture ballast or per manufacturer wiring diagram if indicated otherwise.
 - 2. Night-Light Connection: Operate one fluorescent lamp continuously.
 - 3. Test Push Button and Indicator Light: Visible and accessible without opening fixture or entering ceiling space.
 - a. Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
 - b. Indicator Light: LED indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.
 - 4. Battery: Sealed, maintenance-free, nickel-cadmium type.
 - 5. Charger: Fully automatic, solid-state, constant-current type with sealed power transfer relay.
 - 6. Remote Test: Switch in hand-held remote device aimed in direction of tested unit initiates coded infrared signal. Signal reception by factory-installed infrared receiver in tested unit triggers simulation of loss of its normal power supply, providing visual confirmation of either proper or failed emergency response.
 - 7. Integral Self-Test: Factory-installed electronic device automatically initiates coderequired test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and flashing red LED.
- B. External Type: Self-contained, modular, battery-inverter unit, suitable for powering one or more fluorescent lamps, remote mounted from lighting fixture. Comply with UL 924.
 - 1. Emergency Connection: Operate one fluorescent lamp continuously. Connect unswitched circuit to battery-inverter unit and switched circuit to fixture ballast.
 - 2. Night-Light Connection: Operate one fluorescent lamp in a remote fixture continuously.
 - 3. Battery: Sealed, maintenance-free, nickel-cadmium type.

- 4. Charger: Fully automatic, solid-state, constant-current type.
- 5. Housing: NEMA 250, Type 1 enclosure.
- 6. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
- 7. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.
- 8. Remote Test: Switch in hand-held remote device aimed in direction of tested unit initiates coded infrared signal. Signal reception by factory-installed infrared receiver in tested unit triggers simulation of loss of its normal power supply, providing visual confirmation of either proper or failed emergency response.
- 9. Integral Self-Test: Factory-installed electronic device automatically initiates coderequired test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and flashing red LED.

2.9 EXIT SIGNS

- A. Description: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.
- B. Internally Lighted Signs:
 - 1. Lamps for AC Operation: LEDs, 70,000 hours minimum rated lamp life.
 - 2. Self-Powered Exit Signs (Battery Type): Integral automatic charger in a self-contained power pack.
 - a. Battery: Sealed, maintenance-free, nickel-cadmium type.
 - b. Charger: Fully automatic, solid-state type with sealed transfer relay.
 - c. Operation: Relay automatically energizes lamp from battery when circuit voltage drops to 80 percent of nominal voltage or below. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
 - d. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
 - e. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.
 - f. Remote Test: Switch in hand-held remote device aimed in direction of tested unit initiates coded infrared signal. Signal reception by factory-installed infrared receiver in tested unit triggers simulation of loss of its normal power supply, providing visual confirmation of either proper or failed emergency response.
 - g. Integral Self-Test: Factory-installed electronic device automatically initiates coderequired test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and flashing red LED.
 - 3. Master/Remote Sign Configurations:
 - a. Master Unit: Comply with requirements above for self-powered exit signs, and provide additional capacity in power supply or ballast for power connection to remote unit.

b. Remote Unit: Comply with requirements above for self-powered exit signs, except omit power supply, battery and test features. Arrange to receive full power requirements from master unit. Connect for testing concurrently with master unit as a unified system.

2.10 EMERGENCY LIGHTING UNITS

- A. Description: Self-contained units complying with UL 924.
 - 1. Battery: Sealed, maintenance-free, lead-acid type.
 - 2. Charger: Fully automatic, solid-state type with sealed transfer relay.
 - 3. Operation: Relay automatically turns lamp on when power supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
 - 4. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
 - 5. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.
 - 6. Wire Guard: Heavy-chrome-plated wire guard protects lamp heads or fixtures.
 - 7. Integral Time-Delay Relay: Holds unit on for fixed interval of 10 minutes when power is restored after an outage.
 - 8. Remote Test: Switch in hand-held remote device aimed in direction of tested unit initiates coded infrared signal. Signal reception by factory-installed infrared receiver in tested unit triggers simulation of loss of its normal power supply, providing visual confirmation of either proper or failed emergency response.
 - 9. Integral Self-Test: Factory-installed electronic device automatically initiates coderequired test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and flashing red LED.

2.11 FLUORESCENT LAMPS

- A. Low-Mercury Lamps: Comply with EPA's toxicity characteristic leaching procedure test; shall yield less than 0.2 mg of mercury per liter when tested according to NEMA LL 1.
- B. T8 rapid-start low-mercury lamps, rated 32 W maximum, nominal length of 48 inches (1220 mm), 2800 initial lumens (minimum), CRI 85 (minimum), and average rated life 24,000 hours minimum at 3 hours operation per start, unless otherwise indicated.
- C. T8 rapid-start low-mercury lamps, rated 17 W maximum, nominal length of 24 inches (610 mm), 1300 initial lumens (minimum), CRI 85 (minimum), and average rated life of 24,000 hours minimum at 3 hours operation per start, unless otherwise indicated.

- D. T5 rapid-start low-mercury lamps, rated 28 W maximum, nominal length of 45.2 inches (1150 mm), 2900 initial lumens (minimum), CRI 85 (minimum), and average rated life of 25,000 hours minimum at 3 hours operation per start, unless otherwise indicated.
- E. T5HO rapid-start, high-output low-mercury lamps, rated 54 W maximum, nominal length of 45.2 inches (1150 mm), 5000 initial lumens (minimum), CRI 85 (minimum), and average rated life of 25,000 hours minimum at 3 hours operation per start, unless otherwise indicated.
- F. Compact Fluorescent Lamps: 4-Pin, low mercury, CRI 82 (minimum), average rated life of 12,000 hours at 3 hours operation per start, and suitable for use with dimming ballasts, unless otherwise indicated.
 - 1. 13 W: T4, double or triple tube, rated 900 initial lumens (minimum).
 - 2. 18 W: T4, double or triple tube, rated 1150 initial lumens (minimum).
 - 3. 26 W: T4, double or triple tube, rated 1710 initial lumens (minimum).
 - 4. 32 W: T4, triple tube, rated 2200 initial lumens (minimum).
 - 5. 40 W: T5, biax, rated 3150 initial lumens (minimum).
 - 6. 42 W: T4, triple tube, rated 3200 initial lumens (minimum).
 - 7. 57 W: T4, triple tube, rated 4300 initial lumens (minimum).
 - 8. 70 W: T4, triple tube, rated 5200 initial lumens (minimum).

2.12 HID LAMPS

A. Ceramic, Pulse-Start, Metal-Halide Lamps: Minimum CRI 80.

2.13 LED LIGHTING

- A. Drivers shall be coordinated with LED Luminaire Manufacturer to ensure compatibility.
- B. Drivers shall meet the following criteria:
 - 1. Drivers shall conform to all previously stated conditions for their respective source.
- C. Usable life shall be 50000 hours minimum, defined by the point in which the lamp output has decreased by 30% from its initial output.
- D. Color Quality:
 - 1. CCT shall be per specification. All LEDs supplied must be within a tolerance of +/- 100K from base color temperatures. Additionally, all LEDs shall be sourced from the same bin.
 - 2. Chromaticity Tolerance shall be within +/- 0.03 dUV on the CIE chromaticity diagram from the black body curve.
 - 3. Lamp CRI shall be a minimum of 80.
- E. Warranty on LED fixtures required per 265100 Article 1.15.

2.14 LIGHTING FIXTURE SUPPORT COMPONENTS

- A. Comply with manufacturer requirements for fixture support systems including but not limited to channel- and angle-iron supports and nonmetallic channel and angle supports.
- B. Single-Stem Hangers: 1/2-inch (13-mm) steel tubing with swivel ball fittings and ceiling canopy. Finish same as fixture.
- C. Twin-Stem Hangers: Two, 1/2-inch (13-mm) steel tubes with single canopy designed to mount a single fixture. Finish same as fixture.
- D. Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated steel, 12 gage (2.68 mm).
- E. Wires for Humid Spaces: ASTM A 580/A 580M, Composition 302 or 304, annealed stainless steel, 12 gage (2.68 mm).
- F. Rod Hangers: 3/16-inch (5-mm) minimum diameter, cadmium-plated, threaded steel rod.
- G. Hook Hangers: Integrated assembly matched to fixture and line voltage and equipped with threaded attachment, cord, and locking-type plug.

2.15 RETROFIT KITS FOR FLUORESCENT LIGHTING FIXTURES

- A. Comply with UL 1598 listing requirements.
 - 1. Reflector Kit: UL 1598, Type I. Suitable for two- to four-lamp, surface-mounted or recessed lighting fixtures by improving reflectivity of fixture surfaces.
 - 2. Ballast and Lamp Change Kit: UL 1598, Type II. Suitable for changing existing ballast, lamps, and sockets.

2.16 DISCONNECTS

A. Fluorescent fixtures: All fluorescent fixtures shall be provided with disconnecting means to allow the ballast to be serviced in place. Acceptable means include a switch integral to the luminaire or latching modular plug between ballast and branch circuit, internal to the luminaire.

2.17 ARCHITECTURAL CONTROL PROCESSOR MODULES PERFORMANCE REQUIREMENTS

A. The Architectural Control Processor shall be the Unison Paradigm P-ACP Series Control Processor as manufactured by Electronic Theatre Controls, Inc., or equivalent Architectural control processor by an approved equal.

B. Mechanical

- 1. The Architectural Control Processor (ACP) assembly shall be designed for use in Dimming Enclosures and Control Enclosures.
- 2. The processor shall utilize microprocessor based, solid state technology to provide multiscene lighting and building control.

- 3. ACP module electronics shall be contained in a plug-in assembly.
 - a. The module shall be housed in a formed steel body and contain no discrete wire connections.
 - b. No tools shall be required for module removal or insertion.
 - c. The ACP shall be convection cooled.
 - d. User Interface
 - 1) The ACP shall utilize a backlit liquid crystal display capable of graphics and eight lines of text.
 - 2) The ACP shall provide an alpha-numeric keypad for data entry and navigation
 - 3) The ACP shall provide a touch-sensitive control wheel for navigation.
 - 4) The ACP shall provide shortcut buttons to assist in navigation, selection, and data entry.
 - 5) The ACP keypad, buttons, and wheel shall be backlit for use in low-light conditions.
 - 6) The backlight shall have a user selectable time out, including no time out.
 - 7) The ACP shall provide a front-panel RJ45 jack for Ethernet connection to the processor for configuration, live control, and web-browser-based system access.
 - a) The Ethernet port shall be secured behind the locking door.
 - 8) The ACP shall provide a Secure Digital (SD) Removable Media slot on the front panel for transfer of configuration data.
 - a) The SD slot shall be secured behind the locking door.
 - 9) The ACP shall provide a Universal Serial Bus (USB) port on the front panel for transfer of configuration data.
 - a) The USB port shall be secured behind the locking door.
 - 10) Architectural Lighting System configuration and program information shall be stored in flash memory, which does not require battery backup.
 - a) The ACP shall provide a Compact Flash (CF) Card as backup flash memory and storage.
 - b) The CF Card is stored in the back of the ACP, and can be accessed only by removing the ACP.
 - c) The ACP data can be exchanged by inserting the CF card into another ACP.

C. Electrical

- 1. The ACP shall require no discrete wiring connections; all wiring shall be terminated into Dimming or Control Enclosure.
- 2. The ACP shall require low-voltage power supplied by the Dimming or Control enclosure.
- 3. The ACP shall be hot-swap capable.
- 4. The ACP shall support Echelon LinkPower communications with remote devices, including button stations, button/fader stations, Touchscreen stations, sensors, and third party LonMARK compliant products.
 - a. The LinkPower network shall utilize polarity-independent, low-voltage Class II twisted pair wiring, type Belden 8471 (unshielded) or Belden 8719 (shielded) or equivalent. One # 14 AWG drain wire will be required for system not using grounded metal conduit. Touchscreen stations, interface stations and portable stations connectors will also require (2) #16 AWG wires.

- b. The LinkPower network shall be topology free. Network wiring may be bus, loop, home run, star or any combination of these.
- c. Link power wiring shall permit a total wire run of 1640 ft. (500m) without a repeater. Repeater option modules shall be available to increase wiring maximums in increments of 1640 ft. (500m)
- d. Link power wiring between stations shall not exceed 1313 ft. (400m).
- 5. The ACP shall support 10/100BaseTX, auto MDI/MDIX, 802.3af compliant Ethernet networking using TCP/IP, ESTA BSR E1.17 Advanced Control Networks (ACN) and ESTA BSR E1.31 (sACN) Protocols for internal communication and integration with third-party equipment.
- 6. The ACP shall support EIA-RS232 serial protocol for bi-directional command and communication with third-party equipment.
- 7. The ACP shall support two discrete ESTA DMX512A ports, configurable as input or output ports.*
- 8. *When used in a Dimming Enclosure, the second port is always an output port.
- 9. The ACP shall provide four onboard dry contact closure inputs for integration with third-party products.
- 10. The ACP shall provide four onboard contact closure outputs, rated at 1A@30VDC, for integration with third-party equipment.

D. Functional

1. Capacity

- a. Shall support 1024 channels of control
- b. Shall support 2 physical DMX ports, each of which may be configured as an input or output

2. System

- a. Runtime application shall utilize support Net3 system interoperability
- b. System shall support the use of Network Time Protocol for real time clock synchronization
- c. System shall support remote firmware upload an over Ethernet connection from a connected PC running the Light Designer software or another connected processor.
- d. System shall support local firmware upload from removable media (SD Card, USB Flash Drive)

3. Diagnostics

- a. Shall output an Event log
- b. Standard log shall store a fixed-length history of recent activity
- c. Separate critical log shall only store important messages (such as boot-up settings)

4. Configuration Data

- a. Configuration Data can be uploaded over an Ethernet connection from a PC running Light Designer application
- b. Configuration Data can be retrieved from another Paradigm Processor
- c. A Paradigm Processor shall make its configuration data available for retrieval by another Processor as a backup/recovery mechanism

- d. Configuration Data shall be stored on solid-state media that can be removed to facilitate transfer between Processor units
- e. Configuration Data may be loaded to and from removable media access provided on front panel
- f. Configuration Data for the entire System shall be available for download from any single Processor
- g. Shall store configuration data for Dimming enclosure processors and shall make available for download

5. Scalability

- a. Adding additional Processors to a System shall proportionately increase its overall capabilities up to a maximum System size
- b. The maximum number of Processors configured as a System shall be at least 12
- c. Multiple Processors shall utilize the Ethernet network to remain time synchronized and share control information
- d. Multiple Processors shall utilize the Ethernet network to maintain configuration data synchronization as modifications are made
- e. Failure of a single Processor shall not prohibit continuing operation of the remaining Processors
- f. It shall be possible for multiple Systems to coexist on the same physical network with logical isolation between Systems

6. Local User Interface

- a. Shall provide access to Processor setup (IP address)
- b. Shall provide access to Processor status and diagnostics
- c. Where the Processor is installed within a Dimming enclosure, shall provide access to Dimming enclosure setup, status and diagnostics
- d. Shall provide control functionality for Control Channels, Zones, Fixtures, Groups, Presets, Macros, Walls and Sequences within the current configuration.
- e. Shall provide functionality to schedule astronomical and real time events (add/edit/delete)
- f. Shall allow for display of local DMX information
- g. Shall allow for transfer of log files to local removable media
- h. Shall allow to perform firmware upgrades for connected Dimming enclosures
- i. Shall allow for transfer of configuration to and from Dimming enclosures using removable media
- j. Shall allow for transfer of configuration to and from LCD Stations using removable media
- k. Shall allow for binding of Stations

7. Access Controls

- a. There shall be 2 user accounts Administrator, and User with separate password protection
- b. Account and password settings shall be local to each Processor
- c. Access Controls shall be applied to certain areas of the Paradigm Local User Interface and Web Interface

8. Web User Interface

- a. Shall be an internal web server accessible via Ethernet port
- b. Shall support common web browsers on Windows and Mac platforms
- c. Shall provide functionality to Activate and Deactivate Presets

- d. Shall provide functionality to schedule timed events (add/delete)
- e. Shall display status information
- f. Shall display log files
- g. Shall allow for configuration of Processor settings (date, time)
- h. Shall allow for upload and download of configuration data
- i. There shall be links to other web-enabled devices in the System, including other Paradigm Processors

9. Stations

- a. Stations shall be connected to a Paradigm Processor via a LinkPower network or Ethernet
- b. Station discovery and binding shall be accomplished from the Local User Interface or Light Designer

10. Net3 and ACN Devices

- a. Net3 Devices shall be connected to and controlled from Paradigm Processors via Ethernet
- b. Paradigm Processors shall provide DMX-Net3 gateway functionality
- c. It shall be possible to send and receive Macro triggers defined within the System configuration via Net3
- d. There shall be support for Streaming ACN on up to 24 universes per Processor

11. Operation

- a. When contained in an dimming enclosure, a snapshot of the dimming enclosure output data shall be stored in persistent memory so that hardware can access it for immediate output on boot
- b. DMX output refresh rate shall be configurable
- c. There shall be support for 16-bit DMX Attributes
- d. DMX inputs may be patched to DMX and Streaming ACN outputs as external sources
- e. Streaming ACN inputs shall be patched to DMX outputs (gateway) as external sources
- f. Where there are multiple external sources then priority and HTP shall be used to perform arbitration
- g. External and internal sources shall be arbitrated based on user-selection of standard or custom rules
- h. On Preset Record, the values of Attributes within the Preset shall be updated to reflect the current output
- i. The total output may be the combination of many different Presets running concurrently
- j. There shall be no hard limit on number of concurrent cross fades
- k. Multiple Presets controlling the same Attribute shall first interact based on priority and second based on Latest Takes Precedence(LTP) or Highest Takes Precedence (HTP)
- 1. LTP and HTP operation shall be supported simultaneously and interact (at the same priority) using HTP
- m. Settings due to LTP Presets may be automatically discarded from operation when overridden
- n. It shall be possible to specify that a Preset or Attribute Control will persist when overridden

- o. A Preset may be designated as an HTP Override and shall cause HTP values to be discarded
- p. It shall be possible to modify the rate of a Preset (Cross fades, Effects) from a Control within the System
- q. Each Preset shall have a status that can be Activated, Deactivated or Altered
- r. Preset status may be set based on matching levels in the current output as an option
- s. On startup the System shall be capable of automatically executing timed events within the previous 24 hours to synchronize its initial output state with the current time of day

12. Serial Input/Output

- a. RS232 shall support 8-bit word length, parity selection and 1 or 2 stop bits
- b. RS232 shall support baud rates from 4800 to 115,200 bps
- c. Serial input and output messages are fully customizable
- d. Serial output messages can be generated by any Control or Event

2.18 EMERGENCY BYPASS DETECTION

A. Where required to detect the loss of normal power and trigger special-purpose lighting presets, the detection means shall be the Emergency Bypass Detection Kit as manufactured by Electronic Theatre Controls, Inc., or equal.

B. Mechanical

- 1. The Kit Enclosure shall be a surface mounted, constructed of 16-gauge, formed steel panels with a removable front cover.
- 2. The Emergency Bypass Detection Kit shall include a 3-pole, 10 amp breaker for local over-current protection and simulation of normal power loss.
 - a. The enclosure shall have a lockable door to allow limited access to the over-current protection breaker
- 3. All components shall be properly treated and finished.
 - Exterior surfaces shall be finished in fine textured, scratch-resistant, powder coat paint
- 4. The EBDK enclosure shall provide discrete high and low voltage wiring compartments with voltage barrier.
- 5. EBDK dimensions and weights shall not exceed:
 - a. 10.5" H x 14" W x 4.2" D 11 lb.
- 6. Accessories
 - a. Emergency Bypass Detection Tap Kit (EBDK-TAP)
 - The Emergency Bypass Detection Kit shall support an optional tap kit for normally power loss sensing within an ETC Unison DRd Enclosure
 - 2) The Tap Kit shall provide fused over-current protection for sense feed wiring without the need for an external circuit breaker
 - 3) The Tap Kit shall install within an ETC Unison DRd Enclosure
 - b. Emergency Bypass Restore Switch (EBDK-SWITCH)

- 1) The Emergency Bypass Detection Kit shall support an optional switch kit requiring manual override before allowing the EBDK to return to a normal power state
- The Restore Switch shall be a single-gang device, fully finished, and supplied with mounting holes.
- c. The EBDK Switch Kit shall be clearly labeled identifying intended operation
- d. The Switch shall be labeled Lighting System Restore
- e. The Switch shall include a red indicator that is illuminated when bypass operation is active
 - 1) The EBDK Switch shall require two 16-gauge wires for connection to the Emergency Bypass Detection Kit
 - a) Up to two Bypass Restore Switches shall be supported per Emergency bypass Detection it

C. Electrical

- 1. Emergency Bypass Detection enclosures shall support 100 to 277 volt configurations
 - a. EBDK enclosures shall be field configurable for single-phase, bi-phase, and three-phase operation without the need for additional components.
- 2. Phase Loss Detection circuitry shall provide 0.5 second delay to prevent nuisance tripping
- 3. The EBDK shall provide an integrated circuit breaker for over-current protection and simulation of normal power loss
- 4. The Emergency bypass detection Kit shall support isolated outputs for connection to multiple dimming products simultaneously
 - a. Three isolated contacts shall be provided
 - b. Each contact shall support connection of up to four dimming products.
- 5. The Emergency Bypass Detection Kit shall be completely pre-wired by the manufacturer. The contractor shall provide input feed and control wiring.
- 6. All control wire connections shall be terminated via factory provided connectors.
 - a. Factory provided connector shall support 12 to 22-gauge wiring
 - b. Emergency lighting input shall support load shedding
- 7. The Bypass Detection Kit shall prove a normally-closed input for interface with fire alarm systems
- 8. The Bypass Detection Kit shall be UL and cUL Section 924 Listed for interaction with similarly listed dimming and switching panels

D. Thermal

- 1. Ambient room temperature: 0-40°C / 32-104°F
- 2. Ambient humidity: 10-90% non-condensing

2.19 STATION PROCESSOR POWER MODULES PERFORMANCE REQUIREMENTS

A. Station Power Module shall be the Unison Paradigm P-SPM Series Station Power Module as manufactured by Electronic Theatre Controls, Inc., or equivalent station power module by an approved equal.

B. Mechanical

- 1. The Station Power Module (SPM) assembly shall be designed for use in DRd Series or ERn Rack Enclosures
- 2. The SPM shall convert input power into low-voltage (Class II) power with data line and a secondary auxiliary low-voltage line to energize button, button/fader, touchscreen, and interface devices for multi-scene lighting and building control.
- 3. SPM module shall be contained in a plug-in assembly.
 - a. The module shall be housed in a formed steel body and contain no discrete wire connections.
 - 1) No tools shall be required for module removal or insertion.
- 4. The SPM shall be convection cooled.
- 5. User Interface
 - a. The SPM shall utilize light emitting diodes (LED's) to indication function, status and fault.
- 6. The SPM shall be secured behind the locking door.
- 7. Wall-mounted, direct wire and 19" rack-mount, connectorized repeater and dual-repeater variants shall be available from the same manufacturer where required on the project.

C. Electrical

- 1. The SPM shall require no discrete wiring connections; all wiring shall be terminated into the dimming enclosure, unless required by a variant
- 2. The SPM shall require line-voltage power supplied by the contractor, terminated inside the dimming or control enclosure.
- 3. The SPM shall be hot-swap capable.
- 4. The SPM, in conjunction with a matching Architectural Control Processor (ACP), shall support Echelon LinkPower communications with remote devices, including button, button/fader, touchscreen and interface stations, and shall interoperate with LonMARK-approved third-party devices.
 - a. The LinkPower network shall utilize polarity-independent, low-voltage Class II twisted pair wiring, type Belden 8471 (unshielded) or Belden 8719 (shielded) or equivalent. One # 14 AWG drain wire will be required for system not using grounded metal conduit.
 - b. The LinkPower network shall be topology free. Network wiring may be bus, loop, home run, star or any combination of these.
 - c. Link power wiring shall permit a total wire run of 1640 ft. (500m)
 - 1) Repeaters allow an additional wire run of 1640 ft. (500m)
 - 2) Dual-repeaters allow two additional wire runs of 1640 ft. (500m)
 - d. Link power wiring between stations shall not exceed 1313 ft. (400m).

- 5. The SPM shall support auxiliary power for certain remote devices, including touchscreen and interface stations, as required by the device.
 - a. The auxiliary power network shall utilize polarity-dependent, low-voltage Class II wiring, consisting of two # 16 AWG wires.
 - b. Auxiliary wiring shall permit a total wire run of 1640 ft. (500m)
 - 1) Repeaters allow an additional wire run of 1640 ft. (500m)
 - 2) Dual-repeaters allow two additional wire runs of 1640 ft. (500m)
 - c. The SPM shall supply 1.25 amps at 24v DC continuously.

D. Functional

- 1. Capacity
 - Each SPM shall
- 2. Supply power for up to 32 button and button/fader stations.
- 3. Repeaters and dual-repeaters allow 30 additional stations, 62 total
- 4. Supply auxiliary power for a similar number of interface stations.
- 5. Shall supply auxiliary power for up to four Touchscreen stations, when a like number of other stations are deducted from the total.
 - a. Repeaters and dual-repeaters allow two additional Touchscreens (six total) when a like number of other stations are deducted from the total.

6. Operation

- a. The SPM shall not require configuration or programming.
- b. The SPM shall automatically detect faults in the wiring, indicate the fault, including the fault polarity, and shut down the output power.
 - The SPM shall automatically reset when the fault is clear, and can be manually reset by removing and re-inserting the module.

2.20 PORTABLE TOUCHSCREEN CONTROL STATIONS REQUIREMENTS

A. The Portable Touchscreen Control Stations shall be the Unison Paradigm Portable Touchscreen P-LCD Series Control Stations as manufactured by Electronic Theatre Controls, Inc or equivalent touchscreen control station by an approved equal.

B. General

- 1. Portable Touchscreen stations shall support default and fully graphical control pages.
- 2. Portable Touchscreen stations shall operate using graphic buttons, faders and other images on at least 30 separate programmable control pages.
- 3. Portable Touchscreen stations shall also allow programming of page pass-code, lock out and visibility levels.
- 4. Portable Touchscreen stations shall support location awareness to automatically load the configuration required dependant on the connection point to the system

C. Mechanical

- 1. Portable Touchscreen stations shall consist of a seven inch, backlit liquid crystal display (LCD) with a minimum resolution of 800 by 400 pixels and 24-bit color depth with a touch interface.
- 2. The Portable Touchscreen enclosure and cover shall be constructed of aluminum and finished in a fine-texture powder coat paint
- 3. The enclosure shall provide a hinged cover with two positions for the Touchscreen: closed and operating.
- 4. The Portable Touchscreen shall have a protective cover for removable media ports
 - a. The protective cover shall be hinged
 - b. The Touchscreen cover shall be operational with the media cover in the open or closed position
- 5. The Portable Touchscreen shall include an attached cable with 6-pin Amphenol connector and strain relief to interface with Portable Connector Stations
 - a. Attached Cable shall be 15' in length constructed of ultra-flexible material
 - b. Extension cables up to 100' in length shall be available to extend the cable length to a maximum of 115' total length

D. Electrical

- 1. Portable Touchscreens shall be powered entirely by the System network.
- 2. Portable Touchscreens shall connect to the System using the control station link power network over the attached cable
 - a. Link power network.
 - Link power shall utilize low-voltage Class II unshielded twisted pair, type Belden 8471 or equivalent, and one #14 ESD drain wire (when not installed in grounded metal conduit).
 - 2) Touchscreen stations shall also require (2) #16 AWG stranded wires for 24Vdc operating power. 24Vdc wiring shall be topology free.
 - 3) Network wiring may be bus, loop, home run, star or any combination of these.

E. Functional

- 1. System
 - a. The Portable Touchscreen shall support configuration upload from the processor as proxy
 - b. The Touchscreen shall support configuration or firmware upload from local removable media
 - c. It shall be possible to connect multiple Portable Touchscreen station to the system at one time

2. Setup Mode

- a. There shall be a setup display that is separate from any user-defined configuration
- b. It shall be possible to view and modify connectivity settings
- c. It shall be possible to view status information
- d. It shall be possible to view and modify LCD screen settings
- e. It shall be possible to perform Touchscreen calibration
- f. It shall be possible to view and modify audio settings

- g. The appearance of the setup display shall be standard and not editable
- h. The setup display may be invoked from within the user-defined configuration and/or physical button on the Portable Touchscreen
- i. There shall be a default protected method to invoke the setup display

3. Configurations

- a. It shall be possible to have multiple configurations stored within an LCD Station
- b. The Portable Touchscreen shall automatically load the required configuration based on connection point to the system
- c. Only one configuration may be active on the LCD Station
- d. It shall be possible for Portable Touchscreen Stations connected via the Echelon Link power network (or approved equal) to select a configuration automatically based on the configuration of the physical connection.
- e. Where multiple configurations are stored there shall be a setup menu to allow selection of a configuration
- f. Each configuration shall be identified as a different Station within the System

4. Operation

- a. The Control System shall be designed to allow control of lighting and associated systems via Touchscreen controls. System shall allow the control of presets, sequences, macros and time clock events.
 - 1) System presets shall be programmable via Button, Button/Fader or Touchscreen stations, or LightDesigner software.
 - a) Presets shall have a discrete fade time, programmable from zero to 84,600 seconds with a resolution of one hundred milliseconds.
 - b) Presets shall be selectable via Touchscreen stations.
 - 2) System macros and sequences shall be programmable via LightDesigner system software.
 - a) Macro and sequence steps shall provide user selectable steps, and allow the application of conditional logic.
 - b) Macro and sequences shall be activated by button, time clock event or LightDesigner software.
 - 3) System time clock events shall be programmable via the Touchscreen, LightDesigner system software, the processor user interface, or the internal web server.
 - a) Time clock events shall be assigned to system day types. Standard day types include: anyway, weekday, weekend, Sunday, Monday, Tuesday, Wednesday, Thursday, Friday and Saturday. System shall support programming of additional custom or special day types.
 - b) Time clock events shall be activated based on sunrise, sunset, time of day or periodic event. System shall automatically compensate for regions using a fully configurable daylight saving time.
 - 4) A Color picker, supporting Hue, Saturation and Brightness (HSB) color selection shall be available for color selection of color changing fixtures and provide visual feedback of the current color produced by the associated fixture.
 - a) The color picker shall be provided with a default layout that requires no user configuration
 - b) The Color Picker shall provide RGB faders in addition to the default HSB color wheel for color selection.

- c) Color picker values shall allow for numerical value input in addition to color wheel and fader control
- d) The color picker shall be compatible with color mixing systems that use up to seven discrete color control channels
- b. Portable Touchscreen stations shall be designed to operate standard default or custom system functions. Components shall operate default functions unless reassigned via LightDesigner, the Windows-based configuration program.
 - 1) Optional button functions include: preset selection, manual mode activation, record mode activation, station lockout, raise, lower, macro activation, and cue light, or room join/separate.
 - 2) Optional fader functions include master control, individual channel control, fade rate control or preset master control.
- 5. Portable Touchscreen stations shall allow programming of station and component electronic lockout levels via LightDesigner.
 - a. It shall be possible to adjust LCD contrast and brightness.
 - b. It shall be possible to program the station to dim during periods of inactivity.

2.21 BUTTON AND FADER STATIONS PERFORMANCE REQUIREMENTS

A. Button Stations

1. The Lighting Control Stations shall be the Unison Heritage UH Series Control Stations as manufactured by Electronic Theatre Controls, Inc., or equivalent control stations by an approved equal..

2. Mechanical

- a. Button stations shall operate using up to ten programmable buttons.
- b. All button stations shall be available with white, cream, ivory, gray or black faceplates, and buttons.
 - 1) Manufacturer's standard colors shall conform to the RAL CLASSIC Standard.
- c. Stations shall have indicator lights at each button or fader.
 - 1) Indicators shall be comprised of red, green and blue LED's
 - 2) Indicator color and state (steady On, Blink, Off) shall be configured in software, and shall operate relative to the button or fader it is associated with.
- d. All faceplates shall be designed for flush or surface mounting.
- e. Station faceplates shall be constructed of ABS plastic and shall use no visible means of attachment.
- f. Station faceplates shall be indelibly marked for each button or fader function.
- g. The manufacturer shall supply back boxes for flush mounted half gang stations and for all surface mounted stations.
- h. All Button stations shall be shall be designed to accept the infrared signal from a remote hand held IR transmitter.
 - The stations shall have a 60° reception angle and shall operate reliably within a 45' distance.
- i. IR Transmitters shall be available in five or ten button configurations.
 - 1) IR transmitters shall be mounted in a hand-held black plastic controller.

2) Transmitter dimensions shall be 1.875" wide, 6.625" long and 0.60" deep.

3. Electrical

- a. Button Stations shall offer the following Regular markings
 - 1) UL and cUL LISTED
 - 2) CE Market
 - 3) RHoS and WEE Compliant

4. Functional

- a. The Control System shall be designed to allow control of lighting and associated systems via Button, Button/Fader, and Interface or Astronomical time clock controls. System shall allow the programming of presets, sequences, macros and time clock events.
 - 1) System presets shall be programmable via Button stations, Touchscreen stations, and LightDesigner software.
 - a) Presets shall have a discrete fade time, programmable from zero to 1,000 hours with a resolution of one millisecond.
 - b) Presets shall be selectable via button, fader, IR transmitter, time clock event, macro activation or switch interface stations.
 - 2) System macros and sequences shall be programmable via LightDesigner system software.
 - a) Macro and sequence steps shall provide user selectable steps, and allow the application of conditional logic.
 - b) Macro and sequences shall be activated by button, time clock event or LightDesigner software.
 - 3) System time clock events shall be programmable via LightDesigner system software, the processor user interface, or the internal web server.
 - Time clock events shall be assigned to system day types. Standard day types include: anyway, weekday, weekend, Sunday, Monday, Tuesday, Wednesday, Thursday, Friday and Saturday. System shall support programming of additional custom or special day types.
 - b) Time clock events shall be activated based on sunrise, sunset, time of day or periodic event. System shall automatically compensate for regions using a fully configurable daylight saving time.
- b. Control components shall be designed to operate default or custom system functions. Components shall operate default functions unless re-assigned via LightDesigner, the software-based configuration program.
 - Optional button functions include: preset selection, manual mode activation, record mode activation, station lockout, raise, lower, macro activation, or room join/separate.
 - 2) Optional fader functions include manual master control, individual zone control, fade rate control or preset master control.
- c. Stations (Button and Button/Fader) shall allow programming of station and component electronic lockout levels via LightDesigner.

B. Fader Stations

- 1. The Lighting Control Stations shall be the Unison Heritage UH Series Control Stations as manufactured by Electronic Theatre Controls, Inc., or equivalent fader stations by an approved equal.
- 2. Mechanical

- a. Fader Stations shall operate using up to sixteen programmable faders and twelve programmable buttons.
- b. All fader stations shall be available with white, cream, ivory, gray or black faceplates, fader knobs, and buttons.
 - 1) Manufacturer's standard colors shall conform to the RAL CLASSIC Standard.
- c. Fader stations shall utilize standard 45-millimeter slide potentiometers.
- d. Stations shall have indicators lights at each button or fader.
 - 1) Indicators shall be comprised of red, green and blue LED's
 - 2) Indicator color and state (steady On, Blink, Off) shall be configured in software, and shall operate relative to the button or fader it is associated with.
- e. All faceplates shall be designed for flush or surface mounting.
- f. Station faceplates shall be constructed of ABS plastic and shall use no visible means of attachment.
- g. Station faceplates shall be indelibly marked for each button or fader function.
- h. The manufacturer shall supply back boxes for flush mounted half gang stations and for all surface mounted stations.
- i. Fader stations shall be shall be designed to accept the infrared signal from a remote hand held IR transmitter.
 - The stations shall have a 60° reception angle and shall operate reliably within a 45' distance.
- j. IR Transmitters shall be available in five or ten button configurations.
 - 1) IR transmitters shall be mounted in a hand-held black plastic controller.
 - 2) Transmitter dimensions shall be 1.875" wide, 6.625" long and 0.60" deep.

3. Electrical

- a. Fader Stations shall offer the following Regular markings
 - 1) UL and cUL LISTED
 - 2) CE Market
 - 3) RHoS and WEE Compliant

4. Functional

- a. The Control System shall be designed to allow control of lighting and associated systems via Button, Button/Fader, and Interface, or Astronomical time clock controls. System shall allow the programming of presets, sequences, macros and time clock events.
 - 1) System presets shall be programmable via Button, Button/Fader, Touchscreen, or LightDesigner software.
 - a) Presets shall have a discrete fade time, programmable from zero to 1.000 hours with a resolution of one millisecond.
 - Presets shall be selectable via button, fader, IR transmitter, time clock event, macro activation or switch interface stations.
 - 2) System macros and sequences shall be programmable via LightDesigner system software.
 - a) Macro and sequence steps shall provide user selectable steps, and allow the application of conditional logic.
 - b) Macro and sequences shall be activated by button, time clock event or LightDesigner software.
 - 3) System time clock events shall be programmable via LightDesigner system software, the processor user interface, or the internal web server.

- a) Time clock events shall be assigned to system day types. Standard day types include: anyway, weekday, weekend, Sunday, Monday, Tuesday, Wednesday, Thursday, Friday and Saturday. System shall support programming of additional custom or special day types.
- b) Time clock events shall be activated based on sunrise, sunset, time of day or periodic event. System shall automatically compensate for regions using a fully configurable daylight saving time.
- b. Control components shall be designed to operate default or custom system functions. Components shall operate default functions unless re-assigned via LightDesigner, the software-based configuration program.
 - 1) Optional button functions include: preset selection, manual mode activation, record mode activation, station lockout, raise, lower, macro activation, or room join/separate.
 - 2) Optional fader functions include manual master control, individual zone control, fade rate control or preset master control.
- c. Stations (Button and Button/Fader) shall allow programming of station and component electronic lockout levels via LightDesigner.

C. Portable Plug-in Stations

1. The Lighting Control Stations shall be the Unison Heritage UH Series Control Stations as manufactured by Electronic Theatre Controls, Inc., or equivalent plug in stations by an approved equal.

2. Mechanical

- a. Connector stations shall provide an interface to portable stations.
- b. All connector stations shall be available with white, cream, ivory, gray or black faceplates.
 - 1) Manufacturer's standard colors shall conform to the RAL CLASSIC Standard.
- c. All faceplates shall be designed for flush or surface mounting.
- d. Station faceplates shall be constructed of ABS plastic and shall use no visible means of attachment.
- e. Station faceplates shall be indelibly marked with station function.
- f. The manufacturer shall supply back boxes for all surface mounted stations.

3. Electrical

- a. Portable Plug-in Stations shall offer the following Regular markings
 - 1) UL and cUL LISTED
 - 2) CE Market
 - 3) RHoS and WEE Compliant

4. Functional

- a. The Control System shall be designed to allow control of lighting and associated systems via Button, Button/Fader, and Interface or Astronomical time clock controls. System shall allow the programming of presets, sequences, macros and time clock events.
 - 1) System presets shall be programmable via Button, Button/Fader, Touchscreen, or LightDesigner software.

- a) Presets shall have a discrete fade time, programmable from zero to 1,000 hours with a resolution of one millisecond.
- b) Presets shall be selectable via button, fader, IR transmitter, time clock event, macro activation or switch interface stations.
- 2) System macros and sequences shall be programmable via LightDesigner system software.
 - a) Macro and sequence steps shall provide user selectable steps, and allow the application of conditional logic.
 - b) Macro and sequences shall be activated by button, time clock event or LightDesigner software.
- 3) System time clock events shall be programmable via LightDesigner system software, the processor user interface, or the internal web server.
 - a) Time clock events shall be assigned to system day types. Standard day types include: anyway, weekday, weekend, Sunday, Monday, Tuesday, Wednesday, Thursday, Friday and Saturday. System shall support programming of additional custom or special day types.
 - b) Time clock events shall be activated based on sunrise, sunset, time of day or periodic event. System shall automatically compensate for regions using a fully configurable daylight saving time.
- b. Control components shall be designed to operate default or custom system functions. Components shall operate default functions unless re-assigned via LightDesigner, the software-based configuration program.
 - 1) Optional button functions include: preset selection, manual mode activation, record mode activation, station lockout, raise, lower, macro activation, or room join/separate.
 - 2) Optional fader functions include manual master control, individual zone control, fade rate control or preset master control.

D. Locking Covers

- 1. The Lighting Control Station Locking Covers shall be the Unison Heritage UH Series as manufactured by Electronic Theatre Controls, Inc., or equivalent locking covers by an approved equal.
 - Locking covers shall be available in Sliding Locking for flush mount applications and Hinged Locking for flush and surface mount applications
 - b. Sliding Locking Covers shall
 - 1) Be available with white, cream, ivory, gray or black faceplates.
 - 2) Be constructed of Extruded Aluminum with ABS plastic end caps
 - Provide a smoked Plexiglas window to allow for viewing control status and use of IR remote without opening cover
 - c. Hinged locking covers shall:
 - 1) Be available in standard black powder coat finish
 - 2) Be constructed of 18 gauge steel and finished in standard black powder coat paint, or custom color as specified.
 - Provide a clear Plexiglas window to allow for viewing control status and use of IR remote without opening cover
 - 4) Use internal Hinge that is not accessible when the cover is closed
 - d. Standard colors shall conform to the RAL CLASSIC Standard.
 - e. Locking covers of the same type shall be keyed alike
 - f. The manufacturer shall supply back boxes for all hinged locking covers

2. Functional

- a. All locking covers shall utilize 90-degree locking mechanisms
 - 1) Keys shall be held captive in locks when covers are unlocked.
- b. Locking covers shall allow for easy viewing of system status without opening the cover
- c. Locking covers shall support IR remote activation of configured system functions without opening door

2.22 RACK ENCLOSURES PERFORMANCE REQUIREMENTS

A. The rack enclosure shall be the Unison DRd Series Control Enclosure as manufactured by Electronic Theatre Controls, Inc., or equivalent rack enclosure by an approved equal.

B. Mechanical

- 1. The Rack Enclosure shall be a surface mounted, deadfront switchboard, constructed of 18-guage formed steel panels with a hinged, lockable full-height door containing an integral electrostatic air filter.
 - a. Filter shall be removable for easy cleaning.
 - b. The enclosure shall support one control processor and one station power module plus accessories
 - c. The enclosure door shall have an opening to allow limited access to the control module face panel.
- 2. All rack components shall be properly treated and finished.
 - a. Exterior surfaces shall be finished in fine textured, scratch-resistant, epoxy paint.
- 3. The fully digital rack enclosure shall be available with six or twelve dimmer module spaces, one processor and a single station power supply, Rack dimensions and weights (without modules) shall not exceed:
 - a. 6: 21.9" H x 17" W x 9.6" D 38 lb.
 - b. 12: 31.0" H x 17" W x 9.6" D 51 lb.
- 4. A single low-noise fan shall be located at the top of each rack. The fan shall draw all intake air through the integral electrostatic air filter, over the surfaces of the module housing and out the top of the rack.
 - a. The fan shall maintain the temperature of all components at proper operating levels with dimmers under full load, provided the ambient temperature of the dimmer room does not exceed 40°C/104°F.
 - b. In the event of an over-temperature condition, only the affected dimmer module(s) shall shut down. A red indicator LED will flash and an error message shall appear on the Control Processor.
- 5. Rack Enclosures shall be designed to allow easy insertion and removal of dimmer and control modules without the use of tools. (230 volt racks with CE certification shall require a screwdriver.)
 - a. Supports shall be provided for precise alignment of modules into power and signal connector blocks.

- b. With modules removed, racks shall provide clear front access to all load, neutral and control wire terminations.
- 6. Rack Enclosures shall support use of any combination of rack option cards designed to provide additional rack features. Rack option cards shall include:
 - a. FLO The Fluorescent Option Board shall provide termination for 4 wire low voltage electronic fluorescent dimming ballasts. FLO shall provide 24, 0-10Vdc outputs.
 - b. DALI The DALI Option Board shall provide termination for DALI fluorescent dimming ballasts. DRd shall provide 24, DALI outputs for up to 63 ballasts each in a broadcast mode.
- 7. Optional floor mounting pedestal shall be available for the 12-module rack.
- 8. Racks enclosures shall be designed for use with AX series auxiliary racks for Main Circuit Breaker, Main Lug, and cross bussing applications.

9. Accessories

- a. RideThru Option (RTO)
 - 1) The Rack Enclosure shall support an optional, short-term back-up power source for the control electronics.
 - 2) The short-term back-up power source shall automatically engage upon the loss of normal power, seamlessly transitioning the supply power for the control electronics power to itself.
 - 3) The short-term back-up power supply shall detect the return of normal power, and seamlessly return the control electronics to normal power.
 - 4) The short-term back-up power source shall support the control electronics for at least 10 seconds.
- b. BatteryPack Option (BPO)
 - 1) The Rack Enclosure shall support an optional, long-term back-up power source for the control electronics.
 - 2) The long-term back-up power source shall automatically engage upon the loss of normal power, seamlessly transitioning the supply power for the control electronics power to itself.
 - 3) The long-term back-up power supply shall detect the return of normal power, and seamlessly return the control electronics to normal power.
 - 4) A test switch/indicator shall be available without opening the rack door or removal of any modules/components.
 - 5) The long-term back-up power source shall supply power to the control electronics for at least 90 minutes.

C. Electrical

- 1. Rack enclosures shall be available in 100, 120, 230, 240 and 277 volt, three-phase, main lug configurations.
 - a. 120 volt rack enclosures shall be field configurable for single phase operation without the need for additional components
- 2. Rack enclosures shall be completely pre-wired by the manufacturer. The contractor shall provide input feed, load, and control wiring.
- 3. Standard Short Circuit Current Ratings (SCCR) shall be 22,000 at 100-277 Volt

- a. Higher SCCR ratings, up to 100,000 amps SCCR at 120V, shall be possible when used with an AX series Auxiliary Rack Enclosure.
- b. Higher SCCR ratings, up to 65,000 amps SCCR at 240V and 277V, shall be possible when used with an AX series Auxiliary Rack Enclosure.
- 4. All control wire connections shall be terminated via factory provided connectors.
- 5. Rack enclosures shall support dimming for incandescent, fluorescent, neon, cold cathode, electronic low voltage and magnetic low voltage transformer load types.
- 6. The rack enclosure shall support 16-bit DMX input
- 7. The rack enclosure shall support 65,000 steps of dimming.
- 8. The rack enclosure dimming engine shall support multiple dimmer curves including modified square law, linear, switched, fluorescent, pre-heat and electronic low voltage.
- 9. The rack enclosure shall support voltage regulation including, minimum and maximum scale voltages with offsets
- 10. Rack enclosure shall support a UL924 listed contact input for emergency lighting control bypass
 - a. Emergency lighting input shall support load shedding
- 11. Rack enclosures shall be designed to support the following wire terminations:
 - a. AC
 - b. Echelon link power (Belden 8471 or equivalent)
 - c. 24Vdc (2-16AWG Wire)
 - d. DMX512A Port A (In or Out) (Belden 9729 or equivalent)
 - e. DMX512A Port B (Out) (Belden 9729 or equivalent)
 - f. RS232 Serial In/Out (Belden 9729 or equivalent)
 - g. Unshielded Twisted Pair (UTP) Category 5/5e Ethernet
 - h. Contact Closure In (14AWG to 26AWG Wire)
 - i. Contact Closure Out (14AWG to 26AWG Wire)
 - 1) Contact Closure Out shall provide 1A @ 30vDC

12. Station Power Modules

- a. Station power modules shall provide LinkPower for up to 32 stations and 1.5A@24VDC of Auxiliary (AUX) power.
- b. Station power repeater modules shall provide LinkPower for 30 stations and 1.5A @ 24VDC of Auxiliary (AUX) power.
- c. Station power module shall support over-current/short protection for LinkPower and Auxiliary (AUX) power. LinkPower shall support fault detection on each leg of the balanced data bus.
- 13. All control wire connections shall be terminated via factory provided connectors.
- 14. Main feed lugs shall accept a maximum of 350 MCM wire.
- 15. Load terminals shall accept a maximum of #6 AWG wire.

D. Thermal

- 1. Ambient room temperature: 0-40°C / 32-104°F
- 2. Ambient humidity: 10-90% non-condensing

2.23 FLUORESCENT MODULES PERFORMANC REQUIRMENTS

A. General

- 1. The fluorescent modules shall be the Fluorescent modules as manufactured by Electronic Theatre Controls, Inc., or equivalent fluorescent modules by an approved equal. Fluorescent modules shall be designed for dependable, economical service in architectural, theatrical and video applications.
- 2. Fluorescent modules shall provide operating power and dimming control to three-wire electronic ballasts for dimmable fluorescent fixtures.

B. Electrical

- 1. Each module shall contain a single-pole circuit breaker, associated fuses, a solid-state switching module, and power and control connectors.
- 2. Modules shall not have any protruding pins subject to physical damage when the module is not installed.
- 3. Modules shall be keyed so that modules of different capacity shall not be interchangeable.
- 4. Circuit breakers shall be fully magnetic so the trip current is not affected by ambient temperature. Circuit breakers shall be rated for loads having an inrush rating of no less than 20 times normal current. Circuit breakers shall be have a 125 percent, 10 -120 seconds, must-trip rating. Circuit breakers shall be rated 100% switching duty applications. The breakers shall not derate over product life cycle. Dimmers that do not operate continuously at 100% load shall not be acceptable.
- 5. Each module shall have replaceable fuses on both the switched and dimmed AC circuits to protect from short circuit damage.

C. SCR Assembly

- 1. Each module shall use a solid state module (SSM) consisting of two silicon-controlled rectifiers (SCRs) in an inverse parallel configuration, and all required gating circuitry on the high voltage side of an integral, opto-coupled control voltage isolator. Rectifiers, copper leads and a ceramic substrate shall be reflow soldered to an integral heat sink for maximum heat dissipation. The SSM shall also contain a control LED, an output LED, a thermistor for temperature sensing, and silver-plated control and load contacts. The entire SSM shall be sealed in a plastic housing requiring only a screwdriver to replace. Dimmers employing triac power devices, pulse transformers, or other isolating devices not providing at least 2,500V RMS isolation, shall not be acceptable. Modules requiring disassembly, heat sink grease or additional tools for repair shall not be acceptable.
- 2. All electronic components (current/voltage sensors and indicators) shall be contained in a single, field-replaceable housing. Modules requiring discrete wiring of electronic components shall not be acceptable.
- 3. SCR power switching devices shall have the following minimum ratings:

MODULE SIZE:	15A	20A
Single cycle peak surge current	625A	625A

Half cycle peak surge current	1,620A	1,620A
Transient over voltage	600V	600V
Die size (in)	.257	.257

D. DimmerRange

1. The module shall have user-configurable threshold levels that may be set via the Control Electronics Modules within the dimmer rack. This electronic setting shall allow selection of module outputs suitable to match most ballast dimming ranges, without the use of trim-pots.

E. Physical

- 1. Fluorescent modules shall be fully plug-in and factory wired. The modules shall consist of a heavy duty, die-cast aluminum chassis with integral face panel. No tools shall be required for module removal and insertion. All parts shall be properly treated, primed and finished in fine-texture, scratch resistant, gray epoxy powder coat. With the exception of the circuit breaker, the module shall contain no moving parts. Each module shall be labeled with the manufacturer's name, catalog number and rating. Modules constructed of molded plastic for structural support are not equivalent and are not acceptable. Fluorescent modules shall be and cUL Listed for continuous duty at 100% of rated load.
 - a. D15F 1.8kW
 - b. D20F 2.4kW

2.24 RELAY MODULE PERFORMANCE REQUIREMENTS

A. Mechanical

- 1. ETC relay modules shall be designed for use and compatibility with the dimming racks.
- 2. Dimmer modules shall consist of a heavy-duty, die-cast aluminum chassis with an integral faceplate. All parts shall be properly treated, primed and finished in fine-texture, scratch-resistant gray epoxy powder coat.
- Modules constructed of molded plastic for structural support are not equivalent and are not acceptable.
- 4. With the exception of the circuit breaker, the module shall contain no moving parts.
- 5. Each module shall be labeled with the manufacturer's name, catalog number and rating.
- 6. All electronic components (current/voltage sensors and indicators) shall be contained in a single field-replaceable housing.

B. Electrical

- 1. Each dimmer shall consist of the following components:
 - a. One or two single-pole circuit breakers
 - 1) Circuit breakers shall be fully magnetic so the trip current is not affected by ambient temperature.
 - 2) Circuit breakers shall be rated for tungsten loads having an inrush rating of no less than 20 times normal current.
 - 3) Circuit breakers shall be rated for 100 percent switching duty applications.
 - b. Power and control connectors.
 - 1) Modules shall not have any protruding pins subject to physical damage when the module is not installed.
 - 2) Power efficiency for standard dimmers shall be at least 97 percent at full load with a no-load loss of 3V RMS.
 - 3) The relay shall accept hot patching of a cold incandescent load up to the full rated capacity of the dimmer.
 - 4) Relay modules shall be UL and cUL(120V, 240V and 277V listed) or CE marked (230V) power control devices with Standard SCCR fault current protection shall be 100,000 Amps at 120V and 24,000 Amps at 230V, 240V and 277V.

2.25 DIMMER MODULE PERFORMANCE REQUIREMENTS

A. Mechanical

- 1. Dimmer modules shall be designed for use and compatibility with the dimming racks.
- 2. Dimmer modules shall consist of a heavy-duty, die-cast aluminum chassis with an integral faceplate. All parts shall be properly treated, primed and finished in fine-texture, scratch-resistant gray epoxy powder coat.
- 3. With the exception of the circuit breaker, the module shall contain no moving parts.
- 4. Each module shall be labeled with the manufacturer's name, catalog number and rating.
- 5. All electronic components (current/voltage sensors and indicators) shall be contained in a single field-replaceable housing.

B. Electrical

- 1. Each dimmer shall consist of the following components:
 - a. One or two single-pole circuit breakers
 - 1) Circuit breakers shall be fully magnetic so the trip current is not affected by ambient temperature.
 - 2) Circuit breakers shall be rated for tungsten loads having an inrush rating of no less than 20 times normal current.
 - 3) Circuit breakers shall be rated for 100 percent switching duty applications.
 - b. A solid-state switching module
 - Each dimmer module shall use a solid-state relay (SSR) consisting of two silicon-controlled rectifiers (SCRs) in an inverse parallel configuration, and all required gating circuitry on the high-voltage side of an integral, optocoupled control voltage isolator. Rectifiers, copper leads and a ceramic substrate shall be reflow soldered to an integral heat sink for maximum heat

- dissipation. Dimmers employing triac power devices, pulse transformers, or other isolating devices not providing at least 2,500V RMS isolation shall not be acceptable.
- 2) The SSR shall also contain a control LED, a thermistor for temperature sensing, and silver-plated control and load contacts.
- The entire SSR shall be sealed in a plastic housing requiring only a screwdriver to replace.
- 4) Dimmer modules requiring disassembly, heat sink grease, or additional tools for repair shall not be acceptable.

c. Toroidal filters

- 1) Dimmer modules shall include toroidal filters to reduce the rate of current rise time resulting from switching the SCRs. The filter shall limit objectionable harmonics, reduce lamp filament sing and limit radio frequency interference on line and load conductors.
- Modules shall be available in models offering 200-500 microsecond filter rise times depending upon model. Rise time shall be measured at the worst case slew rate (about 50 percent) from 10 to 90 percent of the output waveform with the dimmer operating at full load.
- d. Power and control connectors.
 - 1) Modules shall not have any protruding pins subject to physical damage when the module is not installed.
 - 2) Power efficiency for standard dimmers shall be at least 97 percent at full load with a no-load loss of 3V RMS.
 - 3) The dimmer shall accept hot patching of a cold incandescent load up to the full rated capacity of the dimmer.
 - 4) Standard AIC fault current protection shall be 10,000 at 120V and 14,000 at 230V/277V.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Lighting fixtures: Set level, plumb, and square with ceilings and walls. Install lamps in each fixture.
 - B. Support for Lighting Fixtures in or on Grid-Type Suspended Ceilings: Use grid as a support element
 - 1. Install a minimum of four ceiling support system rods or wires for each fixture. Locate not more than 6 inches (150 mm) from lighting fixture corners.
 - 2. Support Clips: Fasten to lighting fixtures and to ceiling grid members at or near each fixture corner with clips that are UL listed for the application.
 - 3. Fixtures of Sizes Less Than Ceiling Grid: Install as indicated on reflected ceiling plans or center in acoustical panel, and support fixtures independently with at least two 3/4-inch (20-mm) metal channels spanning and secured to ceiling tees.
 - 4. Install at least one independent support rod or wire from structure to a tab on lighting fixture. Wire or rod shall have breaking strength of the weight of fixture at a safety factor of 3.

- C. Suspended Lighting Fixture Support:
 - 1. Pendants and Rods: Where longer than 48 inches (1200 mm), brace to limit swinging.
 - 2. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers.
 - 3. Continuous Rows: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of fixture chassis, including one at each end.
- D. Air-Handling Lighting Fixtures: Install with dampers closed and ready for adjustment.
- E. Adjust aimable lighting fixtures under supervision of Commissioner
 - 1. Number of Sessions: Allow for two full working shifts of access for lighting adjustment.
 - 2. Scheduling: Contractor shall coordinate meeting time for aiming at night with Commissioner and a work crew as determined necessary by the Commissioner.
 - 3. Equipment: All required equipment shall be available for aiming, including ladders or other lift equipment, and lamps and accessories as specified.
 - 4. Access: Contractor shall re-construct any scaffolding or access equipment to adjust fixtures if the opportunity for adjustment is not coordinated by the Contractor while these means of access are in place.
- F. Connect wiring according to NEC and UL requirements for low-voltage electrical power conductors and cables.
- G. Control system installation shall include the following.
 - 1. It shall be the responsibility of the electrical subcontractor to receive and store the necessary materials and equipment for installation of the dimmer system. It is the intent of these specifications and plans to include everything required for proper and complete installation and operation of the dimming system, even though every item may not be specifically mentioned. The contractor shall deliver on a timely basis to other trades any equipment that must be installed during construction.
 - 2. The electrical subcontractor shall be responsible for field measurements and coordinating physical size of all equipment with the architectural requirements of the spaces into which they are to be installed.
 - 3. The electrical subcontractor shall install all lighting control and dimming equipment in accordance with manufacturers approved shop drawings.
 - 4. All branch load circuits shall be live tested before connecting the loads to the dimmer system load terminals.

3.2 FIELD QUALITY CONTROL

- A. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery and retransfer to normal.
 - B. Inspect each installed luminaire for damage. Replaced damaged luminaires and components.
 - C. Give advance notice of dates and times for field tests.

- D. Provide instruments to make and record test results.
- E. Tests: Verify normal operation of each luminaire after luminaires have been installed and circuits have been energized with normal power source. Interrupt electrical energy to demonstrate proper operation of emergency lighting installation. Include the following information in tests of emergency lighting equipment:
 - 1. Duration of supply.
 - 2. Low battery voltage shutdown.
 - 3. Normal transfer to battery source and retransfer to normal.
 - 4. Low supply voltage transfer.
 - 5. Photometric Tests: Measure light intensities at night at locations where specific illumination performance is indicated. Use photometers with calibration referenced to National Institute of Standards and Technology (NIST) standards.
 - 6. Check for intensity of illumination.
 - 7. Check for uniformity of illumination
 - 8. Check for excessively noisy ballasts
 - 9. Prepare written report of tests indicating actual illumination results.
- F. Replace or repair malfunctioning luminaires and components, then retest. Repeat procedure until all units operate properly.
- G. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.
- H. Replace luminaires that show evidence of corrosion during Project warranty period.

3.3 STARTUP SERVICE

- A. Burn-in all lamps that require specific aging period to operate properly, prior to occupancy by the City of New York. Burn-in fluorescent and compact fluorescent lamps intended to be dimmed, for at least 100 hours at full voltage
 - B. Control system manufacturer's services shall be provided as follows.
 - 1. Upon completion of the installation, including testing of load circuits, the contractor shall notify the dimming system manufacturer that the system is available for formal checkout.
 - 2. Notification shall be provided in writing, two weeks prior to the time that factory-trained personnel are needed on the job site.
 - 3. No power is to be applied to the dimming system unless specifically authorized by written instructions from the manufacturer.
 - 4. The contractor shall be liable for any return visits by the factory engineer as a result of incomplete or incorrect wiring.

5. Upon completion of the formal check-out, the factory engineer shall demonstrate operation and maintenance of the system to the owner's representatives. Instruction shall not exceed four working hours. Additional instruction shall be available upon request.

3.4 FOCUS AND ADJUSTMENT

- A. All adjustable lighting units shall be aimed, focused, locked etc. by the Contractor under the supervision of the Commissioner. The Commissioner shall indicate the number of crews (foreman and apprentice) required. All focusing and adjusting shall be carried out after the entire installation is complete and working including lighting control system, fixtures, and specified lamps. Areas around these fixtures shall be easily accessible and, clean of construction equipment and debris. All fixtures and lamps shall be clean of dust and dirt. All ladders, scaffolds etc. required shall be furnished by the Contractor at the direction of the Commissioner. As aiming and adjusting is completed, locking setscrews and bolts and nuts shall be tightened securely. This may take more than one visit.
 - B. Where possible, units shall be focused during the normal working day. Where daylight interferes with seeing, focus shall be accomplished during the night at a time mutually agreeable to Contractor, Commissioner, and the City of New York. Adjustments shall be made in accordance with the Commissioner's stated intent, under his/her observation.
 - C. Contractor to allow for a minimum of the following commissioning milestones:
 - 1. Light Fixture Focus and Aiming.
 - 2. Programming of Control Systems.
 - D. Re-lamp luminaires that have failed lamps at Substantial Completion.
 - E. Due to the nature of project, provide allowance for up to an additional two programming visits with a representative from the lighting control equipment manufacturer per substantial completion of the project.
 - F. All fixtures must be installed in final locations with specified lamp and accessories in place prior to programming visit.
 - G. Fixtures must be in working condition and clean of dust, grease, and fingerprints.
 - H. Programming time shall be scheduled per Commissioner's discretion and may be outside of working hours.

3.5 CLEANUP

A. At the time of final acceptance by the Commissioner, all luminaires shall have been thoroughly cleaned with materials and methods recommended by the manufacturers, all broken parts shall have been replaced and all lamps shall be operative.

3.6 DEMONSTRATION

- A. Provide systems demonstration under provisions of the DDC General Conditions.
 - B. Provide minimum of two hours demonstration of luminaire operation and maintenance.

END OF SECTION

SECTION 283111

FIRE ALARM 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.

1.2 RELATED DOCUMENTS:

- A. The following documents apply to all required work for the Project:
 - 1. The Contract Drawings
 - 2. The Specifications
 - 3. The General Conditions
 - 4. The Addendum
 - 5. The Contract [City of New York Standard Construction Contract].

1.3 WORK INCLUDED

- A. The work covered by this Section of the Specifications shall include all labor, equipment, materials, hoisting, rigging and services necessary to modify existing Interior Fire Alarm system of the microprocessor based, software programmable, addressable, coded (manual stations shall be individually coded and automatic alarm initiating devices shall be "zone" coded), general, alarm (horns) type. It shall be addressable device point annunciated and also provide visual alarm strobe lights and supervised wiring with all operations as herein described and as shown on Drawings. The system shall consist of, but not be limited to, the following:
 - 1. Fire alarm control panel (FACP).
 - 2. Remote annunciator panel.
 - 3. Manual fire alarm stations.
 - 4. Smoke sensors.
 - 5. Duct smoke sensors.
 - 6. Monitoring Modules.
 - 7. Alarm initiating, supervisory and status monitored devices to be integrated into the fire alarm system via FACP Circuits.

- a. Beam smoke detectors (alarm initiating).
- b. Sprinkler waterflow alarm switches (alarm initiating).
- c. Sprinkler and standpipe valve tamper switches (supervisory).
- 8. Alarm indicating appliance to be integrated into the fire alarm system via the FACP indicating appliance (signal) circuits:
 - a. Alarm horns.
 - b. Visual alarm strobe lights.
 - c. Sprinkler alarm bell (Existing to remain At FACP).
 - d. Smoke alarm bell (Existing to remain At FACP).
 - e. System trouble bell (Existing to remain At FACP).
- 9. Update operating instruction/riser diagram holders.
- 10. Maintain Central Office Connection.
- 11. Existing FACP and system components not affected by renovation shall remain.
- B. The fire alarm system shall have sufficient capacity to incorporate all equipment and perform all functions as stipulated within these Specifications and the Drawings of this project.

1.4 APPLICABLE LISTINGS, CODES AND STANDARDS

- A. Except as modified by governing codes and by the Contract Drawings, comply with the applicable provisions and recommendations of the following:
 - 1. All equipment shall be U.L. listed for its intended use.
 - a. U.L. 864 Fire Protective Signaling System.
 - b. U.L. 268 Smoke Detectors.
 - c. U.L. 1480 and U.L. 464 Fire Alarm Signaling Devices.
 - d. U.L. 1971 Fire Alarm Visual Signaling Devices.
 - e. U.L. 521 Heat Detectors
 - 2. All raceways and wiring shall be installed in compliance with NFPA Standard 70 (National Electrical Code Article 760). All applicable portions of the New York City and National Electrical Codes shall be implicitly followed, in particular with regard to material type and quality, circuitry extensions from and connections to outlet and junction boxes, panel boards and similar appurtenances.

3. National Fire Protection Association Standards

- a. NFPA No. 70 2002 Edition National Electrical Code.
- b. NFPA No. 72 1993 Edition, as amended by NYC Building Code.
- c. NFPA No. 90A 1981 Edition Standard For The Installation Of Air Conditioning And Ventilating Systems.
- d. NFPA No. 72 2002 Edition National Fire Alarm Code.
- e. NFPA No. 90A 2002 Edition Standard for the Installation of Air Conditioning and Ventilating Systems.
- 4. The fire alarm system and its installation shall be provided in conformance with all applicable portions of The Americans With Disabilities Act Of 1992.
- 5. The fire alarm system and its installation shall comply with all applicable requirements of the New York City Building Code.
- 6. All products, components and assemblies furnished by the manufacturer, to meet the Specifications of this Section, shall first have received the approval of the New York City Board of Standards and Appeals (B.S.A.) and/or the New York City Building Department Materials and Equipment Acceptance (M.E.A.). Submittal documents for these products, components and assemblies shall have their respective B.S.A. and/or M.E.A. Approval Calendar Numbers clearly indicated or the submittals shall be rejected by the Engineer.
- 7. The fire alarm system and it's installation shall comply with all applicable requirements of the New York City Electrical Code and New York City Fire Department requirements.

1.5 RELATED DOCUMENTS

- A. Prior to the commencement of work, the Contractor shall obtain all permits necessary for installation of the work. All permit costs and inspections fees shall be included as part of the required work.
- B. Local requirements shall be adhered to with regard to submitting specifications, wiring diagrams, shop drawings and plans. Responsibility for furnishing the quantities of copies on cloth and/or paper, as directed by such requirements, shall be included as part of the Work of this Section.
- C. Prior to commencement and after completion of work, the Contractor shall notify New York City Fire Department.
- D. The Contractor shall submit a letter of approval of the installation from the New York City Fire Department before requesting final acceptance of the system.

1.6 RELATED WORK

A. Supplemental General Requirements of Electrical Work as specified in Section 260500.

- f. A minimum of No. 16 A.W.G., unless otherwise noted, or required by voltage drop calculations.
- g. All low voltage wiring (75 volts and less) shall be Type FPLP, 15 mil insulation, 150°C, colored red, 25 mil overall jacket, cable printing per UL1424, labeled "Classified NYC Cert. Fire Alarm Cable".
- h. All power conductors (above 75 volts) shall be TFFN, TFN, THHN, THWN, or FEP minimum 600 volts, 90°C.
- 2. All wires shall test free from grounds and crosses between conductors.
- 3. A ground wire equal in size to the largest conductor used on the system, but not less than No. 10 A.W.G., attached to the fire alarm control panel (FACP) and shall be installed in 3/4" conduit and securely connected to the grounding bus or terminal in each box or cabinet it enters. The ground wire shall be routed with the supply conductors from the fused cutout. Provide a grounding electrode conductor not less than #8 AWG to the fused cutout and install per New York City electric code.
- 4. Circuit wiring from the FACP to the smoke purge control panel (SPCP) shall be a minimum of as follows:
 - a. Data communications circuit wiring: Two (2) cables, each with two (2) No. 16 A.W.G., twisted and shielded, copper conductors.
- 5. Circuit wiring from the FACP to the remote annunciator panel shall be a minimum of as follows:
 - a. Data communications circuit wiring: Two (2) cables, each composed of two (2) No. 16 A.W.G., twisted and shielded, copper conductors.
 - b. 24 VDC, power circuit wiring: Two (2) No. 14 A.W.G., copper conductors.
- 6. Circuit wiring from the FACP to the system peripheral equipment shall be a minimum of as follows:
 - a. Each multiple addressable peripherals network data communications circuit: Two (2) No. 16 A.W.G., twisted and shielded, copper conductors.
 - b. Each duct smoke sensor/Addressable Module 24 VDC power circuit: Two (2) No. 14 A.W.G., copper conductors.
 - c. Each alarm horn circuit: Two (2) No. 12 A.W.G., copper conductors. Minimum of two (2) circuits per floor. Devices shall be connected to alternate circuits.
 - d. Each alarm strobe light circuit: Two (2) No. 12 A.W.G., copper conductors. Minimum of two (2) circuits per floor. Devices shall be connected to alternate circuits.



- a. Each alarm initiating, supervisory or status monitoring circuit from an Addressable Monitor Module (AMM): Two (2) No. 16 A.W.G., copper conductors.
- b. Each control circuit from a duct smoke sensor Addressable Control Module (ACM): Two (2) No. 13 A.W.B., copper conductors.
- 8. Circuit wiring from the fire alarm control panel (FACP) to the central station transmitter location shall be a minimum of 10 (10) No. 14 A.W.G., copper conductors.

H. Conduit and Raceways

- 1. All wiring shall be mechanically protected when installed exposed and in areas with no drop ceiling and when penetrating fire walls and floor slabs. All wiring in mechanical rooms, elevator equipment rooms, loading dock and garages shall be run in conduit. Only rigid heavy wall conduit, properly sized to New York City Electrical Code requirements, shall be used to provide said mechanical protection, and for all system power (over 75 volts) wiring.
- 2. All penetrations of floor slabs and fire walls shall be fire stopped in accordance with New York City Fire Code.
- 3. Fire alarm system terminal and junction locations shall be identified in accordance with NFPA Standard 70, Section 760-10. Terminal and junction boxes shall be painted red and stenciled in white letters "FIRE ALARM", preventing unintentional interference with the fire alarm system wiring during testing, servicing and additional medications to the system.
- 4. Electrical conduits shall enter only at the sides or bottom of the fire alarm control panel (FACP).
- I. End of line devices (resistors, diodes, capacitors, etc.) shall be furnished as required for mounting as directed by the manufacturer.
- J. Provide fire alarm control panel (FACP), system operating instructions, framed under clear Lexan or glass and mounted adjacent to the FACP.
- K. Provide a reduced copy (8-1/2" x 11") of the fire alarm system riser diagram, framed under clear Lexan or glass and mounted adjacent to the fire alarm control panel (FACP).
- L. The fire alarm control panel (FACP) shall be arranged to receive power from three-wire, 30 Ampere, 120/208 volt, 60 cycle alternating current supply through fused cut-out. All low voltage operation shall be provided from the FACP.
- M. The fire alarm system shall be installed and fully tested under the supervision of a trained manufacturer's technical representative. The manufacturer's technical representative shall provide the following field services:
 - 1. Provide a schedule of addressable device addresses for setting by the Contractor.
 - 2. Program the fire alarm control panel (FACP) central processing unit (CPU).

3. Supervise all final connections between system control equipment and the field peripheral equipment circuit wiring.

3.3 CLEAN UP

A. Upon completion of the installation, all debris created by the installation shall be removed from the premises or disposed of as directed by the City of New York.

3.4 TESTS

- A. Prior to the final acceptance test, the Contractor and a trained manufacturer's technical representative shall test the completed fire alarm system for proper operation. The system shall be demonstrated to perform all of the functions as listed below in 3.04C. Any system, equipment or wiring failures discovered during said test shall be repaired or replaced before requesting scheduling of the final acceptance test.
- B. The fire alarm system shall be tested for final acceptance in the presence of the City of New Commissioner, the New York City Fire Department, Contractor's representative and the Manufacturer's representative.
- C. During the final acceptance test:
 - 1. Every manual fire alarm station shall be tested.
 - 2. Every smoke sensor shall be tested using a calibrated sensitivity test method.
 - 3. Every heat sensor/detector shall be tested using a controllable heat source such as a blower type hair dryer.
 - 4. All other alarm initiating devices/connected panels shall be activated to their alarm state.
 - 5. The sprinkler system waterflow alarm switches shall be tested by flowing water.
 - 6. All other supervised devices/connected panels shall be activated to their off-normal position or state.
 - 7. Every audible alarm signaling device shall be sounded.
 - 8. Every visual alarm signaling device shall be flashed.
 - 9. Every system control function shall be tested for its proper operation.
 - 10. All supervised circuits shall be opened at two (2) locations to test for proper supervision.
- D. Test Reports: Submit reports of manufacturers field testing and final acceptance test by authorities having jurisdiction.
- E. Upon successful completion of all final acceptance tests, the Contractor and Manufacturer shall each author and sign a letter confirming the successful completion of testing. Two (2) copies of each letter shall be forwarded to the City of New York, the Commissioner and the New York City Fire Department.

- F. All final acceptance testing shall be done at a time convenient to the New York City Fire Department and the City of New York's representative and all testing costs shall be borne by the Contractor as part of this work.
- G. All objections noted as a result of the New York City Fire Department inspection shall be corrected and self-certified in accordance with New York City Building and Fire Code requirements by this Contractor.

3.5 INSTRUCTION OF CITY OF NEW YORKS PERSONNEL

A. The Contractor shall provide the services of a trained manufacturer's technical representative for two (2) periods of four (4) hours each, during normal business hours, to instruct the City of New York's designated personnel on the operation and maintenance of the fire alarm system.

3.6 MANUFACTURER'S WARRANTY & CONTRACTOR'S GUARANTEE

- A. The equipment manufacturer shall directly warrant all fire alarm system components, parts and assemblies to be free from inherent mechanical or electrical defects in workmanship for a period of one (1) year from the date of final acceptance by the City of New York and Fire Department. As required, repair service and replacement parts shall be performed and provided during normal working hours, at no cost to the City of New York, for the one (1) year warranty period, unless damage is cause by misuse, abuse or accident.
- B. The Contractor shall guarantee all fire alarm system wiring and raceways to be free from inherent mechanical or electrical defects and against defects in workmanship for a period of one (1) year from the date of final acceptance of the system of the City of New York and Fire Department. As required, repair service and replacement parts shall be performed and provided during normal working hours, at no cost to the City of New York, for the one (1) year guarantee period, unless damage is caused by misuse, abuse or accident.

END OF SECTION

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SECTION 312000

EARTHWORK

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract (City of New York Standard Construction Contract).

1.2 SECTION INCLUDES

- A. Work of this Section includes all plant, labor, tools, hoists, equipment, appliances, materials and services required for the earthwork, in accordance with the specifications and the applicable drawings, including, but not limited to, the following:
 - 1. Excavation as required to accommodate new work.
 - 2. Backfilling and compacting backfill at excavated areas.
 - 3. Protection of excavation.
 - 4. Protection of existing utilities.
 - 5. Protection of adjacent buildings.
 - 6. Excavation for utilties.
 - 7. Miscellaneous dewatering as required.
 - 8. Removal and disposal of excess excavated material.
 - All other items of earthwork and related work as needed to complete the work of this Section.

1.3 SUBMITTALS

- A. Work plan and sequence for cellar slab demolition and reconstruction.
- B. Material Submittals: Drainage stone, filter fabric, vapor barriers and fill soils.

1.4 REFERENCE STANDARDS

- A. The work of this Section shall conform with applicable requirements in the current editions of the following:
 - 1. ASTM D 698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³).

- 2. ASTM D 1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³).
- 3. ASTM D 1556, Test for Density of Soil in Place by Sand Cone Method.
- 4. ASTM D 6913, Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis.
- 5. OSHA General Industry Standards, part 1926, Title 29, Chapter XVII, Subpart P, "Excavations, Trenching and Shoring."

1.5 VERIFYING CONDITIONS

- A. The Contractor, by careful examination, shall inform himself as to the nature and location of the work, the conformation of the ground, the nature of the subsoil conditions, the locations of the ground water table, the character, quality and quantity of the materials to be encountered, the character of the equipment and facilities needed preliminary to and during the prosecution of the work, the general and local conditions and all other matters which can in any way affect the work.
- B. The Contractor shall be held to have visited the site, and to have familiarized himself with the existing conditions, utilities, and the building including reviewing City records that show utility locations.

1.6 PUMPING

A. Pumping: The Contractor shall, during the progress of his work, provide and maintain all required pumps, to keep all excavations, pits, trenches, footings, foundations, free from accumulation of water from any source whatsoever, and also keep the building dry and free of water at all times and under any and all circumstances and contingencies that may arise.

1.7 EXISTING UTILITIES

- A. Protect existing active utilities and services below grade at all times, and notify the public authorities having jurisdiction and/or utility companies immediately of any service damaged or disturbed.
- B. Request information from the Utility Company regarding the disposition of existing active utilities encountered. Remove or cut off the cap inactive or abandoned utilities encountered, whether or not shown, in accordance with directions of authorities or utility companies having jurisdiction.

PART 2 PRODUCTS

2.1 IMPORTED FILL MATERIALS

A. Imported fill material shall consist of clean, well graded sand and/or gravel containing less than fifteen (15) percent by weight of materials passing a No. 200 sieve and a maximum particle size of four (4) inches.

2.2 AGGREGATE SUB-BASE BELOW SLAB ON GRADE

- A. Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, made up of 3/8", 1/2", or 3/4" stone.
- B. Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

- A. General: The Contractor shall furnish all labor, equipment and materials required to prepare site and to excavate all materials of whatever type encountered to the lines and grades shown on the drawings and as specified. The Contractor is required to accept conditions existing at the site; to locate, excavate, remove and dispose of all buried inactive utilities, foundations, debris and all other materials encountered to obtain the finished subgrades and elevations, and in order to complete the construction for the work of this Project; all to be done within the Contract Sum, at no additional cost to the City of New York.
- B. Contractor shall be responsible for the accurate placement of his work in accordance with the location and elevations shown on the drawings.

3.2 EXCAVATION

- A. Excavation work shall be "unclassified" and shall consist of removal and disposal of all materials encountered when establishing required grades, elevations and lines, cost of which shall be included in the Contract.
- B. Contractor shall include in his contract the cost of additional excavation required to obtain acceptable bearing values. Therefore, any additional excavation required is included in the work of this Section at no additional cost to the City of New York.
- C. General Excavation Requirements: Excavations shall conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 feet, and extending a sufficient distance to permit placing and removal of concrete formwork, installation of services and other construction required. Demolition and remove existing cellar slab. Concrete over pour from previous underpinning work amy be encountered when excavating below existing slab, particular in the deeper stair section. Contractor shall be prepared to remove overpour, if needed, using concrete saws and handheld tools.

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- D. Proof roll slab subgrade with walk behind roller. Subgrade material found to be unsuitable by proof roll will be excavated and replaced with approved soil fill compacted to 95% Standard Proctor Maximum Dry Density.
- E. Carry excavations as closely as practicable to the lines of the structure, leaving sufficient work space for other trades. Level off and grade to the elevations and lines required by the drawings.
- F. If excavations are carried below authorized levels beneath slabs on ground, backfill to the required levels with controlled structural fill at no additional cost to the City of New York.
- G. Cut excavations to a neat line, clean and square. Protect excavations against frost, caving-in, and interference of water until concrete is poured and other work below grade is completed.
- H. Excess excavated material, and material unsuitable for use as fill, shall be removed from the site and disposed of legally.
- I. Excavation for Trenches: Dig trenches to the uniform width required for particular item to be installed, sufficiently wide to provide ample working room. Provide six (6) inches to nine (9) inches clearance on both sides of pipe or conduit.
 - Excavate trenches to depth indicated or required. Carry depth of trenches for piping to establish indicated flow lines and invert elevations. Beyond building perimeter, keep bottoms of trenches sufficiently below finish grade to avoid freeze ups.
 - 2. Where rock is encountered, carry excavation six (6) inches below required elevation and backfill with a six (6) inch layer of crushed stone or gravel prior to installation of pipe.
 - 3. For pipes or conduit five (5) inches or less in nominal size and for flat bottomed multiple duct conduit units, do not excavate beyond indicated depths. Hand excavate bottom cut to accurate elevations and support pipe or conduit on undisturbed soil.
 - 4. For pipes or conduit six (6) inches or larger in nominal size, tanks and other mechanical/electrical work indicated to receive subbase, excavate to subbase depth indicated, or if not otherwise indicated, to six (6) inches below bottom of work to be supported.
 - 5. Except as otherwise indicated, excavate for exterior water-bearing piping (water, steam, condensation, drainage) so top of piping is not less than three (3) feet to six (6) feet below finished grade.
 - 6. Grade bottoms of trenches as indicated, notching under pipe bells to provide solid bearing for entire body of pipe.
 - 7. Backfill trenches with concrete where trench excavations pass within eighteen (18) inches of column or wall footings and which are carried below bottom of such

- footings, or which pass under wall footing. Concrete shall conform to the requirements of Section 03300.
- 8. Do not backfill trenches until tests and inspections have been made and backfilling authorized by Commissioner/Engineer. Use care in backfilling to avoid damage or displacement of pipe systems.
- 9. For piping or conduit less than two (2) feet to six (6) inches below surface of roadways, provide four (4) inch thick concrete base slab support. After installation and testing of piping or conduit, provide minimum four (4) inch thick encasements (sides and top) of concrete prior to backfilling or placement of roadway subbase.

3.3 SHEET, SHORING AND BRACING

A. The Contractor shall provide and install adequate temporary shoring, bracing, and other protection as required to maintain excavations in a safe and stable condition. Sides of excavations shall be protected against cave-ins and movement of soil. Underpinning shall be installed as required to prevent disturbance of adjacent structure. Materials and methods shall be adequate and suitable fort the condition involved.

3.4 BACKFILL AND FILL

- General: Place acceptable soil material in layers to required subgrade elevations for each area classification listed below.
 - 1. In excavations, use satisfactory excavated or borrow material.
 - 2. Under grassed areas, use satisfactory excavated or borrow material.
 - 3. Under walks and pavements, use aggregate subbase material.
 - 4. Under steps, use aggregate subbase material.
 - 5. Under building slabs, use aggregate subbase material.
 - 6. Under piping and conduit, use existing subbase material where subbase is indicated under piping or conduit; shape to fit bottom ninety (90) degrees of cylinder.
- B. Backfill excavations as promptly as work permits, but not until completion of the following:
 - 1. Acceptance of construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.
 - 2. Inspection, testing, approval, and recording locations of underground utilities.
 - 3. Removal of concrete formwork after concrete has attained twenty-eight (28) day design strength.
 - 4. Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Cut off temporary sheet piling driven below bottom of structure or utilities, or leave in place if required.

- 5. Removal of trash and debris.
- 6. Permanent or temporary horizontal bracing is in place on horizontally supported walls.
- C. Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow, strip, or break up sloped surfaces steeper than one (1) vertical to four (4) horizontal so that fill material will bond with existing surface.
 - 1. When existing ground surface has a density less than that specified under "Compaction" for particular area classification, break up ground surface, pulverize, moisture condition to optimum moisture content, and compact to required depth and percentage of maximum density.
- D. Placement and Compaction: Place backfill and fill materials in layers not more than eight (8) inches in loose depth for material compacted by heavy compaction equipment, and not more than four (4) inches in loose depth for material compacted by hand operated tampers.
 - 1. Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
 - 2. Place backfill and fill materials evenly adjacent to structures, piping or conduit to required elevations. Take care to prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping or conduit to approximately same elevation in each lift.

3.5 BUILDING SLAB AGGREGATE SUB-BASE COURSE

- A. Placing: Place material on prepared subgrade in layers of uniform thickness, conforming to indicated cross section and thickness. Maintain optimum moisture content for compacting material during placement operations.
- B. When aggregate sub base is shown to be six (6) inches thick or less, place material in a single layer. When shown to be more than six (6) inches thick, place material in equal layers, except no single layer more than six (6) inches or less than three (3) inches in thickness when compacted.

3.6 PROTECTION

- A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
 - 1. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
- B. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.

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C. Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.7 DISPOSAL OF EXCESS AND WASTE MATERIALS

A. Removal from City of New York's Property: Remove waste materials, including unacceptable excavated material, trash and debris, and dispose of it off City of New York's property.

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

30-30 THOMSON AVENUE

LONG ISLAND CITY, NEW YORK 11101-3045

TELEPHONE (718) 391-1000

WEBSITE www.nyc.gov/buildnyc

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

CONTRACT NO. 1

Dated

GENERAL CONSTRUCTION WORK

Staten Island Zoo Aquarium Reconstruction

BOROUGH: CITY OF NEW YOR	614 Broadway Staten Island, NY 10310 K		
Contractor			
Dated			, 20
Entered in the Comp	roller's Office		
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First Assistant Bookk	eeper		
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