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George Latimer, Westchester County Executive

General Requirements and Proposals
Information for Bidders
General and Special Clauses
Technical Specifications

REPLACEMENT OF HVAC SYSTEMS AND ASSOCIATED WORK
BEE-LINE CENTRAL MAINTENANCE FACILITY (DOT-CMF)
YONKERS, NEW YORK

Contract No. 22-524
Bid Opening: December 20, 2023

By Bidder (Please Print)	For Official Use Only
Firm/Business Name: _____	
Address: _____	_____
_____	_____

DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION

Division of Engineering

SPECIAL NOTICE

County of Westchester
New York

ADDENDA TO THE BID DOCUMENTS

Addenda to the Bid Documents will be published on the Empire State Purchasing Group website at (http://www.bidnetdirect.com/new-york) **It is the responsibility of each potential bidder to check the website on a regular basis for further information relative to the bid documents including information relating to any and all addenda** prior to submitting its bid. All Bidders are deemed to have reviewed and considered all addendums in their Bid.

SUBMISSION OF BIDS

Bidders should not submit the entire bid document with its bid submission. Instead, each bidder is required to submit the full set of designated Proposal Pages. The Proposal Pages are denoted by a border and are titled on the bottom as "Proposal Page ___". The Proposal Pages must be accompanied by the "Bid Bond and Consent of Surety" (as set forth in the Proposal Pages) attached to the outside of the sealed bid. A Bid Bond is NOT required for contracts of $100,000 or less. Failure to submit in this manner may cause the bid to be rejected.

The successful bidder will be required to furnish a Performance and Payment Bond.

SPECIAL NOTICE

County of Westchester
New York

MANDATORY PRE-BID SITE INSPECTION

A. Superseding the first paragraph of Article "3. PRE-BID SITE INSPECTION" of the Information for Bidders, Bidders are required to attend a Mandatory Pre-Bid Site Inspection at 10:00 a.m. on Tuesday, December 12, 2023 at a meeting at Central Maintenance Facility, 475 Saw Mill River Road, Yonkers, New York, at which time they will examine the work site under escort by the County's representative.

BIDS FROM CONTRACTORS NOT IN ATTENDANCE AT THIS MEETING, OR THOSE WHO FAIL TO SIGN THE ATTENDANCE SHEET-WILL BE *REJECTED*

B. Bidders shall indicate their interest in the Mandatory Pre-Bid Site Inspection by contacting Vincent Leone, P.E., Department of Public Works and Transportation, Division of Engineering at (914) 995-5107.

C. All other portions of Article "3. PRE-BID SITE INSPECTION" of the Information for Bidders shall remain in full force and effect.

CONTRACT NO. 22-524

SPECIAL NOTICE

County of Westchester
New York

MINORITY PARTICIPATION POLICY

Contractors must comply with the County's Minority Participation Policy, including, but not limited to, the requirement that contractors make a demonstrated good faith effort to utilize Minority Owned Businesses ("MOB") and Women Owned Businesses ("WOB") (see IFB Article 36). To assist contractors in this effort the County has made available a list of MOB and WOB at http://mwbe.westchestergov.com/ Contractors are also encouraged to utilize other sources to identify potential MOB and WOB as subcontractors and suppliers.

All bidders must submit as part of their bid package the Minority/Women Owned Business Enterprise Questionnaire located in the Proposal Page section of the bid documents.

CONTRACT NO. 22-524

SPECIAL NOTICE

County of Westchester
New York

CHANGES IN THE WICKS LAW

Effective July 1, 2008, construction contracts of one million five hundred thousand dollars or less will not require the preparation of separate contracts for plumbing and gas fitting; steam heating, hot water heating, ventilation and air conditioning apparatus; and electric wiring and standard illuminating fixtures and general construction.

Each bidder on a public work contract, where the preparation of separate contracts is not required shall, to the full extent applicable, submit with its bid a separate sealed list that names each Subcontractor that the bidder will use to perform work on the contract and the agreed upon price to be paid to each for (a) plumbing and gas fitting, (b) steam heating, hot water heating, ventilating and air conditioning apparatus and (c) electric wiring and standard illuminating fixtures and (d) general construction. The submission (Proposal Page 6) that contains the agreed upon price shall be acknowledged by both Contractor and Subcontractor. For purposes of this paragraph, the acknowledgment from the Subcontractor may contain the facsimile signature of an officer of the Subcontractor.

After the low bid is announced, the sealed list of subcontractors submitted with the bid shall be opened and the names of such subcontractors shall be announced. Thereafter, any changes of subcontractors or agreed-upon amount to be paid to each shall require the approval of the County upon a showing of legitimate construction need for such change.

The Successful low bidder, before award of the contract, must procure and provide to the County, from each of the above denoted Subcontractors, a Contract Disclosure Statement and the Required Disclosure of Relationships to County forms.

The sealed lists of Subcontractors submitted by unsuccessful bidders shall be destroyed after the contract award.

THIS PROJECT IS NOT SUBJECT TO THE REQUIREMENTS OF THE "WICKS LAW". ACCORDINGLY, EACH BIDDER IS REQUIRED TO SUBMIT SPECIFIC INFORMATION PERTAINING TO ITS PROPOSED SUBCONTRACTORS. PLEASE SEE THE "NOTICE TO CONTRACTORS" THAT FORMS A PART OF THESE BID DOCUMENTS.

SPECIAL NOTICE

County of Westchester
New York

COMPLETION OF GRANT FUNDING FORMS

The bidders are hereby notified that if this project, or any portion thereof, is funded by a grant then the contractor will be responsible to complete all appropriate forms as required by the grant agency in order to complete the application.

PROMPT EXECUTION AND RETURN OF CONTRACT

A. The successful bidder is required to return the completed contract to the County within ten (10) days of receipt of the execution copy of the contract. The contract must be signed, notarized and returned to the County with all insurance certificates, bonds and supporting documentation, including all required Subcontractor information.

B. The County reserves all of its rights, including, but not limited to, proceeding against the bid bond, if the successful bidder fails to submit the complete executed package within the above time frame.

SPECIAL NOTICE

County of Westchester
New York

PROOF OF PAYMENT BY CONTRACTOR TO SUBCONTRACTORS AND MATERIALMEN.

In addition to and without limiting any of the provisions set forth in Section 23 of the Information for Bidders, after the Contractor completes 50% of the work under the contract, the Contractor may be required to supplement each requisition submitted to the County with documentation that establishes that the Contractor has timely and properly paid its subcontractors and materialmen as required by Section 23 of the Information For Bidders. Such documentation may include copies of both sides of cancelled check(s) paid to the order of the subcontractors and materialmen and such other documentation as may be reasonably requested by the Commissioner. If the Contractor fails to submit such documentation, the Commissioner may, in his sole discretion, withhold payment of the requisition until such time as the documentation is properly submitted. Nothing herein is intended or shall be construed to confer upon or give any subcontractor or materialman, or its successors and assigns, any third party beneficiary rights, remedies or basis for reliance upon, under or by reason of the contract or this Special Notice provision.

SPECIAL NOTICE

County of Westchester
New York

PREVAILING WAGE

All public works contracts are subject to the payment of the prevailing wage and supplements as set forth by the laws of the State of New York, including, but not limited to, Articles 8 and 9 of the New York Labor Law (the "Prevailing Wage Laws"). Westchester County has an active Prevailing Wage Enforcement Officer who enforces the Prevailing Wage Laws within the County for public works contracts, including reviewing certified payroll records, visiting job sites, interviewing the employer and employees (See IFB Article 12) and, if necessary, requesting copies of cancelled checks.

Any Contractor who fails to comply with the Prevailing Wage Laws, including, but not limited to, failing to pay the prevailing wage rates and supplements, failing to submit certified payroll records to the County or failing to post the prevailing wage rates and supplements at the work site, will be subject to enforcement as provided for in the Contract and laws of the State of New York through the Westchester County District Attorney's office, the Commissioner of the New York State Department of Labor, the County and/or the employee who suffered the underpayment. This enforcement could include, but is not limited to, criminal penalties, civil penalties, debarment from future bid awards, the withholding of payment under the Contract to satisfy the unpaid wages and supplements, including interest and civil penalty. In addition, such a failure shall constitute grounds for cancellation of the Contract (IFB 8(C)). Moreover, a prime contractor is responsible for its subcontractor's failure to comply with, or evasion of, the provisions of the Prevailing Wage Laws.

SPECIAL NOTICE

County of Westchester
New York

PROJECT LABOR AGREEMENT (PLA)

A. The County of Westchester has determined that a Project Labor Agreement will be used on this Project. The successful bidder will be required as a condition of this Contract to execute the PLA with the Building and Construction Trades Council of Westchester and Putnam Counties, New York, AFL-CIO ("Council"). The PLA will be substantially in the same form as the PLA included in this contract specification book. Bidders are urged to familiarize themselves with the terms and conditions of the PLA.

B. It should be noted that Schedule A of the PLA contains a list of the local unions affiliated with the Council. Copies of the applicable Collective Bargaining Agreements of the local unions can be obtained by writing to the Building and Construction Trades Council of Westchester and Putnam Counties, New York, AFL-CIO at 258 Saw Mill River Road, Elmsford, New York 10523, Attn.: Carol A. Boccardi.

NOTICE TO CONTRACTORS

County of Westchester
New York

Sealed proposals for the following construction work:

CONTRACT NO: 22-524

ADVERTISING: December 1, 2023
MANDATORY PRE-BID INSPECTION: December 12, 2023

REPLACEMENT OF HVAC SYSTEMS AND ASSOCIATED WORK
BEE-LINE CENTRAL MAINTENANCE FACILITY (DOT-CMF)
YONKERS, NEW YORK

will be received by the Board of Acquisition and Contract in Room 528, Michaelian Office Building, 148 Martine Ave., White Plains, New York until 11:00 a.m., **Wednesday, December 20, 2023**, and immediately thereafter and in accordance with Executive Order 202-11 issued by Governor Cuomo on March 27, 2020, the bids will be opened and recorded in a proceeding that is accessible to the public via the livestreaming service WebEx. For additional bidding information or questions call (914) 995-2274.

Instructions for livestreaming via WebEx. Attendees may join by computer browser at https://westchestergov.webex.com/meet/bac-bidopening or by phone 1-415-655-0001 US Toll or 1-844-621-3956 US Toll Free. The Access Code is 614 981 028.

The Bid Documents (General Requirements, Information for Bidders, Technical Specifications, etc. with Authorized Proposal Pages) **MUST BE OBTAINED from the Empire State Purchasing Group website at the following web address:** http://www.bidnetdirect.com/new-york.
There is no cost to the bidder for this service. Bid documents will be available after 1:00 p.m. on the advertising date.

PLEASE TAKE NOTICE: IN ORDER TO SUBMIT A BID, BIDDERS MUST REGISTER AND DOWNLOAD THE BID DOCUMENTS FROM THE EMPIRE STATE PURCHASING GROUP WEBSITE AND MUST REGISTER USING THE NAME OF THE PERSON OR BUSINESS ENTITY THAT WILL BE SUBMITTING THE BID. IN ORDER TO ENSURE THAT COUNTY BID DOCUMENTS HAVE NOT BEEN ALTERED IN ANY WAY, THE COUNTY WILL NOT ACCEPT BIDS FROM PERSONS OR BUSINESS ENTITIES THAT HAVE NOT FOLLOWED THIS REQUIREMENT.

The Bid Documents include Contract Drawings which **MAY BE OBTAINED at no cost on the Empire State Purchasing Group website at the following web address:** http://www.bidnetdirect.com/new-york, after 1:00 p.m. on the advertising date.

If the bidder is unable to utilize the electronic version of the Contract Drawings that are available on the Empire State Purchasing Group Website, the bidder may purchase copies of the Contract Drawings. Contract Drawings may be obtained from the Office of the Board of Acquisition and Contract at the above address after 1:00 p.m. on the advertising date and between the hours of 9:00 a.m. to 4:00 p.m. Monday thru Friday. Copies of the Contract Drawings shall be made available upon payment of a personal check, company check or money order made payable to the County of Westchester, in the amount of $**100.00** per set. For bidders, the deposit for each set of drawings will be refunded in full if returned in good condition within thirty days after award or rejection of bids. For non-bidders, only fifty percent of the deposit will be refunded. No refunds will be made to the successful bidder.

Each bidder is required to submit the full set of authorized Proposal Pages and all bids over **$100,000** must also be accompanied by the "Bid Bond and Consent of Surety" (as set forth in the Proposal Pages) attached to the outside of the sealed bid. Failure to submit in this manner may cause the bid to be rejected. **The successful bidder, no matter the amount of its bid, will be required to furnish a Performance and Payment Bond with its signed contract.**

To the full extent applicable, each bidder shall submit with its bid a separate sealed list that names each Subcontractor that the bidder will use to perform work on the contract and the agreed upon price to be paid to each for: (a) plumbing and gas fitting, (b) steam heating, hot water heating, ventilating and air conditioning apparatus and (c) electric wiring and standard illuminating fixtures and (d) general construction. The submission (Proposal Page 41) that contains the agreed upon price shall be acknowledged by both Contractor and Subcontractor. For purposes of this paragraph, the acknowledgment from the Subcontractor may contain the facsimile signature of an officer of the Subcontractor.

The Successful low bidder, before award of the contract, must obtain and provide to the County, from each of the above denoted Subcontractors, fully completed and signed Contract Disclosure Statement (Proposal Pages 24-32) and Required Disclosure of Relationships to County (Proposal Pages 33) forms.

The sealed lists of Subcontractors submitted by unsuccessful bidders shall be destroyed, unless you request that it be returned by checking the applicable box on Proposal Page 5.

The County of Westchester reserves the right to waive any informalities in the bids, or to reject any or all bids. No bidder may withdraw its bid within forty-five (45) days after the date of the bid opening.

Pursuant to Chapter 308 of the Laws of the County of Westchester, it is the goal of the County to use its best efforts to encourage, promote, and increase the participation of business enterprises owned and controlled by persons of color or women - Minority Business Enterprise (MBE) and Women Business Enterprise (WBE).

REMINDER: All required licenses should be submitted with the Bid.

COUNTY OF WESTCHESTER, NEW YORK
DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION

BY: Hugh J. Greechan, Jr., P.E., Commissioner

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CONTRACT NO. 22-524

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1. GENERAL REQUIREMENTS AND PROPOSALS

DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION

Division of Engineering

1. DESCRIPTION OF THE WORK

Work under this Contract includes all necessary labor, materials and equipment required to:

1. Replacement of 5 Ton Mezzanine indoor unit (AC-2). Provide structural, ductwork and electrical modifications as required.
2. Replacement of 4 Ton Computer Room Unit (AC-5).
3. Replacement of 3 Ton Money Room Unit (AC-6).
4. Replacement of 3 Ton Farebox Room Unit (AC-7).
5. Replacement of 3 Ton Cleaners Lounge Unit (AC-8).
6. Furnish and install new 4 Ton split system unit for security server room.
7. Rigging for removal and new installation.
8. All required architectural, structural, controls, plumbing and electrical work.

It is not intended that this description of work mention each particular item required, but that it give information concerning the general scope and areas of work for the convenience of the bidders.

THIS PROJECT IS NOT SUBJECT TO THE REQUIREMENTS OF THE "WICKS LAW". ACCORDINGLY, EACH BIDDER IS REQUIRED TO SUBMIT SPECIFIC INFORMATION PERTAINING TO ITS PROPOSED SUBCONTRACTORS. PLEASE SEE THE "NOTICE TO CONTRACTORS" THAT FORMS A PART OF THESE BID DOCUMENTS.

2. SUBCONTRACTING & DIRECT EMPLOYMENT OF LABOR

The Contractor shall not subcontract more than ninety (90%) percent of its bid. The Contractor must directly employ at least ten (10%) percent of the personnel working on this contract as measured in man-days worked.

"Directly employ" shall be construed to include only workers employed and paid directly by the Contractor, usually for wages or salary.

The Contractor expressly acknowledges that any violation of this provision constitutes a default under this contract.

3. REQUIRED TIME FOR COMPLETION OF THE WORK

Notification to commence the work will require the mandatory submission of all the executed contracts and the Certificates of Insurance after receipt of authority to award.

The Contractor shall commence the work embraced in this contract within ten (10) days of the service of Notice by the County to do so and shall complete the said work within (180) consecutive calendar days computed from the date of such Notice to commence.

4. SECURITY REGULATIONS

Security Regulations For all County Facilities except County Correctional Facilities:

A. Contractor's attention is called to the fact that this work is to be performed on property which is the responsibility of the County; therefore, all personnel associated with this contract are subject to special conditions affecting security and control of the facilities operations. Every person required to enter the work site will be issued an ID card and be required to fill out appropriate applications. **There is a $30.00 processing fee for each lost ID card**; remitted by check made payable to the County of Westchester. All ID processing will be scheduled by the Construction Administrator.

B. The Contractor/Subcontractor shall issue a copy of the security regulations (Paragraph C) to all personnel engaged on this project.

C. All Contractor/Subcontractor personnel shall be bound by the following security regulations for the duration of this contract.

1) All personnel must conspicuously display the ID card and identify themselves upon request.

2) If an ID card is misplaced or lost, report this immediately to the Inspector.

3) All Contractor/Subcontractor personnel are responsible for all tools and equipment and you must report any loss immediately to the Construction Administrator.

4) All personnel must observe all orders of the Owner.

5) All personnel are to report any unusual incidents or problems to the Construction Administrator immediately.

6) All personnel shall not possess or consume any alcoholic beverage or illegal drug or medication while on the property, or report to work under the influence of alcohol or drugs.

7) Any vehicle left on the property must be locked and the ignition keys must be removed. Vehicles will not be left overnight without prior approval.

8) All personnel shall not enter any other areas of the premises (except the areas agreed to) without prior approval of the Construction Administrator.

Security Regulations For County Correctional Facilities:

A. Contractor's attention is called to the fact that this work is to be performed on property adjacent and/or within the County's Correctional Facilities; therefore, all personnel associated with this project are subject to special conditions affecting security and control of the Correctional Facility Operations. Every person required to enter the work site will be fingerprinted, processed for a photo ID card and be required to fill out appropriate applications. **There is a $100.00 processing fee for each person**, checks made payable to the Commissioner of Finance. All ID processing will be scheduled by the Construction Administrator.

B. All Contractors and Subcontractors shall issue a copy of the security regulations (Paragraph C) to all personnel to be engaged on this project.

C. All Contractor's and Subcontractor's personnel shall be bound by the following security regulations for the duration of this project.

1) All personnel entering the Penitentiary, Jail or Women's Unit must stop and identify themselves to the Control or Desk Officer who will issue the appropriate pass after ascertaining that they have been cleared to enter the facility. Only workers with valid ID will be permitted entry. **NO HELPERS**.

2) All personnel must sign in the Visitor's Book, to include the following information: **PERSON'S NAME, COMPANY NAME, REASON FOR ENTRY, WORK LOCATION IN BUILDING**.

3) All personnel must conspicuously display the ID card and identify themselves upon request.

4) If ID card is misplaced or lost, report this loss immediately to the Shift Captain or Associate Warden.

5) All tradesmen will be required to perform a tool inventory inspection of all tools in their possession to demonstrate to the admitting Correction Officer that the typed inventory list matches the tools each time they enter and leave the building. The tradesmen are responsible for keeping all tools and equipment locked when not in immediate use and they must report any loss of tools or equipment immediately to the Shift Captain or Associate Warden.

6) All tradesmen and helpers shall carry all tools in a locked and secured tool box or tool cart. A typed inventory sheet shall be carried with the tool box/cart listing all hand and power tools. A manufacturer’s MSD Sheet shall be carried with the tool box/cart for any chemical compound that the tradesman has in his/her possession.

7) All debris (i.e. packaging, demolition, etc) shall be removed from the worksite at the end of each workday.

8) All personnel are subject to search at all times.

9) All personnel must observe all orders of Correctional Staff.

10) All personnel are to report any unusual incidents or problems to a Correction Officer, Shift Captain or the Associate Warden immediately.

11) All personnel shall not possess or consume any alcoholic beverage or illegal drug or medication while on County property, or report to work under the influence of alcohol or drugs.

12) Any vehicle left on County property must be locked and the ignition keys must be removed. Vehicles will not be left over-night on County property without prior approval.

13) All personnel shall not enter any other areas of the prison (except the areas agreed to) without prior approval of the Shift Captain or the Associate Warden.

14) All personnel shall not bring anything in for any inmate/detainee or staff member or take out anything for any inmate/detainee or staff member.

15) All personnel shall not engage in any unnecessary conversations with any inmate/detainee.

16) Weapons, i.e., guns, knives, blackjacks, to include any tool activated by gunpowder or other explosive charge is prohibited in the building (i.e., stud gun). Violators of this rule are subject to arrest.

17) All personnel must sign out when leaving and must return the ID card to the Control/Desk Officer before leaving.

18) Failure of the contractor to follow these procedures will result in the contractor being denied access to the facility.

5. PAYMENT FOR BONDS AND INSURANCE

The amount bid for contract bonds and insurance shall not exceed 3%of the total contract price excluding the bid price for Miscellaneous Additional Work (Item W800) and Field Testing Equipment (W851), where applicable. Should the bidder exceed the foregoing three percent (3%), the Department will make the necessary adjustment to determine the total amount bid based on the arithmetically correct proposal.

The amount bid shall be payable with the first contract payment.

GENERAL REQUIREMENTS

CONTRACT DRAWINGS:

CONTRACT NUMBER 22-524

The Design Drawings, as listed on the Contract Drawing Index, herewith made a part of these Specifications, shows in general and/or in detail the work to be done under this Contract and/or the various Contracts forming the entire work for the Project, as described herein.

After sending the executed contract to the County and prior to the first job meeting, the Contractor is responsible for obtaining from Public Works, Division of Engineering, Michaelian Office Building, White Plains, a maximum of five gratis copies of the Contract Drawings and Specifications; for the Contractor's permanent possession. Additional sets, requested by the Contractor, beyond the permitted number and time limit, will be furnished by Public Works; but at the Contractor's expense.

DRAWING NO.	TITLE	SHEET NO.
61-10-T-405-0	TITLE SHEET	T-1
61-10-A-406-0	ROOF PENETRATION DETAILS	A-1
61-10-A-407-0	PART. REFL. CEILING PLANS AND DETAILS	A-2
61-10-S-408-0	DUNNAGE LOCATION PLAN & STRUCTURE DETAILS	S-1
61-10-S-409-0	UNIT DUNNAGE FRAMING PLANS AND SECTIONS	S-2
61-10-P-410-0	PLUMBING NOTES, DETAILS, AND LEGEND	P-1
61-10-P-411-0	NEW WORK PART PLANS	P-2
61-10-HV-412-0	HVAC NOTES, DETAILS, AND LEGEND	HV-1
61-10-HV-413-0	OFFICE AREA PLANS: 1ST FLOOR, MEZZANINE AND 2ND FLOOR	HV-2
61-10-HV-414-0	COMPUTER ROOM AND CLEANER'S LOUNGE PLANS	HV-3
61-10-HV-415-0	RADIO EQUIPMENT AND SERVER ROOM PLANS	HV-4
61-10-HV-416-0	DETAILS 1	HV-5
61-10-HV-417-0	DETAILS 2	HV-6
61-10-HV-418-0	SCHEDULES	HV-7
61-10-HV-419-0	CONTROL SYSTEM ARCHITECTURE AND NOTES	HV-8
61-10-HV-420-0	CONTROL PLAN	HV-9
61-10-E-421-0	LOCATION OF HVAC WORK	E-1
61-10-E-422-0	1ST FLOOR OFFICES AND 2ND FLOOR AC-2 & AC-5 PART PLANS	E-2
61-10-E-423-0	CLEANER'S LOUNGE, SERVER ROOM AND ROOF PLANS	E-3
61-10-E-424-0	PANEL SCHEDULE	E-4
61-10-E-425-0	DETAILS AND ELEVATIONS	E-5

Submit all proposal pages in this section, including all executed and unexecuted pages and fasten with a clip at the upper left hand corner.

Westchester gov.com

George Latimer, Westchester County Executive

PROPOSAL PAGES

REPLACEMENT OF HVAC SYSTEMS AND ASSOCIATED WORK BEE-LINE CENTRAL MAINTENANCE FACILITY (DOT-CMF) YONKERS, NEW YORK

Contract No. 22-524
Bid Opening: December 20, 2023

By Bidder (Please Print)	**For Official Use Only**
Firm/Business Name: _____	
Address: _____	_____
_____	_____

DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION

Division of Engineering

PROPOSAL REQUIREMENTS

BIDDER'S IDENTIFICATION

CONTRACT NO._____

To the Commissioner of Public Works, Westchester County, New York, acting for the party of the first part.

Proposal made by _____
as party of the second part.

Whose business address is _____

_____

_____

Whose telephone number is _____

Whose E-mail address is _____

Whose Federal ID number is _____

Is bidder an individual,
a partnership or a corporation? _____

If a partnership or corporation,
give the names of all partners
or officers with their titles _____

_____

_____

_____

_____

If operating under a trade name or as partners, has the required Certificate been filed with a County Clerk in accordance with the General Business Law, Section 130?

Yes....[ ] No....[ ] N.A….[ ]

If the answer is NO, Certificate must be filed before the contract can be executed.

NOTE: the bid must be submitted using the Contractor's legal name, not just the "doing business as" (i.e. DBA) name.

COMPLETE THIS FORM USING BLACK INK ONLY

PROPOSAL REQUIREMENTS

1. The undersigned, the bidder, does hereby declare that it has carefully read the contract specifications and has carefully studied the relevant plans, profiles and other drawings (as defined in Article "Contract Drawings" of the General Requirements) relating to the contract work, and has inspected the site(s) of the work..

2. The undersigned does hereby declare that it is the only one interested in its indicated bid; that the bid is in all respects without fraud or reservations; and that no official of the County or of the participating municipalities (if any), or any person in the employ of the County of participating municipalities (if any) is directly interested in the contract bid or in the supplies, equipment or works to which it relates, or in any part of the profits resulting there-from.

3. The undersigned does hereby offer and agree to furnish all materials, to fully and faithfully construct, perform and execute all work under the contract in accordance with the plans, profiles, other drawings and specifications relating thereto, and to furnish all labor, tools, implements, machinery, forms, transportation and materials necessary and proper for said purpose at the following indicated lump sum price for the total work and/or the following indicated unit prices for the various items of the work.

4. The undersigned does hereby declare that the indicated price(s) cover all expenses of every kind incidental to the completion of the contract work, including all claims affecting the work, labor and materials, which may arise through any cause whatsoever, excepting as provided for in Article "Disputed Work-Notice Of Claims For Damages: of the General Clauses.

5. The undersigned hereby agrees that in the event that the quantities of contract work actually performed by the undersigned are less than the approximate quantities indicated in the specifications it will make no claim(s) for loss of anticipated profits.

6. The undersigned does hereby agree that it will execute a contract containing all the terms, conditions, provisions and covenants necessary to complete the work according to the appropriate plans and specifications, within ten working days after receipt by the undersigned of the contract from the County, and that if it fails to execute said contract within said period of time the County may rescind the contract award and may retain as liquidated damages and not as a penalty, any amounts submitted as the bid security accompanying the undersigned's proposal, and/or demand from the Bidder's Surety Company that executed the required Bid Bond and Consent of Surety to pay to the County the difference between the amount bid and the amount for which such contract is thereafter awarded, together with the cost to the County of reletting said contract up to the maximum aggregate amount of 25% of the amount bid.

7. The undersigned does hereby agree to commence the work encompassed under the contract within ten days after notification in writing from the Commissioner of Public Works or his authorized designee, unless a definite earlier or later start has been specified, and will complete the work fully and in every respect on or before the specified completion date; and further agrees that the County has the right to employ such combination of labor, equipment

and materials as may be required for the proper completion of the contract work and to deduct all costs from such monies as may be due the undersigned, in the event the contract work is not completed by the specified completion date.

8. The undersigned does hereby agree to comply with all relevant provisions of the Labor Laws of the State of New York, and agrees to adhere to the provisions relating to the eight-hour day and five-day week, the payments of minimum rates for labor, and the latest laws relative to payments for wages for labor on public contracts.

9. The undersigned does hereby agree to insure all persons connected with the contract work against accident, at its own expense, as prescribed by the Workmen's Compensation Law of the State of New York; and that it will be responsible for payments by itself, its subcontractors and vendors of all taxes applicable to the work, and all other payments as may be required by various laws and rules and regulations of the Federal Government, the State of New York and its political subdivisions and agencies, such payments including but not limited to the following:

   A. Federal Social Security Taxes on employees' wages.

   B. Applicable Federal Excise Taxes.

   C. New York State Unemployment Insurance and Disability Payments, based on employees' wages.

10. The undersigned does hereby agree to accept their indicated lump sum price for the total work and/or their indicated unit prices for the various items of the work as the sole basis in the determination of the value of addition to, or deletions from the specified scope of the contract work.

11. ADDENDUM RECEIPT - CONTRACT NO._____

    (The undersigned shall fill in contract number above, and the required information below.)

    The undersigned does hereby acknowledge receipt of the below listed addenda to the contract specifications:

    Addendum No._____ Dated_____

    Addendum No._____ Dated_____

    Addendum No._____ Dated_____

    Addendum No._____ Dated_____

    Addendum No._____ Dated_____

COMPLETE THIS FORM USING BLACK ONLY

PROPOSAL REQUIREMENTS

12. Bidders should not submit the entire Bid document with its bid submission. Instead, Bidders must submit ALL of the Proposal Pages. Proposal Pages are denoted by a border and are titled on the bottom as "Proposal Page __".

    Be sure that, where required, the forms have been completed and signed by a notary public.

    Proposal Page 12 must be completed by a surety company and submitted with the bid if a Performance and Payment Bond is required in accordance with the "Notice to Contractors".

13. NON-COLLUSIVE BIDDING CERTIFICATION

Made pursuant to Section 103-d of the General Municipal Law of the State of New York as amended by the Laws of 1966.

A. 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 his 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 which have been 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.

B. A bid shall not be considered for award nor shall any award be made where a. (1), (2) and (3), above, have not been complied with; provided however, that if any case the bidder cannot make the foregoing certification, the bidder shall so state and shall furnish with the bid a signed statement which sets forth in detail the reasons therefore. Where a. (1), (2) and (3), above, have not been complied with, the bid shall not be considered for award nor shall any award be made unless the head of the purchasing unit of the political subdivision, public department, agency or official thereof to which the bid is made, or his designee, determines that such disclosure was not added for the purpose of restricting competition."

14. The undersigned and each person signing in behalf of the undersigned hereby executes the foregoing Affirmative Action Questionnaire, Proposal, Addendum Receipt and Non-Collusive Bidding Certification.

15. The undersigned and each person signing on behalf of the undersigned hereby certifies that

the person, firm or corporation submitting this proposal as the bidder has not been found guilty of a willful violation of the New York State Labor Law for failure to pay prevailing wages and supplements, as those terms are defined by the New York State Labor Law, within the twelve (12) months immediately preceding the submission of this bid.

16. The undersigned, by submitting the Proposal Pages, acknowledges that it has read the complete bid package including any and all addenda thereto and its bid includes all of the terms and conditions set forth in the bid documents, including, but not limited to, the Notice to Contractors, General Requirements and Proposals, Contract plans/drawings (if any), Proposal Forms, Information for Bidders, General Clauses, Sample Forms and Attachments, Sample Contract and Bond, Schedule of Hourly Rates and Supplements, Technical Specifications, any Special Notices and all applicable laws, rules and regulations. The undersigned further acknowledges that by submitting this bid the above denoted items are incorporated by reference and constitute an integral part of its bid.

17. The undersigned agrees that, if it is not the Successful bidder, the Sealed List of Subcontractors submitted with its bid can be destroyed by the County. **Please check the following box if you want the Sealed List of Subcontractors returned to you.** ☐

Dated_____, 20___

_____
Legal Name of Person, Firm or Corporation

(Seal of Corporation)

_____

_____
Business Address of Person, Firm or Corporation

By_____ _____
Signature Title

COMPLETE THIS FORM USING BLACK INK ONLY

CONTRACT NO. 22-524

ITEMIZED PROPOSAL

ITEM NO.	DESCRIPTION	AMOUNT BID	
		DOLLARS	CENTS
A	For providing all labor, material and equipment necessary to complete all work as shown on the contract drawings and in accordance with the specifications for the Replacement of HVAC Systems and Associated work at Bee-Line Central Maintenance Facility (DOT-CMF), Yonkers, New York.	$	
B	Contract Bonds and Insurance (Must not exceed 3.00% of Subtotal shown above)	$	
W800	Necessary for Miscellaneous Additional Work per Article "Miscellaneous Additional Work (Item W-800)" of Information for Bidders, as directed	$ 150,000	00
		DOLLARS	CENTS
	GROSS SUM OF TOTAL BID	$	

CONTRACTOR: _____

ADDRESS: _____

_____

BY: _____

Signature/Title

CONTRACTOR'S ACKNOWLEDGMENT

(If Corporate)

STATE OF NEW YORK)
COUNTY OF WESTCHESTER) ss.:

On this _____ day of _____, 20___, before me personally came _____ _____to me known and known to me to be the_____ _____of_____the corporation described in and which executed the within instrument, who being by me duly sworn did depose and say that he the said_ _____resides at_____ _____and that he is_____of said corporation and knows the corporate seal of the said corporation; that the seal affixed to the within instrument is such corporate seal and that it was so affixed by order of the Board of Directors of said corporation, and that he signed his name thereto by like order.

_____
Notary Public

CONTRACTOR'S ACKNOWLEDGMENT

(If Individual)

STATE OF NEW YORK)
COUNTY OF WESTCHESTER) ss.:

On this _____day of _____, 20___, before me personally came _____ _____to me known, and known to me to be the same person described in and who executed the within instrument and he duly acknowledged to me that he executed the same for the purpose herein mentioned and, if operating under the trade name, that the certificate required by the New York State General Business Law Section 130 has been filed with the County Clerk of Westchester County.

_____
Notary Public

CONTRACTOR'S ACKNOWLEDGMENT

(If Co-Partnership)

STATE OF NEW YORK)
COUNTY OF WESTCHESTER) ss.:

On this _____day of _____, 20___, before me personally came _____ _____ to me known, and known to me to be a member of the firm of _____ and the person described in, and who executed the within instrument in behalf of said firm, and he acknowledged to me that he executed the same in behalf of, and as the act of said firm for the purposes herein mentioned and that the certificate required by the New York State General Business Law Section 130 has been filed with the County Clerk of Westchester County.

_____
Notary Public

COMPLETE THIS FORM USING BLACK INK ONLY

CONTRACTOR'S ACKNOWLEDGMENT

(If Corporation/Sole Officer)

STATE OF NEW YORK)
) ss.:
COUNTY OF)

On this _____ day of _____, 20__, before me

personally came _____ to me known and
(Name)

known to me to be the _____
(Title)

of _____, the corporation described in and which
(Name of Corporation)

executed the within instrument, who being by me duly sworn did depose and say that he/she,

resides at _____

and that he/she signed the within instrument, on behalf of said corporation, in his/her capacity

as the _____ and sole officer and director of said corporation
(Title)

and that he/she owns all the issued and outstanding capital stock of said corporation.

_____
Notary Public

COMPLETE THIS FORM USING BLACK INK ONLY

LIMITED LIABILITY COMPANY ACKNOWLEDGMENT

STATE OF NEW YORK)
) ss.:
COUNTY OF)

On this _____ day of _____, 20__, before me

personally came _____ to me known to be the individual
(Name of individual who signed agreement)

who executed the foregoing instrument, and who, being duly sworn by me, did depose and say that

(s)he is (the)(a) _____ of_____,
(member)(manager) *(name of limited liability company)*

a _____ limited liability company, and that (s)he has authority
(name of state)

to sign the same, and acknowledged that (s)he executed the same as the act and deed of said limited liability company.

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

_____
Notary Public

My Commission Expires on: _____

COMPLETE THIS FORM USING BLACK INK ONLY

CERTIFICATE OF AUTHORITY

I, _____

(*Officer other than officer executing proposed documents*)

certify that I am _____ of the

(*Title*)

_____

(*Name of Contractor*)

(the "Contractor"), a corporation duly organized and in good standing under the

_____

(*Law under which organized, e.g., the New York Business Corporation Law*)

named in the foregoing agreement; that _____

(*Person executing proposal documents*)

who signed said agreement on behalf of the Contractor was, at the time of execution the

_____ of the Contractor; that said agreement was

(*Title of such person*)

duly signed for and in behalf of said Contractor by authority of its Board of Directors, thereunto duly organized, and that such authority is in full force and effect at the date hereof.

_____

(*Signature*)

(SEAL)

STATE OF NEW YORK)
) ss.:
COUNTY OF)

On this _____ day of, _____, 20___, before me personally came _____ to me known, and known to me to be the _____ of _____, the Corporation described in and which executed the above certificate, who being by me duly sworn did depose and say that he, the said _____ resides at _____ and that he is _____ _____ of said Corporation and knows the Corporate Seal of the said Corporation; that the seal affixed to the above certificate is such Corporate Seal and that it was so affixed by order of the Board of Directors of said Corporation, and that he signed his name thereto by like order.

_____

Notary Public

COMPLETE THIS FORM IN BLACK INK ONLY

CERTIFICATE OF AUTHORITY-LIMITED LIABILITY COMPANY

I, _____,
(member or manager other than person executing the agreement)

certify that I am a _____ of _____
(member/manager) *(Name of Limited Liability Company)*

(the "LLC") duly organized under the Laws of the State of _____; that
(Name of State)

_____who signed said agreement on behalf of the LLC.
(Person Executing Agreement)

was, at the time of execution, a manager of the LLC; that said Contract was duly signed for and on behalf of said LLC and as the act of said LLC for the purposes herein mentioned.

_____
(Signature)

STATE OF NEW YORK)
ss.:
COUNTY OF _____)

On this _____ day of _____, 20___, before me personally came _____, to me known, and known to me to be the _____
(name of member/manager) *(member/manager)*
described in and who executed the above certificate, who being be me duly sworn did depose and say that he resides at _____, and he is a (member/manager) of said LLC; that he is duly authorized to execute said certificate on behalf of said LLC, and that he signed his name thereto pursuant to such authority.

_____
Notary Public *County*

My Commission Expires on:_____

COMPLETE THIS FORM USING BLACK INK ONLY

Required for all Bids over $100,000 where a Performance & Payment Bond is Required in accordance with the "Notice to Contractors"

CONTRACT NO. _____

BID BOND AND CONSENT OF SURETY

KNOW ALL PERSONS BY THESE PRESENTS, That _____
(Name of Contractor)

_____
(Address)

(hereinafter called the "Principal") and the _____ a corporation created and existing under the laws of the State of _____, having its principal office at_____ (hereinafter called the "Surety"),
(PRINT FULL ADDRESS OF SURETY)

are held and firmly bound unto the County of Westchester (hereinafter called the "Obligee"), in the full just sum of *Twenty-Five (25%) Percent of the Attached Bid*, good and lawful money of the United States of America, for the payment of which said sum of money, well and truly to be made and done, the said Principal binds themselves (himself/herself, itself), their (his/her, its) heirs, executors and administrators, successors and assigns, and the said Surety binds itself, its successors and assigns jointly and severally, firmly by these presents:

WHEREAS, the said Principal has submitted to the County of Westchester, New York, a proposal/bid for Contract Number: _____
Project Title: _____
_____ and

WHEREAS, under the terms of the Laws of the State of New York as above indicated, the said Principal has filed or intends to file this bond to guarantee that the Principal will execute all required contract documents, furnish all required insurance and furnish such Performance and Payment Bonds or other bonds as may be required in accordance with the terms of the Principal's said proposal/bid.

NOW, THEREFORE, the Surety agrees:

(i) if the Contract for which the preceding estimate and proposal is made, is awarded to the Bidder by the County, the Surety shall become bound as Surety and guarantor for the faithful performance of the Contract and shall execute and deliver a Performance & Payment Bond, in a form acceptable to the County, in the amount of 100% of the total Contract price, or such other amount as may be specified in the Bid documents, and shall execute the Contract as party of the third part when required to do so by the Board of Acquisition and Contract of the County; and

(ii) if the Bidder shall, upon award of the Contract to the Bidder, fail or refuse to execute the Contract and furnish the necessary bonds and insurance certificates, the Surety shall, on demand by the County, pay to the County the difference between the amount bid and the amount for which such contract is thereafter awarded, together with the cost to the County of reletting said Contract, up to the maximum aggregate amount of this bond.

(iii) the condition of the foregoing obligation is such, that if the said Principal shall promptly execute and submit, and the County shall accept, all required contract documents including insurance and such Performance and Payment Bond or other bonds, all as may be required in accordance with the terms of the Principal's said bid/proposal, then this obligation shall be null and void, otherwise to remain in full force and virtue.

The Surety, for value received, the receipt of which is hereby acknowledged by the Surety, hereby stipulates and agrees that the obligation of the Surety and of its bond shall remain absolute and shall be in no way impaired, affected or discharged by an extension of time, mutually agreed to by the County and the Bidder, within which the County may award said Contract, and the Surety hereby waives notice of any such extension.

IN TESTIMONY WHEREOF, the said Principal has hereunto set his/her (their, its) hand and the said Surety has caused this instrument to be signed by its duly authorized officer this_____ day of _____ 200__.

Signed and delivered this ____ day of _____ 20____ in the presence of:

_____
(Print Name of Contractor)

_____ Principal
(Signature)

_____
(Title of Authorized Officer)

_____
(Print Name of Surety)

By _____ Surety
(Signature)

_____
(Title of Authorized Officer)

(The Surety Company shall append a single copy of a statement of its financial condition, a copy of the resolution authorizing the execution of Bonds by officers of the Surety Company, Power of Attorney, Surety Acknowledgment.)

AFFIRMATIVE ACTION PROGRAM REQUIREMENT

Affirmative Action Program

An approved Affirmative Action Plan shall be required in all contracts for public work where the awarded contract amount exceeds $50,000 or more than fourteen (14) persons are employed by the Contractor and/or his subcontractors.

Does the Contractor participate in an approved Affirmative Action Program? Yes [ ] No [ ]

If Yes, give name of Program: _____

_____

If No, how many employees (total) does the Contractor employ. Please also include in your count the number of employees the Contractor and its Subcontractors expect to use on this project: _____

An approved Affirmative Action Program shall mean a plan approved or adopted by Westchester County including but not limited to, the Home-Town Plan, the Recruitment Training Program or any other program approved or meeting the requirements of the State or Federal government.

The "Monthly Employment Utilization Report" of the Sample Forms, shall be filled out by the Contractor and/or Subcontractor(s) who are required to have an Affirmative Action Program, prior to the start of the work.

Before any subcontractor is approved for use on this contract it will have to complete and submit the "Affirmative Action Program Requirement- Subcontractors" form of the Sample Forms.

COMPLETE THIS FORM USING BLACK INK ONLY

APPRENTICESHIP TRAINING PROGRAM REQUIREMENT

Apprenticeship Training Program

An approved Apprenticeship Training Program shall be required in all contracts for public work where the awarded contract amount exceeds $50,000. and more than fourteen (14) persons are employed by the Contractor or Subcontractor(s).

Will the Contractor utilize apprentices for this Contract? Yes [ ] No [ ]

If Contractor Yes, do the apprentices participate in an approved Apprenticeship Training Program? Yes [ ] No [ ]

If Contractor Yes, give the name of the Program: _____

_____

Will the Subcontractor(s) utilize apprentices for this Contract? Yes [ ] No [ ]

If Subcontractor(s) Yes, do the apprentices participate in an approved Apprenticeship Training Program? Yes [ ] No [ ]

If Subcontractor(s) Yes, give the name of the Program: _____

_____

AN APPROVED APPRENTICESHIP TRAINING PROGRAM SHALL MEAN A NEW YORK STATE REGISTERED APPRENTICESHIP TRAINING PROGRAM AS DEFINED UNDER THE NEW YORK STATE LABOR LAW.

COMPLETE THIS FORM USING BLACK INK ONLY

CERTIFICATE OF LICENSE

(TO BE COMPLETED BY AN ELECTRICAL BIDDER ONLY)

_____, being duly sworn
(Name)

deposes and says that the following statements are true:

(1) I am the _____ of the
(Title)

_____, the bidder named on the
(Name of Contractor)

bid proposal, and I have read and am familiar with: a) the electrical license requirements contained in the Information for Bidders of the bid, b) Chapter 277 Article XVII of the Laws of Westchester County entitled Electrical Licensing Board and the Licensing of Master Electricians, and c) the Westchester County Electrical Licensing Board Rules and Regulations.

(2) I am familiar with, and this bid is being submitted in compliance with, the Westchester County Electrical Licensing Board Rules and Regulations, in particular No. 11, which states as follows:

> No individual holding a Master Electrician's License shall lend such License to any person or allow any other person to carry on, engage in, or labor at the business as defined herein of installing, removing, altering, testing, replacing, or repairing electrical systems. A violation of this section by any person holding a License shall be sufficient cause for revocation of such License.
>
> However, nothing herein shall be construed to prohibit the use of a License by the holder thereof for or on behalf of a partnership, corporation or other business association, provided that fifty-one (51) percent or more of the control of the voting capital stock of such partnership, corporation, or other business association is owned by one (1) or more holders of a Westchester County Master Electrical License and that all work performed by such partnership, corporation or other business association is performed by or under the direct supervision of such License holder or holders.

(3) That, as of this date, the bidder submitting the bid possesses the applicable valid Master/"Special" Electrician's license issued by the Westchester County Electrical Licensing Board; that this License is being used in compliance with the Laws of Westchester County and Westchester County Electrical Licensing Board Rules and Regulations; and **I have provided a copy of such license with the sealed bid proposal**.

COMPLETE THIS FORM USING BLACK INK ONLY

CERTIFICATE OF LICENSE (Continued)

(TO BE COMPLETED BY AN ELECTRICAL BIDDER ONLY)

(4) That all electrical work shall be performed in accordance with the requirements of Chapter 277 Article XVII of the Laws of Westchester County entitled Electrical Licensing Board and the Licensing of Master Electricians and the Westchester County Electrical Licensing Board Rules and Regulations.

(5) That I make this statement in connection with the submission of the bid as proof of the required electrical license, knowing that this statement will be relied upon by the County in the evaluation of that bid.

_____

Signature

Sworn to before me
this _____ day of _____

_____

License No.

_____
Notary Public - State of New York

COMPLETE THIS FORM USING BLACK INK ONLY

CERTIFICATE OF LICENSE

(TO BE COMPLETED BY A PLUMBING BIDDER ONLY)

_____, being duly sworn
(Name)

deposes and says that the following statements are true:

(1) I am the _____ of the
(Title)

_____, the bidder named on the
(Name of Contractor)

bid proposal, and I have read and am familiar with: a) the plumbing license requirements contained in the Information for Bidders of the bid, b) Chapter 277 Article XV of the Laws of Westchester County entitled Westchester County Board of Plumbing Examiners and County-wide Plumbing License, and c) the Westchester County Board of Plumbing Examiners Rules and Regulations.

(2) I am familiar with, and this bid is being submitted in compliance with, Section 277.509A of Article XV of Chapter 277 of the Laws of Westchester County, which states as follows:

> A. No holder of a license or certification issued under this article shall authorize, consent to or permit the use of his or her license or certification by or on behalf of any other person. No person who has not qualified or obtained a license or certification under this article shall represent himself or herself to the public as holder of a license or certification issued under this article, either directly, by means of signs, sign cards metal plates or stationery, or indirectly in any other manner whatsoever. However, nothing herein shall be construed to prohibit the use of a license by the holder thereof for or on behalf of a partnership, corporation or other business association, provided that 51 percent or more of the control of the voting capital stock of such partnership, corporation or other business association is owned by one or more holders of a Westchester County master plumbing license and that all work performed by such partnership, corporation or other business association is performed by or under the direct supervision of such license holder or holders.

(3) That, as of this date, the bidder submitting the bid possesses a valid Master Plumber's license issued by the Westchester County Board of Plumbing Examiners; that this License is being used in compliance with the Laws of Westchester County and the Westchester County Board of Plumbing Examiners Rules and Regulations; and **I have provided a copy of such license with the sealed bid proposal**.

COMPLETE THIS FORM USING BLACK INK ONLY

CERTIFICATE OF LICENSE (Continued)

(TO BE COMPLETED BY A PLUMBING BIDDER ONLY)

(4) That all plumbing work shall be performed in accordance with the requirements of Chapter 277, Article XV of the Laws of Westchester County entitled Westchester County Board of Plumbing Examiners and County-wide Plumbing License, and the Westchester County Board of Plumbing Examiners Rules and Regulations.

(5) That I make this statement in connection with the submission of the bid as proof of the required plumbing license, knowing that this statement will be relied upon by the County in the evaluation of that bid.

_____

Signature

Sworn to before me
this _____ day of _____

_____

License No.

_____
Notary Public - State of New York

COMPLETE THIS FORM USING BLACK INK ONLY

CERTIFICATE OF LICENSE

(TO BE COMPLETED BY A HAULING BIDDER OR SUBCONTRACTOR ONLY)

_____, being duly sworn
(Name)

deposes and says that the following statements are true:

(1) I am the _____ of the
(Title)

_____, the bidder/subcontractor (circle one)
(Name of Contractor)

named on the foregoing bid proposal, and I have read and am familiar with the hauling license requirements contained in the Information for Bidders of the foregoing bid.

(2) That, as of this date, the bidder submitting the foregoing bid/subcontractor of the bidder submitting the foregoing bid (circle one) possesses a valid _____ license
(License type, i.e. Class "A")
issued by the Westchester County Solid Waste Commission.

(3) That all hauling work shall be performed in accordance with the requirements of Chapter 826-a of the Laws of Westchester County.

(4) That I make this statement in connection with the submission of the foregoing bid as proof of the required hauling license, knowing that this statement will be relied upon by the County in the evaluation of that bid.

_____

Signature

Sworn to before me
this _____ day of _____

_____

License No.

_____
Notary Public - State of New York

COMPLETE THIS FORM USING BLACK INK ONLY

STORMWATER POLLUTION PREVENTION CERTIFICATION

I certify under penalty of law that I understand and agree to comply with the terms and conditions of the Stormwater Pollution Prevention Plan ("SPPP") for the construction site identified in such SPPP as a condition of authorization to discharge stormwater. I also understand the operator must comply with the terms and conditions of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater discharges from construction activities and it is unlawful for any person to contribute to a violation of water quality standards.

_____

Signature

Sworn to before me
This _____day of _____, 200_.

_____

Notary Public – State of New York, County of _____
My Commission Expires on _____.

This Certification will also have to be signed by your subcontractors. *Additional copies of this form can be acquired from the Department of Public Works.*

COMPLETE THIS FORM USING BLACK INK ONLY

PREVAILING WAGE RATES AND SUPPLEMENTS

Compliance with the New York State Construction (Article 1, Section 17) and the New York State Labor Law (Section 220)

Is your firm in full compliance with the New York State Labor Law?
(Please check one)

Yes _____ No _____

Are the wage supplements paid into a Federally approved program?
(Please check one)

Yes _____ No _____

If Yes, please indicate which program:

_____

_____

_____

If No, please indicate how the supplements are being paid:

_____

_____

_____

Yes, I have read and understand the terms of this Contract and the laws of this Agreement:

_____ Date: _____
Signature

_____ Date: _____
Notary Public

COMPLETE THIS FORM USING BLACK INK ONLY

MINORITY/WOMEN BUSINESS ENTERPRISE PROGRAM QUESTIONNAIRE
QUESTIONNAIRE REGARDING BUSINESS ENTERPRISES
OWNED AND CONTROLLED BY WOMEN OR PERSONS OF COLOR

As part of the County's program to encourage the meaningful and significant participation of business enterprises owned and controlled by persons of color or women in County contracts, and in furtherance of Section 308.01 of the Laws of Westchester County, completion of this form is required.

A "business enterprise owned and controlled by women or persons of color" means a business enterprise, including a sole proprietorship, limited liability partnership, partnership, limited liability corporation, or corporation, that either:

1.) meets the following requirements:
   a. is at least 51% owned by one or more persons of color or women;
   b. is an enterprise in which such ownership by persons of color or women is real, substantial and continuing;
   c. is an enterprise in which such ownership interest by persons of color or women has and exercises the authority to control and operate, independently, the day-to-day business decisions of the enterprise; and
   d. is an enterprise authorized to do business in this state which is independently owned and operated.

2.) is a business enterprise certified as a minority business enterprise ("MBE") or women business enterprise ("WBE") pursuant to Article 15-a of the New York State Executive Law and the implementing regulations, 9 New York Code of Rules and Regulations subtitle N Part 540 et seq., **OR**

3.) is a business enterprise certified as a small disadvantaged business concern pursuant to the Small Business Act, 15 U.S.C. 631 et seq., and the relevant provisions of the Code of Federal Regulations as amended.

Please note that the term "persons of color," as used in this form, means a United States citizen or permanent resident alien who is and can demonstrate membership of one of the following groups:

(a) Black persons having origins in any of the Black African racial groups;
(b) Hispanic persons of Mexican, Puerto Rican, Dominican, Cuban, Central or South American descent of either Indian or Hispanic origin regardless of race;
(c) Native American or Alaskan native persons having origins in any of the original peoples of North America; or
(d) Asian or Pacific Islander persons having origins in any of the Far East countries, South East Asia, the Indian subcontinent or the Pacific Islands.

1. Are you a business enterprise owned and controlled by women or persons of color in accordance with the standards listed above?

_____ No

_____ Yes

Please note: If you answered "yes" based upon certification by New York State and/or the Federal government, official documentation of the certification must be attached.

2. If you answered "Yes" above, please check off below whether your business enterprise is owned and controlled by women, persons of color, or both.

_____ Women

_____ Persons of Color (*please check off below all that apply)*

_____ Black persons having origins in any of the Black African racial groups
_____ Hispanic persons of Mexican, Puerto Rican, Dominican, Cuban, Central or South American descent of either Indian or Hispanic origin regardless of race
_____ Native American or Alaskan native persons having origins in any of the original peoples of North America
_____ Asian or Pacific Islander persons having origins in any of the Far East countries, South East Asia, the Indian sub-continent or the Pacific Islands

Name of Business Enterprise: _____

Address: _____

_____

Name and Title of person completing questionnaire: _____

_____

Signature: _____

_____ _____

Notary Public Date

CONTRACTOR'S DISCLOSURE STATEMENT

Instructions:

The County of Westchester, in order to insure that it employs responsible contractors for its major construction projects, requires all bidders for construction contracts (which includes reconstruction and repair) with an estimated value of One Hundred Thousand ($100,000.00) or more Dollars to answer completely and swear to the questions below. If a Contractor Disclosure Statement has been included with this bid specification, then the County has determined that it is applicable to this bid. All subcontractors whose contract has a value of One Hundred Thousand ($100,000.00) or more Dollars must also submit a Contractor Disclosure Statement.

Please read the questions carefully and answer them completely. Before you answer these questions, please read the definitions of terms used in these questions. While you may contact the Department of Public Works if you have questions about this form, the County cannot provide you with any legal advice for which you must contact your own lawyer. **FAILURE TO COMPLETE THIS CONTRACTOR DISCLOSURE STATEMENT IN GOOD FAITH MAY RESULT IN THE REJECTION OF YOUR BID**.

If you have previously filled out a Contractor Disclosure Statement for another County bid and only some but not all of your responses have changed, attach a copy of the prior Contractor Disclosure Statement and check #2 below indicating changes only and only answer those questions which have changed since you last filled out the Contractor Disclosure Statement.

If you have previously completed a Contractor Disclosure Statement for another County bid and nothing has changed in your responses to the questions, then check #3 and fill out the attached No Change Affidavit. Attach a copy of the prior Contractor Disclosure Statement to the No Change Affidavit.

NOTE IF THE SPACES PROVIDED FOR ANSWERS ARE NOT SUFFICIENT FOR YOU TO COMPLETE YOUR ANSWER TO A PARTICULAR QUESTION, THEN ATTACH ADDITIONAL PAGES TO THIS CONTRACTOR DISCLOSURE STATEMENT WHICH INDICATE THE NUMBER OF THE QUESTION THAT YOU ARE COMPLETING THE ANSWER FOR.

ALSO DO NOT LEAVE ANY ANSWERS BLANK. IF A QUESTION IS NOT APPLICABLE, ANSWER - N/A – AND OFFER A BRIEF EXPLANATION AS TO WHY THE QUESTION DOES NOT APPLY.

Definitions:

Affiliate – is another Business Entity in which the Contractor or one or more of the Principals of the Contractor has an ownership interest of more than fifty (50%) percent. An Affiliate is also another Business Entity in which the Parent of the Contractor owns more than fifty (50%) percent of that other Business Entity.

Agency or Government Agency – is any Federal, State, City or other local agency including, but not limited to, departments, offices, quasi-public agencies, public authorities and

corporations, boards of education and higher education, public development corporations and local development corporations.

Assignee – is a person or Business Entity to whom an assignment (e.g., a transfer to another of any property, real or personal, including a transfer of any rights in such property) is made.

Business Address – is the location of principal executive offices and is also the primary place of business in Westchester County, if different.

Business Entity – is any profit-seeking business including, but not limited to, corporations, limited and general partnerships, joint ventures and individual (sole) proprietorships.

Contract – is any binding agreement with any Government Agency or other Business Entity for the provision of goods, or services including, but not limited to, construction.

Contractor – is the Business Entity submitting this Contractor Disclosure Statement.

Contractor Disclosure Statement – is this document.

Control – A Business Entity controls another Business Entity when:

- The controlling Business Entity owns more than fifty (50%) percent of the controlled Business Entity, or
- The controlling Business Entity directs or has the right to direct daily operations of the controlled Business Entity, or
- The same person is a Principal in both businesses and directs the daily operations of the controlled Business Entity.

Investigations – is any official inquiry by any Government Agency, with the exception of background investigations for employment.

Officer – is any individual who serves in the function of chief executive officer, chief financial officer or chief operating officer of the Business Entity by whatever titles known.

Parent – is a Business Entity which owns more than fifty (50%) percent of another Business Entity.

Principal – is an individual, partnership, joint venture or corporation which holds ten (10%) percent or more ownership interest in the Business Entity.

Partner – shall mean a person or Business Entity that has a joint ownership in a particular business, but the ownership interest is not as a shareholder of a corporation.

Successor – is a person or Business Entity that takes the place that another has left. With reference to a corporation, a successor shall mean another corporation which, through amalgamation, consolidation, or other legal succession, becomes invested with the rights and assumes the burdens of the first corporation.

CONTRACTOR'S DISCLOSURE STATEMENT

CONTRACT NO.:_____

☐ Check if Subcontractor

Type Of Submission

(*Put a X or √next to the applicable type of submission*)

1. **Fully Completed Contractor Disclosure Statement** _____
(*Sign Oath on last page of Disclosure Statement*)

2. **Changes Only Contractor Disclosure Statement** _____
(*Attach copy of previously filed Contractor Disclosure Statement that you are amending. Denote any changes on the following Contractor Disclosure Statement. Sign Oath on last page of this Disclosure Statement*)

3. **No Change** _____
(*Fill out "No Change Affidavit" [below] and attach copy of previously filed Contractor Disclosure Statement*)

NO CHANGE AFFIDAVIT

I swear that the attached Contractor Disclosure Statement was submitted to the County of Westchester on _____ and was true as signed, and that
(*Date*)
since the above date nothing has occurred which changes in any way the responses made to the questions contained in the attached Contractor Disclosure Statement.

Submitted by: _____
(Signature)
Name (Print): _____
Title (Print): _____

Sworn to before me this ____ day of _____, 200_

_____
NOTARY PUBLIC

COMPLETE THIS FORM USING BLACK INK ONLY

CONTRACTOR'S DISCLOSURE STATEMENT

Questions:

1. The Business Address and taxpayer identification number of Contractor and primary telephone number for such location.

2. List the Business Addresses and primary telephone numbers for such locations, if different from answer to #1 above, where Contractor has been located over the last five (5) years.

3. List all other names and taxpayer identification numbers under which the Contractor, or the Principals and Officers of Contractor, have conducted business within the prior five (5) years.

4. For any response to #3 above, list any and all Westchester County contracts that were awarded to such "other name" Business Entity.

5. List the type of Business Entity that the Contractor is presently organized as (for example - sole proprietorship, partnership, joint venture or corporation).

COMPLETE THIS FORM USING BLACK INK ONLY

6. If Contractor is a corporation, list the date that the Contractor was incorporated. Also list the name of the Government Agency and location of said Agency in which a certificate of incorporation, certificate of doing business or equivalent, has been filed and the date of any amendments thereto. If, however, the Contractor is a partnership, list the date that the partnership was formed and the name of the Government Agency and location of said Agency in which a business certificate for partnership or equivalent has been filed.

7. List all the names, current Business Addresses and business telephone numbers of the Principals and Officers of the Contractor. If the Contractor is a partnership, list all partners and their business telephone numbers.

8. List the names, current Business Addresses, telephone numbers and taxpayer identification numbers of all Affiliates of the Contractor.

9. List all the names, Business Addresses and telephone numbers of the Principals and Officers of the Affiliates listed in response to #7 above. If the Affiliate is a partnership, list the Business Addresses and business telephone numbers of all partners.

COMPLETE THIS FORM USING BLACK INK ONLY

10. Is the Contractor Controlled by another Business Entity? ____Yes ____No. If you answered yes, please identify the name, Business Address and telephone number of that Controlling Business Entity and list any contracts that the Controlling Business Entity has had with Westchester County in the past five (5) years?

    _____
    _____
    _____
    _____
    _____

11. If the Contractor has Control of any other Business Entity that has had a Contract with the County of Westchester in the past five (5) years, please identify the name, Business Address and telephone number of that Controlled Business Entity.

    _____
    _____
    _____
    _____
    _____

12. List any and all contract sanctions imposed on the Contractor or on a Business Entity listed in response to #3 above that was imposed by a Government Agency during the prior five (5) years, including, but not limited to, all cautions, suspensions, debarments, cancellations of a contract based on business conduct, declarations of default, determinations of ineligibility to bid or whether any proceedings to determine eligibility to bid are pending.

    _____
    _____
    _____
    _____
    _____
    _____
    _____
    _____
    _____
    _____

13. List the contract sanction history for the past five (5) years, as defined in #12 above, for any Affiliate of the Contractor.

    _____
    _____
    _____
    _____
    _____
    _____
    _____

COMPLETE THIS FORM USING BLACK INK ONLY

14. If you answered yes to #10 above, list the contract sanction history as defined in #12 above for the Controlling Business Entity during the past five (5) years.

15. List any and all prevailing wage or supplement payment violations; state labor law violations deemed willful and any other federal or state citations, notices, violation orders, pending administrative hearings or proceedings or determinations of a violation of any labor law or regulation regarding the Contractor.

16. List all Investigations of the Contractor, its Principals and Officers or, if a partnership, of the Contractor's Partners. Also list all investigations of Affiliates, their Principals and Officers or, if a partnership, of their Partners.

COMPLETE THIS FORM USING BLACK INK ONLY

17. Have all Federal and State income tax returns, if required, been filed by Contractor during the last five (5) years? ____Yes ____No If you answered no, please explain why such returns were not filed.

_____
_____
_____
_____
_____

18. Are there any criminal proceedings pending against the Contractor or any Principal or Officer of the Contractor or partner, if Contractor is a partnership? ____Yes _____No If you answered yes, please provide details of the pending criminal proceedings.

_____
_____
_____
_____
_____
_____

19. List the record of all criminal convictions of the Contractor, any Principal or Officer or partner, if Contractor is a partnership, and of any former Principal or Officer, of the Contractor or former partner, if Contractor is a partnership, for any crime related to truthfulness or business conduct and for any felony committed within the prior ten (10) years.

_____
_____
_____
_____
_____
_____
_____
_____

20. List all bankruptcy proceedings that the Contractor or its Affiliates have been the subject of within the past seven (7) years, whether pending or completed.

_____
_____
_____
_____
_____
_____
_____
_____

COMPLETE THIS FORM USING BLACK INK ONLY

21. Is the Contractor a successor, assignee or Affiliate of a Business Entity that has ever been denied a Contract or deemed ineligible to bid on a Government Agency contract?
____Yes No ____ If you answered yes, explain below.

_____
_____
_____
_____
_____
_____
_____
_____

OATH

I swear that all of the above answers are true based on my knowledge of the facts, or are believed by me to be true, based upon a review of records containing the facts or based upon information I obtained from someone who has knowledge of the facts; and that I have authority to sign this document; and that the answers given above have not been made in a manner intended to deceive or to defeat the purpose of the Contractor Disclosure Statement, which is to assist the County of Westchester in determining if the Contractor is a responsible bidder.

Submitted by: _____
(Signature)

Name (Print): _____

Title (Print): _____

Sworn to before me this ____ day of

_____, 20__

_____
NOTARY PUBLIC

COMPLETE THIS FORM USING BLACK INK ONLY

REQUIRED DISCLOSURE OF RELATIONSHIPS TO COUNTY

(Prior to execution of a contract by the County, a potential County contractor must complete, sign and return this form to the County)

Contract Name and/or ID No.:
(To be filled in by County)
Name of Contractor:
(To be filled in by Contractor)

A potential County contractor must complete this form as part of the proposed County contract.

1.) Are any of the employees that the Contractor will use to carry out this contract also a County officer or employee, or the spouse, child, or dependent of a County officer or employee?

Yes _____ No _____

If yes, please provide details (attach extra pages, if necessary): _____
_____

2.) Are any of the owners of the Contractor or their spouses a County officer or employee?

Yes _____ No _____

If yes, please provide details (attach extra pages, if necessary): _____
_____

3.) Do any County officers or employees have an **interest**[1] in the Contractor or in any approved subcontractor that will be used for this contract?

Yes _____ No _____

If yes, please provide details (attach extra pages, if necessary): _____
_____

By signing below, I hereby certify that I am authorized to complete this form for the Contractor.

_____

Name: _____
Title: _____
Date: _____

[1] "Interest" means a direct or indirect pecuniary or material benefit accruing to a County officer or employee, his/her spouse, child or dependent, whether as the result of a contract with the County or otherwise. For the purpose of this form, a County officer or employee shall be deemed to have an "interest" in the contract of:

1.) His/her spouse, children and dependents, except a contract of employment with the County;
2.) A firm, partnership or association of which such officer or employee is a member or employee;
3.) A corporation of which such officer or employee is an officer, director or employee; and
4.) A corporation of which more than five (5) percent of the outstanding capital stock is owned by any of the aforesaid parties.

QUESTIONNAIRE REGARDING BUSINESS ENTERPRISES OWNED AND CONTROLLED BY SERVICE-DISABLED VETERANS

The County believes it is a laudable goal to provide business opportunities to veterans who were disabled while serving our country, and wants to encourage the participation in County contracts of certified business enterprises owned and controlled by service-disabled veterans. As part of the County's program to encourage the participation of such business enterprises in County contracts, and in furtherance of Article 17-B of the New York State Executive Law, we request that you answer the questions listed below.

The term "Certified Service-Disabled Veteran-Owned Business" shall mean a business that is a certified service-disabled veteran-owned business enterprise under the New York State Service-Disabled Veteran-Owned Business Act (Article 17-B of the Executive Law).

1. Are you a business enterprise that is owned and controlled by a service-disabled veteran in accordance with the standards listed above?

_____ No
_____ Yes

2. Are you certified with the State of New York as a Certified Service-Disabled Veteran-Owned Business?

_____ No
_____ Yes

3. If you are certified with the State of New York as a Certified Service-Disabled Veteran-Owned Business, please attach a copy of the certification.

Name of Firm/Business Enterprise: _____
Address: _____
Name/Title of Person completing Questionnaire: _____
Signature: _____

STATE OF NEW YORK)
) ss.:
COUNTY OF)

_____

Notary Public

Date:

SCHEDULE "F"
CRIMINAL BACKGROUND DISCLOSURE
INSTRUCTIONS

Pursuant to Executive Order 1-2008, the County is required to maintain a record of criminal background disclosure from all persons providing work or services in connection with any County contract, including leases of County-owned real property and licenses:

a.) If any of the persons providing work or services to the County in relation to a County contract are not subject to constant monitoring by County staff while performing tasks and/or while such persons are present on County property pursuant to the County contract; and
b.) If any of the persons providing work or services to the County in relation to a County contract may, in the course of providing those services, have access to sensitive data (for example SSNs and other personal/secure data); facilities (secure facilities and/or communication equipment); and/or vulnerable populations (for example, children, seniors, and the infirm).

In those situations, the persons who must provide a criminal background disclosure ("Persons Subject to Disclosure") include the following:

a.) Consultants, Contractors, Licensees, Lessees of County-owned real property, their principals, agents, employees, volunteers or any other person acting on behalf of said Contractor, Consultant, Licensee, or Lessee who is at least sixteen (16) years old, including but not limited to Subconsultants, subcontractors, Sublessess, or Sublicensees who are providing services to the County, and
b.) Any family member or other person, who is at least sixteen (16) years old, residing in the household of a County employee who lives in housing provided by the County located on County property.

Under Executive Order 1-2008, it is the duty of every County Consultant, Contractor, Licensee, or Lessee to inquire of each and every Person Subject to Disclosure and disclose whether they have been convicted of a crime or whether they are subject to pending criminal charges, and to submit this form with that information.[1] Accordingly, you are required to complete the attached Criminal Background Disclosure Form and Certification.

Please note that under no circumstances shall the existence of a language barrier serve as a basis for the waiver of or an exception from the disclosure requirements of Executive Order 1-2008. If translation services are required by the Consultant, Contractor, Licensee, or Lessee to fulfill this obligation, it shall be at the sole cost and expense of the Consultant, Contractor, Licensee, or Lessee.

Please also note that the conviction of a crime(s) and/or being subject to a pending criminal charge(s) will not automatically result in a denial of a person's right to work on a County contract, right to be on County property, or license, but may, if the County determines that the prior conviction(s) or pending criminal charge(s) create an unacceptable risk. However, if a person fails to list or falsifies any part of his/her conviction history or any pending criminal charge(s) for any reason, he/she may be prohibited from working or being on County property without any risk assessment. If it is later determined that a Person Subject to Disclosure failed to disclose a criminal conviction or pending criminal charge for any reason, his/her right to work on a County contract, be on County property, or license may be terminated at any time.

Please further note that, pursuant to Executive Order 1-2008, and subject to the applicable provisions of New York Correction Law §§ 752 and 753, the County has the right to bar a Person Subject to Disclosure from providing work or services to the County or from being on County property if any such person has:

a.) A conviction of a crime(s);
b.) A pending criminal proceeding for a crime(s); or
c.) Refused to answer questions concerning his/her criminal background

[1] For these disclosures, a "crime" or "pending criminal charge" includes all felonies and misdemeanors as defined under the New York State Penal Law or the equivalent under Federal law or the laws of any other State.

Please finally note that any failure by a County Consultant, Contractor, Licensee, or Lessee to comply with the disclosure requirements of Executive Order 1–2008 may be considered by the County to be a material breach and shall be grounds for immediate termination by the County of the related County contract.

Exemptions

Executive Order 1-2008 exempts from the aforementioned disclosure requirements Persons Subject to Disclosure:

a.) for whom the County has already conducted a background check and issued a security clearance that is in full force and effect; and

b.) for whom another state or federal agency having appropriate jurisdiction has conducted a security and/or background clearance or has implemented other protocols or criteria for this purpose that apply to the subject matter of a County contract that is in full force and effect.

If you are claiming an exemption for one or more Persons Subject to Disclosure, you must notify the Procuring Officer[2]. The Procuring Officer will then determine whether the Person(s) Subject to Disclosure are actually exempt, and provide written notification of his/her determination. If the Procuring Officer determines that a Person Subject to Disclosure is not exempt, the Procuring Officer will notify you of that determination, and you will have to include disclosures for that person on your Criminal Background Disclosure Form and Certification.

[2] Procuring Officer" shall mean the head of the department or the individual or individuals authorized by the head(s) of the department(s) undertaking the procurement and with respect to those matters delegated to the Bureau of Purchase and Supply pursuant to Section 161.11(a) of the Laws of Westchester County, the Purchasing Agent.

Subconsultants, Subcontractors, Sublessees, or Sublicensees

Under Executive Order 1-2008, it is your duty to ensure that any and all approved subconsultants, subcontractors, sublessees, or sublicensees complete and submit the attached Criminal Background Disclosure Form and Certification for all of their respective Persons Subject to Disclosure. This must be done before such a subconsultant, subcontractor, sublessees, or sublicensees can be approved to perform work on a contract.

New Persons Subject to Disclosure

Under Executive Order 1-2008, you have a **CONTINUING OBLIGATION** to maintain the accuracy of the Criminal Background Disclosure Form and Certification (and any accompanying documentation) for the duration of this contract, including any amendments or extensions thereto. Accordingly, it is your duty to complete and submit an updated Criminal Background Disclosure Form and Certification whenever there is a new Person Subject to Disclosure for this contract. **NO NEW PERSON SUBJECT TO DISCLOSURE SHALL PERFORM WORK OR SERVICES OR ENTER ONTO COUNTY PREMISES UNTIL THE UPDATED CRIMINAL BACKGROUND DISCLOSURE FORM AND CERTIFICATION IS FILED WITH THE PROCURING OFFICER.** You shall also provide the County with any other updates that may be necessary to comply with the disclosures required by Executive Order 1-2008.

PLEASE CONTINUE TO THE

Criminal Background Disclosure Form and Certification

BEGINNING ON THE NEXT PAGE

CONTRACT #:_____

Name of Consultant, Contractor, Lessee, or Licensee: _____

CRIMINAL BACKGROUND DISCLOSURE FORM AND CERTIFICATION

If this form is being completed by a subconsultant, subcontractor, sublessee, or sublicensee, please consider all references in this form to "consultant, contractor, lessee, or licensee" to mean "subconsultant, subcontractor, sublessee, or sublicensee" and check here: _____

I, _____, certify that I am a principal or a
(Name of Person Signing Below)

representative of the Consultant, Contractor, Lessee, or Licensee and I am authorized to complete and execute this Criminal Background Disclosure Form and Certification. I certify that I have asked each Person Subject to Disclosure the following questions:

- **Have you or your company ever been convicted of a crime (all felonies and misdemeanors as defined under the New York State Penal Law or the equivalent under Federal law or the laws of any other State) including, but not limited to, conviction for commission of fraud, embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements or receiving stolen property?**

- **Are you or your company subject to any pending criminal charges (all felonies and misdemeanors as defined under the New York State Penal Law or the equivalent under Federal law or the laws of any other State)?**

I certify that the names and titles of Persons Subject to Disclosure who refused to answer **either** of the questions above are:

1. _____
2. _____
3. _____
4. _____
5. _____

(If more space is needed, please attach separate pages labeled "REFUSED to Answer - Continued.")

I certify that the names and titles of Persons Subject to Disclosure who answered "Yes" to **either of the** questions above are:

1. _____

2. _____

3. _____

4. _____

5. _____

(If more space is needed, please attach separate pages labeled "YES Answers - Continued.")

Each Person Subject to Disclosure listed above who has either **been convicted of a crime(s)** and/or **is subject to a pending criminal charge(s)** must answer additional questions. Those questions are below.

A Person Subject to Disclosure who has **been convicted of a crime(s)** must respond to the following (please attach separate pages with responses for each person, with their name and title):

1.) Describe the reason for being on County property if applicable, identify the specific duties and responsibilities on this project which you intend to perform for the County, including but not limited to, access to sensitive data and facilities and access to vulnerable populations.
2.) Please list all criminal convictions along with a brief description of the crime(s) (including all felonies and misdemeanors as defined under the New York State Penal Law or the equivalent under Federal law or the laws of any other State).
3.) Please provide the date and place of each conviction.
4.) Please provide your age at the time of each crime for which you were convicted.
5.) Please provide the legal disposition of each case.
6.) Please provide any information either produced by yourself or someone on your behalf in regards to your rehabilitation and good conduct.

A Person Subject to Disclosure who **is subject to a pending criminal charge(s)** must respond to the following (please attach separate pages with responses for each person, with their name and title):

1.) Describe the reason for being on County property and if applicable, identify the specific duties and responsibilities on this project which you intend to perform for the County, including but not limited to, access to sensitive data and facilities and access to vulnerable populations.
2.) Please identify all pending criminal charges (all felonies and misdemeanors as defined under the New York State Penal Law or the equivalent under Federal law or the laws of any other State).
3.) Please briefly describe the nature of the pending charges and the date upon which it is alleged that a crime was committed.

I hereby certify that all of the information provided herein (and in any and all attachments) is true and accurate and that all disclosures required by Executive Order 1-2008 and this Criminal Background Disclosure Form and Certification have been completed. By my signature below, I hereby affirm that all of the facts, statements and answers contained herein (and in any and all attachments) are true and correct. I understand that providing false or incomplete information or withholding by omission or intention pertinent information will be cause for refusing further consideration of my being utilized under this contract.

It is understood and agreed that no Person Subject to Disclosure shall perform work or services or enter onto County property until this required Criminal Background Disclosure Form and Certification is filed with the Procuring Officer.

It is understood and agreed that to the extent that new Persons Subject to Disclosure are proposed to perform work or provide services under this contract after filing of this Criminal Background Disclosure Form and Certification with the Procuring Officer, such new Persons Subject to Disclosure shall not perform work or provide services or enter into County property until an updated Criminal Background Disclosure Form and Certification has been filed with the Procuring Officer.

It is further understood and agreed that the consultant, contractor, lessee, or licensee has a continuing obligation to maintain the accuracy of the Criminal Background Disclosure Form and Certification for the duration of this contract, including any amendments or extensions thereto, and shall provide any updates to the information to the County as necessary to comply with the requirements of Executive Order 1-2008.

_____

Name: _____
Title: _____
Date: _____

_____ _____
Notary Public Date

SUBCONTRACTOR'S SEALED BID SUBMISSION

Westchester County Contract No.:_____

Name of Subcontractor:_____

Address:_____

Phone #:_____ **Fax #:**_____

E-mail address:_____

Name of Contractor to whom this bid is submitted:_____

Scope of Work to be performed by Subcontractor (e.g., electrical, plumbing, HVAC):

_____

_____

The price agreed upon by and between Contractor and Subcontractor for the full performance of the Subcontractor's work:

$:_____

In words (e.g, one hundred thousand dollars and xx/100):

_____

_____

Subcontractor	**Contractor**
_____	_____
Signature	Signature
By_____	**By**_____
(print name & title)	**(print name & title)**

THE SUCCESSFUL LOW BIDDER, BEFORE AWARD OF THE CONTRACT, MUST PROCURE AND PROVIDE TO THE COUNTY, FROM EACH OF THE ABOVE DENOTED SUBCONTRACTORS, A CONTRACT DISCLOSURE STATEMENT (PROPOSAL PAGES 24-32) AND THE REQUIRED DISCLOSURE OF RELATIONSHIPS TO COUNTY (PROPOSAL PAGES 33-34)

COMPLETE THIS FORM USING BLACK INK ONLY

2. INFORMATION FOR BIDDERS

DEPARTMENT OF PUBLIC WORKS

Division of Engineering

INFORMATION FOR BIDDERS

1. ADDENDA AND INTERPRETATION

No interpretation of the meaning of the plans, specifications or other contract documents will be made to any bidder orally. Every request for such interpretation should be in writing addressed to the Westchester County Department of Public Works, Division of Engineering, Room 512, Michaelian Office Building, White Plains, New York, and to be given consideration must be received at least five (5) days prior to the date fixed for the opening of bids. Any and all such interpretations and any supplemental instructions will be in the form of written addenda to the specifications which, if issued, will be posted on the internet not later than three (3) days prior to the date fixed for the opening of bids. Revisions to plans or drawings requiring the issuance of additional or revised drawings will be noted on the internet with instructions how to acquire copies of such revised plans or drawings. Failure of any bidder to receive any such addendum or interpretation or any other form, instrument or document shall not relieve any bidder from any obligation under its bid as submitted. All addenda so issued shall become part of the contract documents.

A bidder's failure to request a clarification, interpretation, etc. of any portion of the plans, specifications, or contract or to point out any inconsistency therein will preclude such bidder from thereafter claiming any ambiguity, inconsistency, or error which should have been discovered by a reasonably prudent bidder and from asserting any claim for damages arising directly or indirectly therefrom.

2. VOIDED CLAUSES

Wherever in this booklet any page is stamped "VOID", only the section(s) or paragraph(s) so stamped are void. All other sections(s) and paragraph(s) remain in full force and effect.

3. PRE-BID SITE INSPECTION

Unless otherwise stated, on building construction work, bidders are free and encouraged to examine the work site during normal work hours preceding the date on which bids are to be opened. For those bidders requesting further clarification of the conditions, an appointment with the County's representative, on the eighth day (Tuesday) prior to the bid opening date, can be requested, by contacting the, Department of Public Works, Division of Engineering at (914) 995-2553.

Each bidder must inform itself fully of the conditions relating to the work to be performed. Failure to do so will not relieve a successful bidder of the obligation to furnish all material and labor necessary to carry out the provisions of the contract documents and to complete the contemplated work for the consideration set forth in its Bid.

At the time of the opening of bids each bidder will be presumed to have inspected the sites and to have read and to be thoroughly familiar with the Plans and Contract Documents (including all addenda).

4. BID SECURITY

Bid Security shall be provided in accordance with the "Notice to Contractors." Where

a Performance and Payment bond is required in the Notice to Contractors, the executed "Bid Bond and Consent of Surety" of the Proposal Pages must be submitted with the Bid when the bid is more than $100,000. The successful bidder, no matter the size of its bid, will be required to furnish a Performance and Payment Bond.

Where a Performance and Payment Bond is not specified in the Notice to Contractors, then the required Security may be furnished in the form of a Certified Check; drawn to the order of "County of Westchester, clipped to the top of the front cover and submitted with the Bid.

Certified checks submitted will be returned to all bidders submitting certified checks within three (3) days after the opening of bids unless the bidder or bidders submitting certified checks are among the two lowest bidders. At any time after the opening of bids, the second lowest bidder, if the second lowest bidder has submitted a certified check, may substitute a bid bond for the certified check by presenting the bond to the Secretary of the Board of Acquisition and Contract. This bond shall be in the form and coverage required by the County and shall be in an amount not less than the amount of the bidder's certified check. After receipt, approval and acceptance of the bond by the County, the County will forward to the bidder a County check in an amount equal to the bidder's certified check.

All certified checks submitted will be returned to the two lowest bidders within 48 hours after the successful bidder executes the required contract and furnishes the County with all necessary bonds and insurance certificates.

In the event that the successful bidder has not executed the required contract and furnished the required bonds and insurance certificates within forty-five (45) days after the opening of bids, the County, upon demand from a bidder (except for the successful bidder), will send a County check to the bidder in the amount of the bidder's certified check.

Failure of the successful bidder to execute the contract and furnish the necessary bonds and insurance certificates shall result in forfeiture of the bid security, such sum to be retained by the County as liquidated damages.

5. PERFORMANCE AND PAYMENT BOND

If required pursuant to "Notice to Contractors."

If a Performance and Payment bond is required in accordance with the "Notice to Contractors", the "Bid Bond and Consent of Surety" of the Proposal Pages must be executed by the Contractor's Surety Company and submitted with the Bid for all bids over $100,000.

Simultaneously with its delivery of the executed contract, the successful bidder shall deliver to the County an executed bond in the amount of one hundred percent of the accepted bid as security for the faithful performance of its contract and in the amount of one hundred percent for the payment of all persons performing labor or furnishing materials in connection therewith, prepared in satisfactory form and having as surety thereon such bond underwriter or surety that appears on the U.S. Treasury's listing of approved sureties (Department Circular 570), and is licensed to transact business in New York State. In the event such Surety ceases to appear on the U.S. Treasury's listing of approved sureties (Department Circular 570) or ceases to be licensed to transact business in New York State or becomes insolvent or enters liquidation proceedings, the Contractor, at its sole cost, shall furnish a replacement bond from a surety satisfactory to the County.

The form of contract and Performance and Payment Bond to be used in connection with this Contract and to become a part of the contract documents is attached in the section entitled "Sample Contract and Bond for Construction".

6. INDEMNIFICATION AGREEMENT

The Contractor agrees:

A. that except for the amount, if any, of damage contributed to, caused by or resulting from the negligence of the County, the Contractor agrees to indemnify and hold harmless the County of Westchester, its officers, employees, elected officials, and agents from and against any and all liability, damage, claims, demands, costs, judgments, fees, attorneys' fees or loss arising directly or indirectly out of the performance or failure to perform hereunder by the Contractor or third parties under the direction or control of the Contractor; and

B. to provide defense for and defend, at its sole expense, any and all claims, demands or causes of action directly or indirectly arising out of the Agreement and to bear all other costs and expenses related thereto.

7. INSURANCE REQUIREMENTS

The Contractor, upon award of the contract and throughout the term of the Agreement, shall obtain at its own cost and expense the required insurance as delineated below from insurance companies licensed in the State of New York, carrying a Best's financial rating of A or better. Contractor shall provide evidence of such insurance to the County of Westchester ("County"), either by providing a copy of policies and/or certificates as may be required and approved by the Director of Risk Management of the County ("Director"). The policies or certificates thereof shall provide that ten (10) days prior to cancellation or material change in the policy, notices of same shall be given to the Board of Acquisition and Contract of the County of Westchester by registered mail, return receipt requested, for all of the following stated insurance policies, with a copy also sent to the Director of Risk Management of the County. All notices shall name the Contractor and identify the Contract Number.

If at any time any of the policies required herein shall be or become unsatisfactory to the Director, as to form or substance, or if a company issuing any such policy shall be or become unsatisfactory to the Director, the Contractor shall upon notice to that effect from the County, promptly obtain a new policy, and submit the policy or the certificate as requested by the Director to the Office of Risk Management of the County for approval by the Director. Upon failure of the Contractor to furnish, deliver and maintain such insurance, the Agreement, at the election of the County, may be declared suspended, discontinued or terminated.

Failure of the Contractor to take out, maintain, or the taking out or maintenance of any required insurance, shall not relieve the Contractor from any liability under the Agreement, nor shall the insurance requirements be construed to conflict with or otherwise limit the contractual obligations of the Contractor concerning indemnification.

All property losses shall be made payable to the "County of Westchester" and adjusted with the appropriate County personnel.

In the event that claims, for which the County may be liable, in excess of the insured amounts provided herein are filed by reason of Contractor's negligent acts or omissions under the

agreement or by virtue of the provisions of the labor law or other statute or any other reason, the amount of excess of such claims or any portion thereof, may be withheld from payment due or to become due the Contractor until such time as the Contractor shall furnish such additional security covering such claims in form satisfactory to the Director.

In the event of any loss, if the Contractor maintains broader coverage and/or higher limits than the minimums identified herein, the County shall be entitled to the broader coverage and/or higher limits maintained by the Contractor. Any available insurance proceeds in excess of the specified minimum limits of insurance and coverage shall be available to the County.

The Contractor shall provide proof of the following coverage. (Other coverage may be required by the County of Westchester based on specific needs. If such other coverages are required for a specific contract, those coverages will be described in the "Special Clauses" of the contract specifications):

a) Workers' Compensation and Employer's Liability. Certificate form C-105.2 or State Fund Insurance Company form U-26.3 is required for proof of compliance with the New York State Workers' Compensation Law. State Workers' Compensation Board form DB-120.1 is required for proof of compliance with the New York State Disability Benefits Law. Location of operation shall be "All locations in Westchester County, New York."

Where an applicant claims to not be required to carry either a Workers' Compensation Policy or Disability Benefits Policy, or both, the employer must complete NYS form CE-200, available to download at: http://www.wcb.ny.gov.

If the employer is self-insured for Workers' Compensation, he/she should present a certificate from the New York State Worker's Compensation Board evidencing that fact (Either SI-12, Certificate of Workers' Compensation Self-Insurance, or GSI-105.2, Certificate of Participation in Workers' Compensation Group Self-Insurance).

b) Commercial General Liability Insurance with a combined single limit of $1,000,000 (c.s.1) per occurrence and a $2,000,000 aggregate limit naming the "County of Westchester" as an additional insured on a primary and non-contributory basis. This insurance shall include the following coverages:
   i. Premises - Operations.
   ii. Broad Form Contractual.
   iii. Independent Contractor and Sub-Contractor.
   iv. Products and Completed Operations.

NOTE: Additional insured status shall be provided by standard or other endorsement that extends coverage to the County of Westchester for both on-going and completed operations.

All Contracts involving the use of explosives, demolition and/or underground work shall provide proof that XCU is covered.

c) Commercial Umbrella/Excess Insurance: $2,000,000 each Occurrence and Aggregate naming the "County of Westchester" as additional insured, written on a "follow the form" basis.

d) Owners Protective Liability Policy naming the County as insured, with a minimum limit of liability per occurrence of $3,000,000 (where applicable, or as determined by the Director, Risk Management)

e) Automobile Liability Insurance with a minimum limit of liability per occurrence of $1,000,000 for bodily injury and a minimum limit of $100,000 per occurrence for property damage or a

combined single limit of $1,000,000 unless otherwise indicated in the contract specifications. This insurance shall include for bodily injury and property damage the following coverages and name the "County of Westchester" as additional insured:

i. Owned automobiles.
ii. Hired automobiles.
iii. Non-owned automobiles.

f) Construction Insurance: For the construction, renovation or repair of bridges, viaducts or similar structures, the Contractor at its own cost and expense shall provide and maintain a "Bridge Builder's Risk Form, All Risk Insurance Contract," with flat premium endorsement, until the construction contract is accepted by the Board of Acquisition and Contract of the County of Westchester. The coverage shall be written for 100% of the completed value, covering the Contractor and County of Westchester as the insureds. The Contractor shall provide the original and duplicate policy to the County (unless the County shall accept, in lieu thereof, all contained endorsements including all applicable provisions and coverages).

For the construction of (a) new buildings and (b) for additions or repairs of existing buildings or structures, the Contractor at its own cost and expense shall provide and maintain a "Builder's Risk Form, All Risk Insurance Contract," with flat premium endorsement, until the construction contract is accepted by the Board of Acquisition and Contract of the County of Westchester. The coverage shall be written for 100% of the completed value, covering the Contractor and County of Westchester as the insureds. The Contractor shall provide the original and duplicate policy to the County (unless the County shall accept, in lieu thereof, all contained endorsements including all applicable provisions and coverages).

All policies of the Contractor shall be endorsed to contain the following clauses:

(a) Insurers shall have no right to recovery or subrogation against the County (including its employees and other agents and agencies), it being the intention of the parties that the insurance policies so effected shall protect both parties and be primary coverage for any and all losses covered by the above-described insurance.

(b) The clause "other insurance provisions" in a policy in which the County is named as an insured, shall not apply to the County.

(c) The insurance companies issuing the policy or policies shall have no recourse against the County (including its agents and agencies as aforesaid) for payment of any premiums or for assessments under any form of policy.

(d) Any and all deductibles in the above described insurance policies shall be assumed by and be for the account of, and at the sole risk of, the Contractor.

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8. PREVAILING WAGE RATES AND SUPPLEMENTS

A. Wages to be Paid and Supplements to be Provided

Each laborer, workman or mechanic employed by the Contractor(s), Sub-contractor(s) or other person(s) doing or contracting to do the whole or part of the work contemplated by this Contract, shall be paid the prevailing wages and provide the supplements (including but not limited to health, welfare and pension benefits) as required by Article 8 (Section 220-223) and Article 9 (230-239) of the New York State Labor Law.

B. Schedule of Hourly Rates/Supplements

The "Schedule of Hourly Rates and Supplements" shows the prevailing hourly rates of wages to be paid and supplements to be provided. It is the County's preference that such supplements shall be paid to a Federally qualified Pension, Health and Welfare program and New York State Registered Apprentice Training Program.

Classifications not appearing on the rate sheet can be used only with the consent of the Commissioner of Public Works and then the rate to be paid will be given by the Commissioner of Public Works after advising with the State Department of Labor.

C. Grounds for Cancellation of Contract

In the event of a failure, to pay the prevailing wages and provide the supplements in accordance with the New York State Labor Law, and as described in this Contract, it shall be considered a material breach. For the breach or violation of this provision, without limiting any other rights or remedies to which the County or any individual may be entitled or any civil or criminal penalty for which any violator may be liable, the County shall have the right, in its discretion, to terminate this agreement immediately upon notice. In such event, the Contractor(s), Sub-Contractor(s), et al shall be liable to the County for any additional costs incurred by the County in the completion of the project.

In addition to any other remedies available to the County and irrespective of any applicable penalties pursuant to law, the County may deduct from the amount payable to the Contractor under this contract five hundred ($500.00) dollars as reimbursement for the costs it incurs in investigating any violation of Section 220 of the Labor Law.

D. Records to be kept on Site

The Contractor(s), Sub-contractor(s), et al. shall certify their payrolls and keep them on site and available, in addition to the following informative records:

1) Record of hours worked by each workman, laborer and mechanic on each day;

2) Record of days worked each week by each workman, laborer and mechanic;

3) Schedule of occupation or occupations at which each workman, laborer and mechanic on the project is employed during each work day and week;

4) Schedule of hourly wage rates paid to each workman, laborer and mechanic for each occupation.

5) A statement or declaration signed by each workman, laborer and mechanic attesting that they have been provided with a written notice, informing them of the prevailing wage rates and supplements requirement for this contract.

E. Responsibility of the Contractor, Sub-Contractor, et al.

The Contractor(s), Sub-Contractor(s), et al. will display the posters in a conspicuous location at the site and distribute the wallet cards to the employees. These posters and wallet cards will inform the employees that they are entitled to receive the prevailing wages and supplements as determined by the Department of Labor and will list the

Department of Labor's Public Work field offices, with phone numbers for individuals to call if they believe their rights are being violated.

F. Pay for a Legal Day's Work & Use of Apprentices

The wages to be paid for a legal day's work, as hereinbefore defined, to laborers, workmen or mechanics upon such public works, shall be not less than the prevailing rate of wages as hereinafter defined. Serving laborers, helpers, assistants and apprentices shall not be classified as common labor and shall be paid not less than the prevailing rate of wages as hereinafter defined. No employee shall be deemed to be an apprentice unless he is individually registered in an apprenticeship program which is duly registered with the Industrial Commissioner in conformity with the provision of Article 23 of the Labor Law. The wages to be paid for a legal day's work, as hereinbefore defined, to laborers, workmen or mechanics upon any material to be used upon or in connection therewith shall be not less than the prevailing rate for a day's work in the same trade or occupation in the locality within the state where such public work on, about or in connection with which such labor is performed in its final or completed form is to be situated, erected or used and shall be paid in cash; provided, however, that an employer may pay his employees by check upon a Certificate of the Industrial Commissioner to be issued only after a hearing upon the application to pay by check, which hearing shall be with notice of at least five days to be served personally or by mail on all interested persons, or if not served as aforesaid, then to be published in a manner directed by the Industrial Commissioner, which shall afford interested persons the opportunity to appear and to be heard at such hearing, and after proof has been furnished satisfactorily to the Industrial Commissioner of the employer's financial responsibility and the employer gives assurance that such checks may be cashed by employees without difficulty and for the full amount for which they are drawn. Such Contracts shall contain a provision that each laborer, workman or mechanic, employed by such Contractor, Subcontractor or other person about or upon such public works, shall be paid the wages herein provided.

G. Fiscal Officer's Duty to Determine Schedule of Wages

It shall be the duty of the fiscal officer (the "New York State Commissioner of Labor"), to ascertain and determine the schedule of wages to be paid workmen, laborers and mechanics on each such public work, prior to the time of the advertisement for bids, and such schedule of wages shall be annexed to and form a part of the specifications for the work. Such fiscal officer shall file with the department having jurisdiction such schedule of wages to the time of the commencement of the advertisement for bids on all public works proposed to be constructed. The term "Contract" as used in this subdivision also shall include reconstruction and repair of any such public work.

Where Contracts are not awarded within ninety days of the date of the establishment of the prevailing rate of wages by the fiscal officer, the department of jurisdiction shall request of the fiscal officer a redetermination of a schedule of wages.

H. Penalty for Payment of Less than Prevailing Wages

Any person or corporation that willfully pays after entering into such Contract, less than such stipulated wage scale as established by the fiscal officer shall be guilty of a

misdemeanor and upon conviction shall be punished for such first offense by a fine of five hundred dollars or by imprisonment for not more than thirty days, or both fine and imprisonment; for a second offense by a fine of one thousand dollars, and in addition thereto the Contract on which the violation has occurred shall be forfeited and no such person or corporation shall be entitled to receive any sum nor shall any officer, agent, or employee of the state, municipal corporation or commission or board appointed pursuant to law pay the same or authorize its payment from the funds under his charge or control to any person or corporation for work done upon any Contract, on which the Contractor has been convicted for a second offense in violation of the provisions of this section.

9. LABOR AND COMPLIANCE WITH LABOR LAW

A. Preference for Westchester Residents

The Contractor agrees that in the performance of the work under this Contract he will give preference, and so far as legally possible, to employ citizens and residents of Westchester County.

B. Certifications To Be Filed

It is agreed that, in accordance with Section 220-d of the Labor Law as amended before final payment by or on behalf of the County for any sum due on account of a Contract for a public improvement, the Contractor and each and every Subcontractor of the Contractor or a Subcontractor is required to file a statement in writing in form satisfactory to the Commissioner of Finance certifying to the amounts then due and owing from such Contractor or Subcontractor filing such statement to or on behalf of any and all laborers for daily or weekly wages or supplements on account of labor performed upon the work under the Contract, setting forth therein the names of the persons whose wages or supplements are unpaid and the amount due to each or on behalf of each respectively, which statement so to be filed shall be verified by the oath of the Contractor or Subcontractor as the case may be that he has read such statement subscribed by him and knows the contents thereof, and that the same is true to his own knowledge.

C. Retention of Funds

It is further agreed that in accordance with Section 220b of the Labor Law, as amended:

1) In case any interested person shall have previously filed a protest in writing objecting to the payment to any Contractor or Subcontractor to the extent of the amount or amounts due or become due to him/her for daily or weekly wages or supplements for labor performed on the public improvement for which such Contract was entered into, or if for any other reason it may be deemed advisable, the Commissioner of Finance may deduct from the whole amount of any payment on account thereof the sum or sums admitted by any Contractor or Subcontractor in such statement or statements so filed to be due and owing by him on account of labor performed on such public improvement before making payment of the amount certified for payment in any estimate or voucher, and may withhold the amount so deducted for the benefit of the laborers, workmen or mechanics whose

wages or supplements are unpaid or not provided, as the case may be, as shown by the verified statements filed by any Contractor or Subcontractor, and may pay directly to any person the amount or amounts shown to be due to him or his duly authorized collective bargaining labor organization, as the case may be, for such wages or supplements by the statements filed as hereinbefore required, thereby discharging the obligation of the Contractor or Subcontractor to the person or his duly authorized collective bargaining labor organization receiving such payment to the extent of the amount thereof, or

2) When any interested person shall file a written complaint with the fiscal officer as defined in section 220-b of the Labor Law, alleging unpaid wages or supplements due for labor performed on a public improvement for which a Contract has been entered into, and said labor is alleged to have been performed within the two year period immediately preceding the date of the filing of said complaint, or if, on the fiscal officer's own initiative, unpaid wages or supplements appear to be due, the fiscal officer shall immediately so notify the financial officer of the civil division interested, or, if there are insufficient moneys still due to the Contractor or Subcontractor to satisfy said wages and supplements, including interest and penalty, the financial officer of another civil division which has entered or subsequently enters into a public improvement contract with the Contractor or Subcontractor, who shall withhold from any payment due or earned by the Contractor or Subcontractor executing said public improvement, sufficient moneys to satisfy said wages and supplements, including interest at the rate provided herein, and any civil penalty that may be assessed as provided herein, pending a final determination. The Commissioner of Finance shall immediately confirm in writing to the fiscal officer the amount of money withheld.

3) Moneys withheld pursuant to this section shall be held by the Commissioner of Finance for the sole and exclusive benefit of the workers employed on said public improvement and for payment of any civil penalty that may be assessed as provided herein and shall not be used for any other purpose except upon court order. Any person, partnership, association, corporation or governmental body who files a lien or commences a judicial proceeding with respect to any moneys withheld pursuant to this section shall notify the fiscal officer in writing of the lien or claim on or before the date of filing of the lien or commencement of the judicial proceeding. In any proceeding to obtain moneys withheld pursuant to this section by any person, partnership, association, corporation or governmental body, the Commissioner of Labor shall have the right to appear and be heard.

4) The fiscal officer shall then cause an investigation to be made to determine whether any amounts are due to the laborers, workmen or mechanics, or on their respective behalves, on such public improvement, for labor performed after the commencement of the three-year period immediately preceding the filing of the complaint or the commencement of the investigation on his own initiative, as the case may be, and shall order a hearing therein at a time and place to be specified and shall give notice thereof, together with a copy of such complaint, or a statement of the facts disclosed upon such investigation, which notice shall be served personally or by mail on all interested persons, including the person complained

against and upon the financial officer of the civil division; such person complained against shall have an opportunity to be heard in respect to the matters complained of, at the time and place specified in such notice, which time shall be not less than five days from the service of said notice. The fiscal officer in such an investigation shall be deemed to be acting in a judicial capacity and shall have the rights to issue subpoenas, administer oaths and examine witnesses. The enforcement of a subpoena issued under this section shall be regulated by the Civil Practice Law and Rules. Such investigation and hearing shall be expeditiously conducted, and upon such hearing and investigation, the fiscal officer shall determine the issues raised thereon and shall make and file an order in his office stating such determination and forthwith serve a copy of such order, either personally or by mail, together with notice of filing, upon the parties to such proceedings, and if the fiscal officer be the Comptroller, upon the Commissioner of the Department of Labor. Such order shall direct payment of wages or supplements found to be due, including interest at the rate of interest then in effect as prescribed by the Superintendent of Banks pursuant to Section fourteen (a) of the Banking law per annum from the date of the underpayment to the date of payment.

5) In addition to directing payment of wages or supplements, including interest found to be due, the order of the fiscal officer may direct payment of a further sum as a civil penalty in an amount not exceeding twenty-five percent of the total amount found to be due. In assessing the amount of the penalty, due consideration shall be given to the size of the employer's business, the good faith of the employer, the gravity of the violation, the history of previous violations of the employer or any successor or substantially-owned affiliated entity or any of the partners if the Contractor or Subcontractor is a partnership or any of the five largest shareholders of the Contractor or Subcontractor, as determined by the fiscal officer, and any officer of the Contractor or Subcontractor who knowingly participated in the violation of this article, and the failure to comply with record keeping or other non-wage requirements. Upon the fiscal officer's determination of the penalty, where the fiscal officer is the Commissioner of the Department of Labor, the penalty shall be paid to said Commissioner for deposit in the State Treasury.

6) Upon the entry and service of such order, the Commissioner of Finance shall pay to the claimant, from the moneys due to the Contractor or Subcontractor, the amount of the claim as determined by the fiscal officer and the amount of the civil penalty, if any, shall be paid as provided herein, provided that no proceeding pursuant to Article Seventy-Eight of the Civil Practice Law and Rules for review of said order is commenced by any party aggrieved thereby within thirty days from the date of said order was filed in the office of the fiscal officer. Said proceeding shall be directly in the appellate division of the Supreme Court. Where the fiscal officer is the Commissioner of the Department of Labor, the civil penalty shall be paid to said Commissioner for deposit in the State Treasury. In the event that such a proceeding for review is instituted, moneys sufficient to satisfy the claim and civil penalty shall be set aside by the Commissioner of Finance, subject to the order of the Court.

7) When final determination has been made and such determination is in favor of the complainant, said complainant may in addition to any other remedy provided by this article, institute an action in any Court of appropriate jurisdiction against the person or corporation found violating this article, any substantially-owned affiliated entity or any successor of the Contractor or Subcontractor, any officer of the Contractor or Subcontractor who knowingly participated in the violation of this article, and any of the partners if the Contractor or Subcontractor is a partnership or any of the five largest shareholders of the Contractor or Subcontractor, as determined by the fiscal officer, for the recovery of the difference between the sum, if any, actually paid to him by the Commissioner of Finance pursuant to said order and the amount found to be due him as determined by said order. Such action must be commenced, within three years from the date of the filing of said order, or if the said order is reviewed in a proceeding pursuant to Article Seventy-eight of the Civil Practice Law and Rules, within three years after the termination of such review proceeding.

8) When two final determinations have been rendered against a Contractor, Subcontractor, successor, or any substantially owned affiliated entity of the Contractor or Subcontractor, any of the partners if the Contractor or Subcontractor is a partnership, any officer of the Contractor or Subcontractor who knowingly participated in the violation of this article, any of the five largest shareholders of the Contractor or Subcontractor or any successor within any consecutive six-year period determining that such Contractor, Subcontractor, successor, or any substantially-owned affiliated entity of the Contractor or Subcontractor, any of the partners or any of the five largest shareholders of the Contractor or Subcontractor, any officer of the Contractor or Subcontractor who knowingly participated in the violation of this article has willfully failed to pay the prevailing rate of wages or to provide supplements in accordance with this article, whether such failures were concurrent or consecutive and whether or not such final determinations concerning separate public work projects are rendered simultaneously, such Contractor, Subcontractor, successor, or any substantially-owned affiliated entity of the Contractor or Subcontractor, any of the partners if the Contractor or Subcontractor is a partnership or any of the five largest shareholders of the Contractor or Subcontractor, any officer of the Contractor or Subcontractor who knowingly participated in the violation of this article shall be ineligible to submit a bid on or be awarded any public work contract or subcontract with the State, any municipal corporation or public body for a period of five years from the second final determination, provided, however, that where any such final determination involves the falsification of payroll records or the kickback of wages or supplements, the Contractor, Subcontractor, successor, or any substantially-owned affiliated entity of the Contractor or Subcontractor, any partner if the Contractor or Subcontractor is a partnership or any of the five largest shareholders of the Contractor or Subcontractor, any officer of the Contractor or Subcontractor who knowingly participated in the violation of this article shall be ineligible to submit a bid on or be awarded any public work contract with the State, any municipal corporation or public body for a period of five years from the first final determination.

9) Nothing in this subdivision shall be construed as affecting any provision of any other law or regulation relating to the awarding of public contracts.

Pursuant to Section 220-C of the Labor law, any Contractor or Subcontractor who shall upon his oath verify any statement required to be filed herein, which is known by him to be false, shall be guilty of perjury and punishable as provided by the Penal Law.

10. CONTRACTOR'S REPORT OF EMPLOYMENT AND WEEKLY AFFIDAVIT

Each week the Contractor shall furnish to the Commissioner of Public Works the "Contractor's Report Of Employment And Weekly Affidavit" of the Sample Forms.

11. LAWS/REGULATIONS AND APPROPRIATIONS

A. The Contractor shall, at its own cost and expense, comply with all provisions of the Labor Law (i.e. prevailing rate of wages and supplements), Lien Law, Workmen's Compensation Law and all other laws and ordinances affecting this contract or order, either Federal, State or local.

B. It is recognized and understood by the Parties that when this Agreement is subject to future appropriation by the Westchester County Board of Legislators for funds not presently appropriated to pay for this Agreement; the County shall have no liability under this agreement beyond the funds, if any, that are appropriated and available for payment of the amounts due under this Agreement. The Parties understand and intend that the obligation of the County to pay the amounts due hereunder shall constitute a current expense of the County and shall not in any way be construed to be a debt of the County in contravention of any applicable constitutional or statutory limitations or requirements concerning the creation of indebtedness by the County, nor shall anything contained in this Agreement constitute a pledge of the general tax revenues, funds or monies of the County. The County shall pay amounts due under this Agreement exclusively from legally available funds appropriated for this purpose. Notwithstanding the foregoing, the County will do all things lawfully within its power to obtain, maintain, and properly request and pursue funds from which payments under this Agreement may be made, including: (i) the County Executive making provisions for such payments to the extent necessary in the annual budget submitted to the Board of Legislators for the purpose of obtaining funding; and (ii) using its reasonable efforts to have such portion of the budget approved.

12. REFUSAL TO ANSWER QUESTIONS

It is understood and agreed by the Contractor that he/she bears an affirmative obligation to answer questions specifically or directly relating to this agreement before any official, board or agency authorized or empowered to inquire into such matters. This section shall not be construed as barring the Contractor, its directors, officers or employees from exercising their constitutional privilege against self-incrimination.

The foregoing, however, shall not be construed as limiting the rights and remedies of the County in the event of such refusal, and when such body or agency is wholly civil in nature,

failure or refusal to fully cooperate with and diligently answer the inquiries of such official, board or agency may constitute grounds for the termination of this agreement and/or the exercise of any and all other rights or remedies which the County may have by reason of such failure or refusal.

Any and all contracts made with the State, the County of Westchester, or any public department, agency or official thereof, since July 1, 1959 by such person and by any firm, partnership or corporation of which he is a member, partner, director or officer, may be canceled or terminated by the County of Westchester, without incurring any penalty or damages on account of such cancellation or termination, but any monies owing pursuant to said transaction or contract prior to the cancellation and termination, shall be paid.

The successful bidder will be required to make all books and records concerning this contract available during business hours, upon reasonable notice, to duly authorized County personnel for the purpose of ascertaining compliance and/or performance of all provisions of this contract. This provision shall survive the termination of this agreement and for a period of six (6) years thereafter.

13. BID REQUIREMENTS

The Bid must be made on the "Proposal Pages" included in this specification or as provided with an addendum. All blank spaces on said Proposal Pages must be filled in and no change shall be made in the phraseology or in the items as contained therein.

Any bid which fails to name a price per unit of measurement for each of the items for which quantities are given, may be held to be informal and rejected. Bids submitted on Proposal Pages that contain any omissions, alterations, additions or items not called for in the bid documents, or that are illegible, unbalanced, conditional, incomplete or contain irregularities of any kind, may be rejected as informal. If the various parts of the work have been divided into classes and/or items to enable the bidder to bid for different portions of the work in accordance with its estimate of their costs, in the event of any increase or decrease in the quantity will be paid for at the price bid for that particular item. The sum of the amounts for each class or item, obtained by multiplying the approximate quantity by the unit price, shall constitute the total sum bid.

In the event of a discrepancy between the written bid amount and the numerical bid amount, the written amount will take precedence and be controlling as to the amount of the Bid. Any such discrepancy shall be corrected as set forth in Article "Correction Of Errors" of the Information for Bidders.

14. MISCELLANEOUS ADDITIONAL WORK (ITEM W-800)

A. Description - Under this item each Contractor shall furnish all labor, material and equipment required to accomplish miscellaneous additional work:

1) Necessitated by encountering during the course of the work field conditions of a nature not determinable during design; or

2) For which no unit prices are applicable.

B. Method of Measurement - Only that miscellaneous additional work shall be performed by the Contractor and will be paid for by the County, which has been authorized by the Commissioner or the Construction Administrator in writing, prior to its commencement.

C. Article "Increase or Decrease of Quantities: Elimination of Items" of the Information for Bidders, will still apply relative to the percentage of the total awarded contract price that the work under the contract may be increased or decreased.

D. Payment - The total amount paid to the Contractor will be determined in strict accordance with the provisions of Article "Extra Work: Increased Compensation/ Decreased Work: Credit to the Owner" of the General Clauses, and such payment will include only that overhead and profit that is applicable to the work performed under this item.

E. Each Contractor shall include in its total bid the lump sum printed in the Proposal and any bid other than the specified amount will be considered informal.

15. CORRECTION OF ERRORS

Relative to dollar bid items and the required computations as submitted and performed by bidders on the proposal sheets, if there are any inconsistencies derived in multiplying unit bid prices by the stated quantities, the Commissioner reserves the right to reconcile the unit bid prices or the products of the unit bid prices and the stated quantities, when in the Commissioner's professional opinion such reconciliation(s) would concur with the apparent intent of a bidder and the Commissioner's estimated values of the respective bid items of the proposed contract work. In addition to the foregoing, the Commissioner reserves the right to correct all mathematical errors in additions or subtractions.

16. SHOWN QUANTITIES

All bids shall be submitted upon the following express conditions, which shall apply to and become a part of every bid received. The Bidders accept the quantities shown on the Proposal Pages opposite items of the work for which unit prices are to be bid as being approximate estimated quantities. Bidders shall satisfy themselves by personal examination of the location of the proposed work and surroundings thereof, and by such other means as they may prefer, as to the scope of the work and the accuracy of the approximate estimated quantities; and shall not at any time after submission of their bids dispute such approximate estimated quantities nor assert that there was any misrepresentation by the County or any misunderstanding by the Contractor in regard to the quantity or kind of materials to be furnished, or work to be done.

17. QUALIFICATION OF BIDDERS

The County may make such investigation as it deems necessary to determine the ability of the bidder to perform the work, and the bidder shall furnish all information and data for this purpose as may be requested. The County reserves the right to reject any bid if the evidence submitted by, or the investigation of such bidder fails to satisfy the County, in the County's sole discretion, that it is properly qualified to carry out the obligations of the contract and to complete the contemplated work.

18. REQUIRED EXPERIENCE

The County requires that each contractor possess not less than five (5) year's experience in performing work substantially similar in scope and size to the work for which it is bidding. The contractor agrees that upon request of the County the contractor will furnish a detailed statement of each project that it has performed during the most recent five (5) years (including but not limited to the name and address of the project, the name of the awarding entity/owner, the name of the awarding entity's/owner's representative, a current telephone number where that representative can be reached, the description of the project, general scope of the contractor's work, contract price, dates of performance, whether the contract was terminated for cause or convenience, whether the contract was completed and whether liquidated damages were assessed against the contractor [and if so, provide a written explanation]). The County reserves the right to require additional information as it deems appropriate concerning the history of the contractor's performance of each such contract. The final determination of whether the contractor possesses the requisite experience rests in the sole discretion of the County.

19. INCREASE OR DECREASE OF QUANTITIES: ELIMINATION OF ITEMS

In entering into this contract, the Contractor agrees that quantities shown on the Proposal Pages opposite items of the work for which unit prices have been requested are approximate estimated quantities, and that during the progress of the work the County may find it advisable and shall have the right to omit portions of the work, and to increase or decrease the shown approximate estimated quantities, or the scope of the whole work; and that the County reserves the right to add to or take from the total amount of the work up to a limit of thirty percent of the total amount of the contract based upon the executed contract price for all the specified work.

The Contractor shall make no claim for anticipated profits or loss of profits, because of any difference between the quantities of the various classes of work actually done, or of the materials actually furnished, and the original specified scope of work and the shown approximate estimated quantities.

The aforesaid thirty- percent pertains to the total amount of the contract and not to any individual item. Individual items may be increased or decreased any amount or may be eliminated entirely if so ordered by the Commissioner, excepting that the total amount of the contract as adjusted shall not result in a net increase or decrease of more than thirty percent except by mutual agreement between both parties thereto.

The Contractor waives all claims of any nature due to a misunderstanding of the location, character, or other conditions surrounding the work or of the shown approximate estimated quantities of items of the work.

20. BREAKDOWN COST OF LUMP SUM ITEMS AND CONTRACTS

After award of the contract and prior to actual start of the work, the successful bidder shall submit an itemized schedule of its estimated costs of lump sum items and or lump sum total contract work, for approval by the County. The schedule shall be submitted as an outline series with minor subdivisions, in accordance with the directives of the County. As part of

this Schedule, the Contractor will be required to include a sum sufficient, as determined in the County's sole discretion, for the preparation and submission of approved final "As-builts", record drawings, guarantees, warranties, and operations and maintenance manuals.

21. ENGINEERING CHARGES

In addition to any and all other remedies available to the County when the work embraced in the contract is not completed on or before the date specified herein, engineering and inspection expenses incurred by the County of Westchester upon the work from the completion date originally fixed in the contract to the final date of completion of the work may be charged to the Contractor and be deducted from monies due the Contractor. Consideration of any extra work or supplemental contract work added to the original contract, as well as extenuating circumstances beyond the control of the Contractor, will be given due consideration by the County before assessing engineering and inspection charges against the Contractor. Such charges will be assessed, however, in cases where in the opinion of the Commissioner, the Contractor has delayed the work.

22. ESTIMATES AND PAYMENTS

As the work progresses but not more often than once a month and then on such days as the Construction Administrator may fix, the Contractor will submit a requisition in writing of the amount and value of the work performed and the materials and equipment provided to the date of the requisition, less any amount previously paid to the Contractor. The Contractor must complete at least ten (10%) percent of the work before submitting any claims for mobilization. From each requisition, the County will retain five percent (5%) plus one hundred fifty percent (150%) of the amount necessary to satisfy any claims, liens or judgments against the Contractor that have not been suitably discharged. The Commissioner will thereupon cause the balance of the requisition therein to be paid to the Contractor. In lieu of all or part of the cash retainage the County shall only accept bonds or notes of United States of America, New York State or political subdivisions thereof. As a condition to the making of any progress payment as set forth in this paragraph, the County, in its sole discretion may require the Contractor to submit such document as may be reasonably required to establish that the Contractor (and its subcontractor(s)) have timely and properly paid their respective subcontractor(s) and materialmen of whatever tier.

VENDOR DIRECT PAYMENT: All payments made by the County to the Contractor will be made by electronic funds transfer ("EFT") pursuant to the County's Vendor Direct program. The Contractor is required to complete the Vendor Direct Payment Authorization Form, which is located in the Forms Section on page 11 and 12. Payments will be automatically credited to the Contractor's designated bank account at the Contractor's financial institution. Payments are anticipated to be deposited two business days after the voucher/invoice is processed for payment. Saturdays, Sundays, and legal holidays are not considered business days. Under the Vendor Direct program you will receive an e-mail notification two days prior to the day the payment will be credited to your designated account. The e-mail notification will come in the form of a remittance advice with the same information that currently appears on County check stubs and will contain the date that the funds will be credited to your account. If there is a discrepancy in the amount received please contact

your Westchester County representative as you would have in the past if there were a discrepancy in a check.

In the unlikely event that you do not receive the money in your designated bank account on the date indicated in the e-mail, please contact the Westchester County Accounts Payable Department at 914-995-3748. Whenever you change your bank or change or close your account a new Vendor Direct Payment Authorization Form must be submitted. Please contact the Westchester County Accounts Payable Department at 914-995-3748 and a new form will be e-mailed to you. When completing the payment authorization form you must either supply a voided check or have it signed by a bank official to ensure the authenticity of the account being set up to receive your payments. Failure to return the completed authorization form prior to award of the contract may result in the bid being considered non-responsive and the bid may be rejected.

When the work or major portion thereof, as contemplated by the terms of the contract (see Substantial Completion Payment and Final Payment later in this article), are substantially completed in the judgment of the Commissioner, the Contractor shall submit a requisition for the remainder of the contract balance. An amount equal to two (2) times the value of the remaining items to be completed plus one hundred fifty percent (150%) of the amount that the Commissioner deems necessary to satisfy to satisfy any claims, liens or judgments against the Contractor which have not been suitably discharged shall be deducted from the requisition. As the remaining items of work are satisfactorily completed or corrected, the County will, upon receipt of a requisition, pay for these items less one hundred fifty percent (150%) of the amount necessary to satisfy any claims, liens or judgments.

Contractor agrees, in the event of any withdrawal by the contractor of amounts retained from payments to the contractor pursuant to the terms hereof, that notwithstanding any contrary interpretation of Section 106 of the New York General Municipal Law, the contractor will be obliged to maintain the market value of securities deposited in an amount equal to the amount withdrawn pursuant to said Section 106. The Contractor will, within five (5) days of demand therefore by the fiscal officer of the County, deposit with such fiscal officer cash, or securities of the kind provided in Section 106, of a market value sufficient to maintain the market value of all securities on deposit at a level equal (as of the date such notice of the fiscal officer is given to the contractor) to the amount which the County shall be entitled to retain from payments to the contractor pursuant to the terms of the contract.

All estimates will be made for actual quantities for work performed and materials and equipment incorporated in the work as determined by the measurements of the Engineer, and this determination shall be accepted as final, conclusive and binding upon the Contractor. All estimates will be subject to correction in any succeeding estimate.

Payment will be made for materials pertinent to the project which have been delivered to the site or off-site by the Contractor and/or Subcontractor and suitably stored and secured in first-class condition as required by the Construction Administrator. Payment may be limited to materials in short and/or critical supply and materials specially fabricated for the project, as defined by the contract. Payment will be made only upon the written request of the contractor. The Contractor must submit certified copies of the manufacturer's or vendor's invoices or statements establishing the true purchase value of the material or equipment; freight bills, release of liens and certificate of insurance covering all equipment and materials. Then the County will include in the following monthly payment an amount not to

exceed the lesser of the bid breakdown or the total purchase price of the stored equipment and materials less retainage provided that such equipment and materials are suitable for their intended use.

The Contractor shall be responsible for safeguarding stored equipment and materials against loss or damage of any nature whatsoever, shall retain title until incorporated into the work and acceptance by the County and in case of loss or damage, the Contractor shall replace such lost or damaged equipment and materials at no cost to the County.

After receipt of payment, the Contractor shall not remove from the site equipment and materials for which such payment was made without written authorization from the Commissioner.

No major equipment item shall be brought to the site until the following conditions are met:

1) The County must have received the manufacture's recommendations for on-site storage in writing.

2) The structure in which the equipment is to be installed is roofed (roofing must be watertight) and has such protection of doorways, windows, and other openings that will provide reasonable protection from the weather.

3) Prior to the County making a Partial Payment on a major equipment item the following conditions must be met:
   a. The Contractor must certify to the County, in writing, that the equipment has been properly stored.
   b. The Shop Drawings must be approved and the draft Operation and Maintenance Manuals must have been submitted.

The Contractor shall furnish to the Construction Administrator, prior to the making up of any Partial or Final Estimate, a copy of its and its Subcontractors' weekly payrolls for each and every preceding payroll period. The payroll submitted shall be a certified true copy and shall contain full information including but not limited to the number of hours worked, rate, classification and total sum paid each employee charged to or working on the job. With all except the first estimate, the Contractor shall furnish to the Construction Administrator a sworn statement listing all unpaid bills and liabilities incurred under the Contract.

A. Substantial Completion Payment

1) Within thirty (30) days after receiving written notice from the Contractor of substantial completion of the work under this Agreement, the Commissioner will cause an inspection to be made of the work done under this contract. If, upon such inspection, the Engineer determines that the work is substantially complete, a Substantial Completion Payment to the Contractor for the work done under this Contract, less any and all deductions authorized to be made by the Commissioner under this contract or by law, will be issued.

2) Such a Payment shall be considered a Partial and not a Final Payment.

3) As a condition precedent to receiving payment therefore, the Contractor must have received County approval of all Shop Drawing submittals, the Operation and Maintenance Manuals, and As-Built Drawing(s). Together with its application for substantial completion payment the Contractor shall also deliver to the

Construction Administrator a verified statement certifying that all claims or liabilities arising from the completed work, including all charges for Extra Work, Change Orders, additional time, damages or credits (collectively referred to as "claims") have been presented to the County. All such claims shall be described in sufficient detail so as to be easily identified. The Contractor's failure to submit the verified statement shall constitute a full and final waiver of all claims against the County from the beginning of the project through the date of substantial completion as established by the County. The presentation of the verified statement to the County shall not constitute an acknowledgement by the County that any such claim is valid. The County expressly reserves its right to assert that any such claim(s) is waived or precluded by reason of other provisions of the contract documents. Only claims particularly identified on the Contractor's verified statement shall be preserved; all other claims whatever nature shall be deemed waived and released. It shall also submit proof of title of the materials and equipment covered by the contract. The Contractor shall also, prior to the issuance of said Substantial Completion Payment, supply to the County affidavits and certificates for labor, material and equipment (where applicable).

B. Final Payment

1) Within ten (10) days after receiving written notice from the Contractor of completion of all the work, the Engineer will make a final inspection. If upon inspection the Engineer determines that no further work is needed, the Commissioner will request that the Board of Acquisition and Contract approve the completion of the project and authorize payment of the Final Estimate. Also required prior to the Board of Acquisition and Contract approval is a Condition Report by the Contractor that any damage of public or privately owned properties resulting from the Contractor's work has been satisfactorily repaired.

2) As a condition precedent to receiving Final Payment therefore the Contractor shall submit a supplementary verified statement similar to that required under, "A. Substantial Completion Payment", hereof. This verified statement must include only those charges for Extra Work, Change Orders, additional time, damages or credits (collectively referred to as "claims") that accrued between substantial completion and final completion. The Contractor's failure to submit the verified statement shall constitute a full and final waiver of all claims against the County from the beginning of the project through the date of substantial completion as established by the County. The presentation of the verified statement to the County shall not constitute an acknowledgement by the County that any such claim is valid. The County expressly reserves its right to assert that any such claim is waived or precluded by reason of other provisions of the contract documents. Only claims particularly identified on the Contractor's supplementary verified statement shall be preserved; all other claims of whatever nature shall be deemed waived and released.

3) The Contractor shall also, prior to the issuance of Final Payment, supply to the County affidavits and certificates for labor, material and equipment (where applicable).

4) The County will, not less than thirty (30) days after the Final Acceptance of the work under this contract, by the Board of Acquisition and Contract, pay the Contractor upon the receipt of all required documentation the balance of funds due thereunder after deduction of all previous payments, liens and all percentages and amounts to be kept and retained under provision of this contract.

   All prior Partial Payments, being merely estimates made to enable the Contractor to prosecute the work more advantageously, shall be subject to correction in the Final Estimate and Payment

5) The acceptance by the Contractor or by anyone claiming by or through him of the Final Payment shall operate as and shall be a release to the County and every officer and agent thereof, from any and all claims of the Contractor for anything done or furnished in connection with this work or project and for any act or omission of the County or of any others relating to or affecting the work. No payment, however, final or otherwise, shall operate to release the Contractor or its Sureties from any obligation under this contract or the Performance and Payment Bond. Should the Contractor refuse to accept the final payment as tendered by the County, it shall constitute a waiver of any rights to interest thereon. Nor shall refusal to accept final payment extend any applicable statute of limitation.

23. PAYMENTS TO SUBCONTRACTORS AND MATERIALMEN BY CONTRACTOR

Within fifteen calendar days of the receipt of any payment from the County, the contractor shall pay each of its sub-contractors and materialmen the proceeds from the payment representing the value of the work performed and/or materials furnished by the subcontractor and/or materialmen as reflected in the payment from the owner less an amount necessary to satisfy any claims, liens or judgment against the subcontractor or materialman which have not been suitably discharged and less any retained amount as hereafter described. The contractor shall retain not more than five per centum of each payment to the subcontractor and/or materialman except that the contractor may retain in excess of five per centum but not more than ten per centum of each payment to the subcontractor provided that prior to entering into a subcontract with the contractor, the sub-contractor is unable or unwilling to provide a performance bond and a labor and material bond both in the full amount of the sub-contract at the request of the contractor. However, the contractor shall retain nothing from those payments representing proceeds owed the subcontractor and/or materialman from the County's payments to the contractor for the remaining amounts of the contract balance as provided in Article “Estimates and Payments” of the Information For Bidders. Within fifteen calendar days of the receipts of payment from the contractor, the subcontractor and/or materialman shall pay each of its subcontractors and materialmen in the same manner as the contractor has paid the subcontractor.

Nothing provided herein shall create any obligation on the part of the County to pay or to see the payment of any moneys to any subcontractor or materialman from any contractor nor shall anything provided herein serve to create any relationship in contract or otherwise, implied or expressed between the subcontractor or materialman and the County. Notwithstanding anything to the foregoing, the County may tender payments to the Contractor in the form of joint or dual payee checks.

NOTICE: No direct payment will be made for work done or materials furnished under the General Clauses, Information for Bidders, General Clauses and Special Clauses, except where expressly stated elsewhere, but compensation shall be deemed to be included in the contract lump sum price for the total work and/or the contract unit prices for the various items of the work.

24. TIME OF STARTING

Time being of the essence, all bidders shall take notice that the timely completion of the work called for under this contract is of the greatest importance. The contractor shall commence its work within ten (10) days after "notice to proceed" has been given it by the Commissioner (unless a definite starting date is stated). Prior to commencing its work, the Contractor shall notify the Director of Project Management, Division of Engineering and Department of Public Works, at least forty-eight (48) hours prior to the planned date of its "start", so that a Construction Administrator can be assigned to the work.

25. SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION AND DEMOLITION WORK

At all times the Contractor shall use all required and necessary precautions for the safety and protection of the public, County personnel, construction employees, and private and public property on or adjacent to the work.

The Contractor shall comply fully with all the applicable provisions of the following listed governmental regulations and standards, noting that in case of conflict, the Contractor shall comply with the most stringent rule or regulation:

1) State of New York, Department of Labor, Bureau of Standards and Appeals, Industrial Code Rule 23 "Protection of Persons Employed in Construction and Demolition Work."

2) United States Department of Labor, Bureau of Labor Standards, "Safety and Health Regulations for Construction," as promulgated in accordance with the Occupational Safety and Health Act of 1970, Public Law 91-596; 84 Stat. 1590, Laws of 91st Congress - 2nd Session.

It shall be the sole responsibility of the Contractor to ascertain which of the regulations and standards contained in the foregoing listed publications effect its construction activities, and it shall be solely responsible for the penalties resulting from its failure to comply with such applicable rules and regulations. Copies of the listed publications are available for reference purposes only, in the Westchester County Department of Public Works, Division of Engineering, Design Section, Room 500, Michaelian Office Building, White Plains, New York.

The West Nile Mosquito control program:

1) Routinely, the work site should be inspected for potential habitats (i.e. stagnant/standing water) for mosquitoes.

2) Conditions that would require remediation include: improper site grading, ruts/other depressions, water in debris (i.e. containers, tires, etc.), stored or

discarded materials, and excavations, and those cited by the Construction Administrator.

3) Under the direction of the Construction Administrator, the Contractor shall take all necessary preventive and/or corrective action to eliminate the potential breeding grounds.

26. ACCIDENT PREVENTION AND FIRST AID FACILITIES

In addition to conforming to the applicable governmental regulations and standards referred to in Article “Fire Prevention And Control” of the Information For Bidders, the Contractor shall conduct its work in accordance with the recommendations contained in the latest edition of the "Manual of Accident Prevention in Construction," as published by the Associated General Contractors of America, Inc. and the most recent safety codes approved by the American Standards Association. In case of the conflict with the referenced governmental regulations and standards, the most stringent regulation, standard or recommendation shall govern.

Further, and without in any way limiting the Contractor’s obligations hereunder, and in accordance with the instructions of the Construction Administrator, the Contractor shall provide barricades, warning lights, danger and caution signs and other safeguards at all places where the work in any way is a hazard to the public.

The Contractor shall also provide and maintain upon the site at each location where major work is in progress, a completely equipped first aid kit that shall be readily accessible when construction activities are in progress. Posted on each first aid kit shall be the name, location and telephone number of the nearest hospital or doctor with whom the Contractor has previously made arrangements for emergency treatment in case of accident.

27. FIRE PREVENTION AND CONTROL

The Contractor shall abide by such rules and instructions as to fire prevention and control as the municipality having jurisdiction may prescribe. It shall take all necessary steps to prevent its employees from setting fires not required in the construction of the facility and shall be responsible for preventing the escape of fires set in connection with the construction.

It shall at all times provide the proper housekeeping to minimize potential fire hazards, and shall provide approved spark arresters on all steam engines, internal combustion engines and fuels.

Free access to fire hydrants and standpipe connections shall be maintained at all times during construction operations, and portable fire extinguishers shall be provided by the Contractor and made conveniently available throughout the construction site. The Contractor shall also notify its employees of the location of the nearest fire alarm box at all locations where work is in progress.

28. STATE AND LOCAL SALES TAX EXEMPTION

The Contractor's attention is directed to Section 1115 of the Tax Law of New York State, Chapters 513 and 514 of the Laws of 1974. In connection with capital improvement contracts entered into on or after September 1, 1974, all tangible personal property which will become an integral component of a structure, building or real property of New York State, or any of its political sub-divisions, including the County of Westchester, is exempt from State and local retail sales tax and compensating use tax.

Bidders' proposals shall exclude dollar amounts for the payment of State and Local retail sales tax and compensating use tax, for tangible personal property defined above.

The successful bidder shall be obliged to file the required Contractor Exempt Purchase Certificates, which may be obtained from the New York State Department of Taxation and Finance (1-800-462-8100), in order to utilize such exemption.

29. APPRENTICES

The attention of all bidders is directed to Section 220(3-e) of the New York State Labor Law, which is hereby incorporated herein by reference, which requires, among other things, that "Apprentices who are registered under a Bona Fide New York State Registered Apprentice Training Program shall be permitted to work."

30. AFFIRMATIVE ACTION PROVISION

During the performance of this Contract, the Contractor agrees that it will not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin, age or handicap. Contractor shall take affirmative action to ensure that applicants are employed and that employees are treated during employment without regard to their race, color, religion, sex, national origin, age or handicap. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoffs or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. Contractor agrees to include, or require the inclusion of the above provision in any subcontract made pursuant to its contract with the County.

31. AFFIRMATIVE ACTION PROGRAM REQUIREMENT

Relative to the award of this Contract, it is required that all bidders completely answer all questions contained in the questionnaire entitled "Affirmative Action Program Requirement" of the Proposal Pages, and properly attest to same.

It is also required that all subcontractors completely answer all questions contained in the questionnaire entitled " Affirmative Action Program Requirement-Subcontractors" of the Sample Forms, and properly attest to same. This form is to be submitted with the request to utilize subcontractor(s).

32. AUTHORITY TO DO BUSINESS IN NEW YORK

Any corporation not incorporated under the Laws of New York State, must furnish a copy of its certificate of authority, from the New York State Secretary of State, to do business in the State of New York, in accordance with Article 13 of the New York State Business Corporation Law.

33. LICENSE REQUIREMENTS (ELECTRICAL)

A. In accordance with the requirements of Local Law No. 20-1997 of Westchester County, no person shall perform work under any contract with the County of Westchester except (i) a licensed Master Electrician; (ii) a licensed "Special Electrician"; or (iii) a Journeyman Electrician working under the direct supervision and control of a Master Electrician.

In no event shall the County incur any liability to pay for any electrical work performed in violation of the licensing requirements of Local Law No. 20-1997 of Westchester County.

B. Contract with separate bids:

If the project is one where separate bid specifications are required pursuant to the provisions of the New York General Municipal Law, then any person, partnership, corporation, business organization or other business entity submitting a bid for the electrical portion of the project must possess, at the time of submission of the Bid, a valid Master/"Special" Electrician's license issued by the Westchester County Electrical Licensing Board in accordance with Chapter 277 Article XVII of the Laws of Westchester County and the Westchester County Electrical Licensing Board Rules & Regulations, in particular No. 11, which states as follows:

> No individual holding a Master Electrician's License shall lend such License to any person or allow any other person to carry on, engage in, or labor at the business as defined herein of installing, removing, altering, testing, replacing, or repairing electrical systems. A violation of this section by any person holding a License shall be sufficient cause for revocation of such License.
>
> However, nothing herein shall be construed to prohibit the use of a License by the holder thereof for or on behalf of a partnership, corporation or other business association, provided that fifty-one (51) percent or more of the control of the voting capital stock of such partnership, corporation, or other business association is owned by one (1) or more holders of a Westchester County Master Electrical License and that all work performed by such partnership, corporation or other business association is performed by or under the direct supervision of such License holder or holders.

C. Contract with single bid:

Where the project does not involve separate bids pursuant to the New York General Municipal Law but where some electrical work is contemplated along with other work, the person, firm, partnership or corporation engaged to perform said electrical work

must possess a valid Master/"Special" Electrician's license issued by the Westchester County Electrical Licensing Board.

D. An electrical bidder must complete the "Certificate of License (Electrical)" of the Proposal Pages and will be required to furnish a copy of such license with the sealed Bid. Other bidders will be required to furnish a copy of such license for the applicable person engaged to perform the electrical work when request by the County, prior to awarding the contract.

E. The license must be maintained at all times during the performance of the work contemplated under the contract. The suspension, revocation or the failure to maintain or renew such license shall, in addition to any other right or remedy available to the County, be grounds for immediate termination of the contract, effective immediately upon notice from the Commissioner.

34. LICENSE REQUIREMENTS (PLUMBING)

A. In accordance with the requirements of Chapter 277, Article XV of the Laws of Westchester County, no person shall perform plumbing work under any contract with the County of Westchester except (i) a licensed Master Plumber; (ii) a certified Journey Level Plumber employed by and under the direction of a licensed Master Plumber; or (iii) an Apprentice Plumber working under the direct supervision and control of a Master Plumber or under the direct supervision and control of a certified Journey Level Plumber in the employ of a licensed Master Plumber.

In no event shall the County incur any liability to pay for any plumbing work performed in violation of the licensing requirements of Chapter 277, Article XV of the Laws of Westchester County.

B. Contract with separate bids:

If the project is one where separate bid specifications are required pursuant to the provisions of the New York General Municipal Law, then any person, partnership, corporation, business organization or other business entity submitting a bid for the plumbing portion of the project must possess, at the time of submission of the Bid, a valid Master Plumber's license issued by the Westchester County Board of Plumbing Examiners in accordance with the Westchester County Board of Plumbing Examiners Rules and Regulations and Chapter 277 Article XV of the Laws of Westchester County, in particular Section 277.509A, which states as follows:

> A. No holder of a license or certification issued under this article shall authorize, consent to or permit the use of his or her license or certification by or on behalf of any other person. No person who has not qualified or obtained a license or certification under this article shall represent himself or herself to the public as holder of a license or certification issued under this article, either directly, by means of signs, sign cards metal plates or stationery, or indirectly in any other manner whatsoever. However, nothing herein shall be construed to prohibit the use of a license by the holder thereof for or on behalf of a partnership, corporation or other business association, provided that 51 percent or more of the control of the voting capital stock of such partnership, corporation or other business

association is owned by one or more holders of a Westchester County master plumbing license and that all work performed by such partnership, corporation or other business association is performed by or under the direct supervision of such license holder or holders.

C. Contract with single bid:

Where the project does not involve separate bids pursuant to the New York General Municipal Law but where some plumbing work is contemplated along with other work, the person, firm, partnership or corporation engaged to perform said plumbing work must possess a valid Master Plumber's license issued by the Westchester County Board of Plumbing Examiners.

D. A plumbing bidder must complete the "Certificate of License (Plumbing)" of the Proposal Pages and will be required to furnish a copy of such license and the County issued identity badge with the sealed Bid. Other bidders will be required to furnish a copy of such license and the County issued identity badge for the applicable person engaged to perform the plumbing work when request by the County, prior to awarding the contract.

E. A restricted Master Plumber's license issued by the Westchester County Board of Plumbing Examiners shall satisfy the requirements of this section provided such restricted license authorizes the Master Plumber to engage in the business of plumbing within the local municipality in which the work under the contract is to be performed.

F. The license must be maintained at all times during the performance of the work contemplated under the contract. The suspension, revocation or the failure to maintain or renew such license shall, in addition to any other right or remedy available to the County, be grounds for immediate termination of the contract, effective immediately upon notice from the Commissioner.

35. LICENSE REQUIREMENTS (HAULERS)

(Haulers Of Solid Waste; Recyclables; Construction And Demolition Debris; Garden And Yard Waste And/Or Scrap Metal)

A. DEFINITIONS:

1) "Class A" refers to all haulers except those whose hauling business is limited solely to Class C, Class D or Class E activities or whose recycling business is limited to Class B activities. Class A Licensees may also conduct Class B, Class C, Class D and Class E activities.

2) "Class B" refers to Recyclable brokers. Class B Licensees may also conduct Class C, Class D and Class E activities.

3) "Class C" refers to haulers who exclusively handle construction and demolition debris. Class C Licensees may also conduct Class D and Class E activities. With respect to Class C haulers, the following shall apply: a. Class "C-1" shall refer to a business or subsidiary which generates construction and demolition debris, as defined herein, and which, incidental to such business, transports, stores, processes, transfers or disposes of the construction and demolition debris generated by the

operations of such business or subsidiary. Class "C-1" Licensees may also conduct Class E activities; b. Class "C-2" shall refer to all other businesses which otherwise transport, collect, store, transfer, process, or dispose of construction and demolition debris. Class "C-2" haulers may also conduct Class "C-1", Class D and Class E activities.

4) "Class D" refers to (i) haulers who collect, store, transport, transfer, process or dispose of garden and yard waste generated, originated or brought within the County where such garden and yard waste was previously generated by a person or entity other than the Licensees and/or (ii) haulers who collect, store, transport, transfer, process or dispose of garden and yard waste and which own, lease, or control one or more vehicles having three (3) or more axles which vehicles will be used in the collection, storage, transfer, transportation, processing or disposal of garden and yard waste generated, originated or brought within the County.

5) "Class E" refers to haulers who exclusively conduct a scrap peddler business.

6) "Construction and Demolition Debris" means uncontaminated Solid Waste resulting from the construction, remodeling, repair and demolition of structures and roads, and uncontaminated Solid Waste consisting of vegetation resulting from land clearing and grubbing, utility line maintenance and seasonal and storm-related cleanup. Such waste includes, but is not limited to, bricks, concrete and other masonry materials, soil, rock, wood, wall coverings, plaster, drywall, plumbing fixtures, non-asbestos insulation, roofing shingles, asphaltic pavement, glass, plastics that are not sealed in a manner that conceals other waste, electrical wiring and components containing no hazardous liquids, metals, and trees or tree limbs that are incidental to any of the above.

7) "Hauler" means any person excluding municipalities, the County and any County district including, but not limited to, Refuse Disposal District No. 1 and all County sewer and water districts, who, for a fee or other consideration, collects, stores, processes, transfers, transports or disposes of Solid Waste, Recyclables or construction and demolition debris that is generated or originated within the County or brought within the boundaries of the County for disposal, storage, transfer or processing.

8) "Recyclables" means those materials defined as "Recyclables" under Section 825.30 (8) of the Westchester County Source Separation Law.

9) "Scrap Peddler" shall mean any person who collects scrap materials for sale to a Recyclable broker using no more than one vehicle for collection and transportation of such materials.

10) "Solid Waste" means all putrescible and non-putrescible materials or substances, except as described in Paragraph 4 of 6 NYCRR Part 360-1.2(a), and/or regulated under 6 NYCRR Part 364, that are discarded or rejected as being spent, useless, worthless or in excess to the owners at the time of such discard or rejection including, but not limited to, garbage, refuse, commercial waste, rubbish, ashes, incinerator residue and construction and demolition debris. "Solid Waste" shall not be understood to include Recyclables as defined above.

B. **PLEASE TAKE NOTICE -** In accordance with the requirements of Chapter 826-a, Article III of the Laws of Westchester County, it is unlawful for any person to collect, store, transfer, transport or dispose of solid waste; recyclables; construction and demolition debris; garden and yard waste and/or scrap metal, as defined herein, that is generated or originated within the County or brought within the boundaries of the County for disposal, storage, transfer or processing, or to conduct any activities defined as Class A, Class B, Class C, Class D or Class E activities under Chapter 826-a of the Laws of Westchester County, in Westchester County (hereinafter collectively referred to as "hauling") without having first obtained a license therefore from the Westchester County Solid Waste Commission.

In no event shall the County incur any liability with respect to any hauling activities conducted by the bidder or any subcontractor of the bidder in violation of Chapter 826-a of the Laws of Westchester County.

C. Where the project necessitates that hauling be performed, either the bidder or the person, partnership, corporation, business organization or other business entity engaged to perform such hauling work on behalf of the bidder (hereinafter the "subcontractor") must possess a valid license issued by the Westchester County Solid Waste Commission at the time of submission of the bid and throughout the duration of any contract issued pursuant thereto.

D. A hauler bidder must complete the “Certificate of License (Hauler)” of the Proposal Pages and will be required to furnish a copy of such license with the sealed bid. Other bidders will be required to furnish a copy of such license for the applicable person engaged to perform the hauling work when requested by the County, prior to awarding the contract.

E. The suspension, revocation, or the failure to maintain or renew such license may, in addition to any other right or remedy available to the County, be grounds for termination of the contract, effective immediately upon notice from the Commissioner. The bidder which is awarded the contract hereunder shall have a continuing obligation to notify the Commissioner, within (2) business days, of any suspension, revocation or other action taken with respect to any license issued by the Westchester County Solid Waste Commission which may limit or impair the bidder's ability, or the ability of any authorized subcontractor, to perform such hauling work in the County of Westchester.

It shall be the bidder's responsibility to ensure that any subcontractor who will perform the hauling services required under any contract issued pursuant to this bid specification has a valid license for the duration of the term of any contract awarded hereunder.

F. In the event that a license held by the bidder or its subcontractor is revoked, suspended or otherwise discontinued by the Westchester County Solid Waste Commission, or in the event that the bidder is otherwise required to obtain the services of a new or alternate subcontractor for the hauling work, the bidder shall immediately notify the Commissioner and seek the Commissioner's approval for the use of such subcontractor to provide the hauling services which are required under the contract, and shall provide the Commissioner with a copy of the license issued by the Westchester County Solid Waste Commission to such subcontractor. No bidder or subcontractor shall provide

hauling services under the contract until a copy of its license has been provided to the Commissioner and the Commissioner has approved of such bidder or subcontractor.

36. MINORITY PARTICIPATION POLICY

A. Pursuant to Chapter 308 of the Laws of the County of Westchester, the County encourages the meaningful and significant participation of business enterprises owned by persons of color and women - Minority Business Enterprise (MBE) and Women Business Enterprise(WBE); on County of Westchester contracts.

B. It is the goal of the County of Westchester to use its best efforts to encourage, promote and increase participation of business enterprises owned and controlled by persons of color or women (MBE/WBE) in contracts and projects funded by all departments of the County and to develop a policy to efficiently and effectively monitor such participation.

C. In recognition of the need to promote the development of business enterprises owned and controlled by persons of color and women to achieve a goal of equal opportunity, and overcome the existing under representation of these groups in the business community, the County of Westchester acting through its Office of Economic Development shall as a lawful public and County purpose provide technical and informational assistance to such business enterprises with a particular emphasis on education programs to encourage participation in the contract procurement process.

D. For the purposes of this Local Law, a business enterprise owned and controlled by women or persons of color shall be construed to mean a business enterprise including a sole proprietorship, partnership or corporation that is: (a) at least 51% owned by one or more persons of color or women; (b) an enterprise in which such ownership by persons of color or women is real, substantial and continuing; (c) an enterprise in which such ownership interest by persons of color or women has and exercises the authority to control and operate, independently, the day-to-day business decisions of the enterprise; and (d) an enterprise authorized to do business in this state which is independently owned and operated. In addition, a business enterprise owned and controlled by persons of color or women shall be deemed to include any business enterprise certified as an MBE or WBE pursuant to Article 15-a of the New York State Executive Law and implementing regulations, 9 NYCRR Subtitle N Part 540 et seq., or as a small disadvantaged business concern pursuant to the Small Business Act, 15 U.S.C. 631 et seq., and the relevant provisions of the Code of Federal Regulations as amended.

E. The Contractor hereby acknowledges and agrees:

1) That in the hiring of employees for the performance of work under this contract or any subcontract hereunder, no contractor, subcontractor, nor any person acting on behalf of such contractor or subcontractor, shall be reason of race, creed, color, religion, gender, age, ethnicity, disability, sex, alienage or citizenship status, national origin, marital status, sexual orientation, familial status, genetic predisposition or carrier status discriminate against any citizen of the State of New York who is qualified and available to perform the work to which the employment relates;

2) That no 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, religion, gender, age, ethnicity, disability, sex, alienage or citizenship status, national origin, marital status, sexual orientation, familial status, genetic predisposition or carrier status;

3) That there may be deducted from the amount payable to the contractor by the County under this contract a penalty of fifty (50) dollars for each person for each calendar day during which such person was discriminated against or intimidated in violation of the provisions of the contract;

4) That this contract may be canceled or terminated by the County, 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 section of the contract; and

5) The aforesaid provisions of this section covering every contract for or on behalf of the County for the manufacture, sale or distribution of materials, equipment or supplies shall be limited to operations performed within the territorial limits of the State of New York.

6) Contractor agrees to include, or require the inclusion of the above provision in any subcontract made pursuant to its contract with the County.

F. In furtherance of the Contractor's obligation to make documented good faith efforts to utilize Minority Business Enterprises (MBE) and Women's Business Enterprises (WBE) for the Work required by this Contract, the Contractor shall provide the Minority/Women Business Enterprise Questionnaire signed by an officer of the Contractor, and any additional information requested by the County, including but not limited to the following, which shall be delivered to the Construction Administrator and , Program Manager of Minority- and Women-Owned Business Program, County of Westchester, Room 911, 148 Martine Avenue, White Plains, New York 10601 coincident with the Contractor's delivery to the County of its bid and shall be provided by the Contractor with any request for approval of subcontractors:

1 (a) The name, address, telephone number and contact person of each MBE and WBE solicited verbally by Contractor during the applicable period for the performance of any portion of the Contractor's Work and the date(s) that each such solicitation was made;

1 (b) A description of the portion of the Contractor's Work for which each such solicitation is made.

1 (c) A listing of the project documents, if any, furnished to each such MBE and WBE.

2. A copy of each written solicitation sent by the Contractor to each MBE and WBE and the name and address of each MBE and WBE to whom the solicitation was made.

3) The name and address of each MBE and WBE that performs any portion of the Contractor's Work, a description of such portion of the Work and the dollar

amount therefore.

4) A statement that the Contractor reviewed a list of MBE and WBE contractors in their outreach efforts. A list can be found at www.westchestergov.com/mwob.

5) Indicate those MBE and WBE contractors found on the list that provided the type of subcontractor services required for this project. If none were found, please indicate.

6) Describe other outreach efforts, including other MBE and/or WBE lists, organizations or individuals that were contacted.

The failure of the low bidder to comply with the provisions of this subparagraph F may result in the County NOT awarding this contract to your firm. Failure of the Contractor to comply with the provisions of this subparagraph F may constitute a material breach of this Contract. Failure to comply with the Minority Participation Policy may be considered by the County when awarding contracts.

37. SEXUAL HARASSMENT POLICY

A. As with discrimination involving race, color, religion, age, sexual orientation, disability, and national origin, Westchester County also prohibits sex discrimination, including sexual harassment of its employees in any form. The County will take all steps necessary to prevent and stop the occurrence of sexual harassment in the workplace.

1) **This policy applies to all County employees and all personnel in a contractual relationship with the County**. Depending on the extent of the County's exercise of control, this policy may be applied to the conduct of non-County employees with respect to sexual harassment of County employees in the workplace.

2) This sexual harassment policy includes, but is not limited to, inappropriate forms of behavior described by the Equal Employment Opportunity Commission.

B. Sexual advances that are not welcome, requests for sexual favors, and other verbal or physical conduct of a sexual nature constitutes sexual harassment when:

1) Submission to such conduct is made either explicitly or implicitly a term or condition of an individual's employment; -OR-

2) Submission to or rejection of such conduct by an individual is used as the basis for employment decisions, such as promotion, transfer, or termination, affecting such individuals; -OR-

3) Such conduct has the purpose or effect of unreasonably interfering with an individual's work performance or creating an intimidating, hostile or offensive working environment.

C. Sexual harassment refers to behavior that is not welcome, that is personally offensive, that fails to respect the rights of others, that lowers morale and that, therefore, interferes

with an employee's work performance and effectiveness or creates an intimidating, hostile or offensive working environment.

38. SMOKE-FREE WORKPLACE POLICY

A. By way of Executive Order No. 5 of 1998 and Local Law 3 of 2003, it is now the policy of the County of Westchester to institute a smoke-free "workplace".

B. Every indoor County "workplace", shall become a smoke-free area. The smoking or carrying of lighted cigarettes, cigars, pipes, or any other tobacco-based products, or products that result in smoke, is hereby banned.

C. Every indoor County "workplace" shall be covered under this Executive Order, including the County Jail in Valhalla and the Westchester County Center in White Plains. This Executive Order shall not, however, apply to County-owned facilities that are not County "workplaces", such as employees housing or privately run restaurants on County property (e.g. at the County golf courses).

D. The Richard J. Daronco County Courthouse shall not, for purposes of this Executive Order, be considered a County "workplace", and therefore shall not be required to be smoke-free.

E. This Executive Order is intended to be consistent with, and not modify, any provisions of the New York State Public Health Law.

F. This Executive Order shall take effect immediately and remain in full force and effect until otherwise superseded or revoked.

39. COUNTY ENERGY EFFICIENT PURCHASING POLICY

A. By way of Executive Order No. 9 of 2002, it is now the policy of the County of Westchester to institute an Energy Efficient Purchasing Policy.

B. This policy shall apply to all purchases made by and for the County in accordance with applicable laws, rules and regulations.

C. Wherever the price is reasonably competitive and the quality adequate for the purpose intended, purchase and utilization of products that meet Energy Star requirements for energy efficiency as determined by the United States Environmental Protection Agency and the United States Department of Energy is hereby recommended.

D. If the Energy Star label is not available with respect to a particular product, than it is recommended that products in the upper twenty-five percent of energy efficiency as designated by the United States Federal Energy Management Program shall be purchased and utilized if the prices of those products are reasonably competitive and the quality adequate for the purpose intended.

40. RESTRICTION ON USE OF TROPICAL HARDWOODS

A. The bidder/proposer shall not use or propose to use any tropical hardwoods or tropical hardwood products in any form, except in accordance with State Finance Law § 165 (Use of Tropical Hardwoods), as may be amended from time to time. Pursuant to the

State Finance Law § 165, any bid/proposal which proposes or calls for the use of any tropical hardwood or wood product in the performance of the contract shall be deemed non-responsive.

41. DISCLOSURE OF RELATIONSHIPS TO COUNTY

A. The successful bidder is required to complete the form entitled "Required Disclosure of Relationships to County" on Proposal Pages 32-33 before award of the contract.

B. In the event that any information provided on the completed Proposal Pages entitled "Required Disclosure of Relationships to County" changes during the term of this agreement, the Contractor shall notify the Commissioner in writing within ten (10) days of such event by submitting a revised "Required Disclosure of Relationships to County" form.

42. CONTRACTOR DISCLOSURE STATEMENT

The Contractor and each Major Subcontractor represents that all information provided by the Contractor and Major Subcontractor in the form entitled "Contractor Disclosure Statement" on Proposal Pages 23-31 is in all respects true and correct. In the event the information provided on that document changes during the term of this agreement or for a period of three (3) years after the date that the Contractor and/or the Major Subcontractor receives final payment under this agreement, the Contractor and/or Major Subcontractor shall notify the Commissioner in writing within ten (10) days of such event by submitting a revised "Contractor/Major Subcontractor Disclosure Statement". Bidders must complete the Required Disclosure of Relationships to County form. The Required Disclosure of Relationships to County form is located on Proposal Pages 32-33.

43. CRIMINAL BACKGROUND INFORMATION

Pursuant to Executive Order 1-2008 and subject to the applicable provisions of New York Correction Law §§ 752 and 753, the County shall have the right to bar the following "Persons Subject to Disclosure" (Persons shall mean individuals or legal entities) from providing work or services to the County or from being on County property:

(a) Consultants, Contractors, Licensees, Lessees of County owned real property, their principals, agents, employees, volunteers or any other person acting on behalf of said Contractor, Consultant, Licensee, or Lessee who is at least sixteen (16) years old, including but not limited to Subconsultants, Subcontractors, Sublessees or Sublicensees who are providing services to the County; and

(b) Any family member or other person, who is at least sixteen (16) years old, residing in the household of a County employee who lives in housing provided by the County located on County property.

If any of the above mentioned Persons Subject to Disclosure has either one of the following:

(a) A conviction of a crime (all felonies and misdemeanors as defined under the New York State Penal Law or the equivalent under Federal law or the laws of any other State);

(b) A pending criminal proceeding for a crime(s) as defined above; or

(c) A refusal to answer such questions.

Where the following criteria apply:

(a) If any of the Persons Subject to Disclosure providing work or services to the County in relation to a County Contract are not subject to constant monitoring by County staff while performing tasks and/or while such persons are present on County property pursuant to the County Contract; and

(b) If any of the Persons Subject to Disclosure providing work or services to the County, in relation to a County Contract may, in the course of providing those services, have access to sensitive data (for example, Social Security Numbers and other personal/secure data); facilities (secure facilities and/or communication equipment); and/or vulnerable populations (for example, children, seniors and the infirm).

Accordingly, the Contractor is required to review the Instructions found in the instructions and complete "Contractor and all persons subject to Disclosure Certification Forms" located at Forms Pages 11-13 as well as any other applicable criminal disclosure forms (i.e., Forms Pages 14 through 19," together with Forms Pages 11-13 collectively referred to as "Disclosure Forms").

However, the following Persons Subject to Disclosure are **exempt** from Executive Order 1-2008: (i) those persons for whom the County has already conducted a background check and issued a security clearance that is in full force and effect; or (ii) those persons for whom another state or federal agency having appropriate jurisdiction has conducted a security and/or background clearance or has implemented other protocols or criteria for this purpose that apply to the subject matter of this Contract that is in full force and effect.

If a Person Subject to Disclosure is exempt from the disclosure described in Executive Order 1-2008 because of either "i" or "ii" above, then the Contractor shall notify the Procuring Officer[1] in the respective Department of its claim of exemption and it shall be the responsibility of the Procuring Officer to verify each exemption. If the Procuring Officer determines that the Contractor is exempt under sections "i" or "ii" above, the Procuring Officer shall confirm same with the Contractor and maintain a written record including all supporting details of the verification of and acknowledgement of said exemption.

If the Procuring Officer determines that the Contractor is not exempt under sections "i" or "ii" above, the Procuring Officer shall notify the Contractor in writing, and the appropriate Disclosure Forms shall be required.

It shall be the Contractor's duty to disclose and to inquire of each and every Person Subject to Disclosure, whether they have been convicted of a crime or whether they are currently subject to pending criminal charges. It shall be the duty of the Contractor to submit a completed Certification Form "Forms Pages 11-13"annexed hereto as ," which certifies that the Contractor and every Person Subject to Disclosure has been asked whether they have been convicted of a crime or are currently subject to pending criminal charges.

Should the Contractor or any Person Subject to Disclosure (also referred to as "Person")

[1] "Procuring Officer" shall mean the head of the department or the individual(s) authorized by the head(s) of the department(s) undertaking the procurement and with respect to those matters delegated to the Bureau of Purchase and Supply pursuant to Section 161.11(a) of the Laws of Westchester County, the Purchasing Agent.

affirmatively advise that they have been convicted of a crime said Person shall be identified in Forms Page 14 entitled "Names And Titles Of Persons Subject To Disclosure That Answered Yes" to any questions on Forms Pages11-13 and shall complete Forms Pages 15-16 entitled, "Criminal Background Disclosure Form For Persons Who Have Been Convicted of A Crime."

Should the Contractor or any Person Subject to Disclosure advise that they are subject to pending criminal charges, said Person shall be identified in Forms Page 14 and shall complete the form annexed hereto as Forms Pages 17-18 entitled, "Criminal Background Disclosure Form For Persons Who Are Subject to Pending Criminal Charges."

Should the Contractor or any Person Subject to Disclosure refuse to answer whether they have been convicted of a crime or are currently subject to pending criminal charges, the name and title of said Person(s) shall be listed on Forms Page 19 entitled "Persons That refused To Answer".

It shall be the duty of the Contractor to submit to the Procuring Officer all of the attached applicable Disclosure Forms prior to the commencement of this Contract. It is the responsibility of each Contractor to assure that all of their proposed Subcontractors complete the criminal background and disclosure certification forms and submit the forms to the Procuring Officer before they will be approved to perform work on the contract.

Under no circumstances shall the existence of a language barrier serve as a basis for the waiver of or an exception to this obligation. If the Contractor needs to obtain translation services to fulfill this obligation, it shall be at the sole cost and expense of the Contractor.

The Contractor shall be required to make the same inquiry and forward updated Disclosure Forms to the Procuring Officer regarding additional Persons Subject to Disclosure in connection with this Contract during the term of this Contract. **NO NEW PERSON SUBJECT TO DISCLOSURE SHALL PERFORM WORK OR SERVICES OR ENTER ONTO COUNTY PREMISES UNTIL THE UPDATED DISCLOSURE FORMS ARE FILED WITH THE PROCURING OFFICER.**

THE CONTRACTOR HAS A CONTINUING OBLIGATION TO MAINTAIN THE ACCURACY OF THE DISCLOSURE FORMS FOR THE DURATION OF THIS CONTRACT, INCLUDING ANY AMENDMENTS OR EXTENSIONS THERETO AND SHALL PROVIDE ANY UPDATES TO THE PROCURING OFFICER AS NECESSARY TO COMPLY WITH THE DISCLOSURE REQUIREMENTS BY EXECUTIVE ORDER 1-2008.

Any failure by the Contractor to comply with the disclosure requirements of Executive Order 1–2008, absent proof of exemption deemed satisfactory by the County Procuring Officer, may be considered by the County, a material breach by the Contractor and may be grounds for immediate termination of this Agreement by the County.

44. MANDATORY OSHA CONSTRUCTION SAFETY AND HEALTH TRAINING

Pursuant to NYS Labor Law §220-h – On all public work projects of at least $250,000 all laborers, workers and mechanics employed, in the performance of the contract on the public work site, either by the contractor, sub-contractor or other person doing or contracting to do the

whole or a part of the work contemplated by the contract, are required to be certified as having successfully completed an OSHA construction safety and health course of at least 10 hours prior to performing any work on the project.

3. GENERAL CLAUSES

DEPARTMENT OF PUBLIC WORKS

Division of Engineering

1. MATERIAL AND WORKMANSHIP

It is the intent of these specifications to require first-class work and new and best quality materials. For any unexpected features arising during the progress of the work and not fully covered herein the specifications shall be interpreted to require first-class work and materials, and such interpretations shall be binding upon the Contractor.

1) Upon award of the Contract, the Contractor shall furnish in writing to the Construction Administrator the sources of supply for concrete, and other materials that it proposes to use in the work, and material shall not be furnished from other sources of supply except after written approval by the Construction Administrator. The Contractor shall, before ordering equipment verify that Suppliers of equipment will provide the required warranties, guarantees, and maintenance services.

2. DEFINITIONS

COMMISSIONER - The head of the Department of Public Works of the County of Westchester.

CONSTRUCTION ADMINISTRATOR- The representative of the Commissioner of Public Works at the project site who, unless specifically designated otherwise in the Contract, shall in the first instance, make such determinations as are necessary for the expeditious completion of the Work, except for those determinations that are reserved to the Commissioner.

CONTRACT - Shall mean each of the various parts of these documents both as a whole or severally and except for titles, subtitles, headings and table of contents, shall include the Notice to Bidders, Information for Bidders, the Proposal, the Specifications, the Performance Bond, the Plans, the Contract Form, and all addenda and provisions required by law.

CONTRACTOR - Party of the second part to the Contract acting directly or through its agents, subcontractors, or employees, and who is responsible for all debts pertaining to and for the acceptable performance of the work for which it had contracted.

COUNTY - Party of the first part to the Contract as represented by the Board of Acquisition and Contract and the Commissioner of Public Works for the County of Westchester.

ENGINEER - An Engineer or Architect that designed the project and is serving as the duly authorized representative of the Commissioner of Public Works who, in addition to the duties set forth in the Contract, shall, in the first instance, make such determinations as are necessary to ensure the Contractor's compliance with its obligations for the preparation and submission of shop drawings and all other submittals required for the Work. If there is no Engineer the duties of the Engineer shall be performed by the Construction Administrator and all references in this

Agreement to the Engineer shall be deemed to mean the Construction Administrator.

MAJOR SUBCONTRACTOR- Subcontractors performing all or a portion of the work for Electrical; Heating, Ventilating and Air Conditioning; Fire Prevention; General Construction; and/or any Subcontractor whose subcontract price is equal to or greater than ten percent (10%) of the Contract Price.

OWNER - The County of Westchester.

PLANS - All official drawings or reproductions of drawings pertaining to the work or to any structure connected therewith.

SPECIFICATIONS - The body of directions, requirements, etc. contained in this present volume, together with all documents of any descriptions and agreements made (or to be made), pertaining to the methods(or manner) of performing the work or to the quantities and quality. Specifications shall also include the Notice to Contractors, Instructions to Bidders, Bond, Proposal and Contract Agreement.

SURETY - The corporate body, which is bound with and for the Contractor and which engages to be responsible for the faithful performance of the contract, and to indemnify the County against all claims for damages.

A.A.S.H.O. - American Association of State Highway Officials

A.R.E.A. - American Railway Engineering Association

A.S.T.M. - American Society for Testing Materials

A.W.W.A. - American Water Works Association

N.E.C. - National Electrical Code

N.E.M.A. - National Electric Manufacturers Association

3. BOUNDARIES OF WORK

The County will provide land or rights-of-way for the work specified in this Contract. Other contractors, employees or concessionaires of the county, may for all necessary purposes enter upon the work and premises used by the Contractor, and the Contractor shall give to other contractors and employees of the County all reasonable facilities and assistance for the completion of adjoining work.

4. OVERLAPPING WORK

The Contractor shall take notice that because of work on other contracts within and adjacent to the contract limits it may not have exclusive occupancy of the territory within or adjacent

to the contract limits, and that during the life of this contract the owners and operators of Public Utilities may make changes in their facilities.

The said changes may be made by utility employees or by contract within or adjacent to the contract limits and may be both temporary and permanent.

The Contractor shall cooperate with other Contractors and owners of various utilities and shall coordinate and arrange the sequence of its work to conform with the progressive operations of work already or to be put under contract. Cooperation with Contractors already or to be engaged upon the site is essential to properly coordinate the construction efforts of all Contractors, Utility Owners and Subcontractors engaged in work within and adjacent to the contract limits.

The Contractor shall coordinate the work of its various Subcontractors. Their respective operations shall be arranged and conducted so that delays are avoided. Where the work of the Contractor or Subcontractor overlaps or dovetails with that of other Contractors, materials shall be delivered and operations conducted so as to carry on the work continuously in an efficient and workmanlike manner. The Contractor shall coordinate its work to be done hereunder with the work of the other Contractor(s) and the Contractor shall fully cooperate with such other Contractor(s) and carefully fit its own work to that provided under other contracts as may be directed by the Construction Administrator. If the Construction Administrator shall determine that the Contractor is failing to coordinate its work with the work of the other Contractor(s) as the Construction Administrator has directed, then the Commissioner shall have the right, at its sole option, to withhold any payments otherwise due hereunder until the Construction Administrator's directions are complied with by the Contractor and/or deduct the costs incurred by the County due to the Contractor's failure or refusal to so cooperate. Delays or oversights on the part of the Contractor or Subcontractors or Utility Owners in performing their work in the proper manner thereby causing cutting, removing and replacing work already in place, shall not be the basis for a claim for extra compensation.

In the event of interference between operations of Utility Owners and other Contractors, or among the Contractors themselves, the Construction Administrator shall be the sole judge of the rights of each Contractor insofar as the sequence of work necessary to expedite the completion of the entire project, and in all cases its decision shall be final. The Contractor agrees that it has included in its unit prices bid for the various items of the contract the possible additional cost of performing the work under this contract because it may not have a clear site for its work and because of possible interference of roadway use, other Contractors and necessary utility work, and the necessity or desirability of opening certain sections of pavement to traffic before the entire work is completed. The County shall not be liable for any damages suffered by any Contractor by reason of another Contractor's failure to comply with the directions of the Construction Administrator, or by reason of another Contractor's default in performance or by any act or failure to act of any Utility Owner or anyone working on its behalf, it being understood that the County does not guarantee the responsibility or continued efficiency of any Contractor or Utility Owner and under no circumstances shall the County be liable to any Contractor or Utility Owner for any delays, interferences or any other impediment or hindrance to the Contractor's or Utility Owner's work .

Should the Contractor sustain any damage through any act or omission of any other contractor having a Contract with the County 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 supplier or subcontractor of whatever tier of such contractor, the Contractor shall have no claim against the County for such damage, but shall have a right to recover such damage from the other contractor under the provision similar to the following provision that has been or will be inserted in the Contracts with such other contractors.

Should any other Contractor having or who shall hereafter have a Contract with the County for the performance of work upon the site sustain any damage through any act or omission of the Contractor hereunder or through the act or omission of any subcontractor of whatever tier of the Contractor, the Contractor agrees to reimburse such other Contractor for all such damages and to defend at his own expense any suit based upon such claim and if any judgment or claims against the County shall be allowed the Contractor shall pay or satisfy such judgment or claim and pay all costs and expenses, including attorney's fees, incurred by the County in connection therewith and to indemnify and hold the County harmless from all such claims.

The County's right to indemnification hereunder shall not be diminished or waived by its assessment against the Contractor of liquidated damages as may be provided elsewhere herein.

Delays in availability of any part of the site or any delays due to interference between the several Contractors and the Utility Owners shall be compensated for by the Construction Administrator solely through granting an extension of time in which to complete the work of the contract without assessment of Engineering charges. The Contractor in submitting its bid hereby agrees that it shall make no other claim against the County for any damages due to such delays or interference.

5. PROPER METHOD OF WORK AND PROPER MATERIALS

The Construction Administrator shall have the power in general to direct the order and sequence of the work, which will be such as to permit the entire work under this contract to be begun and to proceed as rapidly as possible, and such as to bring the several parts of the work to a successful completion at about the same time.

If at any time before the commencement or during the progress of the work the materials and appliances used or to be used appear to the Construction Administrator as insufficient or improper for securing the quality of work required, or the required rate of progress, he may order the Contractor to increase their efficiency or to improve their character, and the Contractor shall promptly conform to such order; but the failure of the Construction Administrator to demand any increase of such efficiency or improvement shall not release the Contractor from its obligation to secure the quality of work or the rate of progress specified.

6. CONTROL OF AREA

Unloading of materials and parking of equipment shall be subject to the orders of the Construction Administrator so far as he may find necessary for the protection and safety of the traveling public and the preservation of property.

7. PERMITS, FEES, ETC.

The County will obtain at its sole cost the necessary New York State Pollutant Discharge Elimination System ("SPDES") Permit and will sign the associated Notice of Intent ("NOI"). The Contractor and its subcontractors will sign the required Certification Statement (a copy of which is contained as Proposal Page) when it signs the contract.

All necessary permits from County, State or other concerned Public Authorities shall be secured at the cost and expense of the Contractor. It shall also give all notices required by law, ordinance, or the rules and regulations of the concerned Public Bureaus or Departments, and also as a part of the Contract, comply without extra charge or compensation with all State Laws and all other Ordinances or Regulations that may be applicable to this work. Contractor, however, shall first notify the Commissioner before proceeding with securing of all necessary permits and the giving of required notices.

8. TRAFFIC

The General Contractor shall be responsible for the Maintenance and Protection of traffic at all times until the date of completion and acceptance of its work.

During the whole course of the work the Contractor shall so conduct its work and operations so as to interfere with traffic passing the work as little as possible and effect by every reasonable means the safety and comfort of pedestrians, vehicles and vehicle passengers passing the work.

9. INSPECTION

The Contractor shall at all times provide convenient access and safe and proper facilities for the inspection of all parts of the work. No work, except such shop work as may be so permitted, shall be done except in the presence of the Construction Administrator or his/her assistants. No material of any kind shall be used upon the work until it has been inspected and accepted by the Construction Administrator. All materials rejected shall be immediately removed from the work and not again offered for inspection. Any materials or workmanship found at any time to be defective shall be remedied at once, regardless of previous inspection. The inspection and supervision of the work by the Construction Administrator is intended to aid the Contractor in supplying labor and materials in accordance with the specifications, but such inspection shall not operate to release the Contractor from any of its contract obligations.

10. STOPPING WORK

The Commissioner, Construction Administrator or Engineer may stop by written order any work or any part of the work under this contract if, in his/her opinion, the methods employed

or conditions are such that unsatisfactory work might result. When work is so stopped it shall not be resumed until the methods or conditions are revised to the satisfaction of the Commissioner, which must be signified in writing. The Contractor agrees to make no claim for increased costs arising from the issuance of any stop work order.

11. DIMENSIONS

Figured dimensions on the plans shall be given preference over scaled dimensions, but shall be checked by the Contractor before starting construction. Any errors, omissions or discrepancies shall be brought to the attention of the Engineer and his/her decision thereon shall be final.

12. PAYMENTS TO COUNTY

Wherever in the Contract Documents the Contractor is required to make a payment to the County, the Contractor agrees that the County has the option to withhold such sum(s) from payments otherwise due to the Contractor and that all such sums withheld shall be deemed not to be earned by the Contractor.

13. PROTECTION OF UTILITIES AND STRUCTURES

The Contractor shall be responsible for the preservation of all public and private underground and surface utilities/structures at or adjacent to the construction work; insofar as they may be endangered by the work. This shall hold true whether or not they are shown on the contract drawings. If they are shown on the drawings, the County does not guarantee their locations even though the information will be from the best available sources.

The Contractor shall give ample and reasonable notice to all private, corporate or municipal owners before work is done near their utility or structure; shall properly protect all utilities/structures encountered; shall at their expense repair/replace any items that are damaged; and shall proceed with caution to prevent undue interruptions to utility services.

Investigation and/or on-site mark-out, by the County, must be done prior to excavation work at the Valhalla Campus. This investigation/mark-out is to serve as a guide for the Contractor and does not absolve the Contractor from the responsibility to repair/replace identified or non-identified utilities/structures, at no cost to the County.

All excavation work performed at the Valhalla Campus requires the submission of a completed "Ground Penetration" form/sketch(es) will be distributed to the appropriate utility owners. Therefore, the Contractor should assume that no excavation work can be performed until approximately twenty (20) working days after submission of the form/sketch(es), but not prior to approval by the DPW-BO Superintendent of Buildings.

14. PROTECTION OF WATER RESOURCES & THE ENVIRONMENT

The Contractor is responsible to review the specifications and drawings as they relate to this Agreement to ascertain what procedures must be followed in order to comply with all applicable stormwater management, water quality control, erosion, and sediment control

laws, rules, regulations and permits. If the Contractor is of the opinion that any work required, necessitated, or contained in the specifications or otherwise ordered conflicts with the applicable stormwater management, water quality control, erosion, and sediment control laws, rules, regulations, procedures, and permits, including, without limitation, all applicable provisions of the New York State Stormwater Management Design Manual, and the New York Standards and Specifications for Erosion and Sediment Control as they may be amended from time to time, it must promptly notify the First Deputy Commissioner of the Department of Public Works in writing.

In addition to all other requirements contained in this Agreement, the Contractor recognizes and understands that it is an essential element of this Agreement that the Contractor complies with the County's policies to protect water resources and the environment. The Contractor must comply with all applicable stormwater management, water quality control, erosion, and sediment control laws, rules, regulations, permits, procedures and specifications, including, without limitation, all applicable provisions of the New York State Stormwater Management Design Manual,[1], the New York Standards and Specifications for Erosion and Sediment Control as they may be amended from time to time. All of these documents should be obtained from the New York State Department of Environmental Conservation to ensure that the Contractor has the latest version. It should be noted that the standards set forth in the New York State Stormwater Management Design Manual, and the New York Standards and Specifications for Erosion and Sediment Control apply to ALL work done for the County, regardless of the size of the project. In case of a conflict among the governmental regulations and standards, the most stringent regulation, standard or recommendation shall apply to the work done under this Agreement.

The Contractor and its subcontractors shall execute the required Stormwater Pollution Prevention Certification, which is located at Proposal Page 20. In addition, the Contractor acknowledges that if the work required under this Agreement requires that a State Pollutant Discharge Elimination System ("SPDES") permit be obtained from the New York State Department of Environmental Conservation, then the Contractor must comply with the terms and conditions of the SPDES permit for stormwater discharges from construction activities and the Contractor will not take any action or fail to take any necessary action that will result in the County being held to be in violation of said permit or any other permit. The Contractor shall cooperate with the County in obtaining the permit and comply with the SPDES permit and all other applicable laws, rules, regulations and permits.

The Contractor shall provide, as the Commissioner or his designee may request, proof of compliance with the County's policies to protect water resources and the environment, and all applicable stormwater management, water quality control, erosion and sediment control laws, rules, regulations, permits, procedures and specifications.

The Contractor is responsible to ascertain which of the laws, rules, regulations, permits and standards referenced above affect its construction activities, and the Contractor shall be solely responsible for all costs and expenses, including any penalties or fines, incurred by the County, due to the Contractor's failure to comply with such applicable laws, rules,

[1] available at http://www.dec.state.ny.us/website/dow/swmanual/swmanual.html - The location of this reference is provided to assist the Contractor; it does not relieve the Contractor from the obligation of obtaining and complying with the latest version of the document.

permits, regulations, standards and County policies. The Contractor shall be responsible to defend and indemnify the County from any and all claims resulting from the Contractor's failure to comply with the applicable laws, rules, regulations, permits, standards and County policies.

Failure of the Contractor to comply with the County's policies to protect water resources and the environment, and all applicable stormwater management, water quality control, erosion and sediment control laws, rules, regulations, permits, procedures and specifications may result in the withholding of progress payments to the Contractor by the County. Such withholding of progress payments shall not relieve the Contractor of any requirements of the Agreement including the completion of the work within the specified time, and any construction sequence requirement of the Agreement.

The Contractor acknowledges that its failure to comply with the County's policies to protect water resources and the environment, and all applicable stormwater management, water quality control, erosion and sediment control laws, rules, regulations, permits, procedures and specifications shall constitute a material breach under this contract. For the breach or violation of this provision, without limiting any other rights or remedies to which the County may be entitled, the County shall have the right, in its sole discretion to suspend, discontinue or terminate this Agreement immediately upon notice to the Contractor. In such event, the Contractor shall be liable to the County for any additional costs incurred by the County in the completion of the project.

The failure of the Contractor to comply with these requirements could lead to a determination that the Contractor is not a responsible bidder when the Contractor is bidding on other projects.

15. SANITARY REGULATIONS

The Contractor shall obey and enforce such sanitary regulations and orders and shall take such precautions against infectious diseases as may be deemed necessary. The building of shanties or other structures for housing the men, tools, machinery or supplies will be permitted only at approved places, and the sanitary condition of the grounds in and at such shanties or other structures must be at all times maintained in a satisfactory manner.

16. CLEANING UP

Upon completion of the work, the Contractor shall remove all equipment, rubbish, debris and surplus materials from the buildings, and grounds, and provide a suitable dumping place for such materials. The premises shall be left in a neat, clean and acceptable condition.

No litter, debris of any kind shall be allowed to accumulate for more than one day in any portion of the buildings or grounds, and must be removed from the area at the end of each workday.

17. PREVENTION OF DUST HAZARD

In accordance with the New York State Labor Law, Section 22a, in the event a silica or other harmful dust hazard is created due to construction operations under the contract, the Contractor shall install, maintain and keep in effective operation the appliances and methods

for the elimination of such silica dust or other harmful dust as have been recommended and approved by State and local authorities.

18. REPRESENTATIVE ALWAYS PRESENT

The Contractor in case of its absence from the work shall have a competent representative fluent in English or foreman present, who shall obey without delay, all instructions of the Construction Administrator in the prosecution and completion of the work in conformity with this contract, and shall have full authority to supply labor and material immediately.

19. WORK IN BAD WEATHER

During freezing, stormy or inclement weather, no work shall be done except such as can be done satisfactorily and in a manner to secure first-class construction throughout.

20. PROTECTION OF WORK UNTIL COMPLETION

The Contractor shall be responsible for the protection and maintenance of its work until the same has been accepted by the Owner and shall make good any damage to the work caused by floods, storms, settlements, accidents, or acts of negligence by its employees or others so that the complete work when turned over to the Owner will be in first-class condition and in accordance with the plans and specifications.

21. REMOVAL OF TEMPORARY STRUCTURES AND CLEANING UP

On or before the completion of the work the Contractor shall, without charge therefore, tear down and remove all buildings and other structures built by him for facilitating the carrying out of the work, shall remove all rubbish of all kinds from the grounds which he has occupied, shall do any small amount of additional trimming and grading and shall leave the entire work and premises clean, neat and in good condition. The Contractor shall provide at its own expense suitable dumping places for such material. When the necessity for protecting traffic ends, the Contractor shall remove all signs, lighting devices, barricades and temporary railings from the site of the work.

22. GROSS LOADS HAULED ON HIGHWAY

The Contractor shall at no time during the construction of this contract, haul gross loads exceeding the legal limit prescribed by the Highway Law over the highways of access to, or the highway included in this contract.

23. CONCRETE BATCH PROPORTIONS - YIELD

No Construction Administrator or Engineer is authorized to instruct or inform the Contractor, or any of its agents or employees, or its concrete supplier as to the weights of the ingredients to be used to produce a cubic yard of concrete or as to the yield to be used to produce a cubic yard of concrete or as to the yield to be expected from any batch. The Contractor shall make its own determination and give its own instructions to its agents, employees and concrete supplier as to the total quantity of ingredients to be purchased as a

cubic yard of concrete. The right is reserved to the Construction Administrator and Engineer, however, to verify yields after batch weights have been established by the Contractor and to order a reduction in total weight per load in the event his/her calculations show that the rated capacity of truck mixers, if approved for use, will be exceeded.

24. DAMAGE DUE TO CONTRACTOR'S OPERATIONS

In the event that damage is caused to structures, surfacing, pavement, shrubbery, trees or to grassed areas through trucking operations, delivery of materials, the actual performance of the work, or other causes, the Contractor shall fully restore the same to their original condition at its own expense. In the event that more than one contractor causes damages to any one area, the Director of Project Management will apportion the amount of repair work to be done by each contractor. The decision of the Director of Project Management shall be final and binding upon the Contractor(s) and may not be challenged except pursuant to a proceeding brought pursuant to Article 78 of the Civil Practice Law and Rules.

25. PROPERTY DAMAGE

The Contractor shall not enter upon nor make use of any private property along the line of work except when written permission is secured from the owner of that property. In case of any damage or injury done along the line of work in consequence of any act or omission on the part of the Contractor, or any one in its employ, in carrying out the contract, the Contractor shall at its own expense restore the same or make repairs as are necessary in consequence thereof in a manner satisfactory to the owner of the affected property; provided, however, that the obligation thus assumed by the Contractor shall not inure directly or indirectly to the benefit of any insurer of physical damage to property or loss of use, rents or profits of property regardless of whether the insurer has actually paid the claim or made only a loan to its insured, nor to the latter if it shall waive or abandon any claim against its insurer or insurers.

In case of failure on the part of the Contractor to restore or repair such property in a manner satisfactory to the owner of the affected property, the party of the first part may upon forty-eight hours notice to the Contractor proceed with such restoration or repair. The expense of such restoration or repair shall be deducted from any monies, which are due or may become due the Contractor under its contract. The Construction Administrator shall be the sole judge as to what constitutes failure to restore or repair as above stated and service of notice by mail addressed to the Contractor at the address stated in the proposal shall be sufficient.

26. CLAIMS FOR DAMAGES

The Contractor agrees that it will make no claim against the County or any of its representatives for damages for delay, interference or disruption of any kind in the performance of its Contract and further agrees that any such claim arising from acts or failure to act of the County or any of its representatives shall be fully and exclusively compensated for by an extension of time to complete the performance of the work as provided herein.

27. EXTENSIONS OF TIME

An extension or extensions of time may be granted only by the Commissioner and only upon a verified application therefore by the Contractor. Each application for an extension of time must set forth in detail the nature of each cause of delay in the completion of the work, the date upon which each such cause of delay began and ended, and the number of days attributable to each of such causes. If the schedule for this project is based upon the Critical Path Method, the Contractor must also demonstrate that the delay for which an extension of time is sought occurred on the critical path. A formal written notice of the Contractor's intent to apply for an extension of time must be submitted to the Commissioner within seven (7) calendar days of the start of the alleged delay. The formal application for the extension of time must be submitted to the Commissioner no later than ten (10) calendar days after the end of the delay, but in no event later than the Contractor's submittal of its application for its substantial completion payment. The failure of the Contractor to timely submit either its formal written notice of its intent to apply for an extension of time or the application thereof shall be deemed a waiver of any entitlement to any extension of time.

The Contractor shall be entitled to an extension of time for delay in completion of the work caused solely (1) by the acts or omissions of the County, its officers, agents or employees; or (2) by the acts or omissions of other Contractors on this project; or (3) by supervening conditions entirely beyond the control of either party hereto (such as, but not limited to, Acts of God, excessive inclement weather, war, or any 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).

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 Engineer or Commissioner. If one of multiple causes of delay operating concurrently results from any act or omission of the Contractor or of its subcontractors of whatever tier, and would of itself (irrespective of concurrent causes) have delayed the work, no extension of time will be allowed for the period of delay resulting from such act or omission and the Contractor shall re-arrange his Progress Schedule and operations so as to complete the Work within the time set forth in the Contract and minimize the impact of the Work on the other Prime Contractors.

The determination made by the Commissioner or Engineer on an application for an extension of time shall be binding and conclusive on the Contractor and may not be challenged except in a proceeding commenced pursuant to Article 78 of the Civil Practice Law and Rules.

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 not operate as waiver on the part of the County of any of its rights or remedies under this contract nor shall it relieve the Contractor from his obligation under the Contract, including without limitations its liability to the County for liquidated damages, engineering costs, delays, damages, and/or costs incurred by the County.

If the Commissioner deems it advisable and expedient to have the Contractor complete and furnish the Work after the expiration of the time of Completion of Work (see "Required

Time For Completion Of The Work" of the General Requirements) and in order that the County's fiscal officers may be permitted to make payment to the Contractor for Work performed beyond that date, the Commissioner may extend the Contract solely for the purpose of enabling the Contractor to be paid for Work performed. This extension shall in no way relieve the Contractor from his obligation under the Contract, including without limitations its liability to the County for liquidated damages, engineering costs, delays, damages, attorney's fees and/or costs incurred by the County, nor shall such extension of time be asserted by the Contractor in any action or proceeding as evidence that it completed its work in a timely manner.

The time necessary for review by the Engineer of all submittals including vendors, shop drawings, substitutions, etc., and delays incurred by normal seasonal and weather conditions should be anticipated and is neither compensatory nor eligible for Extensions of Time.

When the Work embraced in the Contract is not completed on or before the date specified herein, engineering and inspection expenses incurred by the County of Westchester upon the Work from the completion date originally fixed in the Contract to the final date of completion of the Work may be charged to the Contract and be deducted from the final monies due the Contractor.

28. REQUEST FOR APPROVAL OF EQUAL

A. GENERAL REQUIREMENTS

Wherever in the Contract Documents an article, material, apparatus, product or process is called for by trade name or catalog reference, or by the name of the patentee, manufacturer or dealer, it is understood that it constitutes the standard requirement to meet the contract specifications. Where two or more articles, materials, apparatus, products or processes are listed as acceptable by reference to trade name or otherwise, the choice of these will be optional to the bidder.

Bidders may base their bid on one of the specified items, or they may base their bid on an "equal". However, the bidder should be aware that the County makes the final determination as to what constitutes an equal.

If the Engineer shall reject the proposed equal as not being the equal of that specifically named in the contract, the successful bidder (Contractor) shall immediately proceed to furnish the designated article, material, apparatus, product or process as specified or an approved equal without additional cost or time delay to the County.

B. REVIEW PROCESS

1) Within fifteen (15) days from the Notice to Proceed, requests for approval of equals must be proposed to the Commissioner on the "Request For Approval Of Equal" form of the Sample Forms. This Period for submitting requests will be strictly enforced. Such requests shall conform to the requirements of this Article.

2) Requests for approval of equals will be received and considered from Prime Contractors only and not from manufacturers, suppliers, Subcontractors, or other third parties.

3) If the materials and equipment submitted are offered as equals to the Contract

Documents the Contractor shall advise the County and the Engineer of the requested equal and comply with the requirements hereinafter specified in this Article.

4) Where the acceptability of an equal is conditioned upon a record of satisfactory operation and the proposed equal does not fulfill this requirement, the Engineer, at his/her sole discretion, may accept the equal if the Contractor provides a bond or cash deposit which guarantees replacement at no cost to the County for any failure occurring within the specified time. The equal item must meet all other technical requirements contained in the Specification.

5) The successful bidder shall furnish such information as required by the Engineer to demonstrate that the equal article, material, apparatus, product or process is the equal of that specified in quality, finish, design, efficiency and durability and has been elsewhere demonstrated to be equally serviceable for the purpose for which it is intended. The Contractor shall set forth the reasons for desiring to utilize the proposed equal.

6) Contractor shall submit:

   a. For each proposed request for approved equal sufficient details, complete descriptive literature and performance data together with samples of the materials, where feasible, to enable the Engineer to determine if the proposed request for approved equal is equal, including manufacturer's brand or trade names, model numbers, description of specification of item, performance data, test reports, samples, history of service, and other data as applicable.

   b. Certified tests, where applicable, by an independent laboratory attesting that the proposed equal is equal.

   c. A list of installations where the proposed equal equipment or materials is performing under similar conditions as specified.

7) Requests for approval of equal after the period set forth in B. REVIEW PROCESS, Paragraph 1, above will not be accepted for evaluation except in case of strikes, discontinuance of manufacturer or other reason deemed valid by the Engineer whereby the specified products or those approved are unattainable. In such case the Contractor shall provide substantial proof that the acceptable products are unavailable.

8) Where the approval of an equal requires revision or redesign of any part of Work, including that of other Contracts, all such revision and redesign, and all new drawings and details required therefore, shall be provided by the Contractor at its own cost and expense, and shall be subject to the approval of the Commissioner.

9) In the event that the Engineer is required to provide additional engineering services, then the engineer's charges for such additional services shall be promptly paid by the Contractor to the County.

10) Any modifications in the Work required under other Contracts to accommodate the changed design will be incorporated in the appropriate Contracts and any resulting increases in Contract prices will be paid by the Contractor who initiated the

changed design to the County.

11) In all cases the Engineer shall be the judge as to whether a proposed equal is to be approved. The Contractor shall abide by his/her decision when proposed equal items are judged to be unacceptable and shall in such instances furnish the item specified or indicated. No equal items shall be used in the Work without written approval of the Engineer.

12) In making request for approval of equal, Contractor represents that:

    a. Contractor has investigated proposed equal, and determined that it is equal to or superior in all respects to the product, manufacturer or method specified.

    b. Contractor will provide the same or better warranties or bonds for proposed equal as for product, manufacturer or method specified.

    c. Contractor waives all claims for additional costs or extension of time related to proposed equal that subsequently may become apparent.

    d. Contractor shall have and make no claim for an extension of time or for damages by reason of the time taken by the Engineer in considering an equal proposed by the Contractor or by reason of refusal of the Engineer to approve an equal proposed by the Contractor. Any delays arising out of consideration, approval, or utilization of an equal shall be the sole responsibility of the Contractor requesting the equal and it shall arrange its operations to make up the time lost.

13) Proposed Equal Will Not Be Accepted If:

    a. Acceptance will require substantial revision of Contract Documents.

    b. They will change design concepts or Technical Specifications.

    c. They will delay completion of the Work, or the Work of other Contractors.

    d. They are indicated or implied on a Shop Drawing and are not accompanied by a formal request for approval of equal from Contractor.

14) Only those products originally specified and/or added by approved requests for equals submitted in accordance with the preceding paragraphs may be used in the Work. Whenever requests for equals are approved, it shall be understood that such approval is conditional upon strict conformance with all requirements of the Contract and further subject to the following:

    a. Any material or article submitted for approval in accordance with the above procedure must be equal, in the sole opinion of the Engineer, to the material or article specified. It must be readily available in sufficient quantity to prevent delay of any Work; it must be available in an equivalent color, texture, dimension, gauge, type and finish as to the item or article specified; it must be equal to the specified item in strength, durability, efficiency, serviceability, compatibility with existing systems, ease and cost of maintenance; it must be compatible with the design and not necessitate substantial design modifications; it must be equal in warranties and guarantees; its use must not impose substantial additional Work, or require substantial changes in the Work of any

other Contractor. Availability of spare parts shall be assured for the useful life of the Project.

b. The Engineer reserves the right to disapprove, for aesthetic reasons, any material or equipment on the basis of design or color considerations alone, without prejudice to the quality of the material or equipment, if the manufacturer cannot meet the required colors or design.

c. All requests for approval of equals of materials or other changes from the contract requirements shall be accompanied by an itemized list of all other items affected. The Engineer shall have the right, if such is not done, to rescind any approvals for equals or changes and to order such Work removed and replaced with Work conforming to the specified requirements of the contract, all at the Contractor's expense, or to assess all additional costs resulting from the equal to the Contractor.

15) Approval of an equal will not relieve Contractor from the requirement to submit Shop Drawings or any of the provisions of the Contract Documents.

16) In the event that the Engineer is required to provide additional engineering services as a result of a request for approval of an equal of materials or equipment which are not "or equal" by the Contractor, or changes by the Contractor in dimension, weight, power requirements, etc., of the equipment and accessories furnished, or as a result of Contractor's errors, omissions or failure to conform to the requirements of the Contract Documents or if the Engineer is required to examine and evaluate any changes proposed by the Contractor solely for the convenience of the Contractor, or for evaluation of deviations from Contract Documents, then the Engineer's charges in connection with such additional services shall be paid by the Contractor to the County.

17) The Contractor shall respond to required submittals with complete information and with a degree of accuracy to achieve approvals within three (3) submissions. All costs to the Engineer involved with subsequent submissions requiring approval, will be paid by the Contractor to the County.

29. SUBSTITUTION

A. Should the Contractor desire to substitute other articles, materials, apparatus, products or processes than those specified or approved as equal, the Contractor shall apply to the Engineer in writing for approval of such substitution. It should be noted that the bid shall not be based on a substituted article, material, apparatus, product or process. With the application shall be furnished such information as required by the Engineer to demonstrate that the article, material, apparatus, product or process he wishes to use is the equivalent of that specified in quality, finish, design, efficiency and durability and has been elsewhere demonstrated to be equally serviceable for the purpose for which it is intended. The Contractor shall set forth the reasons for desiring to make the substitution and shall further state what difference, if any, will be made in the construction schedule and the contract price for such substitution should it be accepted; it being the intent hereunder that any savings shall accrue to the benefit of the County.

B. If the Engineer shall reject any such desired substitution as not being the equivalent of that specifically named in the contract, or if it shall determine that the adjustment in price in favor of the County is insufficient, the Contractor shall immediately proceed to furnish the designated article, material, apparatus, product or process.

C. Request for substitutes must be proposed to the Commissioner on the "Request For Approval Of Substitution" form of the Sample Forms. Such requests shall conform to the requirements of this Article.

D. Requests for substitutions shall include full information concerning differences in cost, and any savings in cost resulting from such substitutions shall be passed on to the County.

E. Requests for utilization of substitutes will be reviewed during the course of the project. The impact on the project and the timeliness of submission will be of key consideration.

F. The approval of utilization of a substitute is subject to the sole and final discretion of the Engineer.

G. REVIEW PROCESS

1) Requests for approval of substitutions will be received and considered from Prime Contractors only and not from manufacturers, suppliers, Subcontractors, or other third parties.

2) If the materials and equipment submitted are offered as substitutions to the Contract Documents or approved equal the Contractor shall advise the County and the Engineer of the requested substitutions and comply with the requirements hereinafter specified in this Article.

3) Where the acceptability of substitution is conditioned upon a record of satisfactory operation and the proposed substitution does not fulfill this requirement, the Engineer, at his/her sole discretion, may accept the substitution if the Contractor provides a bond or cash deposit which guarantees replacement at no cost to the County for any failure occurring within the specified time. The substitution item must meet all other technical requirements contained in the Specification.

4) The Contractor shall furnish such information as required by the Engineer to demonstrate that the equal article, material, apparatus, product or process is the equivalent of that specified in quality, finish, design, efficiency and durability and has been elsewhere demonstrated to be equally serviceable for the purpose for which it is intended and/or that it offers substantial benefits to the County in saving of time and/or cost. The Contractor shall set forth the reasons for desiring to make this substitution.

5) Contractor shall submit:

a. For each proposed request for approved substitute sufficient details, complete descriptive literature and performance data together with samples of the materials, where feasible, to enable the Engineer to determine if the proposed request for approval should be granted, including manufacturer's brand or trade names, model numbers, description of specification of item, performance data, test reports, samples, history of service, and other data as applicable.

b. Certified tests, where applicable, by an independent laboratory attesting to the performance of the substitute.

c. A list of installations where the proposed substitute equipment or materials is performing under similar conditions as specified.

6) Where the approval of a substitute requires revision or redesign of any part of Work, including that of other Contracts, all such revision and redesign, and all new drawings and details required therefore, shall be provided by the Contractor at its own cost and expense, and shall be subject to the approval of the Engineer.

7) In the event that the Engineer is required to provide additional engineering services, then the engineer's charges for such additional services shall be paid by the Contractor to the County.

8) Any modifications in the Work required under other contracts to accommodate the changed design will be incorporated in the appropriate contracts and any resulting increases in contract prices will be charged to the Contractor by the County who initiated the changed design.

9) In all cases the Engineer shall be the judge as to whether a proposed substitute is to be approved. The Contractor shall be bound by his/her decision. No substitute items shall be used in the Work without written approval of the Engineer.

10) In making request for approval of substitute, Contractor represents that:

a. Contractor has investigated proposed substitute, and determined that it is equal to or superior in all respects to the product, manufacturer or method specified or offers other specified advantages to the County.

b. Contractor will provide the same or better warranties or bonds for proposed substitute as for product, manufacturer or method specified.

c. Contractor waives all claims for additional costs or extension of time related to proposed substitute that subsequently may become apparent.

d. Contractor shall have and make no claim for an extension of time or for damages by reason of the time taken by the Engineer in considering a substitute proposed by the Contractor or by reason of failure of the Engineer to approve a substitute proposed by the Contractor. Any delays arising out of consideration, approval, or utilization of a substitute shall be the sole responsibility of the Contractor requesting the substitute and it shall arrange its operations to make up the time lost.

11) Proposed substitute will not be accepted if:

a. Acceptance will require substantial revision of Contract Documents.

b. They will substantially change design concepts or Technical Specifications.

c. They will delay completion of the Work, or the Work of other Contractors.

d. They are indicated or implied on a Shop Drawing and are not accompanied by a formal request for approval of substitute from Contractor.

12) The Engineer reserves the right to disapprove, for aesthetic reasons, any material or

equipment on the basis of design or color considerations alone, without prejudice to the quality of the material or equipment, if the manufacturer cannot meet the required colors or design.

13) All requests for approval of substitutes of materials or other changes from the contract requirements, shall be accompanied by an itemized list of all other items affected by such substitution or change. The Engineer shall have the right, if such is not done, to rescind any approvals for substitutions and to order such Work removed and replaced with Work conforming to the specified requirements of the contract, all at the Contractor's expense, or to assess all additional costs resulting from the substitution to the Contractor.

14) Approval of a substitute will not relieve Contractor from the requirement to submit Shop Drawings or any of the provisions of the Contract Documents.

15) In the event that the Engineer is required to provide additional engineering services as a result of a request for approval of a substitute results in changes by the Contractor in dimension, weight, power requirements, etc., of the equipment and accessories furnished, or as a result of Contractor's errors, omissions or failure to conform to the requirements of the Contract Documents or if the Engineer is required to examine and evaluate any changes proposed by the Contractor solely for the convenience of the Contractor, or for evaluation of deviations from Contract Documents, then the Engineer's charges in connection with such additional services shall be paid by the Contractor.

16) Structural design shown on the Drawing is based upon the configuration of and maximum loading for major items of equipment as indicated on the Drawings and as specified. If the substituted equipment furnished differs from said features, the Contractor shall pay to the County all costs of redesign and for any construction changes required to accommodate the equipment furnished, including the Engineer's charges in connection therewith.

17) The Contractor shall respond to required submittals with complete information and with a degree of accuracy to achieve approvals within two (2) submissions. All costs to the Engineer involved with subsequent submissions of Shop Drawings, Samples or other items requiring approval, will be paid by the Contractor to the County, by deducting such costs from payments due for Work completed. In the event an approved item is requested by the Contractor to be changed or substituted for, all costs involved in the reviewing and approval process will likewise be backcharged to the Contractor unless determined by the Engineer that the need for such substitution and/or deviation from Contract Documents is beyond the control of the Contractor.

30. EXTRA WORK: INCREASED COMPENSATION/DECREASED WORK: CREDIT TO THE OWNER

The Director of Project Management may, at any time, by a written order, and without notice to the sureties, require the performance of Extra Work or require or approve changes in the work, or Decreased Work ("work" to include but not be limited to specified methods of performing work) as he may deem necessary or desirable. The amount of compensation

to be paid to the Contractor for any Extra Work, as so ordered, or credit to the Owner for such decreased work, as so ordered or approved, shall be determined as follows:

1) **First**: By such applicable unit prices, if any, as set forth in the Contract; or

2) **Second**: If no such prices are so set forth, then by unit prices or by a lump sum, or sums, mutually agreed upon by the Director of Project Management and the Contractor; or

3) **Third**: If, in the opinion of the Director of Project Management, the aforesaid unit prices, under "First" above, are not applicable, or if the two parties hereto cannot reach agreement as to new unit prices or a lump sum, or sums, under "Second" above, then by the actual net cost in money to the Contractor of the materials and of the wages of applied labor (including cost of supplements provided and premiums for Workmen's Compensation Insurance, FICA, and Federal and State Unemployment Insurance) required for such Extra Work, plus twenty (20%) percent as compensation for all items of profit and costs or expenses including administration, overhead, superintendence, insurance (other than those specifically noted above) materials used in temporary structures, allowances made by the Contractor to subcontractors, including those made for overhead and profit, additional premiums upon the performance bond of the Contractor and the use of small tools and any and all other costs and expenses not enumerated above, plus such rental for plant and equipment (other than small tools) required and approved for such extra work. Where extra work is performed by a Subcontractor, the twenty percent stipulated above shall be divided between the Contractor and the Subcontractor as per their contractual agreement, or if not defined therein, then as the Contractor sees fit.

Rental rates for any power operated machinery, trucks or equipment, which it may be found necessary to use as in "Third" above, shall be reasonable and shall be based on those prevailing in the area of the County where such work is to be done, and they shall be agreed upon in writing before the work is begun.

In no case shall the rental rates submitted exceed the rates set up in the current edition of "Equipment Watch" plus the cost of fuel and lubricants.

These rates shall include all repairs, fuel, lubricants, applicable taxes, insurance, depreciation, storage and all attachments complete, ready to operate, but excluding operators. Operators shall be paid as stated here in above for labor.

For equipment, which is already on the project, the rental period shall start when ordered to work by the Construction Administrator, and shall continue until ordered to discontinue by him. The minimum payment for any one rental period shall be four hours, unless otherwise agreed upon between the Construction Administrator and the Contractor.

For equipment which has to be brought to the project, specifically for use as in "Third" above, the County will pay all loading and unloading costs, also all transportation costs will not be paid, if the equipment is used for work other than in "Third" above while on the project. The rental period shall begin at the time the equipment has been unloaded on the

project, and shall end on and include the day the order to discontinue the use of the equipment as in "Third" above is given to the Contractor by the Construction Administrator.

The daily rate shall apply for rental periods of four calendar days or less, the weekly rate shall apply for rental periods of more than four and not exceeding twenty-one calendar days, and the monthly rate shall apply for rental periods in excess of twenty-one calendar days. For fractional periods above the full unit rental period (day, week, month) reimbursement shall be proportioned on the basis of the applicable rental period. (Day-8 hrs.; Week-7 calendar days; Month-30 calendar days).

No percentage shall be added to the amounts of equipment rental prices agreed upon, but the price agreed upon shall be the total compensation allowed for the use of such equipment.

The provisions hereof shall not affect the power of the Contractor to act in case of emergency.

31. DISPUTED WORK - NOTICE OF CLAIMS FOR DAMAGES

If the Contractor is of the opinion that any work required, necessitated, or ordered violates or conflicts with or is not required by the terms and provisions of this Contract, it must promptly, within five (5) calendar days after being directed to perform such work, notify the Construction Administrator, in writing, of its contentions with respect thereto and request a final determination thereon. If the Construction Administrator determines that the work in question is contract and not extra work, or that the order complained of is proper, he will direct the Contractor in writing to proceed and the Contractor shall promptly comply. In order, however, to preserve its right to claim compensation for such work or damages resulting from such compliance, the Contractor must, within seven (7) calendar days after receiving notice of the Construction Administrator's determination and direction, notify the Construction Administrator, in writing that the work is being performed or that the determination and direction is being complied with, under protest. Failure of the Contractor to so notify shall be deemed as a waiver of claim for extra compensation or damages therefore.

While the Contractor is performing disputed work or complying with a determination or order under protest in accordance with this Article, in each such case the Contractor shall furnish the Construction Administrator daily with three copies of written statements signed by the Contractor’s representatives at the site showing:

1) the name of each worker employed on such work or engaged in complying with such determination or order, the number of hours employed thereon, and the character of the work each is doing; and

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 order, and from whom purchased or rented.

It is expressly agreed that no dispute over the scope of the Contractor’s work or any portion thereof shall cause any delay or interruption to the Contractor’s work.

In addition to the foregoing statements, the Contractor shall, upon notice from the Board of Acquisition and Contract, produce for examination by the duly appointed representative of

the Board of Acquisition and Contract, all its books of accounts, bills, invoices, payrolls, subcontracts, time books, daily reports, bank deposit books, bank statements, check books and canceled checks, showing all of its acts and transactions in connection with or relating to or arising by reason of this contract, and submit itself, its agents, servants and employees for examination under oath by any duly appointed representative designated by the Board of Acquisition and Contract to investigate claims made against the County. Unless the aforesaid statements shall be made and filed within the time aforesaid and the aforesaid records submitted for examination and the Contractor, its agents, servants, and employees submit themselves for examination as aforesaid, the County shall be released from all claims arising under, relating to or by reason of this contract, except for the sums certified by the Construction Administrator to be due and agreed that no person has power to waive any of the foregoing provisions, and that in any action against the County to recover any sum in excess of the sums certified by the Construction Administrator to be due under or by reason of this contract, the Contractor must allege in its complaint and prove, at the trial, strict compliance with the provisions of this article.

Before final acceptance of the work by the County, all matters of dispute must be adjusted to the mutual satisfaction of the parties thereto. Determinations and decisions in case any question shall arise, shall constitute a condition precedent to the right of the Contractor to receive the money therefore, until the matter in question has been adjusted.

32. CONTRACTOR'S SUBCONTRACTS AND MATERIAL LISTS

Within fifteen (15) days after execution of the Contract, the successful bidder shall submit to the County for approval a list of the subcontractors, materialmen and materials that he/she plans to use in the performance of the work and statements of the work they are to perform. The format and content of the list shall be in accordance with directives from the Construction Administrator. He/sit shall also submit additional information regarding their qualifications as may be later requested by the County. No part of the work may be sublet until after the Contractor has received the County's approval.

The Contractor shall be fully responsible for all acts and omissions of its subcontractors and persons directly or indirectly employed by them, and the County's approval to sublet parts of the work will in no way relieve the Contractor of any of its obligations under the Contract. All dealings of the Construction Administrator with the subcontractors shall be through the Contractor, subcontractors being recognized by the County only as employees of the Contractor.

By executing the Agreement, the Contractor represents that the Contractor shall insert appropriate clauses in all subcontracts to bind the subcontractors to the Contractor by all applicable provisions of the Contract Documents executed between the Contract and the County, but this shall not be construed as creating any contractual relationships between subcontractors and the County. Prior to approval of the subcontractors, the County has the right to review and recommend changes in the subcontracts. The County reserves the right to reject any subcontractor proposed by the Contractor if in the reasonable opinion of the County such subcontractor lacks the experience, capability or integrity to perform its subcontract work or is otherwise non-responsible.

By executing the Agreement, the Contractor represents that the Contractor shall insert appropriate clauses in each subcontract that require that if the Contractor is terminated by the County either for default or convenience that at the sole option of the County the subcontract shall automatically attorn to the County and the subcontractor shall continue without delay or interruption to fully perform all of the obligations required by its subcontract.

Where the specifications permit the Contractor a choice of different materials or manufactured products, it shall state the choice he has made in making up its bid, with the understanding that all choices must subsequently be approved by the Commissioner, after award of the contract to the successful bidder. If the bidder wishes to propose utilization of materials or manufactured products other than those specified, it shall so state and submit the required information in accordance with Article "Request For Approval Of Equal" of the General Clauses."

33. ASSIGNMENT OF CONTRACT

The Contractor shall not assign, transfer, convey or otherwise dispose of the contract or any part of it or any monies due and payable under the contract, without prior written approval of the County. If such approvals are granted by the County, they shall in no way relieve the Contractor or from any obligations under the terms of this Contract.

All documents assigning the contract or any part of it or any monies due and payable under the contract shall contain a clause stating that all monies to be paid the assignee in accordance with the terms of the Contractor's contract with the County, are subject to a prior lien for services rendered or materials and equipment supplied, in favor of all persons, firms or corporations rendering such services or supplying such materials and equipment.

34. PAYMENT FOR GENERAL PROVISIONS

No direct payment will be made for work done or materials furnished in compliance with the General Provisions of the specifications, unless otherwise noted. All compensation to the Contractor for its performance of the requirements of any general provision shall be considered to have been included in the prices he has bid for the individual items if a unit price contract and/or for a lump sum price if a lump sum contract.

In the event the Contractor fails or refuses to proceed with its work and/or correct or repair deficient or defective work then without prejudice to any and all of the County's other rights and remedies, and upon three (3) days notice to Contractor, the County may perform and/or employ any other person or persons to correct and/or repair any or all such work. All costs incurred by the County pertaining thereto shall be paid forthwith by the Contractor to the County.

35. COSTS INCURRED BY COUNTY

Wherever in these Contract Documents the County is entitled to recover costs from the Contractor or charge the Contractor for the costs incurred for the correction, supervision or for any other reason related to the Contractor's work or arising from the Contractor's failure or refusal to proceed with its work in a timely manner, such costs and/or charges shall be

deemed to include, but not be limited to, the County's costs and fees for inspection(s), engineering, consultant(s) and attorneys.

36. GUARANTEE OF WORK

A. Except as otherwise specified, all work performed under the Contract shall be guaranteed by the Contractor against defects resulting from the use of inferior materials, equipment or workmanship for one year from the guarantee starting date (which shall be defined as the date of the County's approval of the final Certificate for Payment or the date of actual full occupancy of the building, whichever is earlier). The building, section thereof, or item of equipment, shall be occupied or put into actual use by the Owner only after judged completed by the Construction Administrator and Owner and approved by him as ready for occupancy.

B. If, within any guarantee period, repairs or changes are required in connection with guaranteed work, which in the opinion of the Construction Administrator or Owner is rendered necessary as a result of the materials, equipment or workmanship which are inferior, defective, or not in accordance with terms of the Contract, the Contractor shall promptly upon receipt of notice from the Construction Administrator or Owner and without expense to the Construction Administrator or Owner:

   1) Place in satisfactory condition, in every particular, all of such guaranteed work, correct all defects thereof, and

   2) Make good all damages to the building or site, or equipment or contents thereof, and

   3) Make good any work or material, or equipment and contents of said building or site disturbed in fulfilling any such guarantee.

C. In any case where in fulfilling requirements of the Contract or of any guarantee embraced in or required thereby the Contractor disturbs any work, it shall restore such disturbed work to a condition satisfactory to the Construction Administrator.

D. If the Contractor, after notice, fails to proceed promptly to comply with terms of its guarantee, the Owner may have the defects corrected and the Contractor shall be liable for all expenses incurred.

E. All special guarantees applicable to definite parts of the work that may be stipulated in the Specifications or other papers forming a part of the Contract shall be subject to the requirements and term of this article.

37. SEPARATE CONTRACTS

A. Contractor's attention is specifically directed to the fact that, because of the work of other contracts within and adjacent to the limits of this Contract they may not have exclusive occupancy of the territory within or adjacent to the limits of this Contract.

B. Contractor's attention is further directed to the fact that, during the life of this Contract the owners and operators of Public Utilities may make changes in their facilities. These changes may be made by the Utility employees or by contract within the limit or adjacent to these contracts and may be both temporary and permanent.

C. Contractor shall be required to cooperate with other contractors and the owners of the various utilities, and to coordinate and arrange the sequence of their work to conform to the progressive operations of the work already under contract and to be put under contract.

D. Contractor shall be responsible for the coordination of the work of their various subcontractors. Their respective operations shall be arranged and conducted so that delays will be avoided. Where the work of a subcontractor overlaps or dovetails with that of other subontractors, materials shall be delivered and operations conducted so as to carry on the work continuously in an efficient and workmanlike manner. Delays or oversights on the part of Contractor or its subcontractors or utility owners in getting any or all of their work done in the proper way thereby causing cutting, removing and replacing work already in place, shall not be the basis for claim for extra compensation.

E. In case of interference between the operations of the utility owners and different Contractors, the Construction Administrator will be the sole judge of the rights of each Contractor and the sequence of work necessary to expedite the completion of the entire project, and in all cases the Construction Administrators decision shall be accepted as final and may not be challenged except in a proceeding brought pursuant to Article 78 of the Civil Practice Law and Rules.

38. COOPERATION WITH OWNER

Each Contractor shall cooperate with the Owner as to parking of vehicles, availability of storage and working areas and confining of activities and personnel to same. **NO PARKING FOR CONTRACTOR'S EMPLOYEES**.

39. JOB MEETINGS & PROJECT SUPERINTENDANT

A. An officer of the Contractor, or its project manager or superintendent, who is fluent in English and authorized to make binding decision on behalf of the Contractor shall attend job meetings with the Commissioner and/or the Construction Administrator, and any subcontractors whom the Inspector may designate; for the purpose of discussing expedition, execution and coordination of the work.

B. Job meetings will be scheduled periodically (the first to be prior to commencement of construction) at a time and place designated by the Construction Administrator.

C. The Contractor shall not commence any work prior to the first (pre-construction) meeting between the Contractor, Commissioner and/or Construction Administrator, client, and other concerned governmental and utility company representatives.

D. At the pre-construction meeting, the scheduling of the work on an arrow-flow diagram (showing chronologically and in detail the sequence and methods that will be followed) will be provided, and details for the proper execution and special requirements of the work will be explained and discussed.

E. The Contractor shall be responsible for providing a detailed construction schedule that provides for a Critical Path Method (“CPM”) and which is compatible with any of the state of the art CPM Method scheduling software.

F. Updated coordinated arrow-flow diagrams or CPM schedules, as the case may be, will be provided by the Contractor, as above, on a monthly basis to the County.

The Contractor shall indicate on the construction schedules noted above, time for shop drawing preparation, approvals, fabrication and delivery of materials and equipment for major items. The County may request that additional important items be included on the schedule.

G. The Contractors hall ensure that its Project Superintendent shall be on site full time at all times when the Contractor's Work is being performed.

40. PATENT WARRANTY

A. Contractor expressly represents, warrants and agrees that he has the legal right to furnish and install and to authorize the County to purchase and use the equipment hereby offered and each and every one of its several parts and every feature thereof, under one or the other, or partly under one and partly under the other of the following representations.

1) That the Contractor possesses a valid patent(s) covering the equipment to be furnished hereunder or part or features thereof or has or will obtain permit(s) and license(s) authorizing the Contractor to furnish and install same and to authorize the purchase and use thereof by the County.

2) The Contractor is responsible before ordering material, equipment, parts, systems, etc, to verify that the suppliers of all such material, equipment, parts, systems, etc, will supply the required warranty, guarantee, O & P manual, and maintenance service schedule.

3) That the equipment offered or certain parts or features thereof are not covered by any valid patent(s) within the knowledge of the Contractor.

B. Contractor further warrants and agrees that if any patent(s) is hereafter issued to any person whatsoever with respect to the equipment or any part or features thereof, to be furnished and installed hereunder, the Contractor will obtain such permit(s) or license(s) from the Patentee as may be necessary to authorize the use of the equipment by the County.

C. Contractor further represents, warrants and agrees that he and its sureties shall hold themselves responsible for and defend any claims made against the County for any infringement of patents due to the purchase and use by the County of said equipment or any part or feature thereof; that they will indemnify and save harmless the County from all costs, expenses and damages which it shall be obliged to pay by reason of any such infringement of patent(s); that in case the use of any such equipment is enjoined, they will bear the expenses of removing same and replacing same with equipment which will satisfactorily perform the function without constituting an infringement of any patent(s); and in case the use of any equipment shall be enjoined, that they shall pay to the County the sum of $1,000.00 per day, as liquidated damages, for each and every day during which the County shall be enjoined from using the same up to the day on which such

equipment is replaced by other equipment which will satisfactorily perform the same function but which will not constitute an infringement of any other patent(s).

D. The Contractor further agrees in the event the use of any of the equipment is enjoined and the Contractor is unable within a reasonable time to devise other equipment which will satisfactorily perform the same functions without infringement on any patent(s), that he will remove the equipment and refund to the County the entire cost of its purchase and installation, plus the sum of $ 1,000.00 per day as liquidated damages for each and every day until the substitute equipment has been purchased and installed by the County, excepting however that such period shall not exceed three months.

E. The Contractor further agrees in the event that any claim or notice of claim for infringement of patent(s) are made or filed prior to the making of payment by the County for the equipment and/or material proposed to be furnished and installed hereunder, that the County may withhold any sum due to the Contractor for such equipment and/or material until such claims shall have been settled or adjudicated or until additional surety bonds or other guarantees of indemnification shall have been posted, if deemed necessary by the County for its protection.

41. MATERIALS

A. Quality

1) It is the intent of these Specifications to describe definitely and fully the character of materials and workmanship required with regard to all ordinary conditions of the work and to require first-class work and new and best quality materials in all particulars. For unexpected conditions arising during the progress of the work and not fully covered herein, the Specifications shall be interpreted by the Construction Administrator to require first-class work and materials and such interpretations shall be accepted by the Contractor.

2) The Contractor is responsible before ordering material, equipment, parts, systems, etc, to verify that the suppliers of all such material, equipment, parts, systems, etc, will supply the required warranty, guarantee, O & P manual, and maintenance service schedule.

3) Where materials or devices are specified in these documents by reference to government, manufacturer's association, or professional society standards, the pertinent sections of the latest edition of such standards shall have the same force and effect as if set forth in full in these Specifications. The following abbreviations shall be used as indicated for the principal societies:

AASHO	American Association of State Highway Officials
ACI	American Concrete Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
ANSI	American National Standards Institute

ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers
ASTM	American Society for Testing and Materials
AWWA	American Water Works Association
AWI	American Woodworking Institute
AWS	American Welding Society
BHMA	Builders Hardware Manufacturers Association
CS	Commercial Standards
FS	Federal Specifications
IEEE	Institute of Electrical and Electronic Engineers
NEC	National Electric Code
NEMA	National Electrical Manufacturer's Association
NFPA	National Fire Protection Association
SDI	Steel Deck Institute
SMACNA	Sheet Metal and Air Conditioning Contractors National Association, Incorporated
TCA	Tile Council of America, Incorporated
TMCA	Tile and Marble Contractors of America
UL	Underwriter's Laboratories, Incorporated

B. Delivery, Storage and Handling:

1) Materials shall be delivered in manufacturer's original sealed containers with complete identification of contents and manufacturer, and kept sealed in original containers until used. Labels shall not be removed until materials have been installed and inspected.

2) Materials shall be delivered, stored, and handled with proper equipment and in a manner to protect them from damage.

3) The Contractor shall make arrangements for the receipt of materials delivered to the construction site. No representative of the County will accept any materials ordered by the Contractor.

4) Finish materials shall be protected from dirt and damage, and perishable materials shall be stored within appropriate weatherproof enclosures.

5) Delivery of materials shall be coordinated with the Operations Schedule.

6) The Contractor shall confine the apparatus, the storage of materials and the operations of the workmen to the limits indicated by law, ordinances, permits, or directions of the Construction Administrator, and shall not encumber the premises beyond the contract limits.

7) The Contractor shall not load or permit any part of the structure to be loaded with a weight that will endanger its safety.

8) Whenever the Contract Documents require delivery by the Contractor of any materials, equipment, or other items, the term delivery shall be deemed to include unloading and storing with proper protection where directed.

C. Federal Regulations

1) Should the Federal Government, because of Declaration of an Emergency, or other cause, establish controls over the use of certain construction materials, then the Contractor, immediately after signing the Contract or immediately after Declaration of an Emergency, shall furnish the Commissioner with an itemized list of all critical materials required for use on the project. For each item, the quantity required and the approximate date on which delivery will be required shall be indicated.

D. Name Plates

1) Each piece of operable equipment to be furnished and installed by a Contractor under its Contract such as motors, pumps, heaters, fans, transformers, switch and fuse racks and other similar equipment shall be provided with a substantial name plate of non-corrodible metal securely fastened in place and clearly and permanently inscribed with the manufacturer's name, the model or type designation, the serial number, the principal rated capacities, the electrical or other power characteristics and other similar and appropriate information.

2) Manufacturer's identification shall be inconspicuous, but where nameplates contain information relative to characteristics or maintenance, they shall be clearly visible and located for easy access.

3) The nameplate of a subcontractor or a distributor will not be permitted.

E. Manufacturer's Certification

1) Prior to the delivery of any water or sewer pipe to the construction site, the Contractor shall furnish properly attested documents certifying as to the type, class, name of manufacturer and source of supply of the pipe. One copy of each document shall be forwarded to the Construction Administrator at the construction site and to the Director of Project Management care of the Engineering Division, Michaelian Office Building, White Plains, New York.

F. Samples

1) The Contractor shall furnish, for approval of the Engineer, any samples required by the specifications or that may be requested by the Owner, of all materials he proposes to use, and shall pay all shipping charges for the samples. The Contractor shall send all samples to the office of the Engineer, except when directed otherwise. The sample of approved material will remain on file in the Engineer's office. A disapproved sample will be returned to the Contractor.

2) No samples are to be submitted with bids.

3) No materials or equipment of which samples are required to be submitted for

approval shall be used on the work until such approval has been given by the Engineer or Construction Administrator, save only at the Contractor's risk and expense.

4) Each sample shall have a label indicating the material represented, its place of origin and the names of the producer, the Contractor and the Contract for which the material is intended.

5) Approval of any sample shall be only for characteristics or for uses named in such approval, and no other. No approval of a sample shall be taken in itself to change or modify any Contract requirement. When a material has been approved, no additional sample of that material will be considered and no change in brand or make will be permitted. Approved samples held by the Engineer will be returned to the Contractor upon completion of the work, if requested.

6) Transactions with manufacturers or subcontractors shall be through the Contractor.

G. Dissimilar Materials

1) Where metals are placed in contact with or fastened to dissimilar metals, concrete, masonry, wood or other absorptive materials subject to repeated wetting or wood treated with a preservative non-compatible with the metal or if drainage from dissimilar materials passes over the work; treat the contact surfaces with a heavy coat of approved alkali-resident bituminous paint.

2) Where one of the metals is aluminum, a coat of zinc-chromate primer shall be applied prior to the bituminous paint.

42. STANDARD OF QUALITY

Wherever in the contract documents an article, material, apparatus, device, product or process is called for by trade name or catalog reference, or by the name of the patentee, manufacturer or dealer, it shall be construed as establishing a standard of quality and not construed as limiting competition. In such instances, the Contractor may use any article, material, etc. which, in the judgment of the Engineer, expressed in writing, is equal to and acceptable for the intent specified.

43. PROPRIETARY ITEM

Whenever less than three names are used in proprietary item specifications, it has been determined that:

A. The use of trade names is necessary for effective and workable specifications for the item.

B. All manufacturers known by the individuals familiar with the trade involved have been listed.

C. Equal items may be approved in accordance with Article “Request For Approval Of Equal” of the General Clauses.

44. SHOP DRAWINGS

A. Shop Drawing Schedule

1) Within fifteen (15) days after the Notice to Proceed, the Contractor shall prepare and submit two (2) copies of its schedule of Shop Drawing submissions to the Engineer for review and approval. The schedule is to be submitted on the "Shop Drawing Schedule" form of the Sample Forms.

2) In order to maintain the construction schedule for this project the Contractor shall submit all Shop Drawings per approved schedule. The Contractor is expressly cautioned that its failure or refusal to timely submit a shop drawing schedule acceptable to the Engineer and/or any deviation from the approved shop drawing schedule shall be deemed a default under this Contract.

3) Shop Drawings shall be submitted without fail in time to permit correction, resubmission and final approval, as hereinafter specified, without causing any delay in the construction of any Work.

4) Samples and Shop Drawings, which are related to the same unit of Work or Specification Section, shall be submitted at the same time. If related Shop Drawings and Samples are submitted at different times, they cannot be reviewed until both are furnished to the Engineer.

5) The schedule shall be updated every four-(4) weeks or more frequently as required by the Engineer.

6) Two (2)-updated copies of the schedule shall be submitted to the Engineer with each application for Partial Payment.

7) Form of Schedule

Schedule shall be in tabular form with appropriate spaces to insert the following information for principal items of equipment and materials:

a. Date on which Shop Drawings are requested and received from the manufacturer.

b. Dates on which Shop Drawings are transmitted to the Engineer by the Contractor.

c. Dates on which Shop Drawings are returned by the Engineer for revisions.

d. Dates on which Shop Drawings are revised by manufacturer and resubmitted to the Engineer.

e. Date on which Shop Drawings are returned by Engineer annotated either "Approved" or "Approved as Noted".

f. Date on which accepted Shop Drawings are transmitted to manufacturer and Contractor's Invoice Number.

g. Date of manufacturer's scheduled delivery.

h. Date on which delivery is actually made.

i. Sample of schedule follows on next page.

B. Shop Drawing Requirements

1) Shop Drawings for the Work shall include working and setting drawings, schedules, shop details, wiring diagrams, manufacturer's catalog cuts and brochures and all other drawings, schedules and diagrams necessary for the proper correlation of the Work.

Insofar as it is practicable, all drawings shall be uniform in size. They shall be dated, numbered consecutively and shall be identified with the Contract Number and Title, a description of the material or equipment and the area of the work and where it is to be installed. Shop drawings shall accurately and clearly show sizes, work, erection dimensions, arrangement and sectional views, necessary details including information for making connection with the work of other items as may be required, materials and finishes, detailed parts lists, and performance characteristics and capacities as may be required.

2) All detailing for structural components shall be done in accordance with the provisions for design and workmanship in the latest additions of the publications listed below except as may be modified in the Contract Documents:

a. "Manual of Steel Construction" of the America Institute of Steel Construction.

b. "Building Code Requirements for Reinforced Concrete" and "Manual of Standard Practice for Detailing Reinforced Concrete Structures" of American Concrete Institute.

3) Detailing practices for other components shall be done to conform to the best trade practices.

4) Contractor Responsibilities

a. Before submitting Shop Drawings to the Engineer all submittals from its Subcontractors, manufacturers or suppliers shall be sent directly to the Contractor for preliminary review, coordination and checking.

Contractor shall be responsible for their submission at the proper time so as to prevent delays in delivery of material or equipment. Contractor shall thoroughly check all drawings for accuracy and conformance to the intent of the Contract Documents. Drawings found to be inaccurate or otherwise in error shall be returned to the Subcontractors, manufacturers, or suppliers by the Contractor for correction.

b. All submittals, including Shop Drawings prepared by or under the direction of the various Contractors, shall be thoroughly checked by the Contractor for accuracy and checked by the Contractor for accuracy and conformance to the intent of the Contract Documents before being submitted tot he Engineer and shall bear the Contractor's signature certifying that they have been so checked. Before submitting them to the Engineer, all submittals shall be properly labeled and consecutively numbered. In a clear space above the title block, the Contractor shall provide the "Shop Drawing ID" form of the Sample Forms, and enter the required information:

c. Shop Drawings shall be submitted as a single package including all associated drawings for any operating system and shall include all items of equipment and any mechanical units involved or necessary for the functioning of such system. Where applicable, the submittal shall include elementary wiring diagrams showing circuit functioning and necessary interconnecting wiring diagrams for construction.

d. If the submittals contain any departures from the Contract Documents, specific mention thereof shall be made in the Contractor's letter of transmittal. Otherwise, the review of such submittals shall not constitute approval of the departure. The Contractor shall also call the Engineer's attention to any changes by the use of larger letters of at least 1" in height on the Shop Drawings along with a letter by the Contractor advising the Engineer to the recommended change and the reason therefore. If this is not done, even if the Work is incorporated in the construction, it will not be accepted by the Engineer even if Shop Drawings are "Approved".

e. No materials or equipment shall be ordered, fabricated or shipped or any Work performed until the Engineer returns to the Contractor the submittals herein required, annotated "Approved".

f. Where errors, deviations, and/or omissions are discovered at a later date in any of the submittals, the Engineer's prior review of the submittals does not relieve the Contractor of the responsibility for correcting all errors, deviations and/or omissions.

g. Two (2) copies of Preliminary Operations and Maintenance Manuals shall be submitted with the final Shop Drawings for each item of equipment.

h. Submittals shall be transmitted in strict compliance with Special Clause 10. A.2 and in sufficient time to allow the Engineer adequate time for review and processing so as not to delay the Project per the approved Shop Drawing Schedule.

i. Contractor shall transmit five (5) prints of each submittal to the Engineer for review. Any submissions, which in the opinion of the Engineer, are not legible will not be reviewed and will be returned to the Contractor annotated "Disapproved".

j. Contract drawings are for engineering and general arrangement purposes only and are not to be used as Shop Drawings.

k. Shop Drawings shall accurately and clearly present the following:

- All working and installation dimensions.
- Arrangement and sectional views.
- Units of equipment in the proposed positions for installation, details of required attachments and connections, and dimensioned locations between units and in relation to the structures.
- Necessary details and information for making connections between the

various trades including, but not limited to, power supplies and interconnecting wiring between units, accessories, appurtenances, etc.

l. Structural and all other layout drawings prepared specifically for the Project shall have a plan scale of not less than 1/4-inch equal to 1 foot and they shall be not larger than the size of the Contract Drawings.

m. Where manufacturer's publications in the form of catalogs, brochures, illustrations, compliance certificates, or other data sheets are submitted in lieu of prepared Shop Drawings, such submissions shall specifically indicate the item for which approval is requested. Identification of items shall be made in ink, and submissions showing only general information are not acceptable.

n. The Contractor shall provide all required copies for the use of the various trades and at the Site, and one (1) copy of approved Shop Drawings shall be provided by the Contractor to each of the other Prime Contractors unless otherwise noted in writing by the Engineer.

o. The Contractor shall respond to required submittals with complete information and accuracy to achieve required approvals within three (3) submissions. All costs to the Owner involved with subsequent submissions of Shop Drawings, Samples or other items requiring approval, will be backcharged to the Contractor, at the rate of 3.0 times direct technical labor cost, by deducting such costs from payments due for Work completed. In the event an approved item is requested by the Contractor to be changed or substituted, all involved costs in the review process will likewise be paid by the Contractor to the County unless determined by the Director of Project Management or Commissioner that the need for such deviation is beyond the control of the Contractor. Contractor shall be responsible for coordinating its Work and submittals with its Subcontractors.. Should Contractor cause the need for additional submissions or reviews of previous submissions all involved costs will similarly be paid to the County.

5) Procedure for Review

a. Shop Drawings will be checked for design conformance with the Contract Documents and general arrangement only.

b. Submittals will be annotated by the Engineer in one of the following ways:

- "Approved" - no exceptions are taken.
- "Approved as Noted" - minor corrections are noted and shall be made and a resubmittal is required.
- "Disapproved because" - with specific deficiencies noted.
- "Disapproved" - based on the information submitted, the submission is not in conformance with the Contract Documents. The deviations from the Contract Documents are too numerous to list and a completely revised submission of the proposed equipment or a submission of other equipment is required.

c. One copy of the reviewed submittals will be returned to the Contractor. It is the Contractor's responsibility to provide copies to:

- Its Subcontractors.
- Its Materialmen and Suppliers.

unless notified otherwise in writing by the Engineer.

6) Disapproved drawings will be returned to the Contractor for correction and resubmission. After the Contractor has had the required corrections made on the original drawing, it shall again submit five copies for review by the Engineer.

7) The acceptance of Shop Drawings by the Engineer shall be only general in nature and shall not relieve the Contractor of any responsibility for the accuracy of the drawings, the proper fitting and construction of the Work or for the furnishing of materials or other Work required by the Contract Documents, but not shown on the Shop Drawings. Acceptance of Shop Drawings by the Engineer shall not be construed as approving departures from the Contract requirements unless specifically noted by the Engineer. Acceptance of Shop Drawings for one item shall not be construed as approval for other changes even if noted by the Contractor on the drawing.

8) Shop Drawings submitted other than in accordance with the outlined procedures will be returned to the Contractor for resubmission and the Contractor shall bear all expense and risk of all delays as if no Shop Drawings had been submitted.

9) No Work shall be performed until the Shop Drawings have been accepted by the Owner, and the Contractor shall be responsible for all costs and damages, which may result from proceeding prior to the approval of the Shop Drawings.

45. SEQUENCE OF CONSTRUCTION OPERATIONS

A. It is mandatory that the premises continue to be occupied and facilities therein shall continue to function during the performance of the construction work.

B. Detailed sequence of construction and availability of spaces in areas through which services must pass shall be coordinated between the Owner and the Contractor, before actual commencement of the Work.

1) To enable the Work to be laid out and prosecuted in an orderly and expeditious manner, Contractor shall provide a proposed Progress Schedule, within fifteen (15) days after the issuance of the Notice to Proceed of this Contract unless otherwise directed in writing by the Construction Administrator. The proposed Progress Schedule shall show the anticipated time of commencement and completion of each of the various operations to be performed under this Contract; together with all necessary and appropriate information regarding the sequence and correlation of Work; and the Schedule of Shop Drawings and delivery of all materials and equipment required for the Work. The Contractor shall prepare a Master Progress Schedule (Schedule) for the Work. Contractor as directed by the Construction Administrator shall revise the proposed Schedule until each activity is properly sequenced to provide that the Work will be completed in the proper order and

within the allotted Contract duration, without any conflicts. When the Construction Administrator has accepted the Schedule the Contractor will sign it. The Contractor shall then provide one (1) copy of such approved Schedule to each Subcontractor and two (2) copies to the Construction Administrator. Contractor shall afford its Subcontractors a reasonable opportunity for the introduction and storage of their materials and the execution of their Work and shall properly connect and coordinate its Work with others.

Contractor shall strictly adhere to the Schedule unless changed as provided for in the following paragraph.

2) Within five (5) days after receiving notice of any change in the Contract, or of any Extra Work to be performed, or of any suspension of the whole or any portion of the Work, or of any other conditions which are likely to cause or are actually causing delays, Contractor must notify the Construction Administrator in writing of the effect, if any, of such change or Extra Work or suspension or other condition upon the previously approved schedule, and must state in what respects, if any, the Schedule should be revised, with the reasons therefor. These proposed changes in the Schedule shall be reviewed and, if appropriate, approved, in writing, by the Construction Administrator. Contractor must strictly adhere to the revised Schedule. Distribution of the revised Schedule shall be as described in paragraph B-1 above. Contractor's compliance with the requirements of this paragraph is in addition to, and not in lieu of, compliance with other notice requirements pertaining to delays and extensions of time contained elsewhere in the contract.

3) The Schedule shall be reviewed by Contractor every two (2) weeks or as directed by the Construction Administrator.

4) If Contractor shall fail to adhere to the approved Schedule, or to the Schedule as revised, they must promptly adopt additional means and methods of construction with no additional cost to the County that will make up for the lost time and will assure completion in accordance with such Schedule. The proposed means and methods shall be described in writing to the County within two (2) days after the Contractor discovered or should have reasonably discovered that the Schedule would not be met as originally proposed. Failure to comply with this requirement may result in the County enforcing its rights under the Contract including, without limitation, default of the Contract.

C. From time to time as the Work progresses and in the sequence indicated by the approved Schedule, the Contractor must submit to the Construction Administrator a specific request in writing for each item of information or approval required. These requests shall be submitted sufficiently in advance of the date upon which the information or approval is actually required by the Contractor to allow for the time the Construction Administrator may reasonably take to act upon such submissions or resubmissions. The Contractor shall not have any right to an Extension of Time on account of delays due to its failure to timely submit requests for the information or approvals.

D. Certain construction work shall be required, which will be disruptive to the Owner's staff insofar as noise, dirt and dust is concerned. The Contractor, therefore, shall

perform such work during other than normal working hours. Subject to the requirements of law, the Owner imposes no limitation on the Contractor's working hours and whatever overtime work may be necessary or required shall be considered by the Contractor and reflected in its Bid Proposal without the benefit of extra compensation.

46. PROTECTION

A. The Contractor shall at all times exercise all necessary precautions for the safety of the public, employees performing the work and County personnel. The Contractor shall provide and maintain barricades, danger signals and other safeguards about the work and shall be held responsible for all accidents or damages to persons or property caused by failure to do so throughout the progress of the work, and shall comply with all applicable provisions of Federal, State and County Safety Laws.

B. The Contractor shall during the performance of its work, protect at all times all adjacent portions of the existing surfaces and existing equipment from damage due to the performance of the construction work.

C. The Contractor shall furnish temporary facilities and/or temporary dust-proof partitions separating all work areas and access routes from those areas not involved in active alterations, so that this work will not interfere with the Owner's access or normal use of areas not allocated to the Contractor, or any essential service to such areas, when ordered by the Construction Administrator.

47. CLEANUP AND REMOVAL OF DEBRIS

A. At the end of each working day, the Contractor shall sweep up and collect all the rubbish and place it in appropriate containers, furnished by the Contractor. Containers shall be kept at a location on, or adjacent to the work site, as designated by the Construction Administrator. Wood or cardboard crates and other debris of a similar nature shall be broken up, securely bundled and neatly stacked alongside the containers. Once each week and at the completion of the work, the Contractor shall remove all accumulated debris and rubbish.

B. At the completion of the work, the Contractor shall clean all equipment, fixtures, surfaces and accessories, removing all dust and other foreign matter, ready for use by the Owner.

48. TEMPORARY SERVICE

A. Sanitary facilities will be provided by the Owner for the Contractor and its personnel.

B. The Owner will supply and pay for the cost of all-temporary water and temporary electric power (120 volt, 60 hertz). The Contractor shall furnish and install all temporary electrical and water connections required for work under this Contract, at and to locations as designated by the Construction Administrator.

49. OPERATING TESTS

A. Where operating tests are specified the Contractor shall test the work as it progresses and shall make satisfactory preliminary tests in all cases before applying to the Engineer for official tests.

B. Official tests will be made in the manner specified for the different branches of the work, in the presence of the Construction Administrator or Engineer. Should defects appear they shall be corrected by the Contractor and the test repeated until the installation is acceptable to the Construction Administrator or Engineer and to any authorities having jurisdiction.

C. No work of any kind shall be covered or enclosed before it has been tested and approved.

D. The Contractor shall furnish all materials and apparatus, make connections and conduct tests, without extra compensation unless noted otherwise.

50. OPERATING INSTRUCTIONS AND PARTS LISTS

A. Where the Specifications require any Contractor to supply equipment operating and maintenance instructions and spare parts lists prior to the completion of the work it shall provide three copies of the publications for each piece of equipment he has furnished and installed under the Contract, upon receipt of the approved shop drawings.

B. Publications shall be prepared for the specific equipment furnished and installed, containing the following information, and shall not refer to other sizes, types or models of similar equipment:

1) Clear and concise instructions for the operation, adjustment, lubrication and other maintenance of the equipment, including a complete lubrication chart.

2) A complete listing of all parts for the equipment, with catalog numbers and other data necessary for ordering replacement parts.

C. Advertising literature will not be acceptable.

51. CUTTING AND PATCHING

Contract with Single Bid:

A. Where the project does not involve separate bids pursuant to the New York General Municipal Law the following will apply:

1) Where walls, floors, ceilings, roofs or other items require cutting for the installation of new work, all such cutting shall be done by the Contractor with the approval of the Construction Administrator; and the Contractor shall patch the opening to make the cut portions match the adjacent finished surfaces, unless otherwise indicated.

2) The Contractor shall not endanger any existing condition by its operations.

3) The cost of all cutting and patching caused by the Contractor's negligence shall be

borne by the Contractor.

Contract with Separate Bids:

B. If the project is one where separate bid specifications are required pursuant to the New York General Municipal Law the following will apply:

1) A sufficient time in advance of the construction of new floors, walls, ceilings, roofs, or other items, each Contractor shall be responsible for properly locating and providing in place all sleeves, inserts and forms required for their work, and shall furnish the Contractor for General Construction with complete information relative to exact locations and dimensions of all required openings in the General Contractor's work. Other Contractors shall periodically consult the Job Progress Chart of the General Contractor so that they will not be delayed by their work requirements, but the General Contractor shall be obliged to give all other Contractors at least seventy-two hours notice before commencing the previously mentioned new construction work.

2) The cost shall be borne by the responsible Contractor for all cutting, patching, re-waterproofing and re-caulking of new work necessary for reception of the work of a Contractor, caused by the Contractor's failure to timely or properly locate and provide in place all sleeves, inserts and forms required for its own work, or by a Contractor's failure to inform the General Contractor of required openings. The General Contractor shall do all cutting, patching, re-waterproofing and re-caulking of all new work no matter how or by whom such work was caused and shall be reimbursed for such extra work by the responsible Contractor, in accordance with the terms of the Contract. All cutting and patching shall have prior approval of the Construction Administrator.

3) Where sleeves, inserts, forms or openings are required in existing walls, floors, ceilings roofs, or other existing items, all necessary cutting, patching, re-waterproofing and re-caulking required shall be done by the individual responsible Contractor, except for finished surfaces. The responsible Contractor shall do all rough patching to bring the cut areas to the proper surface ready to receive the finished surface. All finishing work required to make the cut portions match the adjacent finished surfaces shall be performed by the General Contractor.

4) Each Contractor shall be responsible for coordinating their work with the work of all other Contractors engaged on the project. If directed, Contractors shall submit coordinated shop drawings showing how the fitting of the various parts of the work will be accomplished, for the Construction Administrator’s acceptance.

5) All cutting and patching shall be governed by the applicable divisions of the Specifications with regard to workmanship, materials and methods.

6) No Contractor shall endanger any work by unauthorized cutting, excavating, or other alteration of the work, unless previously authorized by the Construction Administrator.

52. CONFLICTS AMONG CONTRACT DOCUMENTS

In the event of any conflict among the Contract Documents, the Contractor shall notify the Commissioner and comply with the Commissioner's interpretation, according to the following priorities:

Priority Order	Document
1…….	Modification issued after execution of Agreement
2…….	Agreement between Owner and Contractor
3…….	Addenda issued prior to the execution of the Agreement (Later date to take precedence)
4…….	Special Notices
5…….	Technical Specifications
6…….	Construction Drawings:
6A……..	Schedule on Construction Drawings
6B……..	Notes on Construction Drawings
6C……..	Large Scale Details on Construction Drawings
6D……..	Small Scale Details on Construction Drawings
7…….	General Requirements
8…….	Special Clauses
9…….	Information for Bidders and General Clauses

53. RECORD DRAWINGS

A. The Owner shall furnish, at the first job meeting, one set of "paper" copies of the contract drawing(s) - this is in addition to the five sets of contract drawings as described in the Article "Contract Drawings" of the General Requirements; for the Contractor's use to indicate change(s) as they occur for the duration of the construction work. Upon request from the Contractor, the County will supply the Contractor a copy of the original Contract Drawings in AutoCAD format.

B. The Contractor shall record neatly and legibly, using reasonable drafting care, all approved change(s) (including minor revisions or corrections of pipes, ducts, electric outlets, circuit panels and other features, as well as invert elevations and locations of underground lines).

C. When all approved changes are recorded and clearly identified, the Contractor shall prepare a set of "as-built" (record) drawings, in the latest version of AutoCAD, using the approved County format and associated CAD layering guidelines, with 24" x 36" drawing sizes, showing the project as built including all changes in the work made during construction based on marked-up prints, drawings, and other data. These drawings shall be filed on a CD and submitted to the Construction Administrator.

D. All additional "paper" or reproducible drawings are to be obtained by the Contractor at their own expense.

54. TIME

A. All time limits (see Article "Required Time For Completion Of The Work" of the General Requirements, and, Article "Time Of Starting" of the Information For Bidders) stated in the specifications are of the essence of the Contract.

B. The Contractor may perform all necessary labor during other than normal working hours. The Owner imposes no limitation of the Contractor's working hours and whatever overtime work may be necessary or required shall be considered by the Contractor and reflected in its Bid Proposal without the benefit or extra compensation. The Contractor must give a minimum of four (4) hours notice to the Construction Administrator when overtime Work is necessary. The Contractor shall promptly pay to the County the additional cost of the Engineer and Construction Administrator for inspection services during the overtime Work.

55. ACCELERATION OF THE WORK

The Owner may, at its sole discretion and for any reason, require the Contractor to accelerate the schedule of performance by providing overtime, extended day, extra crews, Saturday, Sunday and/or holiday work and/or by having all or any subcontractors designated by the Owner provide overtime, extended day, extra crews, Saturday, Sunday or holiday work by the Contractor's or his subcontractor's own forces, and such requirements is independent of and not related in any way to any apparent inability of the Contractor to comply with the schedule(s), Milestone(s) and/or completion date requirements, the Owner, pursuant to a written change order as signed by the Commissioner shall reimburse the Contractor for the direct cost to the Contractor of the premium time for the labor utilized by the Contractor in such overtime, extended day, extra crews, Saturday, Sunday or holiday work(but not for the straight time costs of such labor) together with any social security and state or federal unemployment insurance taxes in connection with such premium time. However, no overhead, supervision costs, commissions, profit or other costs and expenses of any nature whatsoever, including impact costs or costs associated with lost efficiency or productivity, shall be payable in connection therewith. Anything to the foregoing notwithstanding, in the event that the Contractor has fallen behind schedule or in the Owner's judgment appears likely to fall behind schedule, Owner shall have the absolute right to direct the Contractor to accelerate the performance of its work, including that of its subcontractors, and the full costs for such acceleration shall be borne solely by the Contractor.

56. ULTRA LOW SULFUR DIESEL FUEL

A. Contractors and Subcontractors operating onroad and nonroad vehicles to perform County work must power those vehicles with ultra low sulfur diesel fuel. Ultra low sulfur diesel fuel is any diesel fuel that has a sulfur content of no more than fifteen parts per million.

B. In addition, all onroad and nonroad diesel vehicles used to perform County work and equipped with a model year 2003 or older engine shall utilize the best available

technology[2] in accordance with the following schedule:

a) effective September 1, 2007 - 35% of all such motor vehicles used on this project;
b) effective September 1, 2008 - 65% of all such motor vehicles used on this project;
c) effective September 1, 2009 - 100% of all such motor vehicles used on this project.

C. All onroad and nonroad diesel vehicles to perform County work having a gross vehicle weight rating of more than 14,000 pounds shall utilize the best available technology or be equipped with an engine certified to the applicable 2007 United States Environmental Protection Agency ("EPA") standard for particulate matter as set forth in Section 86.007-11 of Title 40 of the Code of Federal Regulations or to any subsequent EPA standard for such pollutant that is at least as stringent, in accordance with the following schedule:

a) by September 1, 2007 - 35% of all such motor vehicles;
b) by September 1, 2008 - 65% of all such motor vehicles;
c) by September 1, 2009 - 100% of all such motor vehicles

D. Any contractor who violates any provision of Section 873.1329 shall be liable for a civil penalty not to exceed ten thousand dollars plus twice the amount of money saved by such contractor for failure to comply with this section.

E. Any contractor who makes a false claim may be liable for a civil penalty not to exceed twenty thousand dollars, in addition to twice the amount of money saved by such contractor as a result of having made such false claim.

F. Nothing in this section shall be construed to limit the County's authority to cancel or terminate a contract, deny or withdraw approval to perform a subcontract or provide supplies, issue a non-responsibility finding, issue a non-responsiveness finding, deny a person or entity pre-qualification as a vendor, or otherwise deny a person or entity public entity business.

G. If sufficient quantities of ultra low sulfur diesel fuel are not available to meet the needs of a contractor to fulfill the requirements of this contract, the Contractor may submit a written request to the Commissioner to use diesel fuel with a sulfur content of no more than thirty parts per million as long as the contractor shall use whatever quantity of ultra low sulfur diesel fuel that is available. Such determination shall be made in writing on a case by case basis upon written application to the Commissioner. If the Commissioner grants such authority it shall expire sixty days thereafter and may be renewed upon written request for additional periods of sixty days.

[2] Best Available Technology means a system for reducing the emission of pollutants which is based on technology verified by the U.S. Environmental protection Agency or the California Air Resources Board or which has been identified pursuant to NYC's Department of Environmental Protection that (1) reduces diesel particulate matter emissions by at least 85 percent, as compared to a similar engine operating on traditional diesel fuel without emission control technology, or reduces engine emissions to 0.01 grams diesel particulate matter per brake horsepower per hour or less; and 2) achieves the greatest reduction in emissions of nitrogen oxides at a reasonable cost and in no case produces a net increase in nitrogen oxides in excess of 10%.

H. The Contractor, in order to comply with Subsections B & C above, must retrofit its vehicles to include both of the following in order to comply with the Best Available Technology Requirements:

- Diesel Oxidation Catalysts (DOC)
- Crankcase Vent Filters (CVF)

If the Contractor wants to propose an alternative technology it must submit a written request to the Commissioner with sufficient detail to enable the Commissioner to make a determination as to whether to accept the alternative technology. Any approval of alternative technology must be in writing.

57. QUALIFIED TRANSPORTATION FRINGE PROGRAM

EXECUTIVE ORDER NO. 7-2005

Requires that contractors, concessionaires and vendors doing business with the County enroll in a Qualified Transportation Fringe Program as defined in §132(f)(1) of the IRS Tax Code for all contracts for goods or services of $100,000 or more in any twelve month period during the contract term if such contractor, concessionaire or vendor employs more than 25 individuals who utilize public transportation and/or pay for commuter parking at least 1 day per week regardless of whether those employees are engaged in work pursuant to the contract.

Bidders shall submit the signed statement on Proposal Page 34. Notwithstanding the above, a Bidder may submit a Waiver Application on Proposal Page 35 to the Commissioner.

58. USE OF FLUORESCENT LIGHT BULBS & ENERGY EFFICIENT BULBS

The use of incandescent light bulbs is prohibited in County-owned buildings and facilities. Only fluorescent light bulbs may be installed in County buildings and facilities. Exterior lights must utilize energy-efficient bulbs. For further details see Article 58 of the General Clauses.

59. COUNTY OF WESTCHESTER PHOSPHORUS-FREE LAWN FERTILIZER POLICY

Executive Order 8-2007 limits the use of lawn fertilizers containing phosphorous and other compounds containing phosphorous, such as phosphate on County owned property.

EXECUTIVE ORDER NO.8 OF 2007

WHEREAS, the New York City water supply watershed is a critical drinking water source for approximately eight million New York City consumers and approximately one million upstate consumers. Over eighty-five percent (85%) of Westchester County's residents consume water from the New York City water supply system; and

WHEREAS, eutrophication is a natural aging process of lakes or streams brought on by

nutrient enrichment. Eutrophication can be greatly accelerated by human activities that increase the rate at which nutrients and organic substances enter aquatic ecosystems from their surrounding watersheds; and

WHEREAS, as a result of accelerated eutrophication, enhanced plant growth reduces dissolved oxygen in the water creating severely impaired water bodies with unpleasant water taste and odor, discoloration, release of toxins and increased turbidity that interferes with the health and diversity of indigenous fish, plant, and animal populations and with the recreational use of rivers, lakes and wetlands. Consequently, eutrophication restricts water use for fisheries, recreation, industry, and drinking due to the increased growth of undesirable algae and aquatic weeds and the oxygen shortages caused by their death and decomposition; and

WHEREAS, nutrient pollution due to human activities is one of the leading causes of eutrophication in the NYC Watershed, and is specifically accelerated by the introduction of excessive phosphorus into the environment. In fact, most reservoirs in the East of Hudson portion of the New York City Watershed (5 of the 7 located in Westchester County) are designated as phosphorous-restricted basins in accordance with the New York City Watershed Rules & Regulations due to excessive phosphorous volumes which have not been reduced despite phosphorous reductions mandated by the New York State Department of Environmental Conservation (NYSDEC); and

WHEREAS, one unnecessary source of phosphorus pollution in the watershed is the many pounds oflawn fertilizer applied by residents and businesses in the County of Westchester each year; and

WHEREAS, when phosphorus fertilizer is applied to phosphorus-rich lawns, much of the excess simply runs off of the lawn into the storm drainage systems where it can be carried into rivers, lakes, streams, and wetlands, causing eutrophication; and

WHEREAS, soil tests conducted pursuant to a six-year study by the Cornell Cooperative Extension, an extension of the State's designated Land-Grant University, have shown that approximately 90% of the lawns in Westchester County have medium-to-high levels of phosphorus; and

WHEREAS, the New York City Watershed Pesticide and Fertilizer Technical Working Group, established by the New York City Watershed Memorandum of Agreement, issued a report in 2000, noting the high percentage of phosphorus in regional soils and recommending that phosphorus-based lawn fertilizers be added only when a soil analysis identifies phosphorus deficiencies.

WHEREAS, the proposed Stormwater Phase II regulations recently issued by the New York State Department of Environmental Conservation, and which are expected to go into effect in January of2008, will allow the use of phosphorus-based lawn fertilizers on municipally-owned land only where soil testing indicates that phosphorus concentrations are inadequate, in order to ensure that municipalities in the New York City Watershed are

taking satisfactory steps to achieve the above-referenced mandatory phosphorous reductions.

WHEREAS, the United States Environmental Protection Agency has also determined that a Nonpoint Source Implementation Plan was necessary in the Croton Watershed because the phosphorus reductions necessary to meet the targeted applicable water quality standards could not be achieved by wastewater treatment plant upgrades alone; and

WHEREAS, Section 110.11 of the Laws of Westchester County places the responsibility to supervise, direct and control, subject to law, the administrative services and departments of the county, upon the County Executive; and

WHEREAS, I have determined that restricting the application and use of lawn fertilizer containing phosphorus on all County-owned property will address one source of unnecessary and preventable phosphorus pollution and will improve water quality in the County; and

WHEREAS, the Department of Planning, after review of the applicable regulations under the State Environmental Quality Review Act, has advised that this Executive Order has been classified as a Type II action, pursuant to 6 N.Y.C.R.R. § 617.5(c)(20), "routine or continuing agency administration and management, not including new programs or major reordering of priorities that may affect the environment," and 6 N.Y.C.R.R. § 617.5(c)(27), "adoption o fregulations, policies, procedures and local legislative decisions in connection with any action on this list." As such, no further environmental review is required.

NOW THEREFORE, I, , County Executive of the County of Westchester, in light of the aforementioned, do hereby order and direct each and every department, board, agency, and commission of the County of Westchester under my jurisdiction to ensure that the policies and procedures set forth in the following Phosphorus-Free Lawn Fertilizer Policy are complied with.

COUNTY OF WESTCHESTER
PHOSPHORUS- FREE LAWN FERTILIZER POLICY

I. Definitions:

(1) "Certified laboratory" means any laboratory certified by the New York State Department of Health pursuant to section five hundred two of the New York State Public Health Law to conduct soil analysis.

(2) "Commercial fertilizer" means any substances containing one or more recognized plant nutrients which is used for its plant nutrient content, and which is designed for use or claimed to have value in promoting plant growth, except unmanipulated animal or vegetable manures, agricultural liming material, wood ashes, gypsum and other products exempted by regulation of the New York State Commissioner of Agriculture and Markets.

(3) "Lawn fertilizer" means a commercial fertilizer distributed primarily for non-farm use, such as lawns, shrubbery, flowers, golf courses, municipal parks, cemeteries, greenhouses and nurseries, and such other use as the commissioner may define by regulation. Lawn fertilizer does not include fertilizer products intended primarily for garden and indoor plant application.

II. Use and Application of Lawn Fertilizer:

(1) Any lawn fertilizer that is labeled as containing more than 0% phosphorus or other compound containing phosphorus, such as phosphate, shall not be applied upon any County-owned property, except as provided in section III. Of this Executive Order.

(2) No lawn fertilizer shall be applied upon County-owned property when the ground is frozen.

(3) Lawn fertilizer shall not be applied to any impervious surface upon County-owned property, including parking lots, roadways, and sidewalks. If such application occurs, the fertilizer must be immediately contained and either applied to turf in a manner consistent with this Executive Order or placed in an appropriate container.

III. Exemptions:

The prohibition against the use of lawn fertilizer under section II of this Executive Order shall not apply to:

(1) Newly established turf or lawn areas during their first growing season.

(2) Turf or lawn areas that soil tests, performed within the past three years by a certified laboratory or by the Cornell University Cooperative Extension of Westchester County, confirm the need for additional phosphorus application in accordance with the phosphorus levels established by the Cornell University Cooperative Extension of Westchester County. The lawn fertilizer application shall not contain an amount of phosphorus exceeding the amount and rate of application recommended in the soil test evaluation.

(3) Agricultural uses, vegetable and flower gardens, or application to trees or shrubs.

IV. The transition to phosphorus-free lawn fertilizer shall occur as soon as possible in a manner that avoids wasting of existing inventories; accommodates establishment of supply chains for new products; enables the training of County employees and licensees in appropriate work methods; and allows the phase-out of products and practices inconsistent with this Executive Order. However, in no event shall lawn fertilizer containing phosphorus (i.e., labeled as containing more than 0% phosphorus or other compound containing phosphorus, such as phosphate) be applied upon County-owned property after January 1,2009, unless an exemption set forth in Section III of this Executive Order applies.

V. This Executive Order shall take effect on the date hereof, and shall remain in effect until otherwise superseded, repealed, modified or revoked.

SAMPLE FORMS

DEPARTMENT OF PUBLIC WORKS

Division of Engineering

AFFIRMATIVE ACTION PROGRAM REQUIREMENT- SUBCONTRACTOR(S)

County of Westchester, Department of Public Works

(To Be Completed By Subcontractor and Submitted with Request to Utilize Subcontractor)

Affirmative Action Program

An approved Affirmative Action Plan shall be required for all Subcontractors for public work where the subcontracted work exceeds $50,000 or more than fourteen (14) persons are employed by the Subcontractor.

Does the Subcontractor participate in an approved Affirmative Action Program? Yes [ ] No [ ]

If Yes, give name of Program: _____

_____

If No, how many employees will the Subcontractor employ on this project? _____

An approved Affirmative Action Program shall mean a plan approved or adopted by Westchester County including but not limited to, the Home-Town Plan, the Recruitment Training Program or any other program approved or meeting the requirements of the State or Federal government.

The "Monthly Employment Utilization Report" of the Sample Forms, shall be filled out by the Contractor and/or Subcontractor(s) who are required to have an Affirmative Action Program, prior to the start of the work.

CONTRACTOR'S REPORT OF EMPLOYMENT AND WEEKLY AFFIDAVIT

County of Westchester, Department of Public Works

Contract No._____

Report No._____

Week(s) ending_____

Title of Contract and Location _____

Contractor or Subcontractor _____

Address _____

_____

_____

STATE OF)
COUNTY OF) SS.:

I,_____, being duly sworn, depose and say:

1. I pay or supervise the payment of the persons employed by_____
(Contractor or Subcontractor)
in connection with the above referenced contract;

2. During the payment period commencing on the ____ day of _____,

20____ and ending on the _____ day of _____, 20___, all persons employed by

_____ in connection with such contract have been paid in full
(Contractor or Subcontractor)
weekly wages and supplements earned by such persons except the following: (strikeout, if not applicable)

3. Such persons have been paid the prevailing rate of wages and the supplements as determined and required by Section 220 of the New York State Labor Law.

4. No rebates or deductions have been deducted from such wages and supplements except as authorized or required by applicable statutes or regulations of the Federal, State and County Governments.

5. The following is a true and accurate summary of wages and supplements paid:

_____During the week_____Total to date

Number of names on payroll _____

Hours worked _____

Total wages earned_____

6. I have read the foregoing statement of wages and supplement, know the contents thereof, and the same is true to my own knowledge.

_____

(Signature)

STATE OF NEW YORK)
COUNTY OF WESTCHESTER) ss.:

On this _____ day of _____, 20___, before me personally came _____ to me known, and known to me to be the person who executed the above instrument, and who being duly sworn did say that he executed the same.

Sworn to before me
this _____ day of _____

_____

License No.

_____

Notary Public - State of New York

MONTHLY EMPLOYMENT UTILIZATION REPORT

County of Westchester, Department of Public Works

MONTHLY EMPLOYMENT UTILIZATION REPORT	JOB TITLE:	CONTRACT NO.:
WESTCHESTER COUNTY DEPARTMENT OF PUBLIC WORKS DIVISION OF ENGINEERING	NAME AND LOCATION OF CONTRACTOR:	REPORTING PERIOD: FROM: ____________ TO: ____________

CONSTRUCTION TRADE	CLASSIFICATION	WORK HOURS OF EMPLOYMENT														TOTAL NUMBER OF EMPLOYEES		TOTAL NUMBER OF MINORITY EMPLOYEES	
		TOTAL ALL EMPLOYEES BY TRADE				BLACK (NOT HISPANIC ORIGNAL)		HISPANIC		ASIAN OR PACIFIC ISLANDERS		AMERICAN INDIAN OR ALASKAN NATIVE		MINORITY PERCENTAGE %	FEMALE PERCENTAGE %				
		M	HRS	F	HRS	M	F	M	F	M	F	M	F			M	F	M	F
	JOURNEY WORKER																		
	APPRENTICE																		
	TRAINEE																		
	SUB-TOTAL																		
	JOURNEY WORKER																		
	APPRENTICE																		
	TRAINEE																		
	SUB-TOTAL																		
	JOURNEY WORKER																		
	APPRENTICE																		
	TRAINEE																		
	SUB-TOTAL																		
	JOURNEY WORKER																		
	APPRENTICE																		
	TRAINEE																		
	SUB-TOTAL																		
TOTAL JOURNEY WORKER																			
TOTAL APPRENTICES																			
TOTAL TRAINEES																			
GRAND TOTAL (#HRS & #EMPL)																			

COMPANY OFFICAL'S SIGNATURE AND TITLE:	TELEPHONE NUMBER (Include Area Code):	DATE SIGNED:	PAGE: ________ OF ________

This report must be filled out by all contractors (both prime and sub) who are required to have an Affirmative Action Program, and must be filed with the Engineer by the 5th day of each month during the term of the Contract, and shall include the total work hours of each employee classification in each trade in the covered area for the Monthly Reporting Period. The Prime Contractor shall submit a report for its Aggregate Work Force and collect and submit reports for each subcontractor's Aggregate Work Force to the Engineer.

SHOP DRAWING SCHEDULE

County of Westchester, Department of Public Works

SHOP DRAWING SCHEDULE											
SPECIFICATION NUMBER	DESCRIPTION OF ITEM/MODEL #	SUBMISSION	REQUEST FROM CONTRACTOR TO MANUFACTURER	RECEIVED BY CONTRACTOR FROM MANUFACTURER	RECEIVED BY COUNTY FROM CONTRACTOR	RETURNED BY COUNTY TO CONTRACTOR	RETURNED BY CONTRACTOR TO MANUFACTURER	APPROVED BY COUNTY	APPROVED SHOP DRAWINGS TO MANUFACTURER FROM CONTRACTOR	INVOICE NO. AND SCHEDULED DELIVERY DATE	ACTUAL DELIVERY DATE
		ORIGINAL									
		2									
		3									
		4									
		ORIGINAL									
		2									
		3									
		4									
		ORIGINAL									
		2									
		3									
		4									
		ORIGINAL									
		2									
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		4									
		ORIGINAL									
		2									
		3									
		4									
		ORIGINAL									
		2									
		3									
		4									

SHOP DRAWING ID

County of Westchester, Department of Public Works

WESTCHESTER COUNTY DRAWING _____ OF _____

NAME OF PROJECT

_____

Date _____

Contract No. _____

Item/Model No. _____

Manufacturer _____

Contract Drawing No. _____

Specification Section _____

This document has been reviewed, coordinated and checked for accuracy of content and for compliance with the Contract Documents. The information contained herein has been coordinated with all other Contract Work.

Contractor _____

Signed _____

REQUEST FOR APPROVAL OF EQUAL

County of Westchester, Department of Public Works

SPECIFICATION NO.	ITEM	EQUAL

Attach a separate sheet here if more space is required.

REQUEST FOR APPROVAL OF SUBSTITUTIONS

County of Westchester, Department of Public Works

ITEM NO.	ITEM	SUBSTITUTION	COST OF SPECIFIED ITEM	COST OF SUBSTITUTED ITEM	SAVINGS TO COUNTY

Attach a separate sheet here if more space is required.

CONTRACTOR'S ULTRA LOW SULFUR DIESEL FUEL AFFIDAVIT

County of Westchester, Department of Public Works

Contract No. _____Period Included in this Report:_____, 20__ to _____, 20__

Title of Contract and Location_____
_____

Contractor _____
Address_____

Subcontractor _____
Address_____

STATE OF) ss.:
COUNTY OF)

I, _____being duly sworn, depose and say:
(print name) (print title)

1. I certify under penalty of perjury that I agree to comply with the requirements of Chapter 878, Article XIII, Section 873.13.29 of the Laws of Westchester County.
2. During the period _____ through _____, all diesel-powered vehicles, used in the performance of Contract No._____, were powered by ultra low sulfur diesel fuel (15 ppm Sulfur Maximum).
3. No fuel other than Ultra Low Sulfur Diesel Fuel (15 ppm Sulfur Maximum) was utilized on this project for the above described vehicles.
4. The annexed Ultra Low Sulfur Diesel Fuel Log is a true and accurate summary of the low sulfur diesel fuel (15 ppm Sulfur Maximum) purchased and utilized in the performance of this project.
5. I have read the foregoing statement, have full knowledge of the contents thereof, and it is my intent that the County of Westchester will rely on the statements contained herein.

_____
(Signature)

STATE OF) ss.:
COUNTY OF)

On this _____ day of _____, 20__, before me personally came _____ to me known, and known to me to be the person who executed the above instrument, and who being duly sworn did say that he/she executed the same.

Sworn to before me this

_____day of _____, 20__.

_____

Notary Public

The Ultra Low Sulfur Diesel Fuel-Log must be attached.

This Certification also has to be submitted by your subcontractor(s). *Additional copies of this form can be acquired from the Department of Public Work.*

ULTRA LOW SULFUR DIESEL FUEL (15 ppm Sulfur Maximum) – LOG

Period of Log: _____ through _____

Contract No. _____

Title of Contract and Location_____
_____

Contractor or Subcontractor_____
Address_____

Date of Purchase	Name and Address of Vendor (Print)	Gallons Purchased

A Separate Copy of this Certification will also have to be signed by each of your subcontractors that utilize diesel powered vehicles, fifty horsepower or greater, on the above project. *Additional copies of this form can be acquired from the Department of Public Works.*

Westchester gov.com

Westchester County • Department of Finance • Treasury Division

Electronic Funds Transfer (EFT) Vendor Direct Payment Authorization Form

Authorization is: *(check one)*

- ❒ New
- ❒ Change
- ❒ No Change

INSTRUCTIONS: Please complete both sections of this Authorization form and attach a voided check. See the reverse for more information and instructions (Forms Page 21). If you previously submitted this form and there is no change to the information previously submitted, ONLY complete lines 1 through 6 of section 1.

Section I - Vendor Information

1. Vendor Name:

2. Taxpayer ID Number or Social Security Number:

3. Vendor Primary Address

4. Contact Person Name: | Contact Person Telephone Number:

5. Vendor E-Mail Addresses for Remittance Notification:

6. Vendor Certification: *I have read and understand the Vendor Direct Payment Program and hereby authorize payments to be received by electronic funds transfer into the bank that I designate in Section II. I further understand that in the event that an erroneous electronic payment is sent, Westchester County reserves the right to reverse the electronic payment. In the event that a reversal cannot be implemented, Westchester County will utilize any other lawful means to retrieve payments to which the payee was not entitled.*

Authorized Signature | Print Name/Title | Date

Section II- Financial Institution Information

7. Bank Name:

8. Bank Address:

9. Routing Transit Number:

10. Account Type: (check one) ❒ Checking ❒ Savings

11. Bank Account Number: | 12. Bank Account Title:

13. Bank Contact Person Name: | Telephone Number:

14. FINANCIAL INSTITUTION CERTIFICATION (required **ONLY** if directing funds into a Savings Account **OR** if a voided check is not attached to this form): *I certify that the account number and type of account is maintained in the name of the vendor named above. As a representative of the named financial Institution, I certify that this financial Institution is ACH capable and agrees to receive and deposit payments to the account shown.*

Authorized Signature | Print Name / Title | Date

(Leave Blank - to be completed by Westchester County) - Vendor number assigned

Electronic Funds Transfer (EFT)
Vendor Direct Payment Authorization Form

GENERAL INSTRUCTIONS

Please complete both sections of the Vendor Direct Payment Authorization Form and forward the completed form (along with a voided check for the account to which you want your payments credited) to: Westchester County Board of Acquisition and Contract, 148 Martine Ave, Room 104, White Plains, NY 10601, Attention: Vendor Direct. Please see item 14 below regarding attachment of a voided check.

Section I - VENDOR INFORMATION

1. Provide the name of the vendor as it appears on the W-9 form.
2. Enter the vendor's Taxpayer ID number or Social Security Number as it appears on the W-9 form.
3. Enter the vendor's complete primary address (not a P.O. Box).
4. Provide the name and telephone number of the vendor's contact person.
5. Enter the business e-mail address for the remittance notification. THIS IS VERY IMPORTANT. This is the e-mail address that we will use to send you notification and remittance information two days prior to the payment being credited to your bank account. We suggest that you provide a group mailbox (if applicable) for your e-mail address. You may also designate multiple e-mail addresses.
6. Please have an authorized Payee/Company official sign and date the form and include his/her title.

Section II - FINANCIAL INSTITUTION INFORMATION

7. Provide bank's name.
8. Provide the complete address of your bank.
9. Enter your bank's 9 digit routing transit number.
10. Indicate the type of account (check one box only).
11. Enter the vendor's bank account number.
12. Enter the title of the vendor's account.
13. Provide the name and telephone number of your bank contact person.
14. If you are directing your payments to a Savings Account OR you can not attach a voided check for your checking account, this line needs to be completed and signed by an authorized bank official. IF YOU DO ATTACH A VOIDED CHECK FOR A CHECKING ACCOUNT, YOU MAY LEAVE THIS LINE BLANK.

DPW 10/08

SAMPLE CONTRACT AND BOND

FOR CONSTRUCTION

DEPARTMENT OF PUBLIC WORKS

Division of Engineering

WESTCHESTERGOV . COM

DEPARTMENT OF PUBLIC WORKS
OFFICE OF THE COMMISSIONER

CONTRACT AND BOND

FOR CONTRACT

NOTE: ONLY PROVIDED AS A SAMPLE IN THESE SPECIFICATIONS FOR INFORMATIONAL PURPOSES AND NOT TO BE EXECUTED WHEN SUBMITTING THE BID PROPOSAL. THE SUCCESSFUL BIDDER WILL BE REQUIRED TO EXECUTE THESE DOCUMENTS, AS MORE FULLY DESCRIBED IN THE PROPOSAL REQUIREMENTS.

CONTRACT NO. Amount of Contract $

THIS AGREEMENT made this _____ day of _____, 200__, by and between the COUNTY OF WESTCHESTER, a municipal corporation of the State of New York, hereinafter, "County", and

hereinafter called the "Contractor", WITNESSETH as follows:

WHEREAS, the Commissioner of Public Works, hereinafter called "Commissioner", by virtue of the power and authority in him vested did advertise for proposals and bids for:

Westchester County, New York, to furnish all labor, tools, implements and materials that may be requisite and necessary to the execution and completion of the work according to the plans, specifications, profiles and other drawings relating to such work, as approved by the County of Westchester and now on file in the Office of the Commissioner, and

WHEREAS, the Contractor did bid for said work in the manner and form as required by said plans and specifications and, being the lowest responsible bidder therefore, was duly awarded the Contract for such work at prices named in the itemized proposal by a resolution of the Board of Acquisition and Contract of the said County of Westchester.

NOW THEREFORE, the Contractor, in consideration of the prices so named for the various items of work to be paid for as hereinafter provided, does for itself, its representatives, agents, executors, administrators, successors or assigns, covenant and agree with the County that it, the said Contractor, shall and will at its own proper costs and charges and in conformity with said plans and specifications which are made a part of this Contract without setting forth same herein, provide all manner and kind of materials, molds, models, cartage, appliances and appurtenances required and of every description necessary for the due and proper performance of this Contract and the completion of said work to be done under the supervision and direction of the Commissioner, in a good workmanlike manner and in conformity with said plans and specifications without any alteration, deviation, additions, or omissions therefrom except upon due request and under the written direction of said Commissioner.

The Contractor acknowledges receipt of the "Information for Bidders, General and Special Clauses, Specification, Proposal and Plans" relating to this Contract, as well as all issued Addenda thereto, all of which are expressly incorporated in this Contract as if fully set forth herein.

IT IS FURTHER UNDERSTOOD AND AGREED by and between the parties to this Contract that if in the opinion of the said Commissioner of the County of Westchester it shall become necessary to make any change in the work called by the plans and specifications which are a part of this Contract, whereby, consistent with the Information for Bidders, the work contemplated by said plans and specifications is modified and reduced and the costs and expenses of such work lessened, that then and in that event the Contractor will do the work as changed and modified and the said Commissioner shall estimate the difference between the original estimate of quantities therefor and the amount that should be paid by reason of the modification and change and the difference shall be deducted from the original estimate of quantities therefore of said Contract and said Contractor shall be paid accordingly. The estimate of said Commissioner shall be final and conclusive upon the parties hereto and may not be challenged except in a proceeding commenced pursuant to Article 78 of the Civil Practice Law and Rules. Any changes, modifications or deductions shall in no way invalidate this Contract and said Contractor agrees that in the event of any such change or modification reducing the original, estimated quantities therefore, it will not make any claim for any profit, or loss of profit by reason thereof. Notwithstanding any dispute or disagreement arising hereunder, Contractor agrees that the Work shall not be delayed nor disrupted by reason thereof.

The County hereby covenants and agrees with the said Contractor, in consideration of the covenants and agreements herein being strictly and in all respects complied with by the said Contractor as specified, that it will well and truly pay unto the said Contractor the unit prices set forth in the Proposal for the various items included in the Contract.

All partial payments will be made in accordance with the provisions set forth in the "Information for Bidders" and especially that part thereof which relates to "Estimates and Payments".

Furthermore, all partial payments will be made on the claim voucher and verified certificate of the Commissioner, both of which shall be filed in the Office of the Commissioner of Finance of the County of Westchester. The said claim voucher shall show the value of the work completed and the verified certificate shall show the said work was done in accordance with the plans and specifications.

With the final estimate the Contractor shall furnish to the Construction Administrator a sworn statement listing all unpaid bills and liabilities incurred under this Contract up to and including the date of the estimate. Where there are any bills or liabilities in excess of moneys due under any estimate under this Contract, the Construction Administrator may withhold payment of the estimate pending a satisfactory proof of settlement or adjustment of any excess claims. No final estimate will be approved or passed for payment unless and until the Contractor furnishes satisfactory proof that all bills and liabilities incurred under the Contract are paid in full and complies with the requirements of Section 220-a of the Labor Law.

Acceptance shall be effected as follows: whenever, in the opinion of the Commissioner, the Contractor shall have completely performed the Contract on his part to be performed, the Commissioner shall so certify in writing to the Board of Acquisition and Contract of the County and file such certificate with the said Board, stating therein, in substance that the work has been duly examined by him and that the same has been fully performed and completed in accordance

with the terms of the Contract therefor, and recommending the acceptance thereof. When the Board of Acquisition and Contract by resolution duly adopts, approves and ratifies, the said acceptance shall be complete. No final payment shall be made under this Contract until such certificate of completion and recommendation of acceptance have been approved and ratified by a resolution of said Board of Acquisition and Contract.

Unless otherwise provided for in the contract documents, 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, that 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 herein. In the event the Commissioner takes over, uses, occupies or operates any part of the work: (i) the Commissioner shall issue a written determination of Substantial Completion with respect to such part of the Work; and (ii) the Contractor shall be relieved of its absolute obligation to protect such part of the unfinished work in accordance with Article 20 of the General Clauses.

The Commissioner will approve a final estimate for final payment consistent with the authorization of final acceptance from the Board of Acquisition and Contract less previous payments and any and all deductions authorized to be made by the Commissioner under the Contract or law. Payment pursuant to such final estimate less any additional deductions authorized to be made by the Commissioner of Finance under the Contract or law shall constitute the final payment and shall be made by the Commissioner of Finance. If the contract is terminated prior to final acceptance the Commissioner is authorized to prepare a final payment as otherwise authorized by the Board of Acquisition and Contract subject to the above noted adjustments.

Upon the completion and acceptance of this Contract by the Board of Acquisition and Contract, as aforesaid, the Commissioner shall proceed with all reasonable diligence to ascertain from actual measurements the whole amount of work done by the Contractor, and also the value of such work under and according to the terms of this Contract, and thereupon make out in writing a final estimate therefor.

After the completion and acceptance as herein above-mentioned, the Commissioner of Public Works shall file with the Commissioner of Finance of the County of Westchester the original verified certificate, claim voucher and the certification required by Section 220-a of the Labor Law, together with a certified copy of the resolution of approval and ratification of the Board of Acquisition and Contract of the said verified certificate and claim voucher and the resolution of acceptance of completion.

IT IS FURTHER UNDERSTOOD AND AGREED by and between the parties to this Contract that the Contractor will accept the unit prices named in the proposal for all additions to or deductions from the original quantities as given in the specifications. It is agreed that the Commissioner will make estimates of the value for the work completed as provided in the specifications and the final estimate will be made accordingly.

The Contractor further agrees that if at any time before or within thirty days after the whole of the work herein agreed to be performed has been completed and accepted any person or persons claiming to have performed any labor or furnished any material towards the performance and completion of this contract shall file with the proper officials any such notice as is described in the Lien Law, or any other act of the Legislature of the State of New York, the Contractor shall cause such Lien to be discharged of record. Otherwise and in every case and until the Lien is discharge of record the County shall retain, anything herein to the contrary notwithstanding, from the moneys under its control and due or to grow due under this Contract the sum of one hundred fifty (150%) percent of the amount of such Lien, unless otherwise authorized to withhold a larger amount. The Contractor further agrees to pay the County upon demand the costs, including but not limited to attorney's fees, incurred by the County in any action(s) brought to foreclose or otherwise enforce said Lien.

The Contractor covenants and agrees to commence the work embraced in this Contract within Ten [10] calendar days after service upon him, by the Commissioner, of written notice instructing him to begin the work and shall complete the same in all respects within _____ consecutive calendar days computed from the date of such Notice to Commence.

It is further understood and agreed by the parties hereto that the time of completion is of the essence of this Contract.

It is further understood and agreed by the Contractor that before entering upon the performance of this Contract it shall have approved by the County Attorney the Bond required to be furnished by it in the sum of----------
[$] conditioned for the faithful performance of the work.

The Contractor hereby covenants and agrees to observe the plans, specifications and directions of the Commissioner in the doing of the work provided for under this Contract and to furnish the necessary materials and implements required therefore and to remove condemned material and rubbish as provided by plans and specifications and to employ a competent and sufficient force of workmen to complete the work of this improvement within the time specified. Should the Contractor at any time become insolvent, make an assignment for the benefit of creditors, abandon the Work, reduce its working force to a number which, if maintained, would be insufficient, in the sole opinion of the Commissioner, to complete the Work in accordance with the approved progress schedule; sublet, assign or otherwise dispose of this Contract other than as permitted elsewhere herein, refuse or neglect to supply a sufficiency of properly skilled workmen, or of material of the proper quantity or fail in any respect to prosecute the work with promptness and diligence, or fail in any other way in the performance of any of the agreements herein contained; all the foregoing being deemed acts of default, and such default being certified by the Commissioner, the County of Westchester, acting by the Board of Acquisition and Contract, shall be at liberty after five days written notice to the Contractor to provide any such labor or materials, use any and all sums due or to become due to the Contractor under this Contract, to pay for such labor and material, and if the Commissioner shall certify that such default is sufficient ground for such action, the County of Westchester acting by the Board of Acquisition and Contract, shall also be at liberty to terminate the employment of the Contractor for the said work and to enter upon the premises and take possession for the purpose of completing the work included under this Contract of all materials, tools and appliances thereon

and to employ any other person or persons to finish the work and provide the materials therefore. Upon the Contractor's receipt of a notice from the County the Contractor shall immediately discontinue all further operations under this Contract. In case of such termination, the Contractor shall not be entitled to receive any further payment under this Contract until the said work shall be wholly finished, at which time if the unpaid balance of the amount to be paid under this Contract shall exceed the reasonable value of the work performed and the material furnished or the total costs therefor, whichever is greater, in finishing the work, such excess shall be paid by the County of Westchester to the Contractor, but if such expense shall exceed such unpaid balance, the Contractor shall pay the difference to the County.

The expense incurred by the County and the total costs as herein provided either for furnishing materials or for finishing the work and any damage incurred through such default shall be certified by the Commissioner whose certificate thereof shall be final and conclusive upon the parties and may not be challenged except in a proceeding commenced pursuant to Article 78 of the Civil Practice Law and Rules.

In case the County shall declare the Contractor in default as to a part of the work only, the Contractor shall immediately discontinue such part, shall continue performing the remainder of the Work in strict conformity with the terms of the Contract.

In completing the whole or any part of the Work under the provisions of this Contract, the Commissioner shall have the power to depart from or change or vary the terms and provisions of this Contract. 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 certification of the cost of completion referred to above, 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 his default or partial default.

In addition to termination as provided for above, the County may terminate this Contract for the convenience of the County by written notice to the Contractor from the Commissioner. In such event and upon receipt of such notice the Contractor shall stop work on the date specified in the notice; take such actions as may be necessary to protect and preserve the County's materials and property; cancel all cancelable orders for material and equipment; assign to the County and deliver to the jobsite or any other 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 which has been specifically fabricated for the sole purpose of this Contract and not incorporated in the Work; and take no action that will increase the amounts payable by the County under this Contract.

In the event the contract is cancelled for the convenience of the County the following provisions shall apply:

(a) For Work completed prior to the notice of termination, the Contractor shall be paid the fair and reasonable value of its work determined by the pro rata portion of the lump sum bid amount based upon the percent completion of the Work as of the date of termination as determined by the Commissioner, plus work completed pursuant to approved change orders, less amounts

previously paid. For purposes of determining the pro rata portion of the lump sum bid amount to which the Contractor is entitled, the Contractor's approved bid breakdown pursuant to Article 21 of the Information for Bidders shall be considered but shall not be dispositive as to the fair and reasonable value.

(b) For non-cancelable material and equipment that is not capable of use except in the performance of this Contract and which has been specifically fabricated for the sole purpose of this Contract, but not yet incorporated in the Work, the Contractor shall be paid the fair and reasonable value thereof as determined by the Commissioner, but not more than the Contractor's cost for such material and equipment, plus an additional sum of two (2%) percent of such fair and reasonable value.

(c) In the event the County terminates a lump sum Contract for convenience within thirty (30) days after the Contractor has received the Notice of Award from the County, the Contractor shall be paid one (1%) percent of 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 (a) and (b).

(d) On all unit price Contracts, or on unit price items in a Contract, the County will pay the Contractor the sum of (e) and (f) below, less all payments previously made pursuant to this Contract:

(e) For all completed units, the unit price stated in the Contract, and

(f) For units that have been ordered but are only partially completed, the Contractor will be paid (i) a pro rata portion of the unit price as stated in the Contract based upon the percent completion of the unit as determined by the Commissioner and (ii) for non-cancelable material and equipment, payment will be made pursuant to (b), above.

(g) The Commissioner's determination(s) hereunder shall be final, binding and conclusive and subject to review only pursuant to Article 78 of the New York Civil Practice Law and Rules.

(h) The County shall not be liable to the Contractor for any payment or claim if the termination for convenience results in a reduction of thirty (30%) percent or less of the original contract price as bid.

On all Contracts or items in a Contract where time and material records are specified as the basis for payment of the Work, the Contractor shall be paid in accordance with Article 29 of the General Clauses, less all payments previously made pursuant to this Contract.

In no event shall any payments made pursuant to a termination for convenience exceed the Contract price for such items, either individually or collectively.

All payments made pursuant to a termination for convenience shall be in the nature of liquidated damages and shall be accepted by the Contractor in full satisfaction of all claims against the County.

The County may deduct or set off against any sums due and payable arising from a termination for convenience, any claims it may have against the Contractor.

In the event the County terminates the Contractor for default and it is subsequently determined that the Contractor was not in default, said termination shall automatically be converted for all purposes into a termination for convenience.

It is further understood and agreed between the parties hereto that no certificate given or payment made under this Contract, except the final certificate or final payment shall be conclusive evidence of the performance of this Contract either wholly or in part and that no payment shall be construed to be an acceptance of defective work or improper materials. If the Contractor shall fail to replace any defective work or materials, the County may cause such defective materials to be removed and defective work to be replaced and the expense thereof shall be deducted from the amount to be paid the Contractor.

Anything to the contrary in the preceding paragraph notwithstanding, the Contractor is responsible for the repair of defects in materials and workmanship for a period of one year from the date of final acceptance of the work by the Board of Acquisition and Contract, unless a longer term is specified in the specifications.

The Contractor further agrees not to assign, transfer, convey, sublet or otherwise dispose of this Contract, or its right, title or interest in or to the same, or any part hereof without the previous consent in writing of the Board of Acquisition and Contract of the County. Before a Subcontractor shall proceed with any work, the Commissioner must first recommend and the Board of Acquisition and Contract must approve the use of the Subcontractor on this Contract. If a Subcontractor is not approved it may not work on this Contract. The Contractor specifically waives any claim due to the failure or refusal of the Commissioner or the Board of Acquisition and Contract to approve said Subcontractor.

The Contractor agrees to hold himself responsible for any claims made against the County for any infringement of patents by the use of patented articles in the construction and completion of the work or any process connected with the work agreed to be performed under this Contract or of any material used upon the said work, and shall indemnify and save harmless the County for the costs, expenses and damages which the County may be obligated to pay by reason of any infringement of patents used in the construction and completion of the work.

The parties hereto agree that no laborer, workman or mechanic in the employ of the Contractor, Subcontractor or other person doing or contracting to do the whole or part of the work contemplated by the Contract shall be permitted or required to work more than eight hours in any one calendar day or more than five days in any one week except in cases of extraordinary emergency including fire, flood or danger to life or property. No such person shall be so employed more than eight hours in any day or more than five days in any one week except in such emergency. Time lost in any week because of inclement weather by employees engaged in

the construction, reconstruction and maintenance of highways outside of the limits of cities and villages may be made up during that week and/or the succeeding three weeks.

The Contractor further agrees to erect and maintain during construction all necessary guards, rails and signals to prevent accidents to persons, vehicles or to the adjoining property and also agrees to use all necessary precautions in blasting and that he will indemnify and save the County of Westchester harmless from all suits and actions of any kind and nature whatsoever from or on account of the construction of said work.

It is further understood and agreed by the parties hereto that should any dispute arise respecting the true construction, interpretation or meaning of the Contract plans, specifications or conditions herein, or the measurements for the payment thereunder, same shall be referred to and decided by the said Commissioner and his decision thereon shall be final and conclusive upon the parties thereto and may not be challenged except in a proceeding commenced pursuant to Article 78 of the Civil Practice Law and Rules. This provision shall also apply to the true value of and duly authorized extra work or any work permitted by agreement in case any work shall be ordered performed, or any work called for shall be so omitted under and upon the direction of said Commissioner.

The Contractor by the submitting of bids and execution of this Contract hereby covenants and agrees that he has examined the plans, specifications and the site work, as to local conditions, difficulties and accuracy of approximate estimate of quantities and does hereby further covenant and agree that he will not make any claim for damages by reason of any such local conditions, difficulties or variation of approximate estimate of quantities.

The Contractor represents and warrants to the County with the knowledge and expectation that this warranty will be relied upon by the County that it is not now participating and has not at any time participated, either directly or through any substantially owned or affiliated person, firm, partnership or corporation, in an international boycott in violation of the provisions of United States Export Administration Act of 1969, 50 USC 2401 et seq. or the regulations promulgated thereunder.

The Contractor further warrants and represents that it is financially solvent, and sufficiently experienced and competent to perform the work and that the facts provided by it to the County in its bid and supporting documents, and contract documents are true and correct in all respects.

This Contract shall become void and any rights of the Contractor hereunder shall be forfeited if, subsequent to the execution hereof, the Contractor is convicted of a violation of the provision of the United States Export Administration Act of 1969, 50 USC 2401 et seq. as amended or has been found upon the final determination of the United States Commerce Department or any other appropriate agency of the United States or the State of New York to have violated such act or regulations.

If the Contractor, any officer, director, or any party holding a controlling interest (defined as five (5%) percent or more, or in the case of a corporation, any stockholder owning five (5%) percent or more of the outstanding shares) is convicted of a crime (excluding Class B and

Unclassified Misdemeanors as defined under the New York State Penal Law and their equivalent in any city, state or under Federal law related to the type of services or activities which are the subject matter of this Contract) or if a related or affiliated company, partnership or corporation is convicted of a crime (excluding Class B and Unclassified Misdemeanors as defined above) after this Contract is fully executed, the County shall have the right to terminate this Agreement immediately and without penalty. An "affiliated company" as used herein means any affiliate which is a partnership, corporation, proprietorship, association or other entity (i) in which a 50% or greater ownership interest (as defined below) is directly or indirectly held by the Contractor or any of its management personnel (as defined below) or directors, (ii) which directly or indirectly holds 50% or more of the ownership interest in the Contractor, (iii) in which an aggregate 20% or greater ownership interest is directly or indirectly held by one or more shareholders (or partners or proprietors, in the case of a partnership or proprietorship) which or who in the aggregate hold a 20% or greater ownership interest in the Contractor, or (iv) which, whether by Contract or otherwise, directly or indirectly controls, is controlled by or is under common control with the Contractor. An "ownership interest" means the ownership, whether legally or beneficially, of the stock of or assets employed by a corporation, of a partnership interest in or assets employed by a partnership or of a similar interest in or assets employed by any other entity. "Management personnel" means executive officers and all other persons, whether or not officers or employees, who perform policy-making functions similar to those of executive officers.

The Contractor represents that at the time of execution of this Contract, no individual or entity, as described above, has been convicted of a crime during the five (5) year period preceding the execution of this Contract.

The parties hereto recognize that it is the goal of Westchester County to use its best efforts to encourage, promote and increase participation of business enterprises owned and controlled by persons of color or women (MBE/WBE) in contracts or projects funded by all Departments of the County and to effectively and efficiently monitor such participation. Therefore, the Contractor agrees to complete the MBE/WBE Questionnaire, which is attached hereto as Schedule “A,” in furtherance of this goal and in accordance with Local Law No. 27-1997.

It is recognized and understood by the parties that this Contract is subject to appropriation by the Westchester County Board of Legislators. The County shall have no liability under this Contract beyond the funds, if any, that are appropriated and available for payment of the amounts due under this Contract. Notwithstanding the foregoing, the County will do all things lawfully within its power to obtain, maintain and properly request and pursue funds from which payments under this Contract may be made.

The parties hereto for themselves, their legal representatives, successors and assigns, expressly agree that any legal action or proceeding that may arise out of or relating to this Contract shall be brought and maintained only in the courts of the State of New York (“New York State Court”) located in the County of Westchester. With respect to any action between the County and Contractor in New York State Court, the Contractor hereby expressly waives and relinquishes any rights it may otherwise have (i) to move to dismiss on grounds of forum *non*

conveniens; (ii) to remove to Federal Court; and (iii) to move for a change of venue to a New York State Court outside of Westchester County.

This Contract and its terms, covenants, obligations, conditions and provisions shall be binding upon all the parties hereto, their legal representatives, successors and assigns.

This Contract shall not be enforceable until it is signed by all parties and approved by the Office of the County Attorney.

IN WITNESS WHEREOF, the parties hereto have executed this agreement, THE COUNTY OF WESTCHESTER pursuant to law by:

_____ its **Commissioner**

and the CONTRACTOR:

By:_____ its _____
(*Type or Print Name*) (*Title*)

THE COUNTY OF WESTCHESTER:

By:_____
Commissioner

CONTRACTOR:

By:_____
(*Signature*)

ATTEST: *(SEAL)*

By:_____
(*Signature*)

Recommended:

_____
Deputy Commissioner of Public Works

Approved as to form and manner of execution
this _____ day of _____, 200__

_____
County Attorney

CONTRACTOR'S ACKNOWLEDGMENT
(If Corporation)

STATE OF NEW YORK)
) ss.:
COUNTY OF)

On this _____ day of _____, 200__, before me personally came _____ to me known, and known to me to be the _____ of _____, the Corporation described in and which executed the within instrument, who being by me duly sworn did depose and say that the said _____ resides at _____ and that he/she is the _____ of said Corporation and that he/she signed his/her name thereto by order of the Board of Directors of said Corporation and, if operating under any trade name, that the certificate required by the New York State General Business Law Section 130 has been filed with the Secretary of State of the State of New York.

_____
Notary Public

CONTRACTOR'S ACKNOWLEDGMENT
(If Individual)

STATE OF NEW YORK)
) ss.:
COUNTY OF)

On this _____ day of _____, 200__, before me personally came _____ to me known, and known to me to be the same person described in and who executed the within instrument and duly acknowledged to me that he/she executed the same for the purpose herein mentioned and, if operating under any trade name, that the certificate required by the New York State General Business Law Section 130 has been filed with the County Clerk of Westchester County.

_____
Notary Public

CONTRACTOR'S ACKNOWLEDGMENT
(If Co-Partnership)

STATE OF NEW YORK)
) ss.:
COUNTY OF)

On this _____ day of _____, 200__, before me personally came _____ to me known, and known to me to be a member of the firm of _____ and the person described in, and who executed the within instrument in behalf of said firm, and he/she acknowledged to me that he/she executed the same in behalf of, and as the act of said firm for the purposes herein mentioned and, if operating under any trade name, that the certificate required by the New York State General Business Law Section 130 has been filed with the County Clerk of Westchester County.

_____
Notary Public

CERTIFICATE OF AUTHORITY

I, _____
(*Officer other than officer signing contract*)

certify that I am _____ of
(*Title*)

the _____
(*Name of Corporation*)

organized and in good standing under the _____
(*Law under which organized*)

named in the foregoing agreement; that _____
(*Person executing agreement*)

who signed said agreement on behalf of the Contractor was, at the time of execution the

_____ of the Corporation; that said agreement was duly
(*Title of such person*)

signed for and on behalf of said Corporation by authority of its Board of Directors, thereunto duly authorized and is in full force and effect at the date hereof.

_____
(*Signature*)

(SEAL)

STATE OF NEW YORK)
) ss.:
COUNTY OF)

On this _____ day of _____, 200__, before me personally came _____ to me known, and known to me to be the _____ of _____, the Corporation described in and which executed the above certificate, who being by me duly sworn did depose and say that the said _____ resides at _____ and that he/she is _____ of said Corporation and knows the Corporate Seal of the said Corporation; that the seal affixed to the above certificate is such Corporate Seal and was so affixed by order of the Board of Directors of said Corporation, and that he/she signed his/her name thereto by like order.

_____
Notary Public

CORPORATE ACKNOWLEDGEMENT
(Sole Officer)

STATE OF NEW YORK)
) ss.:
COUNTY OF)

On this _____ day of _____, 200__, before me personally came

_____ to me known, and known to me to be the
(*Name*)

_____ of _____,
(*Title*) (*Name of Corporation*)

the Corporation described in and which executed the within instrument, who being by me duly sworn did depose and say that he/she signed the within instrument, on behalf of said Corporation, in his/her capacity as _____ and Sole Officer and
(*Title*)

director of said Corporation and that he/she owns all the issued and outstanding capital stock of said Corporation and knows the Corporate Seal of the said Corporation; and, if operating under any trade name, that the certificate required by New York State General Business Law Section 130 has been filed with the Secretary of State of the State of New York.

_____
Notary Public

PERFORMANCE AND PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS, that we

(hereinafter called the "Principal"), and the _____

_____

a Corporation created and existing under the laws of the State of _____

and having its principal office at _____
in the City of _____ (hereinafter called the "Surety"), are held and firmly bound unto The County of Westchester (hereinafter called the "Obligee") in the penal sum of----------**DOLLARS**---------**AND**----------**/100**----------**[$]**

lawful money of the United States of America, for the payment of which, well and truly to be made, the said Principal binds itself, (himself, themselves) and its (his, their) successors and assigns, and the said Surety binds itself and its successors and assigns, all jointly and severally, firmly by these presents. Said penal sum shall apply separately and independently, in its total amount, to the payment provision and the performance provision of this Bond shall not reduce or limit the right of the Obligee to recover under the other said provision.

Signed, sealed and dated this _____ day of _____, 200__.

WHEREAS, said Principal has entered into a certain written contract with said Obligee, dated this _____ day of _____, 200__, (hereinafter called the "Contract")

For ----**CONTRACT #** _____a copy of which Contract is hereto annexed and hereby made a part of this bond as if herein set forth in full.

NOW THEREFORE, THE CONDITIONS OF THE ABOVE OBLIGATIONS ARE SUCH THAT, if the said Principal, and its (his, their) successors or assigns, or any or either of them shall,

(1) well and truly and in good, sufficient and workmanlike manner, perform or cause to be performed such Contract, and any amendment or extension of or addition thereto, and each and every of the covenants, promises, agreements and provisions therein stipulated and contained to be performed by said Principal, and complete the same within the period therein mentioned, and in each and every respect, comply with the conditions therein mentioned to be complied with by said Principal, and fully indemnify and save harmless the Obligee from all costs and damages which it may suffer by reason of failure so to do and fully reimburse and repay the Obligee all outlay and expense which it may incur in making good any such default, and

(2) also pay or cause to be paid the wages and compensation for labor performed and services rendered of all persons engaged in the prosecution of the work provided for therein, whether such persons by agents, servants or employees of the Principal, and of its (his, their) successors or assigns, or any Subcontractor or of any assignee thereof, including all persons so engaged who perform the work of laborers or of mechanics regardless of any contractual relationship between the Principal, or its (his, their) successors or assigns, or any Subcontractor or any designee thereof, and such laborers or mechanics, but not including office employees not regularly stationed at the site of the work, and further, shall pay or cause to be paid all lawful claims of Subcontractors and of materialmen and other third persons out of or in connection with said Contract and the work, labor, services, supplies and material furnished in and about the performance and completion thereof, then these obligations shall be null and void, otherwise they shall remain in full force and effect.

PROVIDED, however, that this bond is subject to the following additional conditions and limitations:

(a) All persons who have performed labor or rendered services, as aforesaid, all Subcontractors, and all persons, firms, corporations, including materialmen and third persons, as aforesaid, furnishing work, labor, services, supplies and material under or in connection with said Contract or in or about the performance and completion thereof, shall have a direct right of action (subject to the prior right of the Obligee under any claim which it may assert against the Principal or its (his, their) successors and assigns, and/or the Surety and its successors and assigns) against the Principal and its (his, their) successors and assigns on this bond, which right of action shall be asserted in proceedings instituted in the State in which such work, labor, services, supplies or material was performed, rendered or furnished or where work, labor, services, supplies or material has been performed, rendered or furnished, as aforesaid, in more than one State, than in any such State. Insofar as permitted by the laws of such State, said right of action shall be asserted in a proceeding instituted in the name of Obligee to the use and benefit of the person, firm or corporation instituting such action and of all other persons, firms and corporations having claims hereunder, and any other person, firm or corporation having a claim hereunder shall have the

right to be made a party to such proceedings (but not later than twelve months after the performance of said Contract and final settlement thereof) and to have such claim adjudicated in such action and judgment rendered thereon. Prior to the institution of such a proceeding by a person, firm or corporation in the name of the Obligee, as aforesaid, such person, firm of corporation shall furnish the Obligee with a Bond of Indemnity for costs, which Bond shall be in an amount satisfactory to the Obligee.

(b) The Surety or its successors or assigns shall not be liable hereunder for any damages or compensation recoverable under any worker's compensation or employer's liability statute.

(c) In no event shall the Surety or its successors or assigns be liable under either the foregoing clause (1) or the foregoing clause (2) for a greater sum than the penalty of this Bond provided; however, that said penalty is separately applicable, in its total amount to each of the foregoing clauses (1) and (2), or subject to any suit, action or proceeding hereon that is instituted by any person, firm or corporation under the provisions of the above section (a) later than twelve months after the complete performance of said Contract and final settlement thereof.

The Principal, for itself (himself, themselves) and its (his, their) successors and assigns, and the Surety, for itself and its successors and assigns, do hereby expressly waive any objections that might be interposed as to the right of the Obligee 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 said Obligee to require the foregoing provision to be placed in this Bond.

And Surety, for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligations of said Surety and of its successors and assigns and this Bond shall in no way be impaired or affected by an 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 provision thereof, or by an assignment, subletting or other transfer thereof, or of any part thereof, or of any work to be performed, or of any moneys due or to become due thereunder; and the said Surety, for itself and its successors and assigns, does hereby waive notice of any and all of such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts and transfers, and hereby stipulates and agrees that any and all things done and omitted to be done by and in relation to (executors, administrators), successors, assigns, Subcontractors, and other transferees, shall have the same effect as to said Surety and its successors and assigns, as though done or omitted to be done by and in relation to said Principal.

And Surety, for value received, hereby stipulates and agrees, if requested to do so by Obligee, to fully perform and complete the work to be performed under the Contract, pursuant to the terms, conditions and covenants thereof, if for any cause, the Principal fails or neglects to so

fully perform and complete such Work. The Surety further agrees to commence such Work of Completion within twenty-five (25) calendar days after written notice thereof from the Obligee, and to complete such Work within twenty-five (25) calendar days from the expiration of the time allowed the Principal in the Contract for the completion of such Work.

WITNESSETH our hands and seals this _____ day of _____, 200__.

PRINCIPAL:

By:_____
(*Signature*)

(SEAL)

ATTEST:

_____

_____
(*Surety*)

By:_____
(*Signature*)

(SEAL)

ATTEST:

_____

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

If the Contractor (Principal) is a Corporation, the Bond should be signed in its correct corporate name by a duly authorized officer, agent, or attorney-in-fact.

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

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) duly certified copy of latest published financial statement of assets and liabilities of Surety.

CONTRACTOR'S ACKNOWLEDGMENT
(If Corporation)

STATE OF NEW YORK)
) ss.:
COUNTY OF)

On this _____ day of _____, 200__, before me personally came _____ to me known, and known to me to be the _____ of _____, the Corporation described in and which executed the within instrument, who being by me duly sworn did depose and say that the said _____ resides at _____ and that he/she is the _____ of said Corporation and knows the Corporate Seal of the said Corporation; that the seal affixed to the within instrument is such Corporate Seal and that it was so affixed by order of the Board of Directors of said Corporation and that he/she signed his/her name thereto by like order.

_____
Notary Public

CONTRACTOR'S ACKNOWLEDGMENT
(If Individual)

STATE OF NEW YORK)
) ss.:
COUNTY OF)

On this _____ day of _____, 200__, before me personally came _____ to me known, and known to me to be the same person described in and who executed the within instrument and he/she duly acknowledged to me that he/she executed the same for the purpose herein mentioned.

_____
Notary Public

CONTRACTOR'S ACKNOWLEDGMENT
(If Co-Partnership)

STATE OF NEW YORK)
) ss.:
COUNTY OF)

On this _____ day of _____, 200__, before me personally came _____ to me known, and known to me to be a member of the firm of _____ and the person described in, and who executed the within instrument in behalf of said firm, and acknowledged to me that he/she executed the same in behalf of, and as the act of said firm for the purposes herein mentioned.

_____
Notary Public

ACKNOWLEDGMENT BY SURETY COMPANY
(Signed by One Authorized Person)

STATE OF NEW YORK)
) ss.:
COUNTY OF)

On this _____ day of _____, 200__, before me personally came

_____ to me known, and known to me to be the
(*Name*)

_____ of _____,
(*Title*) (*Name of Corporation*)

the Corporation described in and which executed the within instrument, who being by me duly sworn did depose and say that he/she resides at _____

_____ and that he/she is the _____ of said Corporation
(*Title*)

and knows the Corporate Seal of the said Corporation; that the seal affixed to the within instrument is such Corporate Seal and so affixed by order of the Board of Directors of said Corporation and that he/she signed his/her name thereto by like order; and that the said Corporation has received from the Superintendent of Insurance of the State of New York a Certificate of Solvency, and of its sufficiency as Surety or Guarantor, pursuant to Section 327 of the Insurance Law of the State of New York as amended, and that such Certificate has not been revoked.

_____
Notary Public

SCHEDULE OF HOURLY RATES

AND SUPPLEMENTS

DEPARTMENT OF PUBLIC WORKS

Division of Engineering

Kathy Hochul, Governor

Roberta Reardon, Commissioner

Westchester County DPWT

Yolanda Spraggins, Secretary II
148 Martine Avenue, Rm 518
White Plains NY 10601

Schedule Year	2023 through 2024
Date Requested	09/13/2023
PRC#	2023011002

Location	Bee-Line Ctrl. Maint. Facility
Project ID#	22-524
Project Type	Replace AC units and furnish and install split system units.

PREVAILING WAGE SCHEDULE FOR ARTICLE 8 PUBLIC WORK PROJECT

Attached is the current schedule(s) of the prevailing wage rates and prevailing hourly supplements for the project referenced above. A unique Prevailing Wage Case Number (PRC#) has been assigned to the schedule(s) for your project.

The schedule is effective from July 2023 through June 2024. All updates, corrections, posted on the 1st business day of each month, and future copies of the annual determination are available on the Department's website www.labor.ny.gov. Updated PDF copies of your schedule can be accessed by entering your assigned PRC# at the proper location on the website.

It is the responsibility of the contracting agency or its agent to annex and make part, the attached schedule, to the specifications for this project, when it is advertised for bids and /or to forward said schedules to the successful bidder(s), immediately upon receipt, in order to insure the proper payment of wages.

Please refer to the "General Provisions of Laws Covering Workers on Public Work Contracts" provided with this schedule, for the specific details relating to other responsibilities of the Department of Jurisdiction.

Upon completion or cancellation of this project, enter the required information and mail **OR** fax this form to the office shown at the bottom of this notice, **OR** fill out the electronic version via the NYSDOL website.

NOTICE OF COMPLETION / CANCELLATION OF PROJECT

Date Completed: _____ Date Cancelled: _____

Name & Title of Representative: _____

Phone: (518) 457-5589 Fax: (518) 485-1870
W. Averell Harriman State Office Campus, Bldg. 12, Room 130, Albany, NY 12226

General Provisions of Laws Covering Workers on Article 8 Public Work Contracts

Introduction

The Labor Law requires public work contractors and subcontractors to pay laborers, workers, or mechanics employed in the performance of a public work contract not less than the prevailing rate of wage and supplements (fringe benefits) in the locality where the work is performed.

Responsibilities of the Department of Jurisdiction

A Department of Jurisdiction (Contracting Agency) includes a state department, agency, board or commission: a county, city, town or village; a school district, board of education or board of cooperative educational services; a sewer, water, fire, improvement and other district corporation; a public benefit corporation; and a public authority awarding a public work contract.

The Department of Jurisdiction (Contracting Agency) awarding a public work contract MUST obtain a Prevailing Rate Schedule listing the hourly rates of wages and supplements due the workers to be employed on a public work project. This schedule may be obtained by completing and forwarding a "Request for wage and Supplement Information" form (PW 39) to the Bureau of Public Work. The Prevailing Rate Schedule MUST be included in the specifications for the contract to be awarded and is deemed part of the public work contract.

Upon the awarding of the contract, the law requires that the Department of Jurisdiction (Contracting Agency) furnish the following information to the Bureau: the name and address of the contractor, the date the contract was let and the approximate dollar value of the contract. To facilitate compliance with this provision of the Labor Law, a copy of the Department's "Notice of Contract Award" form (PW 16) is provided with the original Prevailing Rate Schedule.

The Department of Jurisdiction (Contracting Agency) is required to notify the Bureau of the completion or cancellation of any public work project. The Department's PW 200 form is provided for that purpose.

Both the PW 16 and PW 200 forms are available for completion online.

Hours

No laborer, worker, or mechanic in the employ of a contractor or subcontractor engaged in the performance of any public work project shall be permitted to work more than eight hours in any day or more than five days in any week, except in cases of extraordinary emergency. The contractor and the Department of Jurisdiction (Contracting Agency) may apply to the Bureau of Public Work for a dispensation permitting workers to work additional hours or days per week on a particular public work project.

Wages and Supplements

The wages and supplements to be paid and/or provided to laborers, workers, and mechanics employed on a public work project shall be not less than those listed in the current Prevailing Rate Schedule for the locality where the work is performed. If a prime contractor on a public work project has not been provided with a Prevailing Rate Schedule, the contractor must notify the Department of Jurisdiction (Contracting Agency) who in turn must request an original Prevailing Rate Schedule form the Bureau of Public Work. Requests may be submitted by: mail to NYSDOL, Bureau of Public Work, State Office Bldg. Campus, Bldg. 12, Rm. 130, Albany, NY 12226; Fax to Bureau of Public Work (518) 485-1870; or electronically at the NYSDOL website www.labor.ny.gov.

Upon receiving the original schedule, the Department of Jurisdiction (Contracting Agency) is REQUIRED to provide complete copies to all prime contractors who in turn MUST, by law, provide copies of all applicable county schedules to each subcontractor and obtain from each subcontractor, an affidavit certifying such schedules were received. If the original schedule expired, the contractor may obtain a copy of the new annual determination from the NYSDOL website www.labor.ny.gov.

The Commissioner of Labor makes an annual determination of the prevailing rates. This determination is in effect from July 1st through June 30th of the following year. The annual determination is available on the NYSDOL website www.labor.ny.gov.

Payrolls and Payroll Records

Every contractor and subcontractor MUST keep original payrolls or transcripts subscribed and affirmed as true under penalty of perjury. As per Article 6 of the Labor law, contractors and subcontractors are required to establish, maintain, and preserve for not less than six (6) years, contemperaneous, true, and accurate payroll records. At a minimum, payrolls must show the following information for each person employed on a public work project: Name, Address, Last 4 Digits of Social Security Number, Classification(s) in which the worker was employed, Hourly wage rate(s) paid, Supplements paid or provided, and Daily and weekly number of hours worked in each classification.

The filing of payrolls to the Department of Jurisdiction is a condition of payment.Every contractor and subcontractor shall submit to the Department of Jurisdiction (Contracting Agency), within thirty (30) days after issuance of its first payroll and every thirty (30) days thereafter, a transcript of the original payrolls, subscribed and affirmed as true under penalty of perjury. The Department of Jurisdiction (Contracting Agency) shall collect, review for facial validity, and maintain such payrolls.

In addition, the Commissioner of Labor may require contractors to furnish, with ten (10) days of a request, payroll records sworn to as their validity and accuracy for public work and private work. Payroll records include, but are not limited to time cards, work description sheets, proof that supplements were provided, cancelled payroll checks and payrolls. Failure to provide the requested information within the allotted ten (10) days will result in the withholding of up to 25% of the contract, not to exceed $100,000.00. If the contractor or subcontractor does not maintain a place of business in New York State and the amount of the contract exceeds $25,000.00, payroll records and certifications must be kept on the project worksite.

The prime contractor is responsible for any underpayments of prevailing wages or supplements by any subcontractor.

All contractors or their subcontractors shall provide to their subcontractors a copy of the Prevailing Rate Schedule specified in the public work contract as well as any subsequently issued schedules. A failure to provide these schedules by a contractor or subcontractor is a violation of Article 8, Section 220-a of the Labor Law.

All subcontractors engaged by a public work project contractor or its subcontractor, upon receipt of the original schedule and any subsequently issued schedules, shall provide to such contractor a verified statement attesting that the subcontractor has received the Prevailing Rate Schedule and will pay or provide the applicable rates of wages and supplements specified therein. (See NYS Labor Laws, Article 8 . Section 220-a).

Determination of Prevailing Wage and Supplement Rate Updates Applicable to All Counties

The wages and supplements contained in the annual determination become effective July 1st whether or not the new determination has been received by a given contractor. Care should be taken to review the rates for obvious errors. Any corrections should be brought to the Department's attention immediately. It is the responsibility of the public work contractor to use the proper rates. If there is a question on the proper classification to be used, please call the district office located nearest the project. Any errors in the annual determination will be corrected and posted to the NYSDOL website on the first business day of each month. Contractors are responsible for paying these updated rates as well, retroactive to July 1st.

When you review the schedule for a particular occupation, your attention should be directed to the dates above the column of rates. These are the dates for which a given set of rates is effective. To the extent possible, the Department posts rates in its possession that cover periods of time beyond the July 1st to June 30th time frame covered by a particular annual determination. Rates that extend beyond that instant time period are informational ONLY and may be updated in future annual determinations that actually cover the then appropriate July 1st to June 30th time period.

Withholding of Payments

When a complaint is filed with the Commissioner of Labor alleging the failure of a contractor or subcontractor to pay or provide the prevailing wages or supplements, or when the Commissioner of Labor believes that unpaid wages or supplements may be due, payments on the public work contract shall be withheld from the prime contractor in a sufficient amount to satisfy the alleged unpaid wages and supplements, including interest and civil penalty, pending a final determination.

When the Bureau of Public Work finds that a contractor or subcontractor on a public work project failed to pay or provide the requisite prevailing wages or supplements, the Bureau is authorized by Sections 220-b and 235.2 of the Labor Law to so notify the financial officer of the Department of Jurisdiction (Contracting Agency) that awarded the public work contract. Such officer MUST then withhold or cause to be withheld from any payment due the prime contractor on account of such contract the amount indicated by the Bureau as sufficient to satisfy the unpaid wages and supplements, including interest and any civil penalty that may be assessed by the Commissioner of Labor. The withholding continues until there is a final determination of the underpayment by the Commissioner of Labor or by the court in the event a legal proceeding is instituted for review of the determination of the Commissioner of Labor.

The Department of Jurisdiction (Contracting Agency) shall comply with this order of the Commissioner of Labor or of the court with respect to the release of the funds so withheld.

Summary of Notice Posting Requirements

The current Prevailing Rate Schedule must be posted in a prominent and accessible place on the site of the public work project. The prevailing wage schedule must be encased in, or constructed of, materials capable of withstanding adverse weather conditions and be titled "PREVAILING RATE OF WAGES" in letters no smaller than two (2) inches by two (2) inches.

The "Public Work Project" notice must be posted at the beginning of the performance of every public work contract, on each job site.

Every employer providing workers. compensation insurance and disability benefits must post notices of such coverage in the format prescribed by the Workers. Compensation Board in a conspicuous place on the jobsite.

Every employer subject to the NYS Human Rights Law must conspicuously post at its offices, places of employment, or employment training centers, notices furnished by the State Division of Human Rights.

Employers liable for contributions under the Unemployment Insurance Law must conspicuously post on the jobsite notices furnished by the NYS Department of Labor.

Apprentices

Employees cannot be paid apprentice rates unless they are individually registered in a program registered with the NYS Commissioner of Labor. The allowable ratio of apprentices to journeyworkers in any craft classification can be no greater than the statewide building trade ratios promulgated by the Department of Labor and included with the Prevailing Rate Schedule. An employee listed on a payroll as an apprentice who is not registered as above or is performing work outside the classification of work for which the apprentice is indentured, must be paid the prevailing journeyworker's wage rate for the classification of work the employee is actually performing.

NYSDOL Labor Law, Article 8, Section 220-3, require that only apprentices individually registered with the NYS Department of Labor may be paid apprenticeship rates on a public work project. No other Federal or State Agency of office registers apprentices in New York State.

Persons wishing to verify the apprentice registration of any person must do so in writing by mail, to the NYSDOL Office of Employability Development / Apprenticeship Training, State Office Bldg. Campus, Bldg. 12, Albany, NY 12226 or by Fax to NYSDOL Apprenticeship Training (518) 457-7154. All requests for verification must include the name and social security number of the person for whom the information is requested.

The only conclusive proof of individual apprentice registration is written verification from the NYSDOL Apprenticeship Training Albany Central office. Neither Federal nor State Apprenticeship Training offices outside of Albany can provide conclusive registration information.

It should be noted that the existence of a registered apprenticeship program is not conclusive proof that any person is registered in that program. Furthermore, the existence or possession of wallet cards, identification cards, or copies of state forms is not conclusive proof of the registration of any person as an apprentice.

Interest and Penalties

In the event that an underpayment of wages and/or supplements is found:

- Interest shall be assessed at the rate then in effect as prescribed by the Superintendent of Banks pursuant to section 14-a of the Banking Law, per annum from the date of underpayment to the date restitution is made.
- A Civil Penalty may also be assessed, not to exceed 25% of the total of wages, supplements, and interest due.

Debarment

Any contractor or subcontractor and/or its successor shall be ineligible to submit a bid on or be awarded any public work contract or subcontract with any state, municipal corporation or public body for a period of five (5) years when:

- Two (2) willful determinations have been rendered against that contractor or subcontractor and/or its successor within any consecutive six (6) year period.
- There is any willful determination that involves the falsification of payroll records or the kickback of wages or supplements.

Criminal Sanctions

Willful violations of the Prevailing Wage Law (Article 8 of the Labor Law) may be a felony punishable by fine or imprisonment of up to 15 years, or both.

Discrimination

No employee or applicant for employment may be discriminated against on account of age, race, creed, color, national origin, sex, disability or marital status.

No contractor, subcontractor nor any person acting on its behalf, shall by reason of race, creed, color, disability, sex 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 (NYS Labor Law, Article 8, Section 220-e(a)).

No contractor, subcontractor, nor any person acting on its behalf, shall in any manner, discriminate against or intimidate any employee on account of race, creed, color, disability, sex, or national origin (NYS Labor Law, Article 8, Section 220-e(b)).

The Human Rights Law also prohibits discrimination in employment because of age, marital status, or religion.

There may be deducted from the amount payable to the contractor under the contract a penalty of $50.00 for each calendar day during which such person was discriminated against or intimidated in violation of the provision of the contract (NYS Labor Law, Article 8, Section 220-e(c)).

The contract may be cancelled or terminated by the State or municipality. All monies due or to become due thereunder may be forfeited for a second or any subsequent violation of the terms or conditions of the anti-discrimination sections of the contract (NYS Labor Law, Article 8, Section 220-e(d)).

Every employer subject to the New York State Human Rights Law must conspicuously post at its offices, places of employment, or employment training centers notices furnished by the State Division of Human Rights.

Workers' Compensation

In accordance with Section 142 of the State Finance Law, the contractor shall maintain coverage during the life of the contract for the benefit of such employees as required by the provisions of the New York State Workers' Compensation Law.

A contractor who is awarded a public work contract must provide proof of workers' compensation coverage prior to being allowed to begin work.

The insurance policy must be issued by a company authorized to provide workers' compensation coverage in New York State. Proof of coverage must be on form C-105.2 (Certificate of Workers' Compensation Insurance) and must name this agency as a certificate holder.

If New York State coverage is added to an existing out-of-state policy, it can only be added to a policy from a company authorized to write workers' compensation coverage in this state. The coverage must be listed under item 3A of the information page.

The contractor must maintain proof that subcontractors doing work covered under this contract secured and maintained a workers' compensation policy for all employees working in New York State.

Every employer providing worker's compensation insurance and disability benefits must post notices of such coverage in the format prescribed by the Workers' Compensation Board in a conspicuous place on the jobsite.

Unemployment Insurance

Employers liable for contributions under the Unemployment Insurance Law must conspicuously post on the jobsite notices furnished by the New York State Department of Labor.

Kathy Hochul, Governor

Roberta Reardon, Commissioner

Westchester County DPWT

Yolanda Spraggins, Secretary II
148 Martine Avenue, Rm 518
White Plains NY 10601

Schedule Year 2023 through 2024
Date Requested 09/13/2023
PRC# 2023011002

Location Bee-Line Ctrl. Maint. Facility
Project ID# 22-524
Project Type Replace AC units and furnish and install split system units.

Notice of Contract Award

New York State Labor Law, Article 8, Section 220.3a requires that certain information regarding the awarding of public work contracts, be furnished to the Commissioner of Labor. One "Notice of Contract Award" (PW 16, which may be photocopied), **MUST** be completed for **EACH** prime contractor on the above referenced project.

Upon notifying the successful bidder(s) of this contract, enter the required information and mail **OR** fax this form to the office shown at the bottom of this notice, **OR** fill out the electronic version via the NYSDOL website.

Contractor Information
All information must be supplied

Federal Employer Identification Number: _____

Name: _____

Address: _____

_____

City: _____ State: _____ Zip: _____

Amount of Contract: $_____

Approximate Starting Date: ____/____/____

Approximate Completion Date: ____/____/____

Contract Type:
[ ] (01) General Construction
[ ] (02) Heating/Ventilation
[ ] (03) Electrical
[ ] (04) Plumbing
[ ] (05) Other : _____

Phone: (518) 457-5589 Fax: (518) 485-1870
W. Averell Harriman State Office Campus, Bldg. 12, Room 130, Albany, NY 12226

Social Security Numbers on Certified Payrolls:

The Department of Labor is cognizant of the concerns of the potential for misuse or inadvertent disclosure of social security numbers. Identity theft is a growing problem and we are sympathetic to contractors' concern regarding inclusion of this information on payrolls if another identifier will suffice.

For these reasons, the substitution of the use of the last four digits of the social security number on certified payrolls submitted to contracting agencies on public work projects is now acceptable to the Department of Labor. This change does not affect the Department's ability to request and receive the entire social security number from employers during its public work/ prevailing wage investigations.

Construction Industry Fair Play Act: Required Posting for Labor Law Article 25-B § 861-d

Construction industry employers must post the "Construction Industry Fair Play Act" notice in a prominent and accessible place on the job site. Failure to post the notice can result in penalties of up to $1,500 for a first offense and up to $5,000 for a second offense. The posting is included as part of this wage schedule. Additional copies may be obtained from the NYS DOL website, https://dol.ny.gov/public-work-and-prevailing-wage
If you have any questions concerning the Fair Play Act, please call the State Labor Department toll-free at 1-866-435-1499 or email us at: dol.misclassified@labor.ny.gov .

Worker Notification: (Labor Law §220, paragraph a of subdivision 3-a)

Effective June 23, 2020

This provision is an addition to the existing wage rate law, Labor Law §220, paragraph a of subdivision 3-a. It requires contractors and subcontractors to provide written notice to all laborers, workers or mechanics of the *prevailing wage and supplement rate* for their particular job classification *on each pay stub**. It also requires contractors and subcontractors to *post a notice* at the beginning of the performance of every public work contract *on each job site* that includes the telephone number and address for the Department of Labor and a statement informing laborers, workers or mechanics of their right to contact the Department of Labor if he/she is not receiving the proper prevailing rate of wages and/or supplements for his/her job classification. The required notification will be provided with each wage schedule, may be downloaded from our website *www.labor.ny.gov* or be made available upon request by contacting the Bureau of Public Work at 518-457-5589. *In the event the required information will not fit on the pay stub, an accompanying sheet or attachment of the information will suffice.

(12.20)

To all State Departments, Agency Heads and Public Benefit Corporations
IMPORTANT NOTICE REGARDING PUBLIC WORK ENFORCEMENT FUND

Budget Policy & Reporting Manual

B-610

Public Work Enforcement Fund

effective date December 7, 2005

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1. Purpose and Scope:

This Item describes the Public Work Enforcement Fund (the Fund, PWEF) and its relevance to State agencies and public benefit corporations engaged in construction or reconstruction contracts, maintenance and repair, and announces the recently-enacted increase to the percentage of the dollar value of such contracts that must be deposited into the Fund. This item also describes the roles of the following entities with respect to the Fund:

- New York State Department of Labor (DOL),
- The Office of the State of Comptroller (OSC), and
- State agencies and public benefit corporations.

2. Background and Statutory References:

DOL uses the Fund to enforce the State's Labor Law as it relates to contracts for construction or reconstruction, maintenance and repair, as defined in subdivision two of Section 220 of the Labor Law. State agencies and public benefit corporations participating in such contracts are required to make payments to the Fund.

Chapter 511 of the Laws of 1995 (as amended by Chapter 513 of the Laws of 1997, Chapter 655 of the Laws of 1999, Chapter 376 of the Laws of 2003 and Chapter 407 of the Laws of 2005) established the Fund.

3. Procedures and Agency Responsibilities:

The Fund is supported by transfers and deposits based on the value of contracts for construction and reconstruction, maintenance and repair, as defined in subdivision two of Section 220 of the Labor Law, into which all State agencies and public benefit corporations enter.

Chapter 407 of the Laws of 2005 increased the amount required to be provided to this fund to .10 of one-percent of the total cost of each such contract, to be calculated at the time agencies or public benefit corporations enter into a new contract or if a contract is amended. The provisions of this bill became effective August 2, 2005.

To all State Departments, Agency Heads and Public Benefit Corporations
IMPORTANT NOTICE REGARDING PUBLIC WORK ENFORCEMENT FUND

OSC will report to DOL on all construction-related ("D") contracts approved during the month, including contract amendments, and then DOL will bill agencies the appropriate assessment monthly. An agency may then make a determination if any of the billed contracts are exempt and so note on the bill submitted back to DOL. For any instance where an agency is unsure if a contract is or is not exempt, they can call the Bureau of Public Work at the number noted below for a determination. Payment by check or journal voucher is due to DOL within thirty days from the date of the billing. DOL will verify the amounts and forward them to OSC for processing.

For those contracts which are not approved or administered by the Comptroller, monthly reports and payments for deposit into the Public Work Enforcement Fund must be provided to the Administrative Finance Bureau at the DOL within 30 days of the end of each month or on a payment schedule mutually agreed upon with DOL.

Reports should contain the following information:

- Name and billing address of State agency or public benefit corporation;
- State agency or public benefit corporation contact and phone number;
- Name and address of contractor receiving the award;
- Contract number and effective dates;
- Contract amount and PWEF assessment charge (if contract amount has been amended, reflect increase or decrease to original contract and the adjustment in the PWEF charge); and
- Brief description of the work to be performed under each contract.

Checks and Journal Vouchers, payable to the "New York State Department of Labor" should be sent to:

Department of Labor
Administrative Finance Bureau-PWEF Unit
Building 12, Room 464
State Office Campus
Albany, NY 12226

Any questions regarding billing should be directed to NYSDOL's Administrative Finance Bureau-PWEF Unit at (518) 457-3624 and any questions regarding Public Work Contracts should be directed to the Bureau of Public Work at (518) 457-5589.

NEW YORK STATE OF OPPORTUNITY. Department of Labor

Required Notice under Article 25-B of the Labor Law

Attention All Employees, Contractors and Subcontractors: You are Covered by the Construction Industry Fair Play Act

The law says that you are an employee unless:

- You are free from direction and control in performing your job, **and**
- You perform work that is not part of the usual work done by the business that hired you, **and**
- You have an independently established business.

Your employer cannot consider you to be an independent contractor unless all three of these facts apply to your work.

It is against the law for an employer to misclassify employees as independent contractors or pay employees off the books.

Employee Rights: If you are an employee, you are entitled to state and federal worker protections. These include:

- Unemployment Insurance benefits, if you are unemployed through no fault of your own, able to work, and otherwise qualified,
- Workers' compensation benefits for on-the-job injuries,
- Payment for wages earned, minimum wage, and overtime (under certain conditions),
- Prevailing wages on public work projects,
- The provisions of the National Labor Relations Act, and
- A safe work environment.

It is a violation of this law for employers to retaliate against anyone who asserts their rights under the law. Retaliation subjects an employer to civil penalties, a private lawsuit or both.

Independent Contractors: If you are an independent contractor**, you must pay all taxes and Unemployment Insurance contributions required by New York State and Federal Law.**

Penalties for paying workers off the books or improperly treating employees as independent contractors:

- **Civil Penalty** — First offense: Up to $2,500 per employee

  Subsequent offense(s): Up to $5,000 per employee

- **Criminal Penalty** — First offense: Misdemeanor - up to 30 days in jail, up to a $25,000 fine and debarment from performing public work for up to one year.

  Subsequent offense(s): Misdemeanor - up to 60 days in jail or up to a $50,000 fine and debarment from performing public work for up to 5 years.

If you have questions about your employment status or believe that your employer may have violated your rights and you want to file a complaint, call the Department of Labor at (866) 435-1499 or send an email to dol.misclassified@labor.ny.gov. All complaints of fraud and violations are taken seriously. You can remain anonymous.

Employer Name:

IA 999 (09/16)

WE ARE YOUR DOL

NEW YORK STATE Department of Labor

New York State Department of Labor
Bureau of Public Work

Attention Employees

THIS IS A:

PUBLIC WORK PROJECT

If you are employed on this project as a **worker, laborer, or mechanic** you are entitled to receive the **prevailing wage and supplements rate** for the classification at which you are working.

Your pay stub and wage notice received upon hire must clearly state your wage rate and supplement rate.

Chapter 629 of the Labor Laws of 2007:

These wages are set by law and must be posted at the work site. They can also be found at: https://dol.ny.gov/bureau-public-work

If you feel that you have not received proper wages or benefits, please call our nearest office.*

Albany	(518) 457-2744	Patchogue	(631) 687-4882
Binghamton	(607) 721-8005	Rochester	(585) 258-4505
Buffalo	(716) 847-7159	Syracuse	(315) 428-4056
Garden City	(516) 228-3915	Utica	(315) 793-2314
New York City	(212) 932-2419	White Plains	(914) 997-9507
Newburgh	(845) 568-5287		

* For New York City government agency construction projects, please contact the Office of the NYC Comptroller at (212) 669-4443, or www.comptroller.nyc.gov – click on Bureau of Labor Law.

Contractor Name: _____

Project Location: _____

Requirements for OSHA 10 Compliance

Article 8 §220-h requires that when the advertised specifications, for every contract for public work, is $250,000.00 or more the contract must contain a provision requiring that every worker employed in the performance of a public work contract shall be certified as having completed an OSHA 10 safety training course. The clear intent of this provision is to require that all employees of public work contractors, required to be paid prevailing rates, receive such training “prior to the performing any work on the project.”

The Bureau will enforce the statute as follows:

All contractors and sub contractors must attach a copy of proof of completion of the OSHA 10 course to the first certified payroll submitted to the contracting agency and on each succeeding payroll where any new or additional employee is first listed.

Proof of completion may include but is not limited to:

- Copies of bona fide course completion card (*Note: Completion cards do not have an expiration date.)*
- Training roster, attendance record of other documentation from the certified trainer pending the issuance of the card.
- Other valid proof

**A certification by the employer attesting that all employees have completed such a course is not sufficient proof that the course has been completed.

Any questions regarding this statute may be directed to the New York State Department of Labor, Bureau of Public Work at 518-457-5589.

WICKS

Public work projects are subject to the Wicks Law requiring separate specifications and bidding for the plumbing, heating and electrical work, when the total project's threshold is $3 million in Bronx, Kings, New York, Queens and, Richmond counties; $1.5 million in Nassau, Suffolk and Westchester counties; and $500,000 in all other counties.

For projects below the monetary threshold, bidders must submit a sealed list naming each subcontractor for the plumbing, HVAC and electrical and the amount to be paid to each. The list may not be changed unless the public owner finds a legitimate construction need, including a change in specifications or costs or the use of a Project Labor Agreement (PLA), and must be open to public inspection.

Allows the state and local agencies and authorities to waive the Wicks Law and use a PLA if it will provide the best work at the lowest possible price. If a PLA is used, all contractors shall participate in apprentice training programs in the trades of work it employs that have been approved by the Department of Labor (DOL) for not less than three years. They shall also have at least one graduate in the last three years and use affirmative efforts to retain minority apprentices. PLA's would be exempt from Wicks, but deemed to be public work subject to prevailing wage enforcement.

The Commissioner of Labor shall have the power to enforce separate specification requirement s on projects, and may issue stop-bid orders against public owners for non-compliance.

Other new monetary thresholds, and similar sealed bidding for non-Wicks projects, would apply to certain public authorities including municipal housing authorities, NYC Construction Fund, Yonkers Educational Construction Fund, NYC Municipal Water Finance Authority, Buffalo Municipal Water Finance Authority, Westchester County Health Care Association, Nassau County Health Care Corp., Clifton-Fine Health Care Corp., Erie County Medical Center Corp., NYC Solid Waste Management Facilities, and the Dormitory Authority.

Contractors must pay subcontractors within a 7 days period.

(07.19)

Introduction to the Prevailing Rate Schedule

Information About Prevailing Rate Schedule

This information is provided to assist you in the interpretation of particular requirements for each classification of worker contained in the attached Schedule of Prevailing Rates.

Classification

It is the duty of the Commissioner of Labor to make the proper classification of workers taking into account whether the work is heavy and highway, building, sewer and water, tunnel work, or residential, and to make a determination of wages and supplements to be paid or provided. It is the responsibility of the public work contractor to use the proper rate. If there is a question on the proper classification to be used, please call the district office located nearest the project. District office locations and phone numbers are listed below.

Prevailing Wage Schedules are issued separately for "General Construction Projects" and "Residential Construction Projects" on a county-by-county basis.

General Construction Rates apply to projects such as: Buildings, Heavy & Highway, and Tunnel and Water & Sewer rates.

Residential Construction Rates generally apply to construction, reconstruction, repair, alteration, or demolition of one family, two family, row housing, or rental type units intended for residential use.

Some rates listed in the Residential Construction Rate Schedule have a very limited applicability listed along with the rate. Rates for occupations or locations not shown on the residential schedule must be obtained from the General Construction Rate Schedule. Please contact the local Bureau of Public Work office before using Residential Rate Schedules, to ensure that the project meets the required criteria.

Payrolls and Payroll Records

Contractors and subcontractors are required to establish, maintain, and preserve for not less that six (6) years, contemporaneous, true, and accurate payroll records.

Every contractor and subcontractor shall submit to the Department of Jurisdiction (Contracting Agency), within thirty (30) days after issuance of its first payroll and every thirty (30) days thereafter, a transcript of the original payrolls, subscribed and affirmed as true under penalty of perjury.

Paid Holidays

Paid Holidays are days for which an eligible employee receives a regular day's pay, but is not required to perform work. If an employee works on a day listed as a paid holiday, this remuneration is in addition to payment of the required prevailing rate for the work actually performed.

Overtime

At a minimum, all work performed on a public work project in excess of eight hours in any one day or more than five days in any workweek is overtime. However, the specific overtime requirements for each trade or occupation on a public work project may differ. Specific overtime requirements for each trade or occupation are contained in the prevailing rate schedules.

Overtime holiday pay is the premium pay that is required for work performed on specified holidays. It is only required where the employee actually performs work on such holidays.

The applicable holidays are listed under HOLIDAYS: OVERTIME. The required rate of pay for these covered holidays can be found in the OVERTIME PAY section listings for each classification.

Supplemental Benefits

Particular attention should be given to the supplemental benefit requirements. Although in most cases the payment or provision of supplements is straight time for all hours worked, some classifications require the payment or provision of supplements, or a portion of the supplements, to be paid or provided at a premium rate for premium hours worked. Supplements may also be required to be paid or provided on paid holidays, regardless of whether the day is worked. The Overtime Codes and Notes listed on the particular wage classification will indicate these conditions as required.

Effective Dates

When you review the schedule for a particular occupation, your attention should be directed to the dates above the column of rates. These are the dates for which a given set of rates is effective. The rate listed is valid until the next effective rate change or until the new annual determination which takes effect on July 1 of each year. All contractors and subcontractors are required to pay the current prevailing rates of wages and supplements. If you have any questions please contact the Bureau of Public Work or visit the New York State Department of Labor website (www.labor.ny.gov) for current wage rate information.

Apprentice Training Ratios

The following are the allowable ratios of registered Apprentices to Journey-workers.

For example, the ratio 1:1,1:3 indicates the allowable initial ratio is one Apprentice to one Journeyworker. The Journeyworker must be in place on the project before an Apprentice is allowed. Then three additional Journeyworkers are needed before a second Apprentice is allowed. The last ratio repeats indefinitely. Therefore, three more Journeyworkers must be present before a third Apprentice can be hired, and so on.

Please call Apprentice Training Central Office at (518) 457-6820 if you have any questions.

Title (Trade)	Ratio
Boilermaker (Construction)	1:1,1:4
Boilermaker (Shop)	1:1,1:3
Carpenter (Bldg.,H&H, Pile Driver/Dockbuilder)	1:1,1:4
Carpenter (Residential)	1:1,1:3
Electrical (Outside) Lineman	1:1,1:2
Electrician (Inside)	1:1,1:3
Elevator/Escalator Construction & Modernizer	1:1,1:2
Glazier	1:1,1:3
Insulation & Asbestos Worker	1:1,1:3
Iron Worker	1:1,1:4
Laborer	1:1,1:3
Mason	1:1,1:4
Millwright	1:1,1:4
Op Engineer	1:1,1:5
Painter	1:1,1:3
Plumber & Steamfitter	1:1,1:3
Roofer	1:1,1:2
Sheet Metal Worker	1:1,1:3
Sprinkler Fitter	1:1,1:2

If you have any questions concerning the attached schedule or would like additional information, please contact the nearest BUREAU of PUBLIC WORK District Office or write to:

New York State Department of Labor
Bureau of Public Work
State Office Campus, Bldg. 12
Albany, NY 12226

District Office Locations:	Telephone #	FAX #
Bureau of Public Work - Albany	518-457-2744	518-485-0240
Bureau of Public Work - Binghamton	607-721-8005	607-721-8004
Bureau of Public Work - Buffalo	716-847-7159	716-847-7650
Bureau of Public Work - Garden City	516-228-3915	516-794-3518
Bureau of Public Work - Newburgh	845-568-5287	845-568-5332
Bureau of Public Work - New York City	212-932-2419	212-775-3579
Bureau of Public Work - Patchogue	631-687-4882	631-687-4902
Bureau of Public Work - Rochester	585-258-4505	585-258-4708
Bureau of Public Work - Syracuse	315-428-4056	315-428-4671
Bureau of Public Work - Utica	315-793-2314	315-793-2514
Bureau of Public Work - White Plains	914-997-9507	914-997-9523
Bureau of Public Work - Central Office	518-457-5589	518-485-1870

Westchester County General Construction

Boilermaker — 11/01/2023

JOB DESCRIPTION Boilermaker **DISTRICT** 4

ENTIRE COUNTIES
Bronx, Dutchess, Kings, Nassau, New York, Orange, Putnam, Queens, Richmond, Rockland, Suffolk, Sullivan, Ulster, Westchester

WAGES

Per Hour:	07/01/2023	01/01/2024
Boilermaker	$ 65.88	$ 67.38
Repairs & Renovations	65.88	67.38

Repairs & Renovation: Includes Repairing, Renovating replacement of parts to an existing unit(s).

SUPPLEMENTAL BENEFITS
Per Hour:

Boilermaker	33.5% of hourly Wage Paid + $ 26.49	33.5% of Hourly Wage Paid + $26.85
Repair $ Renovations		

NOTE: "Hourly Wage Paid" shall include any and all premium(s) pay.

Repairs & Renovation Includes replacement of parts and repairs & renovation of existing unit.

OVERTIME PAY
See (*B, O, **U) on OVERTIME PAGE
Note:* Includes 9th & 10th hours, double for 11th or more.
** Labor Day ONLY, if worked.

Repairs & Renovation see (B,E,Q) on OT Page

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 11, 12, 15, 25, 26, 29) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wage per hour:
(1/2) Year Terms at the following percentage of Boilermaker's Wage

1st	2nd	3rd	4th	5th	6th	7th
65%	70%	75%	80%	85%	90%	95%

Supplemental Benefits Per Hour:

Apprentice(s)	33.5% of Hourly Wage Paid Plus Amount Below	33.5% of Hourly Wage Paid Plus Amount Below
1st Term	$ 20.12	$ 20.36
2nd Term	21.03	21.28
3rd Term	21.95	22.22
4th Term	22.83	23.12
5th Term	23.76	24.07
6th Term	24.67	25.00
7th Term	25.58	25.93

NOTE: "Hourly Wage Paid" shall include any and all premium(s)

4-5

Carpenter — 11/01/2023

JOB DESCRIPTION Carpenter **DISTRICT** 8

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Putnam, Queens, Richmond, Rockland, Suffolk, Westchester

WAGES
Per hour: 07/01/2023

Piledriver	$ 59.16 + 9.79*
Dockbuilder	$ 59.16 + 9.79*

*This portion is not subject to overtime premiums

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker	$ 45.34

OVERTIME PAY
See (B, E2, O) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE.

Paid: for 1st & 2nd yr.
Apprentices See (5,6,11,13,25)

Overtime: See (5,6,11,13,25) on HOLIDAY PAGE.

REGISTERED APPRENTICES
Wages per hour
(1)year terms:

1st	2nd	3rd	4th
$25.60 + 5.30*	$31.20 + 5.30*	$39.58 + 5.30*	$47.97 + 5.30*

*This portion is not subject to overtime premiums

Supplemental benefits per hour:

All Terms: $ 31.83

8-1556 Db

Carpenter — 11/01/2023

JOB DESCRIPTION Carpenter **DISTRICT** 8

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Rockland, Suffolk, Westchester

WAGES
Per hour: 07/01/2023

Carpet/Resilient Floor Coverer	$ 55.05 + 8.25*

*This portion is not subject to overtime premiums

INCLUDES HANDLING & INSTALLATION OF ARTIFICIAL TURF AND SIMILAR TURF INDOORS/OUTDOORS.

SUPPLEMENTAL BENEFITS
Per hour:
$ 39.45

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (18, 19) on HOLIDAY PAGE.

Paid for 1st & 2nd yr.
Apprentices See (5,6,11,13,16,18,19,25)
Overtime: See (5,6,11,13,16,18,19,25) on HOLIDAY PAGE.

REGISTERED APPRENTICES
Wage per hour - (1) year terms:

1st	2nd	3rd	4th
$ 25.20	$ 28.20	$ 32.45	$ 40.33

	+ 1.85*	+ 2.35*	+ 2.85*	+ 3.85*

*This portion is not subject to overtime premiums

Supplemental benefits per hour:

1st	2nd	3rd	4th
$ 15.22	$ 16.22	$ 19.32	$ 20.32

8-2287

Carpenter **11/01/2023**

JOB DESCRIPTION Carpenter **DISTRICT** 8

ENTIRE COUNTIES
Bronx, Dutchess, Kings, Nassau, New York, Orange, Putnam, Queens, Richmond, Rockland, Suffolk, Westchester

WAGES
Per Hour: 07/01/2023

Marine Construction:

Marine Diver	$ 74.03
	+ 9.79*
Marine Tender	$ 53.57
	+ 9.79*

*This portion is not subject to overtime premiums

SUPPLEMENTAL BENEFITS
Per Hour:

Journeyworker	$ 45.34

OVERTIME PAY
See (B, E, E2, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (18, 19) on HOLIDAY PAGE
Overtime: See (5, 6, 10, 11, 13, 16, 18, 19) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wages per hour:
One (1) year terms.

1st year	$ 25.60
	+ 5.30*
2nd year	31.20
	+ 5.30*
3rd year	39.58
	+ 5.30*
4th year	47.97
	+ 5.05*

*This portion is not subject to overtime premiums

Supplemental Benefits
Per Hour:

All terms	$ 31.83

8-1456MC

Carpenter **11/01/2023**

JOB DESCRIPTION Carpenter **DISTRICT** 8

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Putnam, Queens, Richmond, Rockland, Suffolk, Westchester

WAGES
Per hour: 07/01/2023

Building
Millwright $ 58.70
+ 12.62*

*This portion is not subject to overtime premiums

SUPPLEMENTAL BENEFITS
Per hour:

Millwright $ 44.31

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (18,19) on HOLIDAY PAGE.

Overtime See (5,6,8,11,13,18,19,25) on HOLIDAY PAGE.

REGISTERED APPRENTICES
Wages per hour:
One (1) year terms:

1st.	2nd.	3rd.	4th.
$31.74 + 6.75*	$37.19 + 7.92*	$42.64 + 9.09*	$53.54 + 11.43*

*This portion is not subject to overtime premiums

Supplemental benefits per hour:
One (1) year terms:

1st.	2nd.	3rd.	4th.
$29.81	$32.34	$35.52	$39.94

8-740.1

Carpenter — 11/01/2023

JOB DESCRIPTION Carpenter **DISTRICT** 8

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES
Per Hour:

07/01/2023

Timberman $ 54.05
+ 10.26*

*This portion not subject to overtime premiums

SUPPLEMENTAL BENEFITS
Per Hour:

07/01/2023

$ 44.55

OVERTIME PAY
See (B, E, E2, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE.

Paid: for 1st & 2nd yr.
Apprentices See (5,6,11,13,25)

Overtime: See (5,6,11,13,25) on HOLIDAY PAGE.

REGISTERED APPRENTICES
Wages per hour:
One (1) year terms:

1st	2nd	3rd	4th
$23.42 + 5.55*	$28.53 + 5.55*	$36.18 + 5.55*	$43.84 + 5.55*

*This portion is not subject to overtime premiums

Supplemental benefits per hour:
All terms $ 31.54

8-1556 Tm

Carpenter 11/01/2023

JOB DESCRIPTION Carpenter **DISTRICT** 8

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Rockland, Westchester

PARTIAL COUNTIES
Orange: South of but including the following, Waterloo Mills, Slate Hill, New Hampton, Goshen, Blooming Grove, Mountainville, east to the Hudson River.
Putnam: South of but including the following, Cold Spring, TompkinsCorner, Mahopac, Croton Falls, east to Connecticut border.
Suffolk: West of Port Jefferson and Patchogue Road to Route 112 to the Atlantic Ocean.

WAGES
Per hour: 07/01/2023

Core Drilling:
Driller $ 43.88
+ 2.50*

Driller Helper $ 34.47
+ 2.50*

Note: Hazardous Waste Pay Differential:
For Level C, an additional 15% above wage rate per hour
For Level B, an additional 15% above wage rate per hour
For Level A, an additional 15% above wage rate per hour
Note: When required to work on water: an additional $ 3.00 per hour.

*This portion is not subject to overtime premiums

SUPPLEMENTAL BENEFITS
Per hour:

Driller and Helper $ 28.85

OVERTIME PAY
See (B, G, P) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

8-1536-CoreDriller

Carpenter - Building / Heavy&Highway 11/01/2023

JOB DESCRIPTION Carpenter - Building / Heavy&Highway **DISTRICT** 11

ENTIRE COUNTIES
Putnam, Rockland, Westchester

WAGES
WAGES:(per hour)
Applies to CAPRENTER BUILDING/HEAVY & HIGHWAY/TUNNEL:

	07/01/2023	07/01/2024 Additional	07/01/2025 Additional	07/01/2026 Additional
Base Wage	$ 39.80 +$6.71*	$ 1.25**	$ 1.25**	$ 1.25**

*For all hours paid straight or premium.
**To be allocated at a later date.

SHIFT DIFFERENTIAL: When it is mandated by a Government Agency irregular or off shift can be worked. The Carpenter shall receive an additional fifteen percent (15%) of wage plus applicable benefits.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker $ 33.22

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE

HOLIDAY
BUILDING:
Paid: See (1) on HOLIDAY PAGE.
Overtime: See (5, 6, 16, 25) on HOLIDAY PAGE.
- Holidays that fall on Sunday will be observed Monday.

HEAVY&HIGHWAY/TUNNEL:
Paid: See (5, 6, 25) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
- Holidays that fall on Sunday will be observed Monday
- Must be employed during the five (5) work days immediately preceding a holiday or during the five (5) work days following the paid holiday to receive holiday pay
- If Employee is entitled to a paid holiday, the Employee is paid the Holiday wage and supplemental benefits whether they work or not. If Employee works the Holiday, the Employee will receive holiday pay (including supplemental benefits), plus the applicable premium wage for working the Holiday. If Employee works in excess of 8 hours on Holiday, then benefits will be paid for any hours in excess of 8 hours.

REGISTERED APPRENTICES
1 year terms at the following wage rates:

1st	2nd	3rd	4th	5th
$ 19.90	$ 23.88	$ 25.87	$ 27.86	$ 31.84
+3.58*	+3.58*	+3.58*	+3.58*	+3.58*

*For all hours paid straight or premium

SUPPLEMENTAL BENEFITS per hour:

All terms $ 16.27

11-279.1B/HH

Electrician **11/01/2023**

JOB DESCRIPTION Electrician **DISTRICT** 9

ENTIRE COUNTIES
Bronx, Kings, New York, Queens, Richmond, Westchester

WAGES

Per hour:	07/01/2023	03/07/2024
Service Technician	$ 36.40	$ 37.40

Service and Maintenance on Alarm and Security Systems.

Maintenance, repair and /or replacement of defective (or damaged) equipment on, but not limited to, Burglar - Fire - Security - CCTV - Card Access - Life Safety Systems and associated devices. (Whether by service contract of T&M by customer request.)

SUPPLEMENTAL BENEFITS

Per hour:		
Journeyworker:	$ 21.07	$ 21.85

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6, 11, 15, 16, 17, 25, 26) on HOLIDAY PAGE
Overtime: See (5, 6, 11, 15, 16, 17, 25, 26) on HOLIDAY PAGE

9-3H

Electrician **11/01/2023**

JOB DESCRIPTION Electrician **DISTRICT** 8

ENTIRE COUNTIES
Westchester

WAGES

Per hour:	07/01/2023	04/18/2024	04/17/2025
*Electrician/A-Technician	$ 55.75	$ 56.75	$ 58.75

Teledata	55.75	56.75	58.75

*All new installations of wiring, conduit, junction boxes and light fixtures for projects with a base bid of more than $325,000. For projects with a base bid of $325,000 or less, see Maintenance and Repair rates.

Note: On a job where employees are required to work on bridges over navigable waters, transmission towers, light poles, bosun chairs, swinging scaffolds , etc. 40 feet or more above the water or ground or under compressed air, or tunnel projects under construction or where assisted breathing apparatus is required, they will be paid at the rate of time and one-half for such work except on normal pole line or building construction work.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker	$ 56.26	$59.39	$61.09

OVERTIME PAY

See (A, G, *J, P) on OVERTIME PAGE

*NOTE: Emergency work on Sunday and Holidays is at the time and one-half overtime rate.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

(1) year terms at the following wage rates:

	07/01/2023	04/18/2024	04/17/2025
1st term	$ 16.00	$16.00	$16.00
2nd term	17.00	17.00	17.00
3rd term	19.00	19.00	19.00
4th term	21.00	21.00	21.00
MIJ 1-12 months	26.50	26.50	26.50
MIJ 13-18 months	30.00	30.00	30.00

Supplemental Benefits per hour:

	07/01/2023	04/18/2024	04/17/2025
1st term	$ 11.63	$ 12.40	$ 12.72
2nd term	14.30	15.07	15.89
3rd term	15.62	16.40	17.23
4th term	16.95	17.73	18.57
MIJ 1-12 months	13.92	15.72	15.89
MIJ 13-18 months	14.33	16.17	16.29

8-3/W

Electrician — 11/01/2023

JOB DESCRIPTION Electrician **DISTRICT** 8

ENTIRE COUNTIES

Westchester

WAGES

Per hour

	07/01/2023	04/18/2024	04/17/2025
Electrician -M	$ 30.00	$ 30.00	$ 30.00
H - Telephone	30.00	30.00	30.00

All work with a base bid amount of $325,000 or less. Including repairs and /or replacement of defective electrical and teledata equipment, 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.

*If the project exceeds $375,000 due to changes in the scope of work, an Electrician/A Technician must be part of the labor ratio.

SUPPLEMENTAL BENEFITS

	07/01/2023	04/18/2024	04/17/2025
Electrician & H - Telephone	$ 14.33	$ 16.17	$ 16.29

OVERTIME PAY

See (B, G, *J, P) on OVERTIME PAGE

*Note: Emergency work on Sunday and Holidays is at the time and one-half overtime rate.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE

Elevator Constructor 11/01/2023

JOB DESCRIPTION Elevator Constructor **DISTRICT** 4

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk

PARTIAL COUNTIES
Rockland: Entire County except for the Township of Stony Point
Westchester: Entire County except for the Townships of Bedford, Lewisboro, Cortland, Mt. Kisco, North Salem, Pound Ridge, Somers and Yorktown.

WAGES
Per hour:

	07/01/2023
Elevator Constructor	$ 77.49
Modernization & Service/Repair	$ 60.89

NOTE - The 'Employer Registration' (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to June 30,2023 will expire within the granted time frame.

For Pre-Registered Projects Four (4), Ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day. Tuesday thru Friday may be worked with no make-up day. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS
Per Hour:

Elevator Constructor	$ 45.574
Modernization & Service/Repairs	44.412

OVERTIME PAY
Constructor See (D, M, T) on OVERTIME PAGE.

Modern/Service See (B, F, S) on OVERTIME PAGE.

HOLIDAY
Paid: See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
WAGES PER HOUR:
*Note:1st, 2nd, 3rd Terms are based on Average wage of Constructor & Modernization.
Terms 4 thru 9 Based on Journeyman's wage of classification Working in.

6 MONTH TERMS:

1st Term*	2nd & 3rd Term*	4th & 5th Term	6th & 7th Term	8th & 9th Term
50%	50%	55%	65%	75%

SUPPLEMENTAL BENEFITS

Elevator Constructor	
1st Term	$ 0.00
2nd & 3rd Term	36.024
4th & 5th Term	36.943
6th & 7th Term	38.448
8th & 9th Term	39.953

Modernization & Service/Repair	
1st Term	$ 0.00
2nd & 3rd Term	35.694
4th & 5th Term	36.525
6th & 7th Term	37.948
8th & 9th Term	39.38

Elevator Constructor — 11/01/2023

JOB DESCRIPTION Elevator Constructor **DISTRICT** 1

ENTIRE COUNTIES
Columbia, Dutchess, Greene, Orange, Putnam, Sullivan, Ulster

PARTIAL COUNTIES
Delaware: Towns of Andes, Bovina, Colchester, Davenport, Delhi, Harpersfield, Hemdon, Kortright, Meredith, Middletown, Roxbury, Hancock & Stamford
Rockland: Only the Township of Stony Point.
Westchester: Only the Townships of Bedford, Lewisboro, Cortland, Mt. Kisco, North Salem, Pound Ridge, Somers and Yorktown.

WAGES

Per Hour	07/01/2023	01/01/2024
Mechanic	$ 67.35	$ 70.15
Helper	70% of Mechanic Wage Rate	70% of Mechanic Wage Rate

NOTE - The "Employer Registration" (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to June 30, 2023 will expire within the granted time frame.

For Pre-Registered Projects Four (4), Ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day. Tuesday thru Friday may be worked with no make-up day. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS
Per hour

	07/01/2023	01/01/2024
Journeyperson/Helper	$ 37.335*	$ 37.885*

(*)Plus 6% of regular hourly if less than 5 years of service. Plus 8% of regular hourly rate if more than 5 years of service.

OVERTIME PAY
See (D, O) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6, 15, 16) on HOLIDAY PAGE
Overtime: See (5, 6, 15, 16) on HOLIDAY PAGE
Note: When a paid holiday falls on Saturday, it shall be observed on Friday. When a paid holiday falls on Sunday, it shall be observed on Monday.

REGISTERED APPRENTICES
Wages per hour:

0-6 mo*	6-12 mo	2nd yr	3rd yr	4th yr
50 %	55 %	65 %	70 %	80 %

(*)Plus 6% of the hourly rate, no additional supplemental benefits.

Supplemental Benefits per hour worked:

Same as Journeyperson/Helper

1-138

Glazier — 11/01/2023

JOB DESCRIPTION Glazier **DISTRICT** 8

ENTIRE COUNTIES
Bronx, Dutchess, Kings, Nassau, New York, Orange, Putnam, Queens, Richmond, Rockland, Suffolk, Sullivan, Ulster, Westchester

WAGES

Per hour:	7/01/2023
Glazier & Glass Tinting	$ 61.64
*Scaffolding	65.64
Window Film	
**Repair & Maintenance	30.76

*Scaffolding includes swing scaffold, mechanical equipment, scissor jacks, man lifts, booms & buckets 30' or more, but not pipe scaffolding.

**Repair & Maintenance- All repair & maintenance work on a particular building whenever performed, where the total cumulative Repair & Maintenance contract value is under $184,000.

SUPPLEMENTAL BENEFITS

Per hour:	7/01/2023
Glazier & Glass Tinting	$ 40.20
Window Film Repair & Maintenance	23.19

OVERTIME PAY
See (B, E, Q, V) on OVERTIME PAGE
For 'Repair & Maintenance' see (B, B2, I, S) on overtime page.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (4, 6, 16, 25) on HOLIDAY PAGE
For 'Repair & Maintenance'
Paid: See(5, 6, 16, 25)
Overtime: See(5, 6, 16, 25)

REGISTERED APPRENTICES
Wage per hour:
(1) year terms at the following wage rates:

	7/01/2023
1st term	$ 21.93
2nd term	30.05
3rd term	39.95
4th term	48.97

Supplemental Benefits:
(Per hour)

1st term	$ 18.25
2nd term	25.97
3rd term	31.27
4th term	34.32

8-1087 (DC9 NYC)

Insulator - Heat & Frost — 11/01/2023

JOB DESCRIPTION Insulator - Heat & Frost **DISTRICT** 8

ENTIRE COUNTIES
Dutchess, Orange, Putnam, Rockland, Westchester

WAGES

Per hour:	07/01/2023	06/01/2024
Insulator	$ 59.25	+ $ 2.50
Discomfort & Additional Training**	62.31	+ $ 2.50
Fire Stop Work*	31.77	+ $ 2.50

* Applies on all exclusive Fire Stop Work (When contract is for Fire Stop work only). No apprentices on these contracts only.

**Applies to work requiring; garb or equipment worn against the body not customarily worn by insulators; psychological evaluation ;special training, including but not limited to "Yellow Badge" radiation training

Note: Additional $0.50 per hour for work 30 feet or more above floor or ground level.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker	$ 37.35

Discomfort & Additional Training	39.39
Fire Stop Work:	
Journeyworker	19.03

OVERTIME PAY
See (B, E, E2, Q, *T) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Note: Last working day preceding Christmas and New Years day, workers shall work no later than 12:00 noon and shall receive 8 hrs pay.

Overtime: See (2*, 4, 6, 16, 25) on HOLIDAY PAGE.
*Note: Labor Day triple time if worked.

REGISTERED APPRENTICES
(1) year terms:

Insulator Apprentices:

1st	2nd	3rd	4th
$ 31.77	$ 37.26	$ 42.76	$ 48.26

Discomfort & Additional Training Apprentices:

1st	2nd	3rd	4th
$ 33.30	$ 39.09	$ 44.90	$ 50.71

Supplemental Benefits paid per hour:

Insulator Apprentices:

1st term	$ 19.03
2nd term	22.69
3rd term	26.36
4th term	30.03

Discomfort & Additional Training Apprentices:

1st term	$ 20.06
2nd term	23.92
3rd term	27.78
4th term	31.66

8-91

Ironworker — 11/01/2023

JOB DESCRIPTION Ironworker **DISTRICT** 9

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES

Per Hour:	07/01/2023	01/01/2024 Additional
Stone Derrickmen Rigger	$ 72.90	+ $ 1.64
Stone Handset Derrickman	70.47	+ $ 1.11

SUPPLEMENTAL BENEFITS
Per hour:

Stone Derrickmen Rigger	$ 43.10
Stone Handset Derrickman	42.84

OVERTIME PAY
See (B, D1, *E, Q, **V) on OVERTIME PAGE
*Time and one-half shall be paid for all work on Saturday up to eight (8) hours and double time shall be paid for all work thereafter.
** Benefits same premium as wages on Holidays only

HOLIDAY
Paid: See (18) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 25) on HOLIDAY PAGE

Work stops at schedule lunch break with full day's pay.

REGISTERED APPRENTICES
Wage per hour:

Stone Derrickmen Rigger:

	1st	2nd	3rd	4th
07/01/2023	$ 35.90	$ 51.53	$ 57.32	$ 63.11

Supplemental Benefits:
Per hour:

07/01/2023	22.11	32.58	32.58	32.58

Stone Handset:

1/2 year terms at the following hourly wage rate:

	1st	2nd	3rd	4th
07/01/2023	34.56	49.75	55.33	60.90

Supplemental Benefits:
Per hour:

07/01/2023	22.10	32.46	32.46	32.46

9-197D/R

Ironworker — 11/01/2023

JOB DESCRIPTION Ironworker **DISTRICT** 4

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES
Per Hour:

	07/01/2023
Ornamental	$ 46.90
Chain Link Fence	46.90
Guide Rail	46.90

SUPPLEMENTAL BENEFITS
Per hour:
Journeyworker: $ 63.04

OVERTIME PAY
See (B, B1, Q, V) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
Apprentices Hired after 9/1/18:
1 year terms

	07/01/2023
1st Term	$ 21.13
2nd Term	24.77
3rd Term	28.40
4th Term	32.06

Supplemental Benefits per hour:

1st Term	$ 17.90
2nd Term	19.15
3rd Term	20.41
4th Term	21.67

4-580-Or

Ironworker — 11/01/2023

JOB DESCRIPTION Ironworker **DISTRICT** 4

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES
PER HOUR:

Ironworker:	07/01/2023	01/01/2024 Additional	07/01/2024 Additional
Structural Bridges Machinery	$ 57.20	$ 1.75/Hr.*	$ 1.75/Hr.*

(*)To be allocated at a later date.

SUPPLEMENTAL BENEFITS
PER HOUR PAID:

Journeyman $ 87.35

OVERTIME PAY
See (B, B1, Q, *V) on OVERTIME PAGE
*NOTE: Benefits are calculated for every hour paid

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 18, 19) on HOLIDAY PAGE

REGISTERED APPRENTICES
WAGES PER HOUR:

6 month terms at the following rate:

1st	$ 29.73
2nd	30.33
3rd - 6th	30.94

Supplemental Benefits
PER HOUR PAID:
All Terms $ 60.69

4-40/361-Str

Ironworker 11/01/2023

JOB DESCRIPTION Ironworker **DISTRICT** 4

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

PARTIAL COUNTIES
Rockland: Southern section - south of Convent Road and east of Blue Hills Road.

WAGES

Per hour:	07/01/2023
Reinforcing & Metal Lathing	$ 56.95
"Base" Wage	$ 55.20 plus $ 1.75

"Base" Wage is used to calculate overtime hours only.

SUPPLEMENTAL BENEFITS
Per hour:
Reinforcing & Metal Lathing $ 42.72

OVERTIME PAY
See (B, E, Q, *X) on OVERTIME PAGE
*Only $23.50 per Hour for non worked hours

Supplemental Benefit Premiums for Overtime Hours worked:

Time & One Half	$ 49.47
Double Time	$ 56.22

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 11, 13, *18, **19, 25) on HOLIDAY PAGE
*Note: Work performed after first 4 Hours.

REGISTERED APPRENTICES
(1) year terms at the following wage rates:

1st term	2nd term	3rd term	4th Term
Wage Per Hour:			
$ 22.55	$ 28.38	$ 34.68	$ 37.18
"Base" Wage			
$ 21.00	$ 26.80	$ 33.10	$ 35.60
plus $1.55	plus $1.58	plus $1.58	plus $1.58

"Base" Wage is used to calculate overtime hours ONLY.

SUPPLEMENTAL BENIFITS
Per Hour:

1st term	2nd term	3rd term	4th Term
$ 18.17	$ 21.34	$ 22.00	$ 22.50

4-46Reinf

Laborer - Building — 11/01/2023

JOB DESCRIPTION Laborer - Building **DISTRICT** 8

ENTIRE COUNTIES
Putnam, Westchester

WAGES

Per hour	07/01/2023	05/01/2024
Laborer	$ 40.05 plus $5.45**	+ $ 2.00
Laborer - Asbestos & Hazardous Materials Removal	$ 44.50*	+ $ 2.00

* Abatement/Removal of:
- Lead based or lead containing paint on materials to be repainted is classified as Painter.
- Asbestos containing roofs and roofing material is classified as Roofer.

** This portion is not subject to overtime premium.

NOTE: Upgrade/Material condition work plan for work performed during non-outage under a wage formula of 90% wage/100% fringe benefits at nuclear power plants.

SUPPLEMENTAL BENEFITS

Per hour:	07/01/2023
Journeyworker	$ 30.50

OVERTIME PAY
See (B, E, E2, Q, *V) on OVERTIME PAGE
*Note: For Sundays and Holidays worked benefits are at the same premium as wages.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
LABORER ONLY
Hourly terms at the following wage:

Level A	Level B	Level C	Level D
0-1000	1001-2000	2001-3000	3001-4000
$ 28.08	$ 31.90	$ 35.72	$ 39.54

Supplemental Benefits per hour:

Apprentices	
All terms	$ 23.20

8-235/B

Laborer - Heavy&Highway **11/01/2023**

JOB DESCRIPTION Laborer - Heavy&Highway **DISTRICT** 8

ENTIRE COUNTIES
Putnam, Westchester

WAGES
PUTNAM: APPLIES TO ALL HEAVY & HIGHWAY WORK EXCLUDING HIGHWAYS, STREETS, AND BRIDGES

GROUP I: Blaster, Quarry Master, Curbs/Asphalt Screedman, Pipe Jacking and Boring Operations Operator, Qualified Dead Condition Pipe Fuser (B Mechanic)

GROUP II: Burner, Drillers(jumbo, joy, wagon, air track, hydraulic), Drill Operator, Self Contained Rotary Drill, Curbs, Raker, Bar Person, Concrete Finisher.

GROUP III: Pavement Breakers, Jeeper Operator, Jack Hammer, Pneumatic Tools (all), Gas Driller, Guniting, Railroad Spike Puller, Pipelayer, Chain Saw, Deck winches on scows, Power Buggy Operator, Power Wheelbarrow Operator, Bar Person Helper, Compressed Airlance, Water Jet Lance.

GROUP IV: Concrete Laborers, Asph. Worker, Rock Scaler, Vibrator Oper., Bit Grinder, Air Tamper, Pumps, Epoxy (adhesives, fillers and troweled on), Barco Rammer, Concrete Grinder, Crack Router Operator, Guide Rail-digging holes and placing concrete and demolition when not to be replaced, distribution of materials and tightening of bolts.

GROUP V: Drillers Helpers, Common Laborer, Mason Tenders, Signal Person, Pit Person, Truck Spotter, Powder Person, Landscape/Nursery Person, Dump Person, Temp. Heat.

GROUP VIA: Asbestos/Toxic Waste Laborer-All removal (Roads, Tunnels, Landfills, etc.) Confined space laborer, Bio-remediation, Phyto-remediation, Lead or Hazardous material, Abatement Laborer.

Wages:(per hour)	07/01/2023
GROUP I	$ 49.55*
GROUP II	48.20*
GROUP III	47.80*
GROUP IV	47.45*
GROUP V	47.10*
GROUP VIA	49.10*
Operator Qualified	
Gas Mechanic(A Mech)	59.55*
Flagperson	40.75*

*NOTE: To calculate overtime premiums, deduct $0.10 from above wages

SHIFT WORK: A shift premium will be paid on Public Work contracts for off-shift or irregular shift work when mandated by the NYS D.O.T. or other Governmental Agency contracts. Employees shall receive an additional 15% per hour above current rate for all regular and irregular shift work. Premium pay shall be calculated using the 15% per hour differential as base rate.

SUPPLEMENTAL BENEFITS
Per hour:
Journeyworker:
First 40 Hours
Per Hour $ 26.60
Over 40 Hours
Per Hour 19.85

OVERTIME PAY
See (B, E, P, R, S) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6, 8, 15, 25, 26) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 15, 25, 26) on HOLIDAY PAGE
NOTE: For Holiday Overtime: 5, 6 - Code 'S' applies
For Holiday Overtime: 8, 15, 25, 26 - Code 'R' applies

REGISTERED APPRENTICES

	1st term 1-1000hrs	2nd term 1001-2000hrs	3rd term 2001-3000hrs	4th term 3001-4000hrs
07/01/2023	$ 27.46	$ 32.41	$ 37.12	$ 41.83

Supplemental Benefits per hour:

1st term	$ 3.85 - After 40 hours: $ 3.60
2nd term	$ 3.95 - After 40 hours: 3.60
3rd term	$ 4.45 - After 40 hours: 4.00
4th term	$ 5.00 - After 40 hours: 4.50

8-60H/H

Laborer - Tunnel 11/01/2023

JOB DESCRIPTION Laborer - Tunnel **DISTRICT** 11

ENTIRE COUNTIES
Columbia, Dutchess, Greene, Orange, Otsego, Putnam, Rockland, Sullivan, Ulster, Westchester

PARTIAL COUNTIES
Chenango: Townships of Columbus, Sherburne and New Berlin.
Delaware: Townships of Andes, Bovina, Middletown, Roxbury, Franklin, Hamden, Stamford, Delhi, Kortright, Harpersfield, Merideth and Davenport.

WAGES
Class 1: All support laborers/sandhogs working above the shaft or tunnel.

Class 2: All laborers/sandhogs working in the shaft or tunnel.

Class 4: Safety Miners

Class 5: Site work related to Shaft/Tunnel

WAGES: (per hour)

	07/01/2023	06/01/2024	06/01/2025
Class 1	$ 55.55	$ 57.05	$ 58.55
Class 2	57.70	59.20	60.70
Class 4	64.10	65.60	67.10
Class 5	47.65	49.90	51.40

Toxic and hazardous waste, lead abatement and asbestos abatement work will be paid an additional $ 3.00 an hour.

SHIFT DIFFERENTIAL...On all Government mandated irregular shift work:
- Employee shall be paid at time and one half the regular rate Monday through Friday.
- Saturday shall be paid at 1.65 times the regular rate.
- Sunday shall be paid at 2.15 times the regular rate.

SUPPLEMENTAL BENEFITS
Per hour:

Benefit 1	$ 35.73	$ 36.98	$ 38.23
Benefit 2	51.01	TBD	TBD
Benefit 3	71.28	TBD	TBD

Benefit 1 applies to straight time hours, paid holidays not worked.
Benefit 2 applies to over 8 hours in a day (M-F), irregular shift work hours worked, and Saturday hours worked.
Benefit 3 applies to Sunday and Holiday hours worked.

OVERTIME PAY
See (B, E, Q, X) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6, 15, 25) on HOLIDAY PAGE
Overtime: See (5, 6, 15, 16, 25) on HOLIDAY PAGE
When a recognized Holidays falls on Saturday or Sunday, holidays falling on Saturday shall be recognized or observed on Friday and holidays falling on Sunday shall be recognized or observed on Monday. Employees ordered to work on the Saturday or Sunday of the holiday or on the recognized or the observed Friday or Monday for those holidays falling on Saturday or Sunday shall receive double time the established rate and benefits for the holiday.

REGISTERED APPRENTICES
FOR APPRENTICE RATES, refer to the appropriate Laborer Heavy & Highway wage rate contained in the wage schedule for the County and location where the work is to be performed.

11-17/60/235/754Tun

Lineman Electrician 11/01/2023

JOB DESCRIPTION Lineman Electrician **DISTRICT** 6

ENTIRE COUNTIES

Westchester

WAGES

A Lineman/Technician shall perform all overhead aerial work. A Lineman/Technician on the ground will install all electrical panels, connect all grounds, install and connect all electrical conductors, assembly of all electrical materials, conduit, pipe or raceway; placing of fish wire; pulling of cables, wires or fiber optic cable through such raceways; splicing of conductors; dismantling of such structures, lines or equipment.

A Groundman/Truck Driver shall: Build and set concrete forms, handle steel mesh, set footer cages, transport concrete in a wheelbarrow, hand or machine concrete vibrator, finish concrete footers, mix mortar, grout pole bases, cover and maintain footers while curing in cold weather, operate jack hammer, operate hand pavement breaker, tamper, concrete and other motorized saws, as a drill helper, operate and maintain generators, water pumps, chainsaws, sand blasting, operate mulching and seeding machine, air tools, electric tools, gas tools, load and unload materials, hand shovel and/or broom, prepare and pour mastic and other fillers, assist digger operator equipment/operator in ground excavation and restoration, landscape work and painting. Only when assisting a lineman technician, a groundman/truck driver may assist in installing conduit, pipe, cables and equipment.

Below rates apply to electrical overhead and underground distribution and maintenance work and overhead and underground transmission line work, electrical substations, switching structures, continuous pipe-type underground fluid or gas filled transmission conduit and cable installations, maintenance jobs or projects, railroad catenary installations and maintenance, third rail installations, the bonding of rails and the installation of fiber optic cable. (Ref #14.04.01)

NOTE: Includes Teledata Work within ten (10) feet of High Voltage Transmission Lines. Also includes digging of holes for poles, anchors, footer, and foundations for electrical equipment.

Per hour:	07/01/2023	05/06/2024
Lineman, Tech, Welder	$ 60.41	$ 61.91
Crane, Crawler Backhoe	60.41	61.91
Cable Splicer-Pipe Type	66.45	68.10
Digging Mach Operator	54.37	55.72
Cert. Welder-Pipe Type	63.43	65.01
Tractor Trailer Driver	51.35	52.62
Groundman, Truck Driver	48.33	49.53
Equipment Mechanic	48.33	49.53
Flagman	36.25	37.15

Additional $1.00 per hour for entire crew when a helicopter is used.

NOTE: THE FOLLOWING RATES WILL APPLY ON ALL CONTRACTING AGENCY MANDATED MULTIPLE SHIFTS OF AT LEAST FIVE (5) DAYS DURATION WORKED BETWEEN THE HOURS LISTED BELOW:

1ST SHIFT	8:00 AM TO 4:30 PM REGULAR RATE
2ND SHIFT	4:30 PM TO 1:00 AM REGULAR RATE PLUS 17.3%
3RD SHIFT	12:30 AM TO 9:00 AM REGULAR RATE PLUS 31.4%

NOTE - The "Employer Registration" (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to June 30, 2023 will expire within the granted time frame.

For Pre-Registered Projects Four (4), Ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day. Tuesday thru Friday may be worked with no make-up day. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS

Per hour worked (but also required on non-worked holidays):

	07/01/2023	05/06/2024
Lineman, Technician, or Equipment Operators with Crane License	$ 29.40 *plus 7% of the hourly wage paid	$ 30.90 *plus 7% of the hourly wage paid
All other Journeyman	$ 26.40 *plus 7% of the hourly wage paid	$ 26.90 *plus 7% of the hourly wage paid

*The 7% is based on the hourly wage paid, straight time or premium time.

OVERTIME PAY

See (B, E, Q,) on OVERTIME PAGE. *Note* Double time for emergency work designated by the Dept of Jurisdiction.
NOTE: WAGE CAP - Double the straight time hourly base wage shall be the maximum hourly wage compensation for any hour worked. Contractor is still responsible to pay the hourly benefit amount for each hour worked.

HOLIDAY

Paid	See (5, 6, 8, 13, 25) on HOLIDAY PAGE plus Governor of NYS Election Day.
Overtime	See (5, 6, 8, 13, 25) on HOLIDAY PAGE plus Governor of NYS Election Day.

NOTE: All paid holidays falling on Saturday shall be observed on the preceding Friday. All paid holidays falling on Sunday shall be observed on the following Monday. Supplements for holidays paid at straight time.

REGISTERED APPRENTICES

WAGES per hour: 1000 hour terms at the following percentage of the applicable Journeyman Lineman wage.

1st	2nd	3rd	4th	5th	6th	7th
60%	65%	70%	75%	80%	85%	90%

SUPPLEMENTAL BENEFITS per hour:

07/01/2023	05/06/2024
$ 26.40 *plus 7% of the hourly wage paid	$ 26.90 *plus 7% of the hourly wage paid

*The 7% is based on the hourly wage paid, straight time or premium time.

6-1249aWest

Lineman Electrician - Teledata — 11/01/2023

JOB DESCRIPTION Lineman Electrician - Teledata **DISTRICT** 6

ENTIRE COUNTIES

Albany, Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Dutchess, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Niagara, Oneida, Onondaga, Ontario, Orange, Orleans, Oswego, Otsego, Putnam, Rensselaer, Rockland, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Westchester, Wyoming, Yates

WAGES

Per hour:

For outside work, stopping at first point of attachment (demarcation).

	07/01/2023	01/01/2024	01/01/2025
Cable Splicer	$ 37.73	$ 39.24	$ 40.81
Installer, Repairman	$ 35.81	$ 37.24	$ 38.73
Teledata Lineman	$ 35.81	$ 37.24	$ 38.73
Tech., Equip. Operator	$ 35.81	$ 37.24	$ 38.73
Groundman	$ 18.98	$ 19.74	$ 20.53

NOTE: EXCLUDES Teledata work within ten (10) feet of High Voltage (600 volts and over) transmission lines. For this work please see LINEMAN.

NOTE: THE FOLLOWING RATES WILL APPLY ON ALL CONTRACTING AGENCY MANDATED MULTIPLE SHIFTS OF AT LEAST FIVE (5) DAYS DURATION WORKED:

1ST SHIFT	REGULAR RATE
2ND SHIFT	REGULAR RATE PLUS 10%
3RD SHIFT	REGULAR RATE PLUS 15%

SUPPLEMENTAL BENEFITS

Per hour:

	07/01/2023	01/01/2024	01/01/2025
Journeyman	$ 5.70 *plus 3% of the hourly wage paid	$ 5.70 *plus 3% of the hourly wage paid	$ 5.70 *plus 3% of the hourly wage paid

*The 3% is based on the hourly wage paid, straight time rate or premium rate.

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE
NOTE: WAGE CAP - Double the straight time hourly base wage shall be the maximum hourly wage compensation for any hour worked. Contractor is still responsible to pay the hourly benefit amount for each hour worked.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 16) on HOLIDAY PAGE

6-1249LT - Teledata

Lineman Electrician - Traffic Signal, Lighting — 11/01/2023

JOB DESCRIPTION Lineman Electrician - Traffic Signal, Lighting **DISTRICT** 6

ENTIRE COUNTIES
Westchester

WAGES
Lineman/Technician shall perform all overhead aerial work. A Lineman/Technician on the ground will install all electrical panels, connect all grounds, install and connect all electrical conductors which includes, but is not limited to road loop wires; conduit and plastic or other type pipes that carry conductors, flex cables and connectors, and to oversee the encasement or burial of such conduits or pipes.

A Groundman/Groundman Truck Driver shall: Build and set concrete forms, handle steel mesh, set footer cages, transport concrete in a wheelbarrow, hand or machine concrete vibrator, finish concrete footers, mix mortar, grout pole bases, cover and maintain footers while curing in cold weather, operate jack hammer, operate hand pavement breaker, tamper, concrete and other motorized saws, as a drill helper, operate and maintain generators, water pumps, chainsaws, sand blasting, operate mulching and seeding machine, air tools, electric tools, gas tools, load and unload materials, hand shovel and/or broom, prepare and pour mastic and other fillers, assist digger operator/equipment operator in ground excavation and restoration, landscape work and painting. Only when assisting a lineman technician, a groundman/truck driver may assist in installing conduit, pipe, cables and equipment.

A flagger's duties shall consist of traffic control only.
(Ref #14.01.03)

Per hour:	07/01/2023	05/06/2024
Lineman, Technician	$ 54.73	$ 55.95
Crane, Crawler Backhoe	54.73	55.95
Certified Welder	57.47	58.75
Digging Machine	49.26	50.36
Tractor Trailer Driver	46.52	47.56
Groundman, Truck Driver	43.78	44.76
Equipment Mechanic	43.78	44.76
Flagman	32.84	33.57

Above rates are applicable for installation, testing, operation, maintenance and repair on all Traffic Control (Signal) and Illumination (Lighting) projects, Traffic Monitoring Systems, and Road Weather Information Systems. Includes digging of holes for poles, anchors, footer foundations for electrical equipment; assembly of all electrical materials or raceway; placing of fish wire; pulling of cables, wires or fiber optic cable through such raceways; splicing of conductors; dismantling of such structures, lines or equipment.

NOTE: THE FOLLOWING RATES WILL APPLY ON ALL CONTRACTING AGENCY MANDATED MULTIPLE SHIFTS OF AT LEAST FIVE (5) DAYS DURATION WORKED BETWEEN THE HOURS LISTED BELOW:

1ST SHIFT	8:00 AM TO 4:30 PM REGULAR RATE
2ND SHIFT	4:30 PM TO 1:00 AM REGULAR RATE PLUS 17.3%
3RD SHIFT	12:30 AM TO 9:00 AM REGULAR RATE PLUS 31.4%

NOTE - The "Employer Registration" (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to June 30, 2023 will expire within the granted time frame.

For Pre-Registered Projects Four (4), Ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day. Tuesday thru Friday may be worked with no make-up day. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS
Per hour worked (but also required on non-worked holidays):

	07/01/2023	05/06/2024
Lineman, Technician,	$ 29.40	$ 30.90

or Equipment Operators with Crane License	*plus 7% of the hourly wage paid	*plus 7% of the hourly wage paid
All other Journeyman	$ 26.40 *plus 7% of the hourly wage paid	$ 26.90 *plus 7% of the hourly wage paid

*The 7% is based on the hourly wage paid, straight time or premium time.

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE. *Note* Double time for emergency work designated by the Dept. of Jurisdiction.
NOTE: WAGE CAP - Double the straight time hourly base wage shall be the maximum hourly wage compensation for any hour worked. Contractor is still responsible to pay the hourly benefit amount for each hour worked.

HOLIDAY
Paid: See (5, 6, 8, 13, 25) on HOLIDAY PAGE and Governor of NYS Election Day.
Overtime: See (5, 6, 8, 13, 25) on HOLIDAY PAGE and Governor of NYS Election Day.

NOTE: All paid holidays falling on Saturday shall be observed on the preceding Friday. All paid holidays falling on Sunday shall be observed on the following Monday. Supplements for holidays paid at straight time.

REGISTERED APPRENTICES
WAGES per hour: 1000 hour terms at the following percentage of the applicable Journeyman Lineman wage.

1st	2nd	3rd	4th	5th	6th	7th
60%	65%	70%	75%	80%	85%	90%

SUPPLEMENTAL BENEFITS per hour:

07/01/2023	05/06/2024
$ 26.40 *plus 7% of the hourly wage paid	$ 26.90 *plus 7% of the hourly wage paid

*The 7% is based on the hourly wage paid, straight time or premium time.

6-1249aWestLT

Mason - Building — 11/01/2023

JOB DESCRIPTION Mason - Building **DISTRICT** 9

ENTIRE COUNTIES
Nassau, Rockland, Suffolk, Westchester

WAGES

Per hour:	07/01/2023	12/04/2023 Additional	06/05/2024 Additional
Tile Setters	$ 62.98	$ 0.72	$ 0.72

SUPPLEMENTAL BENEFITS
Per Hour:

$ 25.61*

+ $10.04

* This portion of benefits subject to same premium rate as shown for overtime wages.

OVERTIME PAY
See (B, E, Q, V) on OVERTIME PAGE
Work beyond 10 hours on Saturday shall be paid at double the hourly wage rate.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 11, 15, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wage per hour:

(750 hour) term at the following wage rate:
Term:

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th

	1-750	751-1500	1501-2250	2251-3000	3001-3750	3751-4500	4501-5250	5251-6000	6001-6750	6501-7000
07/01/2023	$21.70	$26.66	$33.75	$38.69	$42.25	$45.70	$49.29	$54.23	$57.09	$61.25

Supplemental Benefits per hour:

	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
07/01/2023	$12.55* +$.73	$12.55* +$.78	$15.36* +$.88	$15.36* +$.88	$16.36* +$1.37	$17.86* +$1.42	$18.86* +$1.83	$18.86* +$1.88	$16.86* +$6.03	$22.11* +$6.61

* This portion of benefits subject to same premium rate as shown for overtime wages.

9-7/52A

Mason - Building — 11/01/2023

JOB DESCRIPTION Mason - Building **DISTRICT** 11

ENTIRE COUNTIES
Putnam, Rockland, Westchester

PARTIAL COUNTIES
Orange: Only the Township of Tuxedo.

WAGES
Per hour:

	07/01/2023
Bricklayer	$ 45.89
Cement Mason	45.89
Plasterer/Stone Mason	45.89
Pointer/Caulker	45.89

Additional $1.00 per hour for power saw work
Additional $0.50 per hour for swing scaffold or staging work

SHIFT WORK: When shift work or an irregular workday is mandated or required by state, federal, county, local or other governmental agency contracts, the following premiums apply:
Irregular workday requires 15% premium
Second shift an additional 15% of wage plus benefits to be paid
Third shift an additional 25% of wage plus benefits to be paid

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman	$ 37.95

OVERTIME PAY
OVERTIME:

Cement Mason	See (B, E, Q, W) on OVERTIME PAGE.
All Others	See (B, E, Q) on OVERTIME PAGE.

HOLIDAY

Paid:	See (1) on HOLIDAY PAGE
Overtime:	See (5, 6, 16, 25) on HOLIDAY PAGE

Whenever any of the above holidays fall on Sunday, they will be observed on Monday. Whenever any of the above holidays fall on Saturday, they will be observed on Friday.

REGISTERED APPRENTICES
Wages per hour:

750 hour terms at the following percentage of Journeyman's wage

1st	2nd	3rd	4th	5th	6th	7th	8th
50%	55%	60%	65%	70%	75%	80%	85%

Supplemental Benefits per hour

750 hour terms at the following percentage of journeyman supplements

1st	2nd	3rd	4th	5th	6th	7th	8th
50%	55%	60%	65%	70%	75%	80%	85%

Apprentices indentured before June 1st, 2011 receive full journeyman benefits

11-5wp-b

Mason - Building 11/01/2023

JOB DESCRIPTION Mason - Building **DISTRICT** 9

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES
Building

Wages per hour:	07/01/2023	01/01/2024 Additional
Mosaic & Terrazzo Mechanic	$ 60.65	$1.06
Mosaic & Terrazzo Finisher	59.04	

SUPPLEMENTAL BENEFITS
Per hour:

Mosaic & Terrazzo Mechanic	$ 30.26* + $9.16
Mosaic & Terrazzo Finisher	$ 30.26* + $9.15

*This portion of benefits subject to same premium rate as shown for overtime wages.

OVERTIME PAY
See (A, E, Q) on OVERTIME PAGE
07/01/2023- Deduct $7.25 from hourly wages before calculating overtime.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE
Easter Sunday is an observed holiday.Holidays falling on a Saturday will be observed on that Saturday. Holidays falling on a Sunday will be celebrated on the Monday.

REGISTERED APPRENTICES
Wages Per hour:

1st 0-1500	2nd 1501-3000	3rd 3001-3750	4th 3751-4500	5th 4501-5250	6th 5251-6000
$ 25.82	$ 33.19	$ 36.39	$ 40.38	$ 48.52	$ 54.59

Supplemental Benefits per hour:

$6.00* +$3.21	$7.72* +$4.12	$18.16* +$5.50	$23.27* +$6.41	$24.21* +$7.33	$27.24* +$8.29

*This portion of benefits subject to same premium rate as shown for overtime wages.

9-7/3

Mason - Building 11/01/2023

JOB DESCRIPTION Mason - Building **DISTRICT** 9

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES

Per hour:	07/01/2023	07/03/2023
Building-Marble Restoration:		
Marble, Stone &	$ 47.22	$ 47.44

Terrazzo Polisher

SUPPLEMENTAL BENEFITS
Per Hour:
Journeyworker:

Building-Marble Restoration:
Marble, Stone &
Polisher $ 30.29 $ 30.64

OVERTIME PAY
See (B, *E, Q, V) on OVERTIME PAGE
*ON SATURDAYS, 8TH HOUR AND SUCCESSIVE HOURS PAID AT DOUBLE HOURLY RATE.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 11, 15, 25) on HOLIDAY PAGE
1ST TERM APPRENTICE GETS PAID FOR ALL OBSERVED HOLIDAYS.

REGISTERED APPRENTICES
WAGES per hour:

900 hour term at the following wage:

1st 1-900	2nd 901-1800	3rd 1801-2700	4th 2701
$ 33.04	$ 37.78	$ 42.49	$ 47.22

Supplemental Benefits Per Hour:

27.65	28.52	29.41	30.29

07/03/2023
900 hour term at the following wage:

1st 1-900	2nd 901-1800	3rd 1801-2700	4th 2701
$ 33.19	$ 37.95	$ 42.69	$ 47.44

Supplemental Benefits Per Hour:

27.99	28.86	29.76	30.64

9-7/24-MP

Mason - Building — 11/01/2023

JOB DESCRIPTION Mason - Building **DISTRICT** 9

ENTIRE COUNTIES
Bronx, Dutchess, Kings, Nassau, New York, Orange, Putnam, Queens, Richmond, Rockland, Suffolk, Sullivan, Ulster, Westchester

WAGES
Per Hour:

	07/01/2023	7/03/2023
Marble Cutters & Setters	$ 62.82	$ 63.12

SUPPLEMENTAL BENEFITS
Per Hour:

Journeyworker	$ 39.03	$ 39.34

OVERTIME PAY
See (B, E, Q, V) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wage Per Hour:
07/01/2023
750 hour terms at the following wage

1st	2nd	3rd	4th	5th	6th	7th	8th
0-3000	3001-3750	3751-4500	4501-5250	5251-6000	6001-6750	6751-7500	7500+
$ 26.42	$ 39.62	$ 42.91	$ 46.22	$ 49.52	$ 53.38	$ 59.67	$ 62.82

Supplemental Benefits per hour:
07/01/2023

1st	2nd	3rd	4th	5th	6th	7th	8th
$ 25.38	$ 28.86	$ 29.74	$ 30.60	$ 31.48	$ 36.44	$ 38.17	$ 39.03

07/03/2023
Wage Per Hour:

750 hour terms at the following wage.

1st	2nd	3rd	4th	5th	6th	7th	8th
0-3000	3001-3750	3751-4500	4501-5250	5251-6000	6001-6750	6751-7500	7500+
$ 26.60	$ 39.82	$ 43.13	$ 46.45	$ 49.78	$ 53.64	$ 59.95	$ 63.12

Supplemental Benefits Per Hour:

1st	2nd	3rd	4th	5th	6th	7th	8th
$ 25.54	$ 29.09	$ 29.97	$ 30.84	$ 31.72	$ 36.73	$ 38.48	$ 39.34

9-7/4

Mason - Building — 11/01/2023

JOB DESCRIPTION Mason - Building **DISTRICT** 9

ENTIRE COUNTIES
Nassau, Rockland, Suffolk, Westchester

WAGES

Per hour:	07/01/2023	12/04/2023	06/03/2024
		Additional	Additional
Tile Finisher	$ 48.36	$ 0.59	$ 0.59

SUPPLEMENTAL BENEFITS
Per Hour:

$ 22.56*

+ $9.86

*This portion of benefits subject to same premium rate as shown for overtime wages

OVERTIME PAY
See (B, E, Q, *V) on OVERTIME PAGE
*Work beyond 10 hours on a Saturday shall be paid at double the hourly wage rate.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 11, 15, 16, 25) on HOLIDAY PAGE

9-7/88A-tf

Mason - Building — 11/01/2023

JOB DESCRIPTION Mason - Building **DISTRICT** 9

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES

Per hour:	07/01/2023	07/03/2023
Marble, Stone, Maintenance Finishers:	$ 27.26	$ 27.44

Note 1: An additional $2.00 per hour
for time spent grinding floor using
"60 grit" and below.
Note 2: Flaming equipment operator
shall be paid an additional $25.00 per day.

SUPPLEMENTAL BENEFITS
Per Hour:

Marble, Stone		
Maintenance Finishers:	$ 14.97	$ 15.20

OVERTIME PAY
See (B, *E, Q, V) on OVERTIME PAGE
*Double hourly rate after 8 hours on Saturday

HOLIDAY
Paid: See (5, 6, 8, 11, 15, 25) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 11, 15, 25) on HOLIDAY PAGE
1st term apprentice gets paid for all observed holidays.

REGISTERED APPRENTICES
WAGES per hour:

	07/01/2023	07/03/2023
0-750	$ 21.89	$ 22.04
751-1500	22.60	$ 22.75
1501-2250	23.32	$ 23.48
2251-3000	24.04	$ 24.20
3001-3750	25.11	$ 25.27
3751-4500	26.54	$ 26.72
4501+	27.26	$ 27.44

Supplemental Benefits:
Per hour:

0-750	12.03	$ 12.24
751-1500	12.43	$ 12.64
1501-2250	12.82	$ 13.03
2251-3000	13.21	$ 13.42
3001-3750	13.80	$ 14.02
3751-4500	14.58	$ 14.80
4501+	14.97	$ 15.20

9-7/24M-MF

Mason - Building / Heavy&Highway — 11/01/2023

JOB DESCRIPTION Mason - Building / Heavy&Highway **DISTRICT** 9

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES

Per hour:	07/01/2023	07/03/2023	01/01/2024 Additional
Marble-Finisher	$ 49.32	$ 49.65	$ 0.53

SUPPLEMENTAL BENEFITS
Journeyworker:
Per hour

Marble- Finisher	$ 36.62	$ 36.67

OVERTIME PAY
See (B, E, Q, V) on OVERTIME PAGE
Work beyond 8 hours on a Saturday shall be paid at double the rate.

HOLIDAY
Overtime: See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE
When an observed holiday falls on a Sunday, it will be observed the next day.

9-7/20-MF

Mason - Heavy&Highway — 11/01/2023

JOB DESCRIPTION Mason - Heavy&Highway **DISTRICT** 11

ENTIRE COUNTIES
Putnam, Rockland, Westchester

PARTIAL COUNTIES
Orange: Only the Township of Tuxedo.

WAGES
Per hour:

	07/01/2023
Bricklayer	$ 46.39
Cement Mason	46.39
Marble/Stone Mason	46.39
Plasterer	46.39
Pointer/Caulker	46.39

Additional $1.00 per hour for power saw work
Additional $0.50 per hour for swing scaffold or staging work

SHIFT WORK: When shift work or an irregular workday is mandated or required by state, federal, county, local or other governmental contracts, the following rates apply:
Irregular workday requires 15% premium
Second shift an additional 15% of wage plus benefits to be paid
Third shift an additional 25% of wage plus benefits to be paid

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman	$ 37.95

OVERTIME PAY

Cement Mason	See (B, E, Q, W)
All Others	See (B, E, Q,)

HOLIDAY

Paid:	See (5, 6, 16, 25) on HOLIDAY PAGE
Overtime:	See (5, 6, 16, 25) on HOLIDAY PAGE

- Whenever any of the above holidays fall on Sunday, they will be observed on Monday. Whenever any of the above holidays fall on Saturday, they will be observed on Friday.
- Supplemental Benefits are not paid for paid Holiday
- If Holiday is worked, Supplemental Benefits are paid for hours worked.
- Whenever an Employee works within three (3) calendar days before a holiday, the Employee shall be paid for the Holiday.

REGISTERED APPRENTICES
Wages per hour:

750 hour terms at the following percentage of Journeyman's wage

1st	2nd	3rd	4th	5th	6th	7th	8th
50%	55%	60%	65%	70%	75%	80%	85%

Supplemental Benefits per hour

750 hour terms at the following percentage of journeyman supplements

1st	2nd	3rd	4th	5th	6th	7th	8th
50%	55%	60%	65%	70%	75%	80%	85%

Apprentices indentured before June 1st, 2011 receive full journeyman benefits

11-5WP-H/H

Operating Engineer - Building **11/01/2023**

JOB DESCRIPTION Operating Engineer - Building **DISTRICT** 9

ENTIRE COUNTIES
Bronx, Kings, New York, Putnam, Queens, Richmond, Westchester

PARTIAL COUNTIES
Dutchess: that part of Dutchess County lying south of the North City Line of the City of Poughkeepsie.

WAGES
NOTE: Construction surveying
Party Chief--One who directs a survey party

Instrument Man--One who runs the instrument and assists Party Chief.
Rodman--One who holds the rod and assists the Survey Crew

Wages:(Per Hour)	07/01/2023
Building Construction:	
Party Chief	$ 77.39
Instrument Man	61.25
Rodman	41.39
Steel Erection:	
Party Chief	80.16
Instrument Man	63.60
Rodman	44.23
Heavy Construction-NYC counties only: (Foundation, Excavation.)	
Party Chief	85.74
Instrument man	64.40
Rodman	54.90

SUPPLEMENTAL BENEFITS

Per Hour:	07/01/2023
Building Construction	$ 28.04* +$ 7.65
Steel Erection	28.64* +$ 7.65
Heavy Construction	28.85* +$ 7.64

* This portion subject to same premium as wages

Non-Worked Holiday Supplemental Benefit:
21.19

OVERTIME PAY
See (A, B, E, Q) on OVERTIME PAGE
Code "A" applies to Building Construction and has double the rate after 7 hours on Saturdays.
Code "B" applies to Heavy Construction and Steel Erection and had double the rate after 8 hours on Saturdays.

HOLIDAY

Paid:	See (5, 6, 9, 11, 15, 16, 25) on HOLIDAY PAGE
Overtime:	See (5, 6, 9, 11, 15, 16, 25) on HOLIDAY PAGE

9-15Db

Operating Engineer - Building — 11/01/2023

JOB DESCRIPTION Operating Engineer - Building **DISTRICT** 8

ENTIRE COUNTIES
Putnam, Westchester

PARTIAL COUNTIES
Dutchess: All the counties of Westchester and Putnam and the southern part of Dutchess County defined by the northern boundary line of the City of Poughkeepsie, then due east to Route 115, then north along Route 115 to Bedell Road, then east along Bedell Road to Van Wagner Road, then north along Van Wagner Road to Bower Road, then east along Bower Road to Route 44 and along Route 44 east to Route 343, then along Route 343 east to the northern boundary of Town of Dover Plains and east along the northern boundary of Town of Dover Plains to the border line of the State of Connecticut and bordered on the west by the middle of the Hudson River.

WAGES
GROUP I:
Cranes (All Types up to 49 tons), Boom Trucks, Cherry Pickers (All Types), Clamshell Crane, Derrick (Stone and Steel), Dragline, Franki Pile Rig or similar, High Lift (Lull or similar) with crane attachment and winch used for hoisting or lifting, Hydraulic Cranes, Pile Drivers, Potain and similar.

Cranes (All types 50-99 tons), Drill Rig Casa Grande (CAT or similar), Franki Pile Rig or similar, Hydraulic Cranes (All types including Crawler Cranes- No specific boom length).

Cranes (All types 100 tons and over), All Tower Cranes, All Climbing Cranes irrespective of manufacturer and regardless of how the same is rigged, Franki Pile Rig or similar, Conventional Cranes (All types including Crawler Cranes-No specific boom length), Hydraulic Cranes.

GROUP I-A: Barber Green Loader-Euclid Loader, Bulldozer, Carrier-Trailer Horse, Concrete Cleaning Decontamination Machine Operator, Concrete-Portable Hoist, Conway or Similar Mucking Machines, Elevator & Cage, Excavators all types, Front End Loaders, Gradall, Shovel, Backhoe, etc.(Crawler or Truck), Heavy Equipment Robotics Operator/Mechanic, Hoist Engineer-Material, Hoist Portable Mobile Unit, Hoist(Single, Double or Triple Drum), Horizontal Directional Drill Locator, Horizontal Directional Drill Operator and Jersey Spreader, Letourneau or Tournapull(Scrapers over 20 yards Struck), Lift Slab Console, etc., Lull HiLift or Similar, Master Environmental Maintenance Mechanics, Mucking Machines Operator/Mechanic or Similar Type, Overhead Crane, Pavement Breaker(Air Ram), Paver(Concrete), Post Hole Digger, Power House Plant, Road Boring Machine, Road Mix Machine, Ross Carrier and Similar Machines, Rubber tire double end backhoes and similar machines, Scoopmobile Tractor-Shovel Over 1.5 yards, Shovel (Tunnels), Spreader (Asphalt) Telephie(Cableway), Tractor Type Demolition Equipment, Trenching Machines-Vermeer Concrete Saw Trencher and Similar, Ultra High Pressure Waterjet Cutting Tool System, Vacuum Blasting Machine operator/mechanic, Winch Truck A Frame.

GROUP I-B: Compressor (Steel Erection), Mechanic (Outside All Types), Negative Air Machine (Asbestos Removal), Push Button (Buzz Box) Elevator.

GROUP II: Compactor Self-Propelled, Concrete Pump, Crane Operator in Training (Over 100 Tons), Grader, Machines Pulling Sheep's Foot Roller, Roller (4 ton and over), Scrapers (20 yards Struck and Under), Vibratory Rollers, Welder.

GROUP III-A: Asphalt Plant, Concrete Mixing Plants, Forklift (All power sources), Joy Drill or similar, Tractor Drilling Machine, Loader (1 1/2 yards and under), Portable Asphalt Plant, Portable Batch Plant, Portable Crusher, Skid Steer (Bobcat or similar), Stone Crusher, Well Drilling Machine, Well Point System.

GROUP III-B: Compressor Over 125 cu. Feet, Conveyor Belt Machine regardless of size, Compressor Plant, Ladder Hoist, Stud Machine.

GROUP IV-A: Batch Plant, Concrete Breaker, Concrete Spreader, Curb Cutter Machine, Finishing Machine-Concrete, Fine Grading Machine, Hepa Vac Clean Air Machine, Material Hopper(sand, stone, cement), Mulching Grass Spreader, Pump Gypsum etc, Pump-Plaster-Grout-Fireproofing. Roller(Under 4 Ton),Spreading and Fine Grading Machine, Steel Cutting Machine, Siphon Pump, Tar Joint Machine, Television Cameras for Water, Sewer, Gas etc. Turbo Jet Burner or Similar Equipment, Vibrator (1 to 5).

GROUP IV-B: Compressor (all types), Heater (All Types), Fire Watchman, Lighting Unit (Portable & Generator) Pump, Pump Station(Water, Sewer, Portable, Temporary), Welding Machine (Steel Erection & Excavation).

GROUP V: Mechanics Helper, Motorized Roller (walk behind), Stock Attendant, Welder's Helper, Maintenance Engineer Crane(75 ton and over).

Group VI-A: Welder Certified
GROUP VI-B: Utility Man, Warehouse Man.

WAGES: (per hour)

	07/01/2023	03/04/2024
GROUP I		
Cranes- up to 49 tons	$ 66.23	$ 67.43
Cranes- 50 tons to 99 tons	68.53	69.77
Cranes- 100 tons and over	78.21	79.64
GROUP I-A	58.01	59.04
GROUP I-B	53.48	54.41
GROUP II	55.98	56.97
GROUP III-A	53.94	54.88
GROUP III-B	51.35	52.25
GROUP IV-A	53.40	54.33
GROUP IV-B	45.17	45.94
GROUP V	48.69	49.53
Group VI-A	56.96	57.96
GROUP VI-B		
Utility Man	46.21	47.00
Warehouse Man	48.52	49.26

An additional 20% to wage when required to wear protective equipment on hazardous/toxic waste projects.
Engineers operating cranes with booms 100 feet but less than 149 feet in length will be paid an additional $2.00 per hour.
Engineers operating cranes with booms 149 feet or over in length will be paid an additional $3.00 per hour.
Loader operators over 5 cubic yard capacity additional .50 per hour.
Shovel operators over 4 cubic yard capacity additional $1.00 per hour.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker	$ 31.57	$ 32.32

OVERTIME PAY
See (B, E, Q, V) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6, 8, 15, 25, 26) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 15, 25, 26) on HOLIDAY PAGE

8-137B

Operating Engineer - Heavy&Highway 11/01/2023

JOB DESCRIPTION Operating Engineer - Heavy&Highway **DISTRICT** 8

ENTIRE COUNTIES
Putnam, Westchester

PARTIAL COUNTIES
Dutchess: All the counties of Westchester and Putnam and the southern part of Dutchess County defined by the northern boundary line of the City of Poughkeepsie, then due east to Route 115, then north along Route 115 to Bedell Road, then east along Bedell Road to Van Wagner Road, then north along Van Wagner Road to Bower Road, then east along Bower Road to Route 44 and along Route 44 east to Route 343, then along Route 343 east to the northern boundary of Town of Dover Plains and east along the northern boundary of Town of Dover Plains to the border line of the State of Connecticut and bordered on the west by the middle of the Hudson River.

WAGES
GROUP I: Boom Truck, Cherry Picker, Clamshell, Crane, (Crawler, Truck),
Dragline, Drill Rig (Casa Grande, Cat, or Similar), Floating Crane (Crane on Barges) under 100 tons, Gin Pole, Hoist Engineer-Concrete (Crane-Derrick-Mine Hoist), Knuckle Boom Crane, Rough Terrain Crane.

GROUP I-A: Auger (Truck or Truck Mounted), Boat Captain, Bulldozer-All Sizes, Central Mix Plant Operator, Chipper (all types), Close Circuit T.V., Combination Loader/Backhoe, Compactor with Blade, Concrete Finishing Machine, Gradall, Grader (Motor Grader), Elevator & Cage (Materials or Passenger), Excavator (and all attachments), Front End Loaders (1 1/2 yards and over), High Lift Lull and similar, Hoist (Single, Double, Triple Drum), Hoist Portable Mobile Unit, Hoist Engineer (Material), Jack and Bore Machine, Log Skidders, Mill Machines, Mucking Machines, Overhead Crane, Paver (concrete), Post Pounder (of any type), Push Cats, Road Reclaimer, Robot Hammer (Brokk or similar), Robotic Equipment (Scope of Engineer Schedule), Ross Carrier and similar, Scrapers (20 yard struck and over), Side Boom, Slip Form Machine, Spreader (Asphalt), Trenching Machines (Telephies-Vermeer Concrete Saw), Tractor Type Demolition Equipment, Vacuum Truck. Vibratory Roller(Riding) or Roller used in mainline paving operations.

GROUP I-B: Asphalt Mobile Conveyor/Transfer Machine, Road Paver (Asphalt).

GROUP II-A: Ballast Regulators, Compactor Self Propelled, Fusion Machine, Rail Anchor Machines, Roller (4 ton and over), Scrapers (20 yard struck and under).

GROUP II-B: Mechanic (Outside) All Types, Shop Mechanic.

GROUP III: Air Tractor Drill, Asphalt Plant, Batch Plant, Boiler (High Pressure), Concrete Breaker (Track or Rubber Tire), Concrete Pump, Concrete Spreader, Excavator Drill, Farm Tractor, Forklift (all types), Gas Tapping (Live), Hydroseeder, Loader (1 1/2 yards and under), Locomotive (all sizes), Machine Pulling Sheeps Foot Roller, Portable Asphalt Plant, Portable Batch Plant, Portable Crusher (Apprentice), Powerhouse Plant, Roller (under 4 ton), Sheer Excavator, Skid Steer/Bobcat, Stone Crusher, Sweeper (with seat), Well Drilling Machine.

GROUP IV: Service Person (Grease Truck), Deckhand.

GROUP IV-B: Conveyor Belt Machine (Truck Mounted), Heater (all types), Lighting Unit (Portable), Maintenance Engineer (For Crane Only), Mechanics Helper, Pump (Fireproofing), Pumps-Pump Station/Water/Sewer/Gypsum/Plaster, etc., Pump Truck (Sewer Jet or Similar), Welders Helper, Welding Machine (Steel Erection), Well Point System.

GROUP V: All Tower Cranes-All Climbing Cranes and all cranes of 100-ton capacity or greater (3900 Manitowac or similar) irrespective of manufacturer and regardless of how the same is rigged, Hoist Engineer (Steel), Engineer-Pile Driver, Jersey Spreader, Pavement Breaker/Post Hole Digger.

WAGES: Per hour:	07/01/2023	03/04/2024
Group I	$ 67.27	$ 68.63
Group I-A	59.26	60.42
Group I-B	62.46	63.70
Group II-A	56.74	57.84
Group II-B	58.52	59.67
Group III	55.74	56.81
Group IV	50.63	51.57
Group IV-B	43.43	44.19
Group V Engineer All Tower, Climbing and		

Cranes of 100 Tons	76.24	77.82
Hoist Engineer(Steel)	69.01	70.41
Engineer(Pile Driver)	73.61	75.13
Jersey Spreader, Pavement Breaker (Air Ram)Post Hole Digger	58.06	59.19

SHIFT DIFFERENTIAL:
A 15% premium on all hours paid, including overtime hours for 2nd, 3rd shifts on all government mandated off-shift work

Engineers operating cranes with booms 100 feet but less than 149 feet in length will be paid an additional $2.00 per hour over the rate listed in the Wage Schedule. Engineers operating cranes with booms 149 feet or over in length will be paid an additional $3.00 per hour over the rate listed in the Wage Schedule. Loader and Excavator Operators: over 5 cubic yards capacity $0.50 per hour over the rate listed in the Wage Schedule. Shovel Operators: over 4 cubic yards capacity $1.00 per hour over the rate listed in the Wage Schedule.

NOTE - The "Employer Registration" (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to June 30,2023 will expire within the granted time frame.

For Pre-Registered Projects Four (4), Ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day. Tuesday thru Friday may be worked with no make-up day. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker:	$ 33.75 up to 40 Hours	$ 34.85 up to 40 hours
	After 40 hours $ 24.50* PLUS $ 1.25 on all hours worked	After 40 hours $ 25.55* PLUS $ 1.25 on all hours worked

*This amount is subject to premium

OVERTIME PAY
See (B, E, P, *R, **U) on OVERTIME PAGE

HOLIDAY
Paid:..... See (5, 6, 8, 15, 25, 26) on HOLIDAY PAGE
Overtime..... See (5, 6, 8, 15, 25, 26) on OVERTIME PAGE

* For Holiday codes 8,15,25,26 code R applies
** For Holiday Codes 5 & 6 code U applies

Note: If employees are required to work on Easter Sunday they shall be paid at the rate of triple time.

REGISTERED APPRENTICES
(1)year terms at the following rate.

1st term	$ 29.63	$ 30.21
2nd term	35.56	36.25
3rd term	41.48	42.30
4th term	47.41	48.34
Supplemental Benefits per hour:		
	25.70	26.85

8-137HH

Operating Engineer - Heavy&Highway **11/01/2023**

JOB DESCRIPTION Operating Engineer - Heavy&Highway **DISTRICT** 9

ENTIRE COUNTIES
Putnam, Westchester

PARTIAL COUNTIES
Dutchess: South of the North city line of Poughkeepsie

WAGES
Party Chief - One who directs a survey party
Instrument Man - One who runs the instrument and assists Party Chief

Rodman - One who holds the rod and in general, assists the Survey Crew
Categories cover GPS & Underground Surveying

Per Hour:	07/01/2023
Party Chief	$ 81.72
Instrument Man	61.43
Rodman	52.40

SUPPLEMENTAL BENEFITS

Per Hour:	07/01/2023
All Categories	
Straight Time:	$ 25.25* + $7.64
Premium:	
Time & 1/2	$ 37.88* + $7.64
Double Time	$ 50.50* + $7.64

Non-Worked Holiday Supplemental Benefits:
$ 21.19

OVERTIME PAY
See (B, *E, Q) on OVERTIME PAGE
* Doubletime paid on all hours in excess of 8 hours on Saturday

HOLIDAY
Paid: See (5, 6, 7, 11, 12) on HOLIDAY PAGE
Overtime: See (5, 6, 7, 11, 12) on HOLIDAY PAGE

9-15Dh

Operating Engineer - Heavy&Highway - Tunnel — 11/01/2023

JOB DESCRIPTION Operating Engineer - Heavy&Highway - Tunnel **DISTRICT** 8

ENTIRE COUNTIES
Putnam, Westchester

PARTIAL COUNTIES
Dutchess: All the counties of Westchester and Putnam and the southern part of Dutchess County defined by the northern boundary line of the City of Poughkeepsie, then due east to Route 115, then north along Route 115 to Bedell Road, then east along Bedell Road to Van Wagner Road, then north along Van Wagner Road to Bower Road, then east along Bower Road to Route 44 and along Route 44 east to Route 343, then along Route 343 east to the northern boundary of Town of Dover Plains and east along the northern boundary of Town of Dover Plains to the border line of the State of Connecticut and bordered on the west by the middle of the Hudson River.

WAGES
GROUP I: Boom Truck, Cherry Picker, Clamshell, Crane(Crawler, Truck), Dragline, Drill Rig Casa Grande(Cat or Similar), Floating Crane(Crane on Barge-Under 100 Tons), Hoist Engineer(Concrete/Crane-Derrick-Mine Hoist), Knuckle Boom Crane, Rough Terrain Crane.

GROUP I-A: Auger(Truck or Truck Mounted), Boat Captain, Bull Dozer-all sizes, Central Mix Plant Operator, Chipper-all types, Close Circuit T.V., Combination Loader/Backhoe, Compactor with Blade, Concrete Finishing Machine, Gradall, Grader(Motor Grader), Elevator & Cage(Materials or Passengers), Excavator(and all attachments), Front End Loaders(1 1/2 yards and over), High Lift Lull, Hoist(Single, Double, Triple Drum), Hoist Portable Mobile Unit, Hoist Engineer(Material), Jack and Bore Machine, Log Skidder, Milling Machine, Moveable Concrete Barrier Transfer & Transport Vehicle, Mucking Machines. Overhead Crane, Paver(Concrete), Post Pounder of any type, Push Cats, Road Reclaimer, Robot Hammer(Brokk or similar), Robotic Equipment(Scope of Engineer Schedule), Ross Carrier and similar machines, Scrapers(20 yards struck and over), Side Boom, Slip Form Machine, Spreader(Asphalt), Trenching Machines, Telephies-Vermeer Concrete Saw, Tractor type demolition equipment, Vacuum Truck, Vibratory Roller (Riding) used in mainline paving operations.

GROUP I-B: Asphalt Mobile Conveyor/Transfer Machine, Road Paver(Asphalt).

GROUP II-A: Ballast Regulators, Compactor(Self-propelled), Fusion Machine, Rail Anchor Machines, Roller(4 ton and over), Scrapers(20 yard struck and under).

GROUP II-B: Mechanic(outside)all types, Shop Mechanic.

GROUP III: Air Tractor Drill, Asphalt Plant, Batch Plant, Boiler(High Pressure), Concrete Breaker(Track or Rubber Tire), Concrete Pump, Concrete Spreader, Excavator Drill, Farm Tractor, Forklift(all types of power), Gas Tapping(Live), Hydroseeder, Loader(1 1/2 yards and under), Locomotive(all sizes), Machine Pulling Sheeps Foot Roller, Portable Asphalt Plant, Portable Batch Plant, Portable Crusher(Apprentice), Powerhouse Plant, Roller(under 4 ton), Sheer Excavator, Skidsteer/Bobcat, Stone Crusher, Sweeper(with seat), Well Drilling Machine.

GROUP IV-A: Service Person(Grease Truck), Deckhand.

GROUP IV-B: Conveyor Belt Machine(Truck Mounted), Heater(all types), Lighting Unit(Portable), Maintenance Engineer(for Crane only), Mechanics Helper, Pump(Fireproofing), Pumps-Pump Station/Water/Sewer/Gypsum/Plaster, etc., Pump Truck(Sewer Jet or similar), Welding Machine(Steel Erection), Welders Helper.

GROUP V-A: Engineer(all Tower Cranes, all Climbing Cranes & all Cranes of 100 ton capacity or greater),Hoist Engineer(Steel-Sub Structure), Engineer-Pile Driver, Jersey-Spreader, Pavement breaker, Post Hole Digger

WAGES: (per hour)

	07/01/2023	03/04/2024
GROUP I	$ 67.27	$ 68.63
GROUP I-A	59.26	60.42
GROUP I-B	62.46	63.70
GROUP II-A	56.74	57.84
GROUP II-B	58.52	59.67
GROUP III	55.74	56.81
GROUP IV-A	50.63	51.57
GROUP IV-B	43.43	44.19
GROUP V-A		
Engineer-Cranes	76.24	77.82
Engineer-Pile Driver	73.61	75.13
Hoist Engineer	69.01	70.41
Jersey Spreader/Post Hole Digger	58.06	59.19

SHIFT DIFFERENTIAL:
A 15% premium on all hours paid, including overtime hours for 2nd, 3rd shifts on all government mandated off-shift work

An additional 20% to wage when required to wear protective equipment on hazardous/toxic waste projects. Operators required to use two buckets pouring concrete on other than road pavement shall receive $0.50 per hour over scale. Engineers operating cranes with booms 100 feet but less than 149 feet in length will be paid an additional $2.00 per hour. Engineers operating cranes with booms 149 feet or over in length will be paid an additional $3.00 per hour. Operators of shovels with a capacity over (4) cubic yards shall be paid an additional $1.00 per hour. Operators of loaders with a capacity over (5) cubic yards shall be paid an additional $0.50 per hour.

SUPPLEMENTAL BENEFITS
Per hour:
Journeyworker:

	$ 33.75 up to 40 hours After 40 hours $24.50 plus $1.25 on all hours worked	$ 34.85 up to 40 hours After 40 hours $25.55 plus $1.25 on all hours worked

OVERTIME PAY
See (D, O, *U, V) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6, 8, 15, 25, 26) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 15, 25, 26) on HOLIDAY PAGE
* Note: For Holiday codes 5 & 6, code U applies. For Holiday codes 8, 15, 25, 26, code R applies.
Note: If employees are required to work on Easter Sunday, they shall be paid at the rate of triple time.

REGISTERED APPRENTICES
(1)year terms at the following rates:

1st term	$ 29.63	$ 30.21
2nd term	35.56	36.25
3rd term	41.48	42.30
4th term	47.41	48.34

Supplemental Benefits per hour:

All terms	$ 25.70	$ 26.85

8-137Tun

JOB DESCRIPTION Operating Engineer - Marine Dredging **DISTRICT** 4

ENTIRE COUNTIES
Albany, Bronx, Cayuga, Clinton, Columbia, Dutchess, Essex, Franklin, Greene, Jefferson, Kings, Monroe, Nassau, New York, Orange, Oswego, Putnam, Queens, Rensselaer, Richmond, Rockland, St. Lawrence, Suffolk, Ulster, Washington, Wayne, Westchester

WAGES
These wages do not apply to Operating Engineers on land based construction projects. For those projects, please see the Operating Engineer Heavy/Highway Rates. The wage rates below for all equipment and operators are only for marine dredging work in navigable waters found in the counties listed above.

Per Hour:	07/01/2023	10/01/2023
CLASS A1 Deck Captain, Leverman Mechanical Dredge Operator Licensed Tug Operator 1000HP or more.	$ 43.94	$ 45.26
CLASS A2 Crane Operator (360 swing)	39.16	40.33
CLASS B Dozer, Front Loader Operator on Land	To conform to Operating Engineer Prevailing Wage in locality where work is being performed including benefits.	
CLASS B1 Derrick Operator (180 swing) Spider/Spill Barge Operator Operator II, Fill Placer, Engineer, Chief Mate, Electrician, Chief Welder, Maintenance Engineer Licensed Boat, Crew Boat Operator	38.00	39.14
CLASS B2 Certified Welder	35.77	36.84
CLASS C1 Drag Barge Operator, Steward, Mate, Assistant Fill Placer	34.79	35.83
CLASS C2 Boat Operator	33.67	34.68
CLASS D Shoreman, Deckhand, Oiler, Rodman, Scowman, Cook, Messman, Porter/Janitor	27.97	28.81

SUPPLEMENTAL BENEFITS
Per Hour:
THE FOLLOWING SUPPLEMENTAL BENEFITS APPLY TO ALL CATEGORIES

All Classes A & B	$ 11.85 plus 6% of straight time wage, Overtime hours add $ 0.63	$ 12.00 plus 6% of straight time wage, Overtime hours add $ 0.63
All Class C	$ 11.60 plus 6% of straight time wage, Overtime hours add $ 0.50	$ 11.75 plus 6% of straight time wage, Overtime hours add $ 0.50
All Class D	$ 11.35 plus 6% of straight time	$ 11.60 plus 6% of straight time

wage, Overtime hours add $ 0.38

wage, Overtime hours add $ 0.50

OVERTIME PAY
See (B2, F, R) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 15, 26) on HOLIDAY PAGE

4-25a-MarDredge

Operating Engineer - Survey Crew - Consulting Engineer — 11/01/2023

JOB DESCRIPTION Operating Engineer - Survey Crew - Consulting Engineer **DISTRICT** 9

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Putnam, Queens, Richmond, Suffolk, Westchester

PARTIAL COUNTIES
Dutchess: That part in Duchess County lying South of the North City line of Poughkeepsie.

WAGES
Feasibility and preliminary design surveying, any line and grade surveying for inspection or supervision of construction.

Per hour:	07/01/2023
Survey Classifications	
Party Chief	$ 47.15
Instrument Man	39.30
Rodman	34.35

SUPPLEMENTAL BENEFITS
Per Hour:

All Crew Members: $ 23.15

OVERTIME PAY
OVERTIME:.... See (B, E*, Q, V) ON OVERTIME PAGE.
*Double-time paid on the 9th hour on Saturday.

HOLIDAY
Paid: See (5, 6, 7, 11, 16) on HOLIDAY PAGE
Overtime: See (5, 6, 7, 11, 16) on HOLIDAY PAGE

9-15dconsult

Painter — 11/01/2023

JOB DESCRIPTION Painter **DISTRICT** 8

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Putnam, Queens, Richmond, Suffolk, Westchester

WAGES

Per hour:	07/01/2023
Brush	$ 51.70*
Abatement/Removal of lead based or lead containing paint on materials to be repainted.	51.70*
Spray & Scaffold	$ 54.70*
Fire Escape	54.70*
Decorator	54.70*
Paperhanger/Wall Coverer	54.48*

*Subtract $ 0.10 to calculate premium rate.

SUPPLEMENTAL BENEFITS
Per hour:

Paperhanger	$ 34.60
All others	32.73
Premium	36.70**

**Applies only to "All others" category, not paperhanger journeyworker.

OVERTIME PAY
See (A, H) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
One (1) year terms at the following wage rate.

Per hour:	07/01/2023
Appr 1st term...	$ 19.95*
Appr 2nd term...	25.56*
Appr 3rd term...	31.05*
Appr 4th term...	41.62*

*Subtract $ 0.10 to calculate premium rate.

Supplemental benefits:
Per Hour:

Appr 1st term...	$ 16.06
Appr 2nd term...	19.95
Appr 3rd term...	23.02
Appr 4th term...	29.16

8-NYDC9-B/S

Painter — 11/01/2023

JOB DESCRIPTION Painter **DISTRICT** 8

ENTIRE COUNTIES
Putnam, Suffolk, Westchester

PARTIAL COUNTIES
Nassau: All of Nassau except the areas described below: Atlantic Beach, Ceaderhurst, East Rockaway, Gibson, Hewlett, Hewlett Bay, Hewlett Neck, Hewlett Park, Inwood, Lawrence, Lido Beach, Long Beach, parts of Lynbrook, parts of Oceanside, parts of Valley Stream, and Woodmere. Starting on the South side of Sunrise Hwy in Valley Stream running east to Windsor and Rockaway Ave., Rockville Centre is the boundary line up to Lawson Blvd. turn right going west all the above territory. Starting at Union Turnpike and Lakeville Rd. going north to Northern Blvd. the west side of Lakeville road to Northern blvd. At Northern blvd. going east the district north of Northern blvd. to Port Washington Blvd. West of Port Washington blvd.to St.Francis Hospital then north of first traffic light to Port Washington and Sands Point, Manor HAven, Harbour Acres.

WAGES

Per hour:	07/01/2023
Drywall Taper	$ 51.45*

*Subtract $ 0.10 to calculate premium rate.

SUPPLEMENTAL BENEFITS

Per hour:	
Journeyman	$ 30.88

OVERTIME PAY
See (A, H) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wages - Per Hour:

1500 hour terms at the following wage rate:

1st term	$ 19.95*
2nd term	25.56*
3rd term	31.00*
4th term	41.52*

*Subtract $ 0.10 to calculate premium rate.

Supplemental Benefits - Per hour:
One year term (1500 hours) at the following dollar amount.

1st year	$ 15.22
2nd year	18.90
3rd year	21.81
4th year	27.58

8-NYDCT9-DWT

Painter - Bridge & Structural Steel 11/01/2023

JOB DESCRIPTION Painter - Bridge & Structural Steel **DISTRICT** 8

ENTIRE COUNTIES
Albany, Bronx, Clinton, Columbia, Dutchess, Essex, Franklin, Fulton, Greene, Hamilton, Kings, Montgomery, Nassau, New York, Orange, Putnam, Queens, Rensselaer, Richmond, Rockland, Saratoga, Schenectady, Schoharie, Suffolk, Sullivan, Ulster, Warren, Washington, Westchester

WAGES
Per Hour:
STEEL:

Bridge Painting:	07/01/2023	10/01/2023
	$ 54.50	$ 56.00
	+ 10.10*	+ 10.35*

ADDITIONAL $6.50 per hour for POWER TOOL/SPRAY, whether straight time or overtime.

NOTE: All premium wages are to be calculated on base rate per hour only.

* For the period of May 1st to November 15th, this amount is payable up to 40 hours. For the period of Nov 16th to April 30th, this amount is payable up to 50 hours. EXCEPTION: First and last week of employment, and for the weeks of Memorial Day, Independence Day and Labor Day, where the amount is paid for the actual number of hours worked (no cap).

NOTE: Generally, for Bridge Painting Contracts, ALL WORKERS on and off the bridge (including Flagmen) are to be paid Painter's Rate; the contract must be ONLY for Bridge Painting.

SHIFT WORK:

When directly specified in public agency or authority contract documents for an employer to work a second shift and works the second shift with employees other than from the first shift, all employees who work the second shift will be paid 10% of the base wage shift differential in lieu of overtime for the first eight (8) hours worked after which the employees shall be paid at time and one half of the regular wage rate. When a single irregular work shift is mandated in the job specifications or by the contracting agency, wages shall be paid at time and one half for single shifts between the hours of 3pm-11pm or 11pm-7am.

SUPPLEMENTAL BENEFITS
Per Hour:
Journeyworker:

	$ 11.78	$ 12.43
	+ 30.85*	+ 31.55*

* For the period of May 1st to November 15th, this amount is payable up to 40 hours. For the period of Nov 16th to April 30th, this amount is payable up to 50 hours. EXCEPTION: First and last week of employment, and for the weeks of Memorial Day, Independence Day and Labor Day, where the amount is paid for the actual number of hours worked (no cap).

OVERTIME PAY
See (B, F, R) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (4, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wage - Per hour:
Apprentices: (1) year terms.

1st year	$ 21.80	$ 22.40
	+ 4.04	+ 4.14
2nd year	$ 32.70	$ 33.60
	+ 6.06	+ 6.21
3rd year	$ 43.60	$ 44.80
	+ 8.08	+ 8.28

Supplemental Benefits - Per hour:

1st year	$ .90 + 12.34	$ 1.16 + 12.62
2nd year	$ 7.07 + 18.51	$ 7.46 + 18.93
3rd year	$ 9.42 + 24.68	$ 9.94 + 25.24

NOTE: All premium wages are to be calculated on base rate per hour only.

8-DC-9/806/155-BrSS

Painter - Line Striping — 11/01/2023

JOB DESCRIPTION Painter - Line Striping **DISTRICT** 8

ENTIRE COUNTIES
Albany, Clinton, Columbia, Dutchess, Essex, Franklin, Fulton, Greene, Hamilton, Montgomery, Nassau, Orange, Putnam, Rensselaer, Rockland, Saratoga, Schenectady, Schoharie, Suffolk, Sullivan, Ulster, Warren, Washington, Westchester

WAGES
Per hour:

Painter (Striping-Highway):	07/01/2023	01/01/2024	07/01/2024
Striping-Machine Operator*	$ 31.53	$ 31.53	$ 34.12
Linerman Thermoplastic	38.34	38.34	41.12

Note: * Includes but is not limited to: Positioning of cones and directing of traffic using hand held devices. Excludes the Driver/Operator of equipment used in the maintenance and protection of traffic safety.

NOTE - The "Employer Registration" (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to June 30,2023 will expire within the granted time frame.

For Pre-Registered Projects Four (4), Ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day. Tuesday thru Friday may be worked with no make-up day. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS
Per hour paid:
Journeyworker:

Striping Machine Operator:	$ 10.03	$ 22.24	$ 23.65
Linerman Thermoplastic:	10.03	22.24	23.65

OVERTIME PAY
See (B, B2, E2, F, S) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 20) on HOLIDAY PAGE
Overtime: See (5, 20) on HOLIDAY PAGE

REGISTERED APPRENTICES
One (1) year terms at the following wage rates:

1st Term:	$ 15.00	$ 15.00	$ 15.00
2nd Term:	18.92	18.92	20.47
3rd Term:	25.22	25.22	27.30

Supplemental Benefits per hour:

1st term:	$ 9.16	$ 22.24	$ 23.65
2nd Term:	10.03	22.24	23.65
3rd Term:	10.03	22.24	23.65

8-1456-LS

Painter - Metal Polisher — 11/01/2023

JOB DESCRIPTION Painter - Metal Polisher **DISTRICT** 8

ENTIRE COUNTIES

Albany, Allegany, Bronx, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Dutchess, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Kings, Lewis, Livingston, Madison, Monroe, Montgomery, Nassau, New York, Niagara, Oneida, Onondaga, Ontario, Orange, Orleans, Oswego, Otsego, Putnam, Queens, Rensselaer, Richmond, Rockland, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Suffolk, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Westchester, Wyoming, Yates

WAGES

	07/01/2023
Metal Polisher	$ 38.18
Metal Polisher*	39.28
Metal Polisher**	42.18

*Note: Applies on New Construction & complete renovation
** Note: Applies when working on scaffolds over 34 feet.

SUPPLEMENTAL BENEFITS

Per Hour:	07/01/2023
Journeyworker:	
All classification	$ 12.34

OVERTIME PAY
See (B, E, P, T) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6, 11, 15, 16, 25, 26) on HOLIDAY PAGE
Overtime: See (5, 6, 9, 11, 15, 16, 25, 26) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wages per hour:
One (1) year term at the following wage rates:

	07/01/2023
1st year	$ 16.00
2nd year	17.00
3rd year	18.00
1st year*	$ 16.39
2nd year*	17.44
3rd year*	18.54
1st year**	$ 18.50
2nd year**	19.50
3rd year**	20.50

*Note: Applies on New Construction & complete renovation
** Note: Applies when working on scaffolds over 34 feet.

Supplemental benefits:
Per hour:

1st year	$ 8.69
2nd year	8.69
3rd year	8.69

8-8A/28A-MP

Plumber — 11/01/2023

JOB DESCRIPTION Plumber **DISTRICT** 8

ENTIRE COUNTIES
Putnam, Westchester

WAGES
Per hour:

	07/01/2023
Plumber and Steamfitter	$ 62.36

SHIFT WORK:

When directly specified in public agency or authority contract documents, shift work outside the regular hours of work shall be comprised of eight (8) hours per shift not including Saturday, Sundays and holidays. One half (1/2) hour shall be allowed for lunch after the first four (4) hours of each shift. Wage and Fringes for shift work shall be straight time plus a shift premium of twenty-five (25%) percent. A minimum of five days Monday through Friday must be worked to establish shift work.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker	$ 41.51

OVERTIME PAY
See (B, E, E2, Q, V) on OVERTIME PAGE
OVERTIME:... See on OVERTIME PAGE.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
(1)year terms at the following wages:

1st Term	$ 23.20
2nd Term	26.61
3rd Term	30.74
4th Term	43.81
5th Term	46.99

Supplemental Benefits per hour:

1st term	$ 17.12
2nd term	19.12
3rd term	22.74
4th term	30.02
5th term	31.82

8-21.1-ST

Plumber - HVAC / Service — 11/01/2023

JOB DESCRIPTION Plumber - HVAC / Service **DISTRICT** 8

ENTIRE COUNTIES
Dutchess, Putnam, Westchester

PARTIAL COUNTIES
Delaware: Only the townships of Middletown and Roxbury
Ulster: Entire County(including Wallkill and Shawangunk Prisons) except for remainder of Town of Shawangunk and Towns of Plattekill, Marlboro, and Wawarsing.

WAGES
Per hour: 07/01/2023

HVAC Service	$ 42.68
	+ $ 4.37*

*Note: This portion of wage is not subject to overtime premium.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker HVAC Service	$ 28.99

OVERTIME PAY
See (B, F, R) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6, 16, 25) on HOLIDAY PAGE
Overtime: See (5, 6, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
HVAC SERVICE

(1)year terms at the following wages:

1st yr.	2nd yr.	3rd yr.	4th yr.	5th yr.

$ 19.32	$ 22.91	$ 28.56	$ 35.13	$ 38.15
+$2.39*	+$2.70*	+$3.25*	+$3.88*	+$4.12*

*Note: This portion of wage is not subject to overtime premium.

Supplemental Benefits per hour:

Apprentices	07/01/2023
1st term	$ 20.84
2nd term	22.28
3rd term	23.85
4th term	26.01
5th term	27.55

8-21.1&2-SF/Re/AC

Plumber - Jobbing & Alterations — 11/01/2023

JOB DESCRIPTION Plumber - Jobbing & Alterations **DISTRICT** 8

ENTIRE COUNTIES
Dutchess, Putnam, Westchester

PARTIAL COUNTIES
Ulster: Entire county (including Wallkill and Shawangunk Prisons in Town of Shawangunk) EXCEPT for remainder of Town of Shawangunk, and Towns of Plattekill, Marlboro, and Wawarsing.

WAGES

Per hour:	07/01/2023
Journeyworker:	$ 48.51

Repairs, replacements and alteration work is any repair or replacement of a present plumbing system that does not change existing roughing or water supply lines.

SHIFT WORK:
When directly specified in public agency or authority contract documents, shift work outside the regular hours of work shall be comprised of eight (8) hours per shift not including Saturday, Sundays and holidays. One half (1/2) hour shall be allowed for lunch after the first four (4) hours of each shift. Wage and Fringes for shift work shall be straight time plus a shift premium of twenty-five (25%) percent. A minimum of five days Monday through Friday must be worked to establish shift work.

SUPPLEMENTAL BENEFITS
Per hour:
Journeyworker
$ 34.76

OVERTIME PAY
See (B, *E, E2, Q, V) on OVERTIME PAGE
*When used as a make-up day, hours after 8 on Saturday shall be paid at time and one half.

HOLIDAY

Paid:	See (1) on HOLIDAY PAGE
Overtime:	See (5, 6, 8, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
(1) year terms at the following wages:

1st year	$ 20.92
2nd year	23.24
3rd year	25.29
4th year	35.48
5th year	37.49

Supplemental Benefits per hour:

1st year	$ 11.45
2nd year	13.46
3rd year	17.51
4th year	23.67
5th year	25.68

8-21.3-J&A

Roofer — 11/01/2023

JOB DESCRIPTION Roofer **DISTRICT** 9

ENTIRE COUNTIES
Bronx, Dutchess, Kings, New York, Orange, Putnam, Queens, Richmond, Rockland, Sullivan, Ulster, Westchester

WAGES

Per Hour:	07/01/2023	05/01/2024 Additional
Roofer/Waterproofer	$ 46.50 + $7.00*	$2.50

* This portion is not subjected to overtime premiums.

Note: Abatement/Removal of Asbestos containing roofs and roofing material is classified as Roofer.

SUPPLEMENTAL BENEFITS
Per Hour: $ 31.37

OVERTIME PAY
See (B, H) on OVERTIME PAGE
Note: An observed holiday that falls on a Sunday will be observed the following Monday.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES
(1) year term apprentices indentured prior to 01/01/2023

1st	2nd	3rd	4th
$ 16.28	$ 23.25 + 3.50*	$ 27.90 + 4.20*	$ 34.88 + 5.26*

Supplements:

1st	2nd	3rd	4th
$ 4.03	$ 15.85	$ 18.95	$ 23.61

* This portion is not subjected to overtime premiums.

(1) year term apprentices indentured after 01/01/2023

1st	2nd	3rd	4th	5th
$ 17.67	$ 20.93 + 3.16*	$ 23.25 + 3.50*	$ 27.90 + 4.20*	$ 34.88 + 5.26

Supplements:

1st	2nd	3rd	4th	5th
$ 7.61	$ 14.29	$ 15.85	$ 18.95	$ 23.61

* This portion is not subjected to overtime premiums.

9-8R

Sheetmetal Worker — 11/01/2023

JOB DESCRIPTION Sheetmetal Worker **DISTRICT** 8

ENTIRE COUNTIES
Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster, Westchester

WAGES

	07/01/2023
SheetMetal Worker	$ 47.00 + 3.60*

*This portion is not subject to overtime premiums.

SHIFT WORK
For all NYS D.O.T. and other Governmental mandated off-shift work:
10% increase for additional shifts for a minimum of five (5) days

SUPPLEMENTAL BENEFITS
Journeyworker $ 45.62

OVERTIME PAY
OVERTIME:.. See (B, E, Q,) on OVERTIME PAGE.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 15, 16, 23) on HOLIDAY PAGE

REGISTERED APPRENTICES

1st	2nd	3rd	4th	5th	6th	7th	8th
$ 17.50 + 1.44*	$ 19.67 + 1.62*	$ 21.87 + 1.80*	$ 24.05 + 1.98*	$ 26.24 + 2.16*	$ 28.44 + 2.34*	$ 31.10 + 2.52*	$ 33.75 + 2.70*

*This portion is not subject to overtime premiums.

Supplemental Benefits per hour:

Apprentices	
1st term	$ 19.53
2nd term	21.99
3rd term	24.42
4th term	26.88
5th term	29.32
6th term	31.75
7th term	33.72
8th term	35.71

8-38

Sheetmetal Worker — 11/01/2023

JOB DESCRIPTION Sheetmetal Worker **DISTRICT** 4

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Rockland, Suffolk, Westchester

WAGES
Per Hour: 07/01/2023

Sign Erector $ 56.00

NOTE: Structurally Supported Overhead Highway Signs(See STRUCTURAL IRON WORKER CLASS)

SUPPLEMENTAL BENEFITS
Per Hour: 07/01/2023

Sign Erector $ 55.66

OVERTIME PAY
See (A, F, S) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6, 10, 11, 12, 16, 25) on HOLIDAY PAGE
Overtime: See (5, 6, 10, 11, 12, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
Per Hour:
6 month Terms at the following percentage of Sign Erectors wage rate:

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
35%	40%	45%	50%	55%	60%	65%	70%	75%	80%

SUPPLEMENTAL BENEFITS
Per Hour:

07/01/2023

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
$ 14.95	$ 16.95	$ 18.93	$ 20.93	$ 28.56	$ 31.05	$ 33.57	$ 36.05	$ 38.56	$ 41.05

4-137-SE

Sprinkler Fitter — 11/01/2023

JOB DESCRIPTION Sprinkler Fitter **DISTRICT** 1

ENTIRE COUNTIES
Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster, Westchester

WAGES
Per hour 07/01/2023

Sprinkler $ 50.86

Fitter

SUPPLEMENTAL BENEFITS
Per hour

Journeyperson $ 30.19

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
Note: When a holiday falls on Sunday, the following Monday shall be considered a holiday and all work performed on either day shall be at the double time rate. When a holiday falls on Saturday, the preceding Friday shall be considered a holiday and all work performed on either day shall be at the double time rate.

REGISTERED APPRENTICES
Wages per hour

One Half Year terms at the following wage.

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
$ 24.77	$ 27.53	$ 30.03	$ 32.78	$ 35.53	$ 38.29	$ 41.04	$ 43.79	$ 46.54	$ 49.30

Supplemental Benefits per hour

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
$ 8.74	$ 8.74	$ 20.32	$ 20.32	$ 20.57	$ 20.57	$ 20.57	$ 20.57	$ 20.57	$ 20.57

1-669.2

Teamster - Building / Heavy&Highway — 11/01/2023

JOB DESCRIPTION Teamster - Building / Heavy&Highway **DISTRICT** 8

ENTIRE COUNTIES
Putnam, Westchester

WAGES
GROUP A: Straight Trucks (6-wheeler and 10-wheeler), A-frame, Winch, Dynamite Seeding, Mulching, Agitator, Water, Attenuator, Light Towers, Cement (all types), Suburban, Station Wagons, Cars, Pick Ups, any vehicle carrying materials of any kind.
GROUP AA: Tack Coat
GROUP B: Tractor & Trailers (all types).
GROUP BB: Tri-Axle,14 Wheeler
GROUP C: Low Boy (carrying equipment).
GROUP D: Fuel Trucks, Tire Trucks.
GROUP E: Off-road Equipment (over 40 tons): Athey Wagons, Belly Dumps, Articulated Dumps, Trailer Wagons.
GROUP F: Off-road Equipment (over 40 tons) Euclid, DJB.
GROUP G: Off-road Equipment (under 40 tons) Athey Wagons, Belly Articulated Dumps, Trailer Wagons.
GROUP H: Off-road Equipment(under 40 tons), Euclid.
GROUP HH: Off-road Equipment(under 40 tons) D.J.B.
GROUP I: Off-road Equipment(under 40 tons) Darts.
GROUP II: Off-road Equipment(under 40 tons) RXS.

WAGES:(per hour)

	07/01/2023
GROUP A	$ 46.86*
GROUP AA	49.86*
GROUP B	47.48*
GROUP BB	46.98*
GROUP C	49.61*
GROUP D	47.31*
GROUP E	47.86*
GROUP F	48.86*
GROUP G	47.61*
GROUP H	48.23*
GROUP HH	48.61*
GROUP I	48.36*
GROUP II	48.73*

* To calculate premium wage, subtract $ .10 from the hourly wage.

Note: Fuel truck operators on construction sites addit. $5.00 per day.
For work on hazardous/toxic waste site addit. 20% of hourly rate.

Shift Differential: When mandated by the contracting agency, DOT, or any governmental agency contracts shall receive a shift differential of fifteen (15%) above the wage rate.

NOTE: The Employer Registration (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to June 30,2023 will expire within the granted time frame.

For Pre-Registered Projects Four (4), Ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day. Tuesday thru Friday may be worked with no make-up day. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS
Per hour:
Journeyworker

First 40 hours	$ 35.58
41st-45th hours	15.73
Over 45 hours	1.60

OVERTIME PAY
See (B, E, P, R) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6, 8, 9, 15, 25) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 9, 15, 25) on HOLIDAY PAGE

8-456

Welder **11/01/2023**

JOB DESCRIPTION Welder **DISTRICT** 1

ENTIRE COUNTIES
Albany, Allegany, Bronx, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Dutchess, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Kings, Lewis, Livingston, Madison, Monroe, Montgomery, Nassau, New York, Niagara, Oneida, Onondaga, Ontario, Orange, Orleans, Oswego, Otsego, Putnam, Queens, Rensselaer, Richmond, Rockland, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Suffolk, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Westchester, Wyoming, Yates

WAGES
Per hour 07/01/2023

Welder: To be paid the same rate of the mechanic performing the work.*

*EXCEPTION: If a specific welder certification is required, then the 'Certified Welder' rate in that trade tag will be paid.

OVERTIME PAY

HOLIDAY

1-As Per Trade

Overtime Codes

Following is an explanation of the code(s) listed in the OVERTIME section of each classification contained in the attached schedule. Additional requirements may also be listed in the HOLIDAY section.

NOTE: Supplemental Benefits are 'Per hour worked' (for each hour worked) unless otherwise noted

(AA)	Time and one half of the hourly rate after 7 and one half hours per day
(A)	Time and one half of the hourly rate after 7 hours per day
(B)	Time and one half of the hourly rate after 8 hours per day
(B1)	Time and one half of the hourly rate for the 9th & 10th hours week days and the 1st 8 hours on Saturday. Double the hourly rate for all additional hours
(B2)	Time and one half of the hourly rate after 40 hours per week
(C)	Double the hourly rate after 7 hours per day
(C1)	Double the hourly rate after 7 and one half hours per day
(D)	Double the hourly rate after 8 hours per day
(D1)	Double the hourly rate after 9 hours per day
(E)	Time and one half of the hourly rate on Saturday
(E1)	Time and one half 1st 4 hours on Saturday; Double the hourly rate all additional Saturday hours
(E2)	Saturday may be used as a make-up day at straight time when a day is lost during that week due to inclement weather
(E3)	Between November 1st and March 3rd Saturday may be used as a make-up day at straight time when a day is lost during that week due to inclement weather, provided a given employee has worked between 16 and 32 hours that week
(E4)	Saturday and Sunday may be used as a make-up day at straight time when a day is lost during that week due to inclement weather
(E5)	Double time after 8 hours on Saturdays
(F)	Time and one half of the hourly rate on Saturday and Sunday
(G)	Time and one half of the hourly rate on Saturday and Holidays
(H)	Time and one half of the hourly rate on Saturday, Sunday, and Holidays
(I)	Time and one half of the hourly rate on Sunday
(J)	Time and one half of the hourly rate on Sunday and Holidays
(K)	Time and one half of the hourly rate on Holidays
(L)	Double the hourly rate on Saturday
(M)	Double the hourly rate on Saturday and Sunday
(N)	Double the hourly rate on Saturday and Holidays
(O)	Double the hourly rate on Saturday, Sunday, and Holidays
(P)	Double the hourly rate on Sunday
(Q)	Double the hourly rate on Sunday and Holidays
(R)	Double the hourly rate on Holidays
(S)	Two and one half times the hourly rate for Holidays

(S1) Two and one half times the hourly rate the first 8 hours on Sunday or Holidays One and one half times the hourly rate all additional hours.

(T) Triple the hourly rate for Holidays

(U) Four times the hourly rate for Holidays

(V) Including benefits at SAME PREMIUM as shown for overtime

(W) Time and one half for benefits on all overtime hours.

(X) Benefits payable on Paid Holiday at straight time. If worked, additional benefit amount will be required for worked hours. (Refer to other codes listed.)

Holiday Codes

PAID Holidays:

Paid Holidays are days for which an eligible employee receives a regular day's pay, but is not required to perform work. If an employee works on a day listed as a paid holiday, this remuneration is in addition to payment of the required prevailing rate for the work actually performed.

OVERTIME Holiday Pay:

Overtime holiday pay is the premium pay that is required for work performed on specified holidays. It is only required where the employee actually performs work on such holidays. The applicable holidays are listed under HOLIDAYS: OVERTIME. The required rate of pay for these covered holidays can be found in the OVERTIME PAY section listings for each classification.

Following is an explanation of the code(s) listed in the HOLIDAY section of each classification contained in the attached schedule. The Holidays as listed below are to be paid at the wage rates at which the employee is normally classified.

(1)	None
(2)	Labor Day
(3)	Memorial Day and Labor Day
(4)	Memorial Day and July 4th
(5)	Memorial Day, July 4th, and Labor Day
(6)	New Year's, Thanksgiving, and Christmas
(7)	Lincoln's Birthday, Washington's Birthday, and Veterans Day
(8)	Good Friday
(9)	Lincoln's Birthday
(10)	Washington's Birthday
(11)	Columbus Day
(12)	Election Day
(13)	Presidential Election Day
(14)	1/2 Day on Presidential Election Day
(15)	Veterans Day
(16)	Day after Thanksgiving
(17)	July 4th
(18)	1/2 Day before Christmas
(19)	1/2 Day before New Years
(20)	Thanksgiving
(21)	New Year's Day
(22)	Christmas
(23)	Day before Christmas
(24)	Day before New Year's
(25)	Presidents' Day
(26)	Martin Luther King, Jr. Day
(27)	Memorial Day
(28)	Easter Sunday

(29) Juneteenth

New York State Department of Labor - Bureau of Public Work
State Office Building Campus
Building 12 - Room 130
Albany, New York 12226

REQUEST FOR WAGE AND SUPPLEMENT INFORMATION

As Required by Articles 8 and 9 of the NYS Labor Law

Fax (518) 485-1870 or mail this form for new schedules or for determination for additional occupations.

This Form Must Be Typed

Submitted By: (Check Only One) ☐ Contracting Agency ☐ Architect or Engineering Firm ☐ Public Work District Office Date:

A. Public Work Contract to be let by: (Enter Data Pertaining to Contracting/Public Agency)

1. Name and complete address ☐ (Check if new or change)

Telephone Fax

E-Mail:

2. NY State Units (see Item 5).

- ☐ 01 DOT
- ☐ 02 OGS
- ☐ 03 Dormitory Authority
- ☐ 04 State University Construction Fund
- ☐ 05 Mental Hygiene Facilities Corp.
- ☐ 06 OTHER N.Y. STATE UNIT
- ☐ 07 City
- ☐ 08 Local School District
- ☐ 09 Special Local District, i.e., Fire, Sewer, Water District
- ☐ 1O Village
- ☐ 11 Town
- ☐ 12 County
- ☐ 13 Other Non-N.Y. State (Describe)

3. SEND REPLY TO ☐ (check if new or change)
Name and complete address:

Telephone Fax

E-Mail:

4. SERVICE REQUIRED. Check appropriate box and provide project information.

☐ New Schedule of Wages and Supplements.

APPROXIMATE BID DATE :

☐ Additional Occupation and/or Redetermination

PRC NUMBER ISSUED PREVIOUSLY FOR THIS PROJECT :

OFFICE USE ONLY

B. PROJECT PARTICULARS

5. Project Title _____

Description of Work _____

_____

Contract Identification Number _____

Note: For NYS units, the OSC Contract No. _____

6. Location of Project:
Location on Site _____

Route No/Street Address _____

Village or City _____

Town _____

County _____

7. Nature of Project - Check One:

- ☐ 1. New Building
- ☐ 2. Addition to Existing Structure
- ☐ 3. Heavy and Highway Construction (New and Repair)
- ☐ 4. New Sewer or Waterline
- ☐ 5. Other New Construction (Explain)
- ☐ 6. Other Reconstruction, Maintenance, Repair or Alteration
- ☐ 7. Demolition
- ☐ 8. Building Service Contract

8. OCCUPATION FOR PROJECT :

- ☐ Construction (Building, Heavy Highway/Sewer/Water)
- ☐ Tunnel
- ☐ Residential
- ☐ Landscape Maintenance
- ☐ Elevator maintenance
- ☐ Exterminators, Fumigators
- ☐ Fire Safety Director, NYC Only
- ☐ Fuel Delivery
- ☐ Guards, Watchmen
- ☐ Janitors, Porters, Cleaners, Elevator Operators
- ☐ Moving furniture and equipment
- ☐ Trash and refuse removal
- ☐ Window cleaners
- ☐ Other (Describe)

9. Does this project comply with the Wicks Law involving separate bidding? YES ☐ NO ☐

10. Name and Title of Requester

Signature

SEE PAGE TWO FOR LAWS RELATING TO PUBLIC WORK CONTRACTS

NEW YORK STATE DEPARTMENT OF LABOR
Bureau of Public Work - Debarment List

LIST OF EMPLOYERS INELIGIBLE TO BID ON OR BE AWARDED ANY PUBLIC WORK CONTRACT

Under Article 8 and Article 9 of the NYS Labor Law, a contractor, sub-contractor and/or its successor shall be debarred and ineligible to submit a bid on or be awarded any public work or public building service contract/sub-contract with the state, any municipal corporation or public body for a period of five (5) years from the date of debarment when:

- Two (2) final determinations have been rendered within any consecutive six-year (6) period determining that such contractor, sub-contractor and/or its successor has WILLFULLY failed to pay the prevailing wage and/or supplements;
- One (1) final determination involves falsification of payroll records or the kickback of wages and/or supplements.

The agency issuing the determination and providing the information, is denoted under the heading 'Fiscal Officer'. DOL = New York State Department of Labor; NYC = New York City Comptroller's Office; AG = New York State Attorney General's Office; DA = County District Attorney's Office.

Debarment Database: To search for contractors, sub-contractors and/or their successors debarred from bidding or being awarded any public work contract or subcontract under NYS Labor Law Articles 8 and 9, or under NYS Workers' Compensation Law Section 141-b, access the database at this link: https://apps.labor.ny.gov/EDList/searchPage.do

For inquiries where WCB is listed as the "Agency", please call 1-866-546-9322

NYSDOL Bureau of Public Work Debarment List 11/22/2023

Article 8

AGENCY	Fiscal Officer	FEIN	EMPLOYER NAME	EMPLOYER DBA NAME	ADDRESS	DEBARMENT START DATE	DEBARMENT END DATE
DOL	DOL	*****5754	0369 CONTRACTORS, LLC		515 WEST AVE UNIT PH 13NORWALK CT 06850	05/12/2021	05/12/2026
DOL	DOL	*****4018	ADIRONDACK BUILDING RESTORATION INC.		4156 WILSON ROAD EAST TABERG NY 13471	03/26/2019	03/26/2024
DOL	AG	*****1812	ADVANCED BUILDERS & LAND DEVELOPMENT, INC.		400 OSER AVE #2300HAUPPAUGE NY 11788	09/11/2019	09/11/2024
DOL	DOL	*****1687	ADVANCED SAFETY SPRINKLER INC		261 MILL ROAD P.O BOX 296EAST AURORA NY 14052	05/29/2019	05/29/2024
DOL	NYC		ALL COUNTY SEWER & DRAIN, INC.		7 GREENFIELD DR WARWICK NY 10990	03/25/2022	03/25/2027
DOL	NYC		AMJED PARVEZ		401 HANOVER AVENUE STATEN ISLAND NY 10304	01/11/2021	01/11/2026
DOL	DOL		ANGELO F COKER		2610 SOUTH SALINA STREET SUITE 14SYRACUSE NY 13205	09/17/2020	09/17/2025
DOL	DOL		ANGELO F COKER		2610 SOUTH SALINA STREET SUITE 14SYRACUSE NY 13205	12/04/2018	12/04/2023
DOL	DOL		ANGELO GARCIA		515 WEST AVE UNIT PH 13NORWALK CT 06850	05/12/2021	05/12/2026
DOL	DOL		ANGELO TONDO		449 WEST MOMBSHA ROAD MONROE NY 10950	06/06/2022	06/06/2027
DOL	DOL		ANITA SALERNO		158 SOLAR ST SYRACUSE NY 13204	01/07/2019	01/07/2024
DOL	DOL	*****4231	ANKER'S ELECTRIC SERVICE, INC.		10 SOUTH 5TH ST LOCUST VALLEY NY 11560	09/26/2022	09/26/2027
DOL	NYC		ARADCO CONSTRUCTION CORP		115-46 132RD ST SOUTH OZONE PARK NY 11420	09/17/2020	09/17/2025
DOL	DOL		ARNOLD A. PAOLINI		1250 BROADWAY ST BUFFALO NY 14212	02/03/2020	02/03/2025
DOL	NYC		ARSHAD MEHMOOD		168-42 88TH AVENUE JAMAICA NY 11432	11/20/2019	11/20/2024
DOL	NYC		AVM CONSTRUCTION CORP		117-72 123RD ST SOUTH OZONE PARK NY 11420	09/17/2020	09/17/2025
DOL	NYC		AZIDABEGUM		524 MCDONALD AVENUE BROOKLYN NY 11218	09/17/2020	09/17/2025
DOL	DOL	*****8421	B & B DRYWALL, INC		206 WARREN AVE APT 1WHITE PLAINS NY 10603	12/14/2021	12/14/2026
DOL	NYC		BALWINDER SINGH		421 HUDSON ST SUITE C5NEW YORK NY 10014	02/20/2019	02/20/2024
DOL	NYC	*****8416	BEAM CONSTRUCTION, INC.		50 MAIN ST WHITE PLAINS NY 10606	01/04/2019	01/04/2024
DOL	DOL		BERNARD BEGLEY		38 LONG RIDGE ROAD BEDFORD NY 10506	12/18/2019	12/18/2024
DOL	NYC	*****2113	BHW CONTRACTING, INC.		401 HANOVER AVENUE STATEN ISLAND NY 10304	01/11/2021	01/11/2026
DOL	DOL	*****3627	BJB CONSTRUCTION CORP.		38 LONG RIDGE ROAD BEDFORD NY 10506	12/18/2019	12/18/2024
DOL	DOL	*****4512	BOB BRUNO EXCAVATING, INC		5 MORNINGSIDE DR AUBURN NY 13021	05/28/2019	05/28/2024
DOL	DOL		BOGDAN MARKOVSKI		370 W. PLEASANTVIEW AVE SUITE 2.329HACKENSACK NJ 07601	02/11/2019	02/11/2024
DOL	DOL		BRADLEY J SCHUKA		4 BROTHERS ROAD WAPPINGERS FALLS NY 12590	10/20/2020	10/20/2025
DOL	DOL	*****9383	C.C. PAVING AND EXCAVATING, INC.		2610 SOUTH SALINA ST SUITE 12SYRACUSE NY 13205	09/17/2020	09/17/2025
DOL	DOL	*****9383	C.C. PAVING AND EXCAVATING, INC.		2610 SOUTH SALINA ST SUITE 12SYRACUSE NY 13205	12/04/2018	12/04/2023
DOL	DOL	*****4083	C.P.D. ENTERPRISES, INC		P.O BOX 281 WALDEN NY 12586	03/03/2020	03/03/2025
DOL	DOL	*****5161	CALADRI DEVELOPMENT CORP.		1223 PARK ST. PEEKSKILL NY 10566	05/17/2021	05/17/2026
DOL	DOL	*****3391	CALI ENTERPRISES, INC.		1223 PARK STREET PEEKSKILL NY 10566	05/17/2021	05/17/2026
DOL	NYC		CALVIN WALTERS		465 EAST THIRD ST MT. VERNON NY 10550	09/09/2019	09/09/2024
DOL	DOL	*****4155	CASA BUILDERS, INC.	FRIEDLANDER CONSTRUCTION	64 N PUTT CONNERS ROAD NEW PALTZ NY 12561	05/10/2023	05/10/2028

NYSDOL Bureau of Public Work Debarment List 11/22/2023

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DOL	AG	*****7247	CENTURY CONCRETE CORP		2375 RAYNOR ST RONKONKOMA NY 11779	08/04/2021	08/04/2026
DOL	DOL	*****0026	CHANTICLEER CONSTRUCTION LLC		4 BROTHERS ROAD WAPPINGERS FALLS NY 12590	10/20/2020	10/20/2025
DOL	NYC	*****2117	CHARAN ELECTRICAL ENTERPRISES		9-11 40TH AVENUE LONG ISLAND CITY NY 11101	09/26/2023	09/26/2028
DOL	NYC		CHARLES ZAHRADKA		863 WASHINGTON STREET FRANKLIN SQUARE NY 11010	03/10/2020	03/10/2025
DOL	DOL		CHRISTOPHER GRECO		26 NORTH MYRTLE AVENUE SPRING VALLEY NY 10956	02/18/2021	02/18/2026
DOL	DOL		CHRISTOPHER PAPASTEFANOU A/K/A CHRIS PAPASTEFANOU		1445 COMMERCE AVE BRONX NY 10461	05/30/2019	05/30/2024
DOL	DOL		CRAIG JOHANSEN		10 SOUTH 5TH ST LOCUST VALLEY NY 11560	09/26/2022	09/26/2027
DOL	DOL	*****3228	CROSS-COUNTY LANDSCAPING AND TREE SERVICE, INC.	ROCKLAND TREE SERVICE	26 NORTH MYRTLE AVENUE SPRING VALLEY NY 10956	02/18/2021	02/18/2026
DOL	DOL	*****2524	CSI ELECTRICAL & MECHANICAL INC		42-32 235TH ST DOUGLASTON NY 11363	01/14/2019	01/14/2024
DOL	DOL	*****7619	DANCO CONSTRUCTION UNLIMITED INC.		485 RAFT AVENUE HOLBROOK NY 11741	10/19/2021	10/19/2026
DOL	DOL		DANIEL ROBERT MCNALLY		7 GREENFIELD DRIVE WARWICK NY 10990	03/25/2022	03/25/2027
DOL	DOL		DARIAN L COKER		2610 SOUTH SALINA ST SUITE 2CSYRACUSE NY 13205	09/17/2020	09/17/2025
DOL	DOL		DARIAN L COKER		2610 SOUTH SALINA ST SUITE 2CSYRACUSE NY 13205	12/04/2018	12/04/2023
DOL	DOL		DAVID FRIEDLANDER		64 NORTH PUTT CORNERS RD NEW PALTZ NY 12561	05/10/2023	05/10/2028
DOL	NYC		DAVID WEINER		14 NEW DROP LANE 2ND FLOORSTATEN ISLAND NY 10306	11/14/2019	11/14/2024
DOL	DOL		DELPHI PAINTING & DECORATING CO INC		1445 COMMERCE AVE BRONX NY 10461	05/30/2019	05/30/2024
DOL	DOL		DINA TAYLOR		64 N PUTT CONNERS RD NEW PALTZ NY 12561	05/10/2023	05/10/2028
DOL	DOL	*****5175	EAGLE MECHANICAL AND GENERAL CONSTRUCTION LLC		11371 RIDGE RD WOLCOTT NY 14590	02/03/2020	02/03/2025
DOL	AG		EDWIN HUTZLER		23 NORTH HOWELLS RD BELLPORT NY 11713	08/04/2021	08/04/2026
DOL	DA		EDWIN HUTZLER		2375 RAYNOR STREET RONKONKOMA NY 11779	08/04/2021	08/04/2026
DOL	DOL	*****0780	EMES HEATING & PLUMBING CONTR		5 EMES LANE MONSEY NY 10952	01/20/2002	01/20/3002
DOL	NYC	*****5917	EPOCH ELECTRICAL, INC		97-18 50TH AVE CORONA NY 11368	04/19/2018	04/19/2024
DOL	DOL		FAIGY LOWINGER		11 MOUNTAIN RD 28 VAN BUREN DRMONROE NY 10950	03/20/2019	03/20/2024
DOL	DA		FREDERICK HUTZLER		2375 RAYNOR STREET RONKONKOMA NY 11779	08/04/2021	08/04/2026
DOL	NYC	*****6616	G & G MECHANICAL ENTERPRISES, LLC.		1936 HEMPSTEAD TURNPIKE EAST MEDOW NY 11554	11/29/2019	11/29/2024
DOL	DOL		GABRIEL FRASSETTI			04/10/2019	04/10/2024
DOL	NYC		GAYATRI MANGRU		21 DAREWOOD LANE VALLEY STREAM NY 11581	09/17/2020	09/17/2025
DOL	DA		GEORGE LUCEY		150 KINGS STREET BROOKLYN NY 11231	01/19/1998	01/19/2998
DOL	DOL		GIGI SCHNECKENBURGER		261 MILL RD EAST AURORA NY 14052	05/29/2019	05/29/2024
DOL	DA		GIOVANNA TRAVALJA		3735 9TH ST LONG ISLAND CITY NY 11101	01/05/2023	01/05/2028
DOL	DA	*****0213	GORILLA CONTRACTING GROUP, LLC		505 MANHATTAN AVE WEST BABYLON NY 11704	10/05/2023	10/05/2028
DOL	DOL		HANS RATH		24 ELDOR AVENUE NEW CITY NY 10956	02/03/2020	02/03/2025
DOL	DOL		HERBERT CLEMEN		42 FOWLER AVENUE CORTLAND MANOR NY 10567	01/24/2023	01/24/2028
DOL	DOL		HERBERT CLEMEN		42 FOWLER AVENUE CORTLAND MANOR NY 10567	10/25/2022	10/25/2027
DOL	DOL		IRENE KASELIS		32 PENNINGTON AVE	05/30/2019	05/30/2024

NYSDOL Bureau of Public Work Debarment List 11/22/2023

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DOL	DOL	*****9211	J. WASE CONSTRUCTION CORP.		8545 RT 9W ATHENS NY 12015	03/09/2021	03/09/2026
DOL	DOL		J.M.J CONSTRUCTION		151 OSTRANDER AVENUE SYRACUSE NY 13205	11/21/2022	11/21/2027
DOL	DOL		J.R. NELSON CONSTRUCTION		531 THIRD STREET ALBANY NY 12206	12/22/2022	12/22/2027
DOL	DOL		J.R. NELSON CONSTRUCTION		531 THIRD STREET ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL		J.R. NELSON, LLC		531 THIRD STREET ALBANY NY 12206	12/22/2022	12/22/2027
DOL	DOL		J.R. NELSON, LLC		531 THIRD STREET ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL		J.R.N COMPANIES, LLC		531 THIRD STREET ALBANY NY 12206	12/12/2022	12/12/2027
DOL	DOL		J.R.N COMPANIES, LLC		531 THIRD STREET ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL	*****1147	J.R.N. CONSTRUCTION, LLC		531 THIRD ST ALBANY NY 12206	12/22/2022	12/22/2027
DOL	DOL	*****1147	J.R.N. CONSTRUCTION, LLC		531 THIRD ST ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL		JAMES J. BAKER		7901 GEE ROAD CANASTOTA NY 13032	08/17/2021	08/17/2026
DOL	DOL		JASON P. RACE		3469 STATE RT. 69 PERISH NY 13131	09/29/2021	09/29/2026
DOL	DOL		JASON P. RACE		3469 STATE RT. 69 PERISH NY 13131	02/09/2022	02/09/2027
DOL	DOL		JASON P. RACE		3469 STATE RT. 69 PERISH NY 13131	11/15/2022	11/15/2027
DOL	DOL		JASON P. RACE		3469 STATE RT. 69 PERISH NY 13131	03/01/2022	03/01/2027
DOL	DOL	*****7993	JBS DIRT, INC.		7901 GEE ROAD CANASTOTA NY 13032	08/17/2021	08/17/2026
DOL	DOL	*****2435	JEFFEL D. JOHNSON	JMJ7 AND SON	5553 CAIRNSTRAIL CLAY NY 13041	11/21/2022	11/21/2027
DOL	DOL		JEFFEL JOHNSON ELITE CARPENTER REMODEL AND CONSTRUCTION		C2 EVERGREEN CIRCLE LIVERPOOL NY 13090	11/21/2022	11/21/2027
DOL	DOL	*****2435	JEFFREY M. JOHNSON	JMJ7 AND SON	5553 CAIRNS TRAIL CLAY NY 13041	11/21/2022	11/21/2027
DOL	NYC		JENNIFER GUERRERO		1936 HEMPSTEAD TURNPIKE EAST MEADOW NY 11554	11/29/2019	11/29/2024
DOL	DOL		JIM PLAUGHER		17613 SANTE FE LINE ROAD WAYNEFIELD OH 45896	07/16/2021	07/16/2026
DOL	DOL		JMJ7 & SON CONSTRUCTION, LLC		5553 CAIRNS TRAIL LIVERPOOL NY 13041	11/21/2022	11/21/2027
DOL	DOL		JMJ7 AND SONS CONTRACTORS		5553 CAIRNS TRAIL CLAY NY 13041	11/21/2022	11/21/2027
DOL	DOL		JMJ7 CONTRACTORS		7014 13TH AVENUE BROOKLYN NY 11228	11/21/2022	11/21/2027
DOL	DOL		JMJ7 CONTRACTORS AND SONS		5553 CAIRNS TRAIL CLAY NY 13041	11/21/2022	11/21/2027
DOL	DOL		JMJ7 CONTRACTORS, LLC		5553 CAIRNS TRAIL CLAY NY 13041	11/21/2022	11/21/2027
DOL	DOL		JOHN GOCEK		14B COMMERCIAL AVE ALBANY NY 12065	11/14/2019	11/14/2024
DOL	DOL		JOHN MARKOVIC		47 MANDON TERRACE HAWTHORN NJ 07506	03/29/2021	03/29/2026
DOL	DOL		JOHN WASE		8545 RT 9W ATHENS NY 12015	03/09/2021	03/09/2026
DOL	DOL		JON E DEYOUNG		261 MILL RD P.O BOX 296EAST AURORA NY 14052	05/29/2019	05/29/2024
DOL	DOL		JORGE RAMOS		8970 MIKE GARCIA DR MANASSAS VA 20109	07/16/2021	07/16/2026
DOL	DOL		JOSEPH K. SALERNO		1010 TILDEN AVE UTICA NY 13501	07/24/2023	07/24/2028
DOL	DOL		JOSEPH K. SALERNO II		1010 TILDEN AVE UTICA NY 13501	07/24/2023	07/24/2028
DOL	DOL	*****5116	JP RACE PAINTING, INC. T/A RACE PAINTING		3469 STATE RT. 69 PERISH NY 13131	02/09/2022	02/09/2027
DOL	DOL	*****5116	JP RACE PAINTING, INC. T/A RACE PAINTING		3469 STATE RT. 69 PERISH NY 13131	11/15/2022	11/15/2027
DOL	DOL	*****5116	JP RACE PAINTING, INC. T/A RACE PAINTING		3469 STATE RT. 69 PERISH NY 13131	09/29/2021	09/29/2026

NYSDOL Bureau of Public Work Debarment List 11/22/2023

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DOL	DOL	*****5116	JP RACE PAINTING, INC. T/A RACE PAINTING		3469 STATE RT. 69 PERISH NY 13131	03/01/2022	03/01/2027
DOL	DOL	*****5116	JP RACE PAINTING, INC. T/A RACE PAINTING		3469 STATE RT. 69 PERISH NY 13131	03/01/2022	03/01/2027
DOL	DOL	*****1147	JRN CONSTRUCTION, LLC		531 THIRD STREET ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL	*****1147	JRN CONSTRUCTION, LLC		531 THIRD STREET ALBANY NY 12206	12/22/2022	12/22/2027
DOL	DOL		JRN PAVING, LLC		531 THIRD STREET ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL		JRN PAVING, LLC		531 THIRD STREET ALBANY NY 12206	12/22/2022	12/22/2027
DOL	DOL		JULIUS AND GITA BEHREND		5 EMES LANE MONSEY NY 10952	11/20/2002	11/20/3002
DOL	DOL		KARIN MANGIN		796 PHELPS ROAD FRANKLIN LAKES NJ 07417	12/01/2020	12/01/2025
DOL	DOL		KATE E. CONNOR		7088 INTERSTATE ISLAND RD SYRACUSE NY 13209	03/31/2021	03/31/2026
DOL	DOL	*****2959	KELC DEVELOPMENT, INC		7088 INTERSTATE ISLAND RD SYRACUSE NY 13209	03/31/2021	03/31/2026
DOL	DOL		KIMBERLY F. BAKER		7901 GEE ROAD CANASTOTA NY 13032	08/17/2021	08/17/2026
DOL	DOL		KMA GROUP II, INC.		29-10 38TH AVENUE LONG ISLAND CITY NY 11101	10/11/2023	10/11/2028
DOL	DOL	*****1833	KMA GROUP INC.		29-10 38TH AVENUE LONG ISLAND CITY NY 11101	10/11/2023	10/11/2028
DOL	DOL		KMA INSULATION, INC.		29-10 38TH AVENUE LONG ISLAND CITY NY 11101	10/11/2023	10/11/2028
DOL	NYC		KULWANT S. DEOL		9-11 40TH AVENUE LONG ISLAND CITY NY 11101	09/26/2023	09/26/2028
DOL	DA	*****8816	LAKE CONSTRUCTION AND DEVELOPMENT CORPORATION		150 KINGS STREET BROOKLYN NY 11231	08/19/1998	08/19/2998
DOL	DOL		LEROY E. NELSON JR		531 THIRD ST ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL		LEROY E. NELSON JR		531 THIRD ST ALBANY NY 12206	12/22/2022	12/22/2027
DOL	AG	*****3291	LINTECH ELECTRIC, INC.		3006 TILDEN AVE BROOKLYN NY 11226	02/16/2022	02/16/2027
DOL	DOL		LOUIS A. CALICCHIA		1223 PARK ST. PEEKSKILL NY 10566	05/17/2021	05/17/2026
DOL	NYC		LUBOMIR PETER SVOBODA		27 HOUSMAN AVE STATEN ISLAND NY 10303	12/26/2019	12/26/2024
DOL	NYC		M & L STEEL & ORNAMENTAL IRON CORP.		27 HOUSMAN AVE STATEN ISLAND NY 10303	12/26/2019	12/26/2024
DOL	DOL	*****2196	MAINSTREAM SPECIALTIES, INC.		11 OLD TOWN RD SELKIRK NY 12158	02/02/2021	02/02/2026
DOL	DA		MANUEL P TOBIO		150 KINGS STREET BROOKLYN NY 14444	08/19/1998	08/19/2998
DOL	DA		MANUEL TOBIO		150 KINGS STREET BROOKLYN NY 11231	08/19/1998	08/19/2998
DOL	NYC		MAREK FABIJANOWSKI		50 MAIN ST WHITE PLAINS NY 10606	01/04/2019	01/04/2024
DOL	NYC		MARIA NUBILE		84-22 GRAND AVENUE ELMHURST NY 11373	03/10/2020	03/10/2025
DOL	DOL		MATTHEW P. KILGORE		4156 WILSON ROAD EAST TABERG NY 13471	03/26/2019	03/26/2024
DOL	DOL	*****4829	MILESTONE ENVIRONMENTAL CORPORATION		704 GINESI DRIVE SUITE 29MORGANVILLE NJ 07751	04/10/2019	04/10/2024
DOL	NYC	*****9926	MILLENNIUM FIRE PROTECTION, LLC		325 W. 38TH STREET SUITE 204NEW YORK NY 10018	11/14/2019	11/14/2024
DOL	NYC	*****0627	MILLENNIUM FIRE SERVICES, LLC		14 NEW DROP LNE 2ND FLOORSTATEN ISLAND NY 10306	11/14/2019	11/14/2024
DOL	DOL	*****1320	MJC MASON CONTRACTING, INC.		42 FOWLER AVENUE CORTLAND MANOR NY 10567	10/25/2022	10/25/2027
DOL	DOL	*****1320	MJC MASON CONTRACTING, INC.		42 FOWLER AVENUE CORTLAND MANOR NY 10567	01/24/2023	01/24/2028
DOL	NYC		MUHAMMED A. HASHEM		524 MCDONALD AVENUE BROOKLYN NY 11218	09/17/2020	09/17/2025
DOL	NYC		NAMOW, INC.		84-22 GRAND AVENUE ELMHURST NY 11373	03/10/2020	03/10/2025

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DOL	DOL	*****7790	NATIONAL BUILDING & RESTORATION CORP		1010 TILDEN AVE UTICA NY 13501	07/24/2023	07/24/2028
DOL	DOL	*****1797	NATIONAL CONSTRUCTION SERVICES, INC		1010 TILDEN AVE UTICA NY 13501	07/24/2023	07/24/2028
DOL	DA	*****9786	NATIONAL INSULATION & GC CORP		180 MILLER PLACE HICKSVILLE NY 11801	12/12/2018	12/12/2023
DOL	NYC		NAVIT SINGH		402 JERICHO TURNPIKE NEW HYDE PARK NY 11040	08/10/2022	08/10/2027
DOL	DA		NICHOLAS T. ANALITIS		505 MANHATTAN AVE WEST BABYLON NY 11704	10/05/2023	10/05/2028
DOL	DOL		NICHOLE E. FRASER A/K/A NICHOLE RACE		3469 STATE RT. 69 PERISH NY 13131	03/01/2022	03/01/2027
DOL	DOL		NICHOLE E. FRASER A/K/A NICHOLE RACE		3469 STATE RT. 69 PERISH NY 13131	11/15/2022	11/15/2027
DOL	DOL		NICHOLE E. FRASER A/K/A NICHOLE RACE		3469 STATE RT. 69 PERISH NY 13131	09/29/2021	09/29/2026
DOL	DOL		NICHOLE E. FRASER A/K/A NICHOLE RACE		3469 STATE RT. 69 PERISH NY 13131	02/09/2022	02/09/2027
DOL	DOL	*****7429	NICOLAE I. BARBIR	BESTUCCO CONSTRUCTION, INC.	444 SCHANTZ ROAD ALLENTOWN PA 18104	09/17/2020	09/17/2025
DOL	NYC	*****5643	NYC LINE CONTRACTORS, INC.		402 JERICHO TURNPIKE NEW HYDE PARK NY 11040	08/10/2022	08/10/2027
DOL	DOL		PAULINE CHAHALES		935 S LAKE BLVD MAHOPAC NY 10541	03/02/2021	03/02/2026
DOL	DOL		PETER STEVENS		11 OLD TOWN ROAD SELKIRK NY 12158	02/02/2021	02/02/2026
DOL	DOL		PETER STEVENS		8269 21ST ST BELLEROSE NY 11426	12/22/2022	12/22/2027
DOL	DOL	*****0466	PRECISION BUILT FENCES, INC.		1617 MAIN ST PEEKSKILL NY 10566	03/03/2020	03/03/2025
DOL	NYC		RASHEL CONSTRUCTION CORP		524 MCDONALD AVENUE BROOKLYN NY 11218	09/17/2020	09/17/2025
DOL	DOL	*****1068	RATH MECHANICAL CONTRACTORS, INC.		24 ELDOR AVENUE NEW CITY NY 10956	02/03/2020	02/03/2025
DOL	DOL	*****2633	RAW POWER ELECTRIC CORP.		3 PARK CIRCLE MIDDLETOWN NY 10940	07/11/2022	07/11/2027
DOL	DA	*****7559	REGAL CONTRACTING INC.		24 WOODBINE AVE NORTHPORT NY 11768	10/01/2020	10/01/2025
DOL	DOL		RICHARD REGGIO		1617 MAIN ST PEEKSKILL NY 10566	03/03/2020	03/03/2025
DOL	DOL		ROBBYE BISSESAR		89-51 SPRINGFIELD BLVD QUEENS VILLAGE NY 11427	01/11/2003	01/11/3003
DOL	DOL		ROBERT A. VALERINO		3841 LANYARD COURT NEW PORT RICHEY FL 34652	07/09/2019	07/09/2024
DOL	DOL		ROBERT BRUNO		5 MORNINGSIDE DRIVE AUBURN NY 13021	05/28/2019	05/28/2024
DOL	DOL		ROMEO WARREN		161 ROBYN RD MONROE NY 10950	07/11/2022	07/11/2027
DOL	DOL		RONALD MESSEN		14B COMMERCIAL AVE ALBANY NY 12065	11/14/2019	11/14/2024
DOL	DOL	*****7172	RZ & AL INC.		198 RIDGE AVENUE VALLEY STREAM NY 11581	06/06/2022	06/06/2027
DOL	DOL	*****1365	S & L PAINTING, INC.		11 MOUNTAIN ROAD P.O BOX 408MONROE NY 10950	03/20/2019	03/20/2024
DOL	DOL		SAL FRESINA MASONRY CONTRACTORS, INC.		1935 TEALL AVENUE SYRACUSE NY 13206	07/16/2021	07/16/2026
DOL	DOL		SAL MASONRY CONTRACTORS, INC.		(SEE COMMENTS) SYRACUSE NY 13202	07/16/2021	07/16/2026
DOL	DOL	*****9874	SALFREE ENTERPRISES INC		P.O BOX 14 2821 GARDNER RDPOMPEI NY 13138	07/16/2021	07/16/2026
DOL	DOL		SALVATORE A FRESINA A/K/A SAM FRESINA		107 FACTORY AVE P.O BOX 11070SYRACUSE NY 13218	07/16/2021	07/16/2026
DOL	DOL		SAM FRESINA		107 FACTORY AVE P.O BOX 11070SYRACUSE NY 13218	07/16/2021	07/16/2026
DOL	NYC	*****0349	SAM WATERPROOFING INC		168-42 88TH AVENUE APT.1 AJAMAICA NY 11432	11/20/2019	11/20/2024
DOL	DA	*****0476	SAMCO ELECTRIC CORP.		3735 9TH ST LONG ISLAND CITY NY 11101	01/05/2023	01/05/2028
DOL	NYC	*****1130	SCANA CONSTRUCTION		863 WASHINGTON STREET	03/10/2020	03/10/2025

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DOL	DOL	*****2045	SCOTT DUFFIE	DUFFIE'S ELECTRIC, INC.	P.O BOX 111 CORNWALL NY 12518	03/03/2020	03/03/2025
DOL	DOL		SCOTT DUFFIE		P.O BOX 111 CORNWALL NY 12518	03/03/2020	03/03/2025
DOL	NYC	*****6597	SHAIRA CONSTRUCTION CORP.		421 HUDSON STREET SUITE C5NEW YORK NY 10014	02/20/2019	02/20/2024
DOL	DOL		SHULEM LOWINGER		11 MOUNTAIN ROAD 28 VAN BUREN DRMONROE NY 10950	03/20/2019	03/20/2024
DOL	DA		SILVANO TRAVALJA		3735 9TH ST LONG ISLAND CITY NY 11101	01/05/2023	01/05/2028
DOL	DOL	*****0440	SOLAR GUYS INC.		8970 MIKE GARCIA DR MANASSAS VA 20109	07/16/2021	07/16/2026
DOL	NYC		SOMATIE RAMSUNAHAI		115-46 132ND ST SOUTH OZONE PARK NY 11420	09/17/2020	09/17/2025
DOL	DOL	*****2221	SOUTH BUFFALO ELECTRIC, INC.		1250 BROADWAY ST BUFFALO NY 14212	02/03/2020	02/03/2025
DOL	NYC	*****3661	SPANIER BUILDING MAINTENANCE CORP		200 OAK DRIVE SYOSSET NY 11791	03/14/2022	03/14/2027
DOL	DOL		STANADOS KALOGELAS		485 RAFT AVENUE HOLBROOK NY 11741	10/19/2021	10/19/2026
DOL	DOL	*****3496	STAR INTERNATIONAL INC		89-51 SPRINGFIELD BLVD QUEENS VILLAGE NY 11427	08/11/2003	08/11/3003
DOL	DOL	*****6844	STEAM PLANT AND CHX SYSTEMS INC.		14B COMMERCIAL AVENUE ALBANY NY 12065	11/14/2019	11/14/2024
DOL	DOL	*****9933	STEED GENERAL CONTRACTORS, INC.		1445 COMMERCE AVE BRONX NY 10461	05/30/2019	05/30/2024
DOL	DOL	*****9528	STEEL-IT, LLC.		17613 SANTE FE LINE ROAD WAYNESFIELD OH 45896	07/16/2021	07/16/2026
DOL	DOL		STEFANOS PAPASTEFANOU, JR. A/K/A STEVE PAPASTEFANOU, JR.		256 WEST SADDLE RIVER RD UPPER SADDLE RIVER NJ 07458	05/30/2019	05/30/2024
DOL	DOL	*****3800	SUBURBAN RESTORATION CO. INC.		5-10 BANTA PLACE FAIR LAWN PLACE NJ 07410	03/29/2021	03/29/2026
DOL	DOL	*****1060	SUNN ENTERPRISES GROUP, LLC		370 W. PLEASANTVIEW AVE SUITE 2.329HACKENSACK NJ 07601	02/11/2019	02/11/2024
DOL	DOL	*****9150	SURGE INC.		8269 21ST STREET BELLEROSE NY 11426	12/22/2022	12/22/2027
DOL	DOL		SYED RAZA		198 RIDGE AVENUE NY 11581	06/06/2022	06/06/2027
DOL	DOL	*****8209	SYRACUSE SCALES, INC.		158 SOLAR ST SYRACUSE NY 13204	01/07/2019	01/07/2024
DOL	DOL		TERRY THOMPSON		11371 RIDGE RD WOLCOTT NY 14590	02/03/2020	02/03/2025
DOL	DOL	*****9733	TERSAL CONSTRUCTION SERVICES INC		107 FACTORY AVE P.O BOX 11070SYRACUSE NY 13208	07/16/2021	07/16/2026
DOL	DOL		TERSAL CONTRACTORS, INC.		221 GARDNER RD P.O BOX 14POMPEI NY 13138	07/16/2021	07/16/2026
DOL	DOL		TERSAL DEVELOPMENT CORP.		1935 TEALL AVENUE SYRACUSE NY 13206	07/16/2021	07/16/2026
DOL	DOL		TEST		P.O BOX 123 ALBANY NY 12204	05/20/2020	05/20/2025
DOL	DOL	*****6789	TEST1000		P.O BOX 123 ALBANY NY 12044	03/01/2021	03/01/2026
DOL	DOL	*****5766	THE COKER CORPORATION	COKER CORPORATIO N	2610 SOUTH SALINA ST SUITE 14SYRACUSE NY 13205	12/04/2018	12/04/2023
DOL	DOL	*****5766	THE COKER CORPORATION	COKER CORPORATIO N	2610 SOUTH SALINA ST SUITE 14SYRACUSE NY 13205	09/17/2020	09/17/2025
DOL	DA	*****1050	TRI STATE CONSTRUCTION OF NY CORP.		50-39 175TH PLACE FRESH MEADOWS NY 11365	03/28/2022	03/28/2027
DOL	DA	*****4106	TRIPLE H CONCRETE CORP		2375 RAYNOR STREET RONKONKOMA NY 11779	08/04/2021	08/04/2026
DOL	DOL	*****8210	UPSTATE CONCRETE & MASONRY CONTRACTING CO INC		449 WEST MOMBSHA ROAD MONROE NY 10950	06/06/2022	06/06/2027
DOL	DOL	*****6418	VALHALLA CONSTRUCTION, LLC.		796 PHLEPS ROAD FRANKLIN LAKES NJ 07417	12/01/2020	12/01/2025
DOL	NYC	*****2426	VICKRAM MANGRU	VICK CONSTRUCTI ON	21 DAREWOOD LANE VALLEY STREAM NY 11581	09/17/2020	09/17/2025

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DOL	NYC		VICKRAM MANGRU		21 DAREWOOD LANE VALLEY STREAM NY 11581	09/17/2020	09/17/2025
DOL	DOL		VICTOR ALICANTI		42-32 235TH ST DOUGLASTON NY 11363	01/14/2019	01/14/2024
DOL	DOL		VIKTORIA RATH		24 ELDOR AVENUE NEW CITY NY 10956	02/03/2020	02/03/2025
DOL	NYC	*****3673	WALTERS AND WALTERS, INC.		465 EAST AND THIRD ST MT. VERNON NY 10550	09/09/2019	09/09/2024
DOL	DOL	*****3296	WESTERN NEW YORK CONTRACTORS, INC.		3841 LAYNARD COURT NEW PORT RICHEY FL 34652	07/09/2019	07/09/2024
DOL	DOL	*****8266	WILLIAM CHRIS MCCLENDON	MCCLENDON ASPHALT PAVING	1646 FALLS STREET NIAGARA FALLS NY 14303	05/01/2023	05/01/2028
DOL	DOL		WILLIAM CHRIS MCCLENDON		1646 FALLS STREET NIAGARA FALLS NY 14303	05/01/2023	05/01/2028
DOL	DOL		WILLIAM G. PROERFRIEDT		85 SPRUCEWOOD ROAD WEST BABYLON NY 11704	01/19/2021	01/19/2026
DOL	DOL	*****5924	WILLIAM G. PROPHY, LLC	WGP CONTRACTING, INC.	54 PENTAQUIT AVE BAYSHORE NY 11706	01/19/2021	01/19/2026
DOL	DOL		XENOFON EFTHIMIADIS		29-10 38TH AVENUE LONG ISLAND CITY NY 11101	10/11/2023	10/11/2028

TECHNICAL SPECIFICATIONS

DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION

Division of Engineering

SECTION 048100 - UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Information For Bidders, General Clauses and Special clauses, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Concrete unit masonry for filling opening at removal of through-the-wall air conditioning unit, Computer room ON 2nd floor.
   2. Patching work where mechanical work requires work on existing masonry walls.
   2. Mortar and grout.
   3. Masonry joint reinforcement.
   4. Ties and anchors.
   5. Embedded flashing.
   6. Miscellaneous masonry accessories (block vents).

1.3 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product data for each different masonry unit, accessory, and other manufactured product specified.

C. Full-size units for each different exposed masonry unit required showing the full range of exposed colors, textures, and dimensions to be expected in the completed construction.

D. Material certificates for the following, signed by manufacturer and Contractor, certifying that each material complies with requirements.
   1. Each different cement product required for mortar and grout, including name of manufacturer, brand, type, and weight slips at time of delivery.
   2. Each type and size of joint reinforcement.
   3. Each type and size of anchors, ties, and metal accessories.

E. Material test reports from a qualified independent testing agency, employed and paid by Contractor or manufacturer, indicating and interpreting test results relative to compliance of the following proposed masonry materials with requirements indicated:
   1. Mortar complying with property requirements of ASTM C 270.
   2. Mortar complying with BIA M1.

3. Grout mixes. Include description of type and proportions of grout ingredients.
4. Masonry units.

F. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.4 QUALITY ASSURANCE

A. Single-Source Responsibility for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one source and by a single manufacturer for each different product required.

B. Single-Source Responsibility for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source or producer for each aggregate.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms, under cover, and in a dry location to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion, and other causes. If units become wet, do not install until they are in an air-dried condition.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.6 PROJECT CONDITIONS

A. Protection of Masonry: During erection, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
1. Extend cover a minimum of 24 inches (600 mm) down both sides and hold cover securely in place.
2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches (600 mm) down face next to unconstructed wythe and hold cover in place.

B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.

C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
1. Protect base of walls from rain-splashed mud and mortar splatter by coverings spread on ground and over wall surface.
2. Protect sills, ledges, and projections from mortar droppings.
3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt on completed masonry.

D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace unit masonry damaged by frost or freezing conditions. Comply with the following requirements:
1. Cold-Weather Construction: When the ambient temperature is within the limits indicated, use the following procedures:

a. 40 to 32 deg F (4 to 0 deg C): Heat mixing water or sand to produce mortar temperatures between 40 and 120 deg F (4 and 49 deg C).
b. 32 to 25 deg F (0 to -4 deg C): Heat mixing water and sand to produce mortar temperatures between 40 and 120 deg F (4 and 49 deg C). Heat grout materials to produce grout temperatures between 40 and 120 deg F (4 and 49 deg C). Maintain mortar and grout above freezing until used in masonry.
c. 25 to 20 deg F (-4 to -7 deg C): Heat mixing water and sand to produce mortar temperatures between 40 and 120 deg F (4 and 49 deg C). Heat grout materials to produce grout temperatures between 40 and 120 deg F (4 and 49 deg C). Maintain mortar and grout above freezing until used in masonry. Heat masonry units to 40 deg F (4 deg C) if grouting. Use heat on both sides of walls under construction.
d. 20 deg F (-7 deg C) and Below: Heat mixing water and sand to produce mortar temperatures between 40 and 120 deg F (4 and 49 deg C). Heat grout materials to produce grout temperatures between 40 and 120 deg F (4 and 49 deg C). Maintain mortar and grout above freezing until used in masonry. Heat masonry units to 40 deg F (4 deg C). Provide enclosures and use heat on both sides of walls under construction to maintain temperatures above 32 deg F (0 deg C) within the enclosures.

2. Cold-Weather Protection: When the mean daily temperature is within the limits indicated, provide the following protection:

a. 40 to 25 deg F (4 to -4 deg C): Cover masonry with a weather-resistant membrane for 48 hours after construction.
b. 25 to 20 deg F (-4 to -7 deg C): Cover masonry with insulating blankets or provide enclosure and heat for 48 hours after construction to prevent freezing. Install wind breaks when wind velocity exceeds 15 mi./h (25 km/h).
c. 20 deg F (-7 deg C) and Below: Provide enclosure and heat to maintain temperatures above 32 deg F (0 deg C) within the enclosure for 48 hours after construction.

3. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and above and will remain so until masonry has dried out, but not less than 7 days after completion of cleaning.

E. 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 (38 deg C) and above.

PART 2 - PRODUCTS

2.1 CONCRETE MASONRY UNITS

A. General: Provide shapes indicated and as follows for each form of concrete masonry unit required.
B. Concrete Masonry Units: ASTM C 90 and as follows:

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi.
2. Weight Classification: Normal weight.
3. Provide Type I, moisture-controlled units.
4. Size: Manufactured to the actual dimensions indicated on Drawings within tolerances specified in the applicable referenced ASTM specification.
   a. 6 inch (152 mm) nominal: 5-5/8 inch (143 mm) actual.

   a. 4 inches (102 mm) nominal; 3-5/8 inches (92 mm) actual.

   b. 8 inch (200 mm) nominal: 7-5/8 inch (194 mm) actual.
5. Exposed Faces: Manufacturer's standard color and texture, unless otherwise indicated.

2.2 BRICK

A. Face Brick: Replacement face brick shall match existing face brick in hardness and weatherability, size, color, and surface texture and reflectance. Provide replacement face brick custom made to match existing bricks to provide an exact match to existing units to Architect's satisfaction.

2.2 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, lenigh portland cement. Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

B. Hydrated Lime: Carson's Miracle lime,ASTM C 207-79, Type S.

C. Aggregate for Mortar: ASTM C 144; except for joints less than 1/4 inch (6.5 mm), use aggregate graded with 100 percent passing the No. 16 (1.18 mm) sieve.

D. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMU, containing integral water repellent by same manufacturer.

E. Water: Clean and Potable.

2.3 JOINT REINFORCEMENT, BAR REINFORCEMENT TIES AND ANCHORING DEVICES

A. Materials: Comply with requirements indicated below for basic materials and with requirements indicated under each form of joint reinforcement, tie and anchor for size and other characteristics:

1. Application: Use for all masonry, both exterior and interior.
2. Hot-Dip Galvanized Steel Wire: ASTM A153, Class B-2 (1.5 oz. per sq. ft. of wire surface) for zinc coating applied after prefabrication.
3. Type 304 or type 316 stainless steel.

B. Horizontal Joint Reinforcement: Dur-O-Wal or an approved equal, truss or ladder design, 3/16" side rods, #9 ga. cross rods welded steel wire, 1.5 oz. ASTM A153 Class B-2 hot-dipped zinc coating (after fabrication) for exterior walls, mill galvanized wire for interior walls, width 1-1/2" to 2" less than wall thickness. Provide preformed corner and "T" shaped units for intersecting walls. At insulated exterior cavity walls use in combination with "Dur-O-Eye" adjustable wall tie system.

C. Anchors and Ties: Hot-dip galvanized metal of approved design, as follows:

1. Adjustable Walls Ties in Cavity Walls: galvanized 3/16" diameter, high tensile, cold drawn steel wire conforming to ASTM A82: two piece pintle and eye, rectangular type as manufactured by Dur-O-Wal or approved equal.
2. Gripstay Channels : Hohmann &Barnard, Inc. #362-C, 16 gage and #363 Flexible Gripstay Anchor, 16 gage.
3. Corrugated or Crimped Ties: 7/8 inch wide, 16 gage.

D. Anchors: Stainless steel of approved design as follows:

1. Corrugated Buck Anchor : Hohmann &Barnard, Inc. #345, 16 gage.

2.4 CONCEALED FLASHING MATERIALS

A. Metal Flashing: Copper sheet of weight indicated below.
   1. Weight: 16-oz./sq. ft.

B. Products: Subject to compliance with requirements, provide one of the following:
   1. Dovetail and Sawtooth Flashing by Cheney Flashing Company, Inc.

2.5 MISCELLANEOUS MASONRY ACCESSORIES

A. Non-Metallic Control Joint Strips: Premolded, flexible cellular neoprene rubber filler strips complying with ASTM D1056, Grade RE41E1, capable of compression up to 35%, of width and thickness indicated.

B. Bond Breaker Strips: Asphalt-saturated organic roofing felt complying with ASTM D226, Type I (No. 15 asphalt felt).

C. Weepholes: Provide the following for weepholes:
   1. Round Plastic Tubing: Medium-density polyethylene, 3/8” outside diameter by 4” long.

2.6 MASONRY CLEANERS

A. Acidic Cleaner: Manufacturer's standard-strength, general-purpose cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry surfaces of type indicated below without discoloring or damaging masonry surfaces; expressly approved for intended use by manufacturer of masonry units being cleaned. “Sure Klean” No. 600 detersent by Pro SoCo, INC. or approved equal.

2.7 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
   1. Do not use calcium chloride in mortar or grout.
   2. Add cold-weather admixture (if used) at the same rate for all mortar, regardless of weather conditions, in order to ensure that mortar color is consistent.

B. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification, for types of mortar required, unless otherwise indicated.
   1. Limit cementitious materials in mortar to portland cement and lime.
   2. For exterior, above-grade, load-bearing and nonload-bearing walls and parapet walls; for interior load-bearing walls; for interior nonload-bearing partitions, and for other applications where another type is not indicated, use type indicated below:
      a. Type: N.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of unit masonry. Do not proceed with installation until unsatisfactory conditions have been corrected.

B. Examine rough-in and built-in construction to verify actual locations of piping connections prior to installation.

3.2 INSTALLATION, GENERAL

A. Thickness: Build cavity and composite walls and other masonry construction to the full thickness shown. Build single-wythe walls to the actual thickness of the masonry units, using units of thickness indicated.

B. Build chases and recesses to accommodate items specified in this and other Sections of the Specifications.

C. Leave openings for equipment to be installed before completion of masonry. After installing equipment, complete masonry to match construction immediately adjacent to the opening.

D. Cut masonry units with motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide continuous pattern and to fit adjoining construction. Use full-size units without cutting, where possible. Allow units cut with water-cooled saws to dry before placing, unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

E. Mix units for exposed unit masonry from several pallets or cubes as they are placed to produce uniform blend of colors and textures.

F. Wetting of Brick: Wet brick prior to laying if the initial rate of absorption exceeds 30 g/30 sq. in. (g/194 sq. cm) per minute when tested per ASTM C 67. Allow units to absorb the water so they are damp but not wet at the time of laying.

3.3 CONSTRUCTION TOLERANCES

A. Variation from Plumb: For vertical lines and surfaces of columns, walls, and arrises, do not exceed 1/4 inch in 10 feet (6 mm in 3 m), nor 3/8 inch in 20 feet (10 mm in 6 m), nor 1/2 inch in 40 feet (12 mm in 12 m) or more. For external corners, expansion joints, control joints, and other conspicuous lines, do not exceed 1/4 inch in 20 feet (6 mm in 6

m), nor 1/2 inch in 40 feet (12 mm in 12 m) or more. For vertical alignment of head joints, do not exceed plus or minus 1/4 inch in 10 feet (6 mm in 3 m), nor 1/2 inch (12 mm) maximum.

B. Variation from Level: For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines, do not exceed 1/4 inch in 20 feet (6 mm in 6 m), nor 1/2 inch in 40 feet (12 mm in 12 m) or more. For top surface of bearing walls, do not exceed 1/8 inch (3 mm) in 10 feet (3 m), nor 1/16 inch (1.5 mm) within width of a single unit.

C. Variation of Linear Building Line: For position shown in plan and related portion of columns, walls, and partitions, do not exceed 1/2 inch in 20 feet (12 mm in 6 m), nor 3/4 inch in 40 feet (19 mm in 12 m) or more.

D. Variation in Cross-Sectional Dimensions: For columns and thickness of walls, from dimensions shown, do not exceed minus 1/4 inch (6 mm) nor plus 1/2 inch (12 mm).

E. Variation in Mortar-Joint Thickness: Do not vary from bed-joint thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm). Do not vary bed-joint thickness from bed-joint thickness of adjacent course by more than 1/8 inch (3 mm). Do not vary from head-joint thickness indicated by more than plus or minus 1/8 inch (3 mm). Do not vary head-joint thickness from adjacent head-joint thickness by more than 1/8 inch (3 mm). Do not vary from collar-joint thickness indicated by more than minus 1/4 inch (6 mm) or plus 3/8 inch (10 mm).

3.4 MORTAR BEDDING AND JOINTING

A. Lay hollow concrete masonry units as follows:
   1. With full mortar coverage on horizontal and vertical face shells.
   2. Bed webs in mortar in starting course on footings and in all courses of piers, columns, and pilasters, and where adjacent to cells or cavities to be filled with grout.
   3. For starting course on footings where cells are not grouted, spread out full mortar bed, including areas under cells.
   4. Maintain joint widths indicated, except for minor variations required to maintain bond alignment. If not indicated, lay walls with 3/8-inch (10-mm) joints.

B. Lay solid brick-size masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not furrow bed joints or slush head joints.

   1. At cavity walls, slope beds toward cavity to minimize mortar protrusions into cavity. As work progresses, trowel mortar fins protruding into cavity flat against cavity face of brick.

C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.

3.5 STRUCTURAL BONDING OF MULTIWYTHE MASONRY

A. Use individual metal ties installed in horizontal joints to bond wythes together. Provide ties as shown, but not less than 1 metal tie for 4 sq. ft. (0.37 sq. m) of wall area spaced not to exceed 24 inches (610 mm) o.c. horizontally and vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches (305 mm) of openings and space not more than 36 inches (915 mm) apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24 inches (610 mm) o.c. vertically.

B. Use continuous horizontal-joint reinforcement installed in horizontal mortar joints for bond tie between wythes. Install at not more than 16” O.C. vertically

C. Corners: Provide interlocking masonry unit bond in each course at corners, unless otherwise shown.

1. Provide continuity with horizontal-joint reinforcement at corners by using prefabricated "L" units in addition to masonry bonding.

3.6 HORIZONTAL-JOINT REINFORCEMENT

A. General: Provide continuous horizontal-joint reinforcement as indicated. Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch (16 mm) on exterior side of walls, 1/2 inch (13 mm) elsewhere. Lap reinforcing a minimum of 6 inches (150 mm).

1. Space reinforcement not more than 16 inches (406 mm) o.c.

B. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.

C. Provide continuity at corners and wall intersections by using prefabricated "L" and "T" sections. Cut and bend reinforcement units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.7 FLASHING, WEEP HOLES, AND VENTS

A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to the downward flow of water in the wall, and where indicated.

B. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Place through-wall flashing on sloping bed of mortar and cover with mortar. Seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer before covering with mortar.

C. Install flashing as follows:

1. At composite masonry walls, including cavity walls, extend flashing from exterior face of outer wythe of masonry, through the outer wythe, turned up a minimum of 4 inches (100 mm), and through the inner wythe to within 1/2 inch (13 mm) of the

interior face of the wall in exposed masonry. Where interior surface of inner wythe is concealed by furring, carry flashing completely through the inner wythe and turn up approximately 2 inches (50 mm), unless otherwise indicate.

2. At lintels and shelf angles, extend flashing a minimum of 4 inches (100 mm) into masonry at each end. At heads and sills, extend flashing 4 inches (100 mm) at ends and turn up not less than 2 inches (50 mm) to form a pan.
3. Interlock end joints of ribbed sheet-metal flashing by overlapping ribs not less than 1-1/2 inches (38 mm) or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements of Division 7 Section "Joint Sealants" for application indicated.
4. Cut off flashing flush with face of wall after masonry wall construction is completed.

D. Install weep holes in the head joints in exterior wythes of the first course of masonry immediately above embedded flashing and as follows:
1. Form weep holes by keeping head joints free and clear of mortar.
2. Space weep holes 24 inches (600 mm) o.c., unless otherwise indicated.
3. Place cavity drainage material immediately above flashing in cavities.

E. Install reglets and nailers for flashing and other related construction where shown to be built into masonry.

3.8 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or if units do not match adjoining units. Install new units to match adjoining units; install in fresh mortar or grout, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point-up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for application of sealants.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears prior to tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.

2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.

4. Wet wall surfaces with water prior to application of cleaners; remove cleaners promptly by rinsing thoroughly with clear water.

5. Clean brick by bucket and brush hand-cleaning method described in BIA Technical Note No. 20 Revised, using the following masonry cleaner:

    a. Acidic cleaner, applied in compliance with directions of acidic cleaner manufacturer.

6. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2 applicable to type of stain present on exposed surfaces.

E. Protection: Provide final protection and maintain conditions that ensure unit masonry is without damage and deterioration at time of Substantial Completion.

END OF SECTION 048100

STRUCTURAL STEEL – ROOF DUNNAGE / FRAMING

DESCRIPTION

The work covered by this section includes furnishing all equipment, labor, supervision and materials and performing all operations required to remove any existing hardware such as nuts, washers, bolts, screws, structural steel shapes such as plates, clip angles, dunnage member's beams, columns, etc.

Providing and installing new structural steel members such as I-Beams, channels, columns, angles, clip angles, plates, etc. associated with constructing new and/or modifying - reconstructing steel dunnage supports for five (5) roof top mounted Heating and Ventilating Units at AC2A, AC2B, AC6, ACC 5A / 5B and RTU2.

Providing and installing new structural steel members for one (1) through the wall structural steel support within a metal panel wall system including steel plates, channels, and associated hardware and welding.

The Contractor shall be responsible for coordinating with the HV Equipment manufacturer for all methods and details for securement of the mechanical equipment to the prefabricated equipment curbs and or the new structural steel dunnage for each of the rooftop units and shall submit the methods of attachment along with supporting structural calculations validating the proposed connection within the Submittal Package for Design Engineers Approval.

All structural steel work for project is as shown on the contract plans, as specified herein and as directed by the Design Engineer and the assigned Project Coordinator.

MATERIALS:

All applicable provisions of Section 564 – "Structural Steel" of the New York State Department of Transportation Standard Specification shall apply except as otherwise modified herein. The Hot Dipped Galvanizing of shapes such as steel angles, channels, columns, WF beams, plates etc. shall conform with A.S.T.M. A123 / ASTM. A153. All hardware plates / angles / channels, including bolts, washers, nuts, etc. shall be hot dipped galvanized, properly prepared for one (1) prime coat and two (2) finish coats of high performance paint to match the colors of adjacent materials, unless noted otherwise. All plates / angles / channels shall be pre-drilled prior to receiving hot dipped galvanizing protection. Under this Contract Stainless Steel hardware has been shown on the drawing, Stainless Steel hardware shall be Grade 316. The Contractor shall in addition to coating hot dipped galvanized steel plates / angles / channels shall also provide insulating / separation rubber washer as a barrier between stainless steel and coated galvanized contact surfaces.

STRUCTURAL STEEL – ROOF DUNNAGE / FRAMING

MATERIALS: (Cont'd.)

Dunnage Steel Shapes:	include W8 x 15 Beams, C4 x 5.4 Channels, ¼" & ½" Thick Steel Plates, HSS 4x4x1/4" Columns, 3"x3"x1/4"Angles, 3-1/2"x 3-1/2"x 1/4" Angles, 5"x 3" x ¼" Clip Angles, Rolled Shapes to be A.S.T.M. A-572 Grade 50, Plates to be A.S.T.M. A-36
Galvanized Hardware	½" & ¾" diameter bolts, washers, & retaining nuts, Galvanizing as per ASTM 153, Grade A325 U.O.N.
Stainless Steel Hardware	¼" diameter bolts, lock washers, bevel washers & retaining nuts Grade 316
Through Wall Support:	1/8" thick plates 6" x 18", 6 x 24"
Stainless Steel Hardware	¼" diameter bolts, lock washers, bevel washers & retaining nuts Grade 316

CONSTRUCTION DETAILS

Care shall be taken by the Contractor during any steel dunnage & hardware removal so as not to damage the remaining steel framing members, roof decking, metal wall assembly, roofing assembly, and any and all adjacent utilities, building finishes, etc. The Contractor shall bring to the attention of the Engineer any locations where the removals of existing steel members and /or hardware will result in damage to the remaining building components and will proceed as per the Design Engineer and assigned Project Coordinators direction and approval.

The Contractor shall proceed with the work under the structural steel for HV Roof Dunnage and Wall Support Steel only with the prior Design Engineer's approval for the recommended work sequence.

All structural steel work will include preliminary inspection of all steel framing impacted by the proposed new or reconstruction work such as visual or temporary physical destructive removal of building components to gather all necessary information to prepare shop drawings for approvals, fabrication of steel such cutting, drilling, hot dip galvanizing, transportation and any off and on site erection shall be done in accordance with provisions of the latest SCM (Steel Construction Manual-NYSDOT).

The Contractor shall take note that prior to any physical work or deliveries of any kind being conducted on the Central Maintenance Facility Building and Grounds that the Liberty Operations Facility Managers will be properly notified in advance of all contractor inspection or construction work will taking place. As the overall Operation of the Facility directly impacts the General Public it is the utmost importance that this Transportation Operation continues to Operate without any negative impact to Bus Maintenance and Operation.

STRUCTURAL STEEL – ROOF DUNNAGE / FRAMING

SUBMITTALS

Shop Drawings: The Contractor shall submit a complete set of shop drawings to the Design Engineer that show the plan / assembly including members identified, details, procedures and diagrams showing the proposed sequence of onsite erection. The submitted shop drawings shall be signed and sealed by a New York State Licensed Professional Engineer.

The shop drawing(s) shall include complete information for the fabrication and / or on site field erection of all the structural dunnage components. The drawing shall include the locations, size of bolts, connections, camber, holes, member shapes sizes and lengths and other pertinent data. The drawing must show the welding conforming to the standard AWS notations and symbols, indicating type weld, widths, lengths.

The Shop Drawing Submittal shall include related product data for the

Manufacturer's specifications for connecting hardware products:
High Strength Bolts of all types and shall include washers, retaining nuts.
Welding electrode and rods.

The submittal shall include all informational certificates:
Fabricator AISC Quality Certification
Welders Certifications
Structural Steel of each shape shall include certified mill reports indicating chemical and physical properties
High Strength bolts, washers and retaining nuts of each type

DELIVERY, STORAGE AND HANDLING;

Delivery: The Contractor must have his own personnel on site to accept the delivery of materials and again must coordinate the same with the Project Coordinator, giving the Facility Operators seven (7) days' notice of the same. Please see storage below.

Storage: The Contractor shall note that storage space within the Central Maintenance Facility is extremely limited. The Contractor for the purpose of bidding shall assume that all equipment and materials we be brought onto site and removed from the site on a daily basis.

Handling: The Contractor shall be responsible for the handling of all contract related materials, including lifting of all materials onto the roof and or skating the same across the existing roof.

The Contractor shall be cautioned that there are on-going projects occurring which will or may impact the ease or freedom of mobility and holding areas on the current roof levels.

STRUCTURAL STEEL – ROOF DUNNAGE / FRAMING

DELIVERY, STORAGE AND HANDLING; (Cont'd.)

Handling: (Cont'd.)

Please note, there is an ongoing contract involving the installation of elevated piping primarily in the areas of Proposed HV Units AC2A and ACC 5A/5B as well as proposed Solar Panels to be installed throughout the roof.

ERECTION / ASSEMBLY:

General:

The Contractor may be assembling or erecting the structural steel dunnage assemblies completely on site and shall do so in accordance with AISC, Steel Construction Manual 325 or the SCM-NYSDOT, Approved Shop Drawings and Contract Documents.

The Contractor shall have components marked and should the match mark materials for field assembly. The materials then when lifted to and placed within the fabrication location should expedite erection and handling of materials.

The Contractor shall set steel dunnage members accurately to the dimensions and elevations as shown on the approved shop drawings.

The Contractor shall be responsible for aligning and adjusting the new or proposed steel support and or reinforcing members with the existing steel framing members and shall perform all necessary field adjustments to compensate for any minor discrepancies in the elevations and alignment of new steel members.

All new steel members such as WF Beams, Channels, Clip Angles, Plates, etc. must be set level and plumb conforming within the approved tolerances of the AISC 325.

All bolted connections shall comply with the AISC 325.

Where necessary the Contractor will be responsible for providing all materials and methods associated for temporarily supporting the new steel members in place so as to be able to properly bolt or weld the connections.

Where field welding and on site marring of material may or will require on site finishing or refinishing touch-up to render materials free of markings, burrs or defects wherever possible. The Project Coordinator will represent the County in determining the finished product as assembled is acceptable to the Owner.

STRUCTURAL STEEL – ROOF DUNNAGE / FRAMING

Connections:

All bolted and welded connections shall be visually inspected by the project coordinator. Where the Project Coordinator and Design Engineer question the integrity of either a bolted or welding connection the County may engage the services of an independent certified testing and inspection agency to inspect the bolted or welded connection.

If the connection(s) are found to be unacceptable or deficient the Contractor will be responsible for payment to the inspection agency and for correcting the improper workmanship. The same may include the removal, replacement for correcting the improper workmanship as instructed by the Design Engineer.

Connections: (Cont'd.)

The Contractor will also be responsible for payment of all subsequent or follow-up inspection and testing of the corrected connections to confirm the integrity of the corrective bolted or welded connection.

Touch-Up Finish:

Where the galvanized finish of steel members has been partially removed do to handling of steel members, preparation of connections such as may be required for drilling bolt holes or grinding of the finish and marring the protective finish the Contractor will be responsible for touching up the protective galvanizing by cleaning all field welds, bolted connections and damaged or abraded surfaces of the shop applied protective coating.
Restoration of the protective coating shall include applying two (2) coats of zinc rich paint such as ZRC Cold Galvanizing Compound containing 95% or the maximum zinc enriched paint conforming to Westchester County Health Department / Local V.O.C. restrictions compliant. The Contractor shall submit the ZRC product technical cut sheets and Materials Safety Data Sheets for Engineering Approval.

MEASUREMENT AND PAYMENT

The amount to be paid for under the New structural steel work will be for the lump sum price bid for all the associated work made to successfully complete the installation of the new structural steel members as outlined under DESCRIPTION heading, all in accordance with the contract drawings, specifications or as ordered by the Project Coordinator / Design Engineer.

CONTRACT NO. 22-524

DIVISION 6-WOOD AND PLASTIC

SECTION 061053 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Wood blocking, nailers.

B. Related Requirements:

   1. Division 07 Section "Platinum EPDM Roofing."

1.3 DEFINITIONS

A. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.

B. Lumber grading agencies, and the abbreviations used to reference them, include the following:

   1. NeLMA: Northeastern Lumber Manufacturers' Association.
   2. NHLA: National Hardwood Lumber Association.
   3. NLGA: National Lumber Grades Authority.
   4. SPIB: The Southern Pine Inspection Bureau.
   5. WCLIB: West Coast Lumber Inspection Bureau.
   6. WWPA: Western Wood Products Association.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

   1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.

2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
5. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

B. LEED Submittals:

1. Certificates for Credit MR 6: Chain-of-custody certificates indicating that products specified to be made from certified wood comply with forest certification requirements. Include documentation that manufacturer is certified for chain of custody by an FSC-accredited certification body. Include statement indicating cost for each certified wood product.

1.5 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For the following, from ICC-ES:

1. Preservative-treated wood.
2. Power-driven fasteners.
3. Powder-actuated fasteners.
4. Expansion anchors.
5. Metal framing anchors.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Certified Wood: Lumber shall be produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."

B. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.

C. Maximum Moisture Content of Lumber: 19 percent for 2-inch nominal thickness or less, unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC3b for exterior construction not in contact with the ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat items indicated on Drawings, and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.

2.3 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.

B. For concealed boards, provide lumber with 19 percent maximum moisture content and any of the following species and grades:

1. Mixed southern pine, No. 2 grade; SPIB.
2. Hem-fir or hem-fir (north), Construction or No. 2 Common grade; NLGA, WCLIB, or WWPA.
3. Spruce-pine-fir (south) or spruce-pine-fir, Construction or No. 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
4. Eastern softwoods, No. 2 Common grade; NELMA.
5. Northern species, No. 2 Common grade; NLGA.
6. Western woods, Construction or No. 2 Common grade; WCLIB or WWPA.

C. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

2.4 PLYWOOD

A. Treated Plywood: DOC PS 1, Exterior, AC, thickness as noted on drawing details.

2.5 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners of Type 304 stainless steel.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: NES NER-272.

D. Wood Screws: ASME B18.6.1.

E. Screws for Fastening to Metal Framing: ASTM C 1002, ASTM C 954, length as recommended by screw manufacturer for material being fastened.

F. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).

G. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

H. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

1. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 (ASTM F 738M and ASTM F 836M, Grade A1 or A4).

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.

B. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

C. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

D. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. NES NER-272 for power-driven fasteners.
2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.

3.2 WOOD BLOCKING, AND NAILER INSTALLATION

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

3.3 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061053

CONTRACT NO. 22-524

DIVISION 7 – THERMAL AND MOISTURE PROTECTION

SECTION 07 25 00 - WEATHER BARRIERS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Weather barrier membrane for masonry infill at removal of through-the-wall air conditioning unit in Computer room, 2nd Floor.

B. Weather barrier membrane (DuPont™ Tyvek® HomeWrap®)

C. Seam Tape (DuPont™ Tyvek® Tape)

D. Flashing (DuPont™ FlexWrap™, DuPont™ FlexWrap™ NF, DuPont™ StraightFlash™, DuPont™ StraightFlash™ VF, and/or DuPont™ Thru-Wall Flashing)

E. Fasteners (DuPont™ Tyvek® Wrap Caps)

1.2 REFERENCES

A. ASTM International

1. ASTM C920; Standard Specification for Elastomeric Joint Sealants
2. ASTM C1193; Standard Guide for Use of Joint Sealants
3. ASTM D882; Test Method for Tensile Properties of Thin Plastic Sheeting
4. ASTM D1117; Standard Guide for Evaluating Non-woven Fabrics
5. ASTM E84; Test Method for Surface Burning Characteristics of Building Materials
6. ASTM E96; Test Method for Water Vapor Transmission of Materials
7. ASTM E1677; Specification for Air Retarder Material or System for Framed Building Walls
8. ASTM E2178; Test Method for Air Permeance of Building Materials

B. AATCC – American Association of Textile Chemists and Colorists

1. Test Method 127 Water Resistance: Hydrostatic Pressure Test

C. TAPPI

1. Test Method T-410; Grams of Paper and Paperboard (Weight per Unit Area)
2. Test Method T-460; Air Resistance (Gurley Hill Method)

1.3 SUBMITTALS

A. Refer to Section 013300 Submittal Requirements.

B. Product Data: Submit manufacturer current technical literature for each component.

C. Samples: Weather Barrier membrane, minimum 8-1/2 inches by 11 inch.

D. Quality Assurance Submittals

1. Manufacturer Instructions: Provide manufacturer’s written installation instructions.

1.4 QUALITY ASSURANCE

A. Qualifications

1. Installer shall have experience with installation of similar weather barrier assemblies under similar conditions.
2. Installation shall be in accordance with manufacturer's installation guidelines and recommendations.
3. Source Limitations: Provide weather barrier and accessory materials produced by single manufacturer.

1.5 DELIVERY, STORAGE AND HANDLING

A. Refer to Section [01 60 00 Product Requirements] [insert section number and title].

B. Deliver weather barrier materials and components in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Store weather barrier materials as recommended by system manufacturer.

1.6 SCHEDULING

A. Review requirements for sequencing of installation of weather barrier assembly with installation of windows, doors, louvers and flashings to provide a weather-tight barrier assembly.

PART 2 – PRODUCTS

2.1 MANUFACTURER

A. DuPont; 4417 Lancaster Pike, Chestnut Run Plaza 728, Wilmington, DE 19805; 1-800-44-TYVEK (8-9835); http://www.construction.tyvek.com

2.2 MATERIALS

A. Basis of Design: spunbonded polyolefin, non-woven, non-perforated, weather barrier is based upon DuPont™ Tyvek® HomeWrap® and related assembly components.

B. Performance Characteristics:

1. Air Penetration: <.004 cfm/ft^2 at 1.57 psf, when tested in accordance with ASTM E2178. Type I per ASTM E1677.
2. Water Vapor Transmission: 56 perms, when tested in accordance with ASTM E96-05, Method A.
3. Water Penetration Resistance: 250 cm when tested in accordance with AATCC Test Method 127.
4. Basis Weight: 1.8 oz/yd^2, when tested in accordance with TAPPI Test Method T-410.

5. Air Resistance: 1200 seconds, when tested in accordance with TAPPI Test Method T-460.
6. Tensile Strength: 30/30 lbs/in., when tested in accordance with ASTM D882.
7. Tear Resistance: 8/6 lbs, when tested in accordance with ASTM D1117.
8. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E84. Flame Spread: 15, Smoke Developed: 15

2.3 ACCESSORIES

A. Seam Tape: [2] [or] [3] inch wide, DuPont™ Tyvek® Tape as distributed by DuPont Building Innovations.

B. Fasteners:

1. DuPont™ Tyvek® Wrap Cap Screws, as distributed by DuPont: 1-5/8 inch rust resistant screw with 2-inch diameter plastic cap or manufacturer approved 1-1/4” or 2” metal gasketed washer.

C. Sealants

1. Refer to Section [07 92 00 Joint Sealants] [insert section number and title].

OR

2. Provide sealants that comply with ASTM C 920, elastomeric polymer sealant to maintain watertight conditions.
3. Products:
   b. DuPont™ Commercial Sealant
   c. Sealants recommended by the weather barrier manufacturer.

D. Adhesive:

1. Provide adhesive recommended by weather barrier manufacturer.

E. Primer:

1. Provide flashing manufacturer recommended primer to assist in adhesion between substrate and flashing.

F. Flashing

1. DuPont™ FlexWrap™, as distributed by DuPont: flexible membrane flashing materials for window openings and penetrations.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify substrate and surface conditions are in accordance with weather barrier manufacturer recommended tolerances prior to installation of weather barrier and accessories.

3.2 INSTALLATION – WEATHER BARRIER

A. Install weather barrier over exterior face of exterior wall substrate in accordance with manufacturer recommendations.

B. Start weather barrier installation at a building corner, leaving 6-12 inches of weather barrier extended beyond corner to overlap.

C. Install weather barrier in a horizontal manner starting at the lower portion of the wall surface. Maintain weather barrier plumb and level.

D. Extend bottom roll edge over sill plate interface 2” to 3” minimum. Seal weather barrier with sealant or tape. Shingle weather barrier over back edge of thru-wall flashings and seal weather barrier with sealant or tape. Ensure weeps are not blocked.

E. Subsequent layers shall overlap lower layers a minimum of 6 inches horizontally in a shingling manner.

F. Window and Door Openings: Extend weather barrier completely over openings.

G. Weather Barrier Attachment:

1.

AND/OR

2. Attach weather barrier to masonry. Secure using weather barrier manufacturer recommended fasteners, spaced 12 -18 inches vertically on center and 24 inches maximum horizontally. Weather barrier may be temporarily attached to masonry using recommended adhesive, placed in vertical strips spaced 24 inches on center, when coordinated on the project site. Use cladding fasteners as permanent means of attachment.

H. Apply 4 inch by 7 inch piece of DuPont™ StraightFlash™ or weather barrier manufacturer approved alternate to weather barrier membrane prior to the installation cladding anchors.

3.3 SEAMING

A. Seal seams of weather barrier with seam tape at all vertical and horizontal overlapping seams.

B. Seal any tears or cuts as recommended by weather barrier manufacturer.

3.4 OPENING PREPARATION (for use with flanged windows)

A. Cut weather barrier in an “I-cut” pattern. A modified I-cut is also acceptable.

1. Cut weather barrier horizontally along the bottom and top of the window opening.
2. From the top center of the window opening, cut weather barrier vertically down to the sill
3. Fold side and bottom weather barrier flaps into window opening and fasten.

B. Cut a head flap at 45-degree angle in the weather barrier membrane at window head to expose 8 inches of sheathing. Temporarily secure weather barrier membrane flap away from sheathing with tape.

3.5 FLASHING

A. Cut [7-inch] [9-inch] wide DuPont™ FlexWrap™ a minimum of 12 inches longer than width of sill rough opening. Apply primer as recommended by the manufacturer.

B. Cover horizontal sill by aligning DuPont™ FlexWrap™ edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs.

C. Fan DuPont™ FlexWrap™ or DuPont™ FlexWrap™ NF at bottom corners onto face of wall. Firmly press in place. Mechanically fasten fanned edges. Mechanical fastening is not required for DuPont™ FlexWrap™ NF.

D. On exterior, apply continuous bead of sealant to wall or backside of window mounting flange across jambs and head. Do not apply sealant across sill.

E. Install window according to manufacturer's instructions.

F. Apply 4-inch wide strips of DuPont™ StraightFlash™ at jambs overlapping entire mounting flange. Extend jamb flashing 1-inch above top of rough opening and below bottom edge of sill flashing.

G. Apply 4-inch wide strip of DuPont™ StraightFlash™ as head flashing overlapping the mounting flange. Head flashing should extend beyond outside edges of both jamb flashings.

H. Position weather barrier head flap across head flashing. Adhere using 4-inch wide DuPont™ StraightFlash™ over the 45-degree seams.

I. Tape head flap in accordance with manufacturer recommendations.

J. On interior, install backer rod in joint between frame of window and flashed rough framing. Apply sealant around entire window to create air seal. Apply sealant in accordance with sealant manufacturer's instructions and ASTM C1193.

3.6 THRU-WALL FLASHING INSTALLATION

A. Apply primer per manufacturer's written instructions.

B. Install preformed corners and end dams bedded in sealant in appropriate locations along wall.

C. Starting at a corner, remove release sheet and apply membrane to primed surfaces in lengths of 8 to 10 feet.

D. Extend membrane through wall and leave ¼ inch minimum exposed to form drip edge.

E. Roll flashing into place. Ensure continuous and direct contact with substrate.

F. Lap ends and overlap preformed corners 4 inches minimum. Seal all laps with sealant.

G. Trim exterior edge of membrane 1-inch and secure metal drip edge per manufacturer's written instructions.

3.12 PROTECTION

A. Protect installed weather barrier from damage.

END OF SECTION

CONTRACT NO. 22-524

DIVISION 7-THERMAL AND MOISTURE PROTECTION

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Clauses and Special Clauses of the Contract apply to this Section.

1.2 SUMMARY

A. This Section includes sheet metal flashing and trim in the following categories:

1. Manufactured Products:
   a. Manufactured reglets and counterflashing.

2. Formed Products:
   a. Formed low-slope roof sheet metal fabrications.

B. Related Sections:

1. Division 06 Section "Miscellaneous Rough Carpentry" for wood nailers, curbs, and blocking.
2. Division 07 Section "Joint Sealants" for installing sheet metal flashing and trim integral with roofing.
3. Division 7 Section 075323 “Rubbergard Platinum EPDM Roofing System, Firestone Building Products, Inc.” for installing sheet metal flashing and trim integral with roofing membrane.

1.3 PERFORMANCE REQUIREMENTS

A. General: Install sheet metal flashing and trim to withstand thermally induced movement, and exposure to weather without failing.

1.4 SUBMITTALS

C. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

D. Shop Drawings: Show fabrication and installation layouts of sheet metal flashing and trim, including plans, elevations, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experience Installer who has completed sheet metal flashing and trim work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

E. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings.

1.6 PROJECT CONDITIONS

A. Coordinate Work of this Section with interfacing and adjoining Work for proper sequencing of each installation. Ensure best possible weather resistance, durability of Work, and protection of materials and finishes.

PART 2 – PRODUCTS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.

B. Copper Sheet: ASTM B 370, cold-rolled copper sheet, H00 or H01 temper.

1. Non-Patinated Exposed Finish: Mill.

C. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304, dead soft, fully annealed.

1. Finish: 2D (dull, cold rolled).
2. Surface: Smooth, flat.

1.2 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal[**or manufactured item**] unless otherwise indicated.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.

1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.

    a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating.
    b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
    c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.

2. Fasteners for Copper Sheet: Copper, hardware bronze or Series 300 stainless steel.
3. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.

C. Solder:

1. For Copper: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.
2. For Stainless Steel: ASTM B 32, Grade Sn60, with an acid flux of type recommended by stainless-steel sheet manufacturer.

D. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.

E. Elastomeric Sealant: ASTM C 920, elastomeric, polyurethane, silicone or polymer sealant; low modulus; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

H. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.

I. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

1.3 MANUFACTURED SHEET METAL FLASHING AND TRIM

A. Reglets: Units of type, material, and profile indicated, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing

indicated with factory-mitered and -welded corners and junctions with interlocking counterflashing on exterior face, of same metal as reglet.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following but are not limited to, the following:
   a. Fry Reglet Corporation.

2. Material: Stainless steel, 0.019 inch thick.
3. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
4. Masonry Type: Provide with offset top flange for embedment in masonry mortar joint.

5. Finish: Mill.

1.4 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.

1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
2. Obtain field measurements for accurate fit before shop fabrication.
3. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.

B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

C. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

D. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant.

E. Expansion Provisions: Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.

F. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

G. Fabricate cleats and attachment devices of sizes as recommended by SMACNA's "Architectural Sheet Metal Manual" and by FMG Loss Prevention Data Sheet 1-49 for application, but not less than thickness of metal being secured.

H. Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.

I. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.

J. Do not use graphite pencils to mark metal surfaces.

1.5 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

A. Roof and Roof to Wall Transition Flashing: Fabricate from the following materials:

1. Copper: Thickness as indicated.

PART 2 - EXECUTION

2.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of the Work.

1. Verify compliance with requirements for installation tolerances of substrates.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

2.2 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
3. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
4. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
5. Install sealant tape where indicated.
6. Torch cutting of sheet metal flashing and trim is not permitted.
7. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of **10 feet** with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.

D. Seal joints as shown and as required for watertight construction.

1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

E. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches, except reduce pre-tinning where pre-tinned surface would show in completed Work.

1. Do not solder metallic-coated steel and aluminum sheet.

2. Pre-tinning is not required for zinc-tin alloy-coated stainless steel and zinc-tin alloy-coated copper.
3. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.

2.3 ROOF FLASHING INSTALLATION

A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in SMACNA's "Architectural Sheet Metal Manual" and as indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch centers.

C. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at 16-inch centers.

D. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints a minimum of 4 inches and bed with sealant. Secure in a waterproof manner by means of snap-in installation and sealant or lead wedges and sealant.

E. Copings: Anchor to resist uplift and outward forces according to recommendations in SMACNA's "Architectural Sheet Metal Manual" and as indicated.

1. Interlock exterior bottom edge of coping with continuous cleat anchored to substrate at 24-inch centers.
2. Anchor interior leg of coping with washers and screw fasteners through slotted holes at 24-inch centers.

2.4 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

B. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

2.5 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder.

C. Clean off excess sealants.

D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of installation, remove unused materials and clean finished surfaces. Maintain in a clean condition during construction.

E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 076200

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

RELATED DOCUMENTS

Drawings and General Provisions of the Contract, including information for Bidders, General Clauses and Division 1, General Requirements apply to this Section.

1.2 SUMMARY

A. The work of this Section consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all caulking and sealing work for this project as required by the schedules, keynotes and drawings, including, but not limited to the following:

NOTE: Sealant supplier shall perform a "bond" test on all substrates to determine adhesion properties and requirement, if any, for primer application; coordinate with Article 1.05 herein.

1. Provide sealant systems in all joints between dissimilar materials on building exterior as indicated and/or required to obtain water and air tight seals; using the following material types for respective locations.
2. Provide building to building expansion joint system – seismic design using compressible, color seal joint system; carry same up and over coping juncture.
3. Provide expansion and/or control joint sealant systems within masonry (coordinate with Section 04 20 00 – work to be accomplished as part of these operations) -Type I OR II material with Type III backer system OR, at option of Contractor, DOUBLE SEAL system with internal rod using product similar and equal to #150.
4. Provide all interior joints between dissimilar materials as indicated or required to insure positive seals

Door frames	VI
Window surrounds	VI
Plumbing fixtures	II
Sound integrity	VI, Exposed; V, Concealed
Water penetration	II
Light seals	VI
Mill & counter work	VI, Dry; II for Wet

NOTE: Sealants are generally required at the following locations:

a. Interior door frames to surrounding face construction;
b. Interior window trim/reveals to window frames;
c. Plumbing fixtures and accessories where same abut finished surfaces;
d. **Where gypsum wall board is in contact with concrete slabs, walls and columns (tops, bottoms and sides)**

e. ***Where concrete block is in contact with concrete slabs, walls and columns (tops, bottoms and sides)***
f. ***At fire rated gypsum partition systems (coordinate with Section 9)***
and like locations where dissimilar materials about each other in finished areas.

5. Perform balance of caulking and sealing as may be necessary and/or required to insure conformance to guarantee/warranty provisions contained herein.

1.3 RELATED WORK SPECIFIED ELSEWHERE -Entire Project Specification

A. Bond testing shall be performed as noted in Paragraph 1.02.A above and results submitted to Architect for file.

B. All surfaces to receive sealant shall be dry and cleaned of all foreign matter as specified in Part 3.

C. Application devices shall have nozzles of proper size and shall provide sufficient pressure to completely fill joints as detailed.

D. Consult sealant manufacturer for recommendations for application of sealant when air temperature is below 40°F. Provide written recommendation to Architect prior to application.

E. Sealants shall comply with VOC requirements of the Jurisdiction of the Work, or in absence of said regulation, all material shall comply with the following as applicable for particular application and shall **not** contain or be formulated with aromatic solvents, halogenated solvents, fibrous talc or asbestos, formaldehyde, mercury, lead, cadmium, hexavalent chromium or their derivatives.

F. Reference Standards
1. ASTM C 834 -Latex Sealing Compounds
2. ASTM C 919 – Standard Practice for Use of Sealants in Acoustical Applications
3. ASTM C 920 -Elastomeric Joint Sealants
4. ASTM C 1193 -Standard Guide for Use of Joint Sealants
5. ASTM C 1311 – Solvent Release Sealants
6. ASTM C 1330 – Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants
7. ASTM C 1401 – Standard Guide for Structural Sealant Glazing
8. ASTM C 1481 – Standard Guide for Use of Joint Sealants with Exterior Insulation and Finish Systems (EFIS)
9. ASTM D 1056 -Flexible Cellular Materials, Sponge or Expanded Rubber.
10. SWRI (Sealant, Waterproofing and Restoration Institute) Sealant and Caulking Guide Specification

1.4 SUBMITTALS

Provide documentation of manufacturer’s take-back programs for products provided under this Section.

A. Product Data indicating for each type of sealant and component used in this work - chemical characteristics; performance criteria; substrate preparation; limitations; color availability; and the like affecting the use of each product.

B. Samples of all components to be used in the work of this section

C. Color charts for selection.

D. Manufacturer's installation instructions indicating, if any, special procedures; surface preparation; perimeter conditions requiring special attention; and like items affecting installation of each product.

E. Results of bond tests shall be incorporated in installation recommendations.

F. Certification of specification compliance.

G. Manufacturers Material Safety Data Sheet (MSDS) must be submitted for each manufactured product.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver products in original factory packaging bearing identification of product, manufacturer, and batch number. Provide Material Safety Data Sheets for each product.

B. Store products in a location protected from freezing, damage, construction activity, precipitation, and direct sunlight in strict accordance with manufacturer's recommendations.

C. Condition products to approximately 60 to 70 degrees F (16 to 21degrees C) for use in accordance with manufacturer's recommendations.

D. Handle all products with appropriate precautions and care as stated on Material Safety Data Sheet.

1.6 QUALITY CONTROL

A. Preconstruction Sealant Tests for Adhesion and Compatibility: Submit sealant samples for each material to be sealed in the work including, but not limited to metal flashing, painted wood at windows, glazing gaskets, glazing materials, framing members, masonry and stone of each type used, and all other components and accessories, to sealant manufacturer to verify sealant compatibility and to determine, by testing in compliance with ASTMC 794, as well as the type of primer required for each condition tonsure sealant adhesion to substrates.

1. Cost of Testing: The sealant manufacturers shall perform and/or the Contractor shall, at his own expense employ an independent testing agent acceptable to the Architect to perform tests and certifications indicated. No costs shall be passed to the Owner.

2. Test Samples: Submit to the testing agency or sealant manufacturer at least 5 pieces of each type, finish, kind, condition, and form of material to which sealant is to be attached.
3. Scheduling: Scheduling sufficient time for testing, analysis, and reporting of results.
4. Test Reports and Recommendations: Obtain written reports and recommendations regarding proper sealant material, primer, and application for each condition. Use sealants and substrates only in combinations for which favorable adhesion and compatibility results have been obtained.

B. Construction Sealant Adhesion Tests shall be performed as specified under "Field Quality Control" in Part 3 of this Section.

1.7 SPECIAL GUARANTEE/ WARRANTY TERMS

A. This Contractor shall guarantee that caulking and sealing work will be free from defects of materials and workmanship for 2 years from the date of final acceptance of this work.

B. The following types of failure will be adjudged defective work: leakage, hardening, chalking, crumbling, melting, shrinking or running of caulking; or staining of adjacent work by caulking.

C. Repair and replace work which becomes defective during the guarantee term, without cost to the Owner.

1.8 SUSTAINABILITY

A. In the selection of the products and materials of this section as well as for the entire project, preference will be given to those with the following characteristics:
1. Water based
2. Water-soluble
3. Can be cleaned up with water
4. Non-flammable
5. Biodegradable
6. Low or preferably no Volatile Organic Compound (VOC)
7. Manufactured without compounds that contribute to ozone depletion in the upper atmosphere
8. Manufactured without compounds that contribute to smog in the lower atmosphere
9. Do not contain methylene-chloride
10. Do not contain chlorinated hydrocarbons
11. Contains the least possible of post-consumer or postindustrial waste

PART 2- PRODUCTS

2.1 GENERAL

A. Joint primer, sealer and/or conditioner shall be as recommended byte sealant manufacturer

B. Preformed joint filers shall be no staining compatible with sealant and primer, and of a resilient nature and shall be one of the following:
   1. Expanded Polyethylene Joint Filler (for existing joints) Flexible, compressible, closed-cell polyethylene of not less than 10 psi compression deflection (25%)

C. Backer Rod for General Vertical Use: ASTM C 1330, Types B or C, rod stock closed cell polyethylene foam, closed cell neoprene foam, or open cell urethane foam, as recommended by sealant manufacturers being compatible both with the sealant used and the primer.

D. Closed Cell Neoprene Joint Filler for all joint systems within stucco systems as specified in Section 09 24 00 -ASTM D 1056, Class SCE41 similar and equal to Williams Products "Expand-O-Foam “cord.

E. Accessory Items:
   1. Bond Breaker Tape -Polyethylene or other plastic tape as recommended by the sealant manufacturer; non-bonding to sealant; self-adhesive where applicable; thickness, minimum 0.012 inch.
   2. Cleaning Solvents -Oil free solvents as recommended by the sealant manufacturer. Do not use reclaimed solvents
   3. Masking Tape -Removable paper or fiber tape, self-adhesive, non-staining.
   4. Materials impregnated with oil, bitumen or similar materials shall not be used.

F. Sealant Colors
   1. Exposed materials, provide color as indicated or, if not indicated, as selected by the Architect from manufacturer’s standard colors.
   2. Concealed materials provide the natural color which has the best overall performance characteristics.

2.2 MATERIAL TABLE

NOTE: At the Contractors’ option, a “Silyl-Terminated Polyether” compound as manufactured by Sonneborn/ Degussa Admixtures under the name “Sonolastic 150” or “ProSil^{sct}1” by Pecora acceptable for use in lieu of Type I and Type II materials as specified below.

A. Sealant materials shall be as follows and shall relate to scope of work described herein and shall form a general material reference for all sections performing sealant operations. Backer systems shall be as specified in Paragraph 2.01 above and as suitable for intended substrate and joint conditions.

B. Type -I (For use in vertical expansion joints where extensive movement occurs and for general exterior sealant operations.)

   Sealant compound -2 component non-sag Polyurethane similar and equal to:
   1. Tremco (Dymeric 240/240FC)
   2. Sonneborn (Sonolastic NP2)

3. Pecora (Dynatrol II)

C. Type -II -GENERAL (For use in vertical expansion joints where extensive movement occurs and for general exterior sealant operations.)

Sealant compound -1 part, low-modulus silicone sealant similar and equal to:
1. Dow Corning (795)
2. General Electric (Silpruf)
3. Pecora (864)
4. Sonneborn (Omniseal)
5. Tremco (Spectrem 1 or 2 as suitable for intended application)

Backing -Type "A" backer rod as per Paragraph 2.01.C above for general use and Type III sealant for moving joints.

D. Type -IIA -GLAZING SYSTEMS

Sealant compound -Silicone rubber of design recommended by the manufacturer for the intended application and similar and equal to:
1. General Electric -SSG 4000 OR 4200 Structural Glazing Sealant; 3211 or 3103 Insulating Glass Sealant; 2000 Weather Seal.
2. Dow Corning – 795, 895, 983 or 995 as suitable for encountered conditions.
3. Tremco Inc.– Tremco Proglaze SG or Spectrem 2 Structural Glazing Sealant; Tremco Proglaze II Insulation Glass Sealant.
4. Pecora #895 or other suitable combination as recommended by the nominated manufacturer of the overall window/curtain wall assembly.

E. Type -III (For use as a primary sealant expansion joint systems and as backup to Type II material for aesthetic affect; horizontal deck sealants and other such applications as may be noted on the drawings.)

Sealant compound -Compressible, polyurethane sponge

MANUFACTURERS:
First List, Primary Sealant; Second List, Backer Seal
1. Emseal USA, Inc. (Emseal precompressed, sheathed)
2. WillSeal USA (Willseal 600)
3. Tremco (illmod 600)

OR

1. Emseal USA, Inc. (BackerSeal precompressed, sheathed)
2. WillSeal, USA (Willseal)
3. Tremco (illmod)
4. Polytite Manufacturing (Polytite B)

F. Type -IV (For use in connection with roofing, flashing and waterproofing work)

Sealant compound -Single component non-sag Polyurethane similar and equal to:
1. Tremco(Vulkem-116)

2. Sonneborn (Sonolastic NP1)
3. Sika Chemical Company (Sikaflex -1a)
4. Tremco (Dymonic)
5. Pecora (Dynatrol II-SG)

G. Type -V (For use in acoustical sealing operations)

Sealant compound -Butyl Rubber or Latex Base for developing acoustical requirements specified. Material shall be similar and equal to:

1. Pecora (BA-98)
2. W.W. Henry (313)
3. U.S. Gypsum (Acoustical Sealant)
4. Tremco (Acoustical Sealant)

H. Type -VI (For interior sealant systems around door frames, window reveals and like locations in painted surfaces)

Sealant compound -Acrylic Latex or Paintable Silicone material of suitable nature similar and equal to that as manufactured by Tremco, DAP/USG, Dow Corning, or Pecora Backing -as required.

Color -Grey or white for paint

I. Type -VII – Fire Rated Caulking compound for bedding and/or sealing of joints in rated gypsum wall systems shall be similar and equal to: "AC20 – FTR" by Pecora; "Tremstop Acrylic" by Tremco; "Blockade" by DAP or approved equal.

PART 3- EXECUTION

3.1 INSPECTION AND ACCEPTANCE

A. Examine all surfaces and contiguous elements to receive work of this section and correct, as part of the Work of this Contract, any defects affecting installation. Commencement of work will be construed as complete acceptability of surfaces and contiguous elements.

3.2 JOINT DESIGN

A. Joints shall be a maximum of 3/8 inch deep by minimum 3/8 inch wide

B. Joints in concrete or masonry:
   1. Depth of sealant shall equal width of joints in joints up to1/2 inch wide; joints 1/2 inch to 1 inch wide, depth shall be1/2 inch.
   2. For expansion joints or other joints 1 inch to 2 inch wide depth shall not be greater than 1/2 the applied sealant width and no greater than 5/8 inch for Type I nor 1/2 inch for TypeII materials.

C. Joints in metal, glass and other non-porous surfaces: Depth shall be a minimum of 1/2 the applied sealant width, and shall in no case exceed the applied sealant width

3.3 PREPARATION

A. Clean joint surfaces immediately before installation of sealant another materials specified in this Section:
   1. Remove all loose materials, dirt, dust, rust, oils and other foreign matter that will impair the performance of materials installed under this Section.
   2. Remove lacquers, protective coatings and similar materials from joint faces with manufacturer's recommended solvents.
   3. Do not limit cleaning of joint surfaces to solvent wiping; use methods such as grinding, etching or other approved and manufacturer’s recommended means, if required, to clean the joint surfaces, assuring that the sealant materials will obtain positive and permanent adhesion.

3.4 JOINT BACKING INSTALLATION

A. Install bond breaker tape in relaxed condition as it comes off the roll. Do not stretch the tape. Lap individual lengths.

B. Prevent three sided adhesion by use of bond breaker tapes or backer rods at the back of the joint.

Install backer rods for all liquid sealants, except where specifically recommended against by sealant manufacturers.

Install backer rods immediately before sealants, do not permit backer rods to get wet.

Install backer rods at the proper depth to create the specified sealant depth, avoid placing backer rods too deep which will result in sealant failure due to excessive sealant depth.

Backup material shall be suitable size and shape so that when compressed 20 to 50%, it will fit in all joints where required.

Do not cut or puncture the surface skin of the rod

C. Apply masking tape where required by surfaces encountered, and as may be determined by mockup testing, in continuous strips in alignment with joint edge.

Remove tape immediately after joints have been sealed and tooled.

3.5 SEALANT INSTALLATION

A. Prime surfaces where required with primer recommended by sealant manufacturer and as determined by "bond" test required in Part 1 of this Section

B. Apply, tool and finish sealant in accordance with manufacturer’s recommendations.

C. Install sealants with ratchet hand gun or other approved mechanical gun. Where gun application is impracticable, install sealant by knife or by pouring, as applicable.

"Gun" devices shall have nozzles of proper size and shall provide sufficient pressure to completely fill joints as detailed.

D. Finishing: Tool all vertical, non-sag sealants so as to compress the sealant, eliminating all air voids and providing a neat smoothly finished joint. Provide slightly concave joint surface, unless otherwise indicated or recommended by the manufacturer.

3.6 FIELD QUALITY CONTROL

A. Test Samples
   1. If requested by the Architect, for each 1,000 linear feet of joint installed, cut out and carefully remove a 6 inch long sample of the undisturbed sealant and joint backer material from the newly installed Work. Remove the samples in the presence of the Testing Laboratory's Representative, who will retain them for evaluating and testing.
   2. Reseal cutout areas with the same type materials.

3.7 CLEANING

A. Immediately remove misapplied sealant and droppings from metal surfaces with solvents and wiping cloths. On other materials, remove misapplied sealant and droppings by methods and materials recommended in writing by the manufacturer of the sealant material.

B. After sealants are applied and before skin begins to form on sealant, remove all masking and other protection. Clean up remaining defacement caused by the Work.

C. All finished work shall be left in neat, clean condition.

3.8 WASTE MANAGEMENT-

A. Separate waste in accordance with the Waste Management Plan.

B. Close and seal tightly all partly used sealant containers and store protected in well-ventilated, fire-safe area at moderate temperature.

C. Place used sealant tubes and containers in areas designated for hazardous materials.

END OF SECTION 079200

CONTRACT NO. 22-524
DIVISION 8 - OPENINGS

SECTION 084000 - ALUMINUM CONSTRUCTION

Part 1 - GENERAL

1.1 Drawings and General Provisions of the Contract, including Informationfor Bidders, General Clauses and Division 1, General Requirements applyto this Section.

1.2 DESCRIPTION OF WORK

A. The work of this Section consists of the provision of all materials, accessories, incidentals and the like necessary and/orrequired for the complete execution of all aluminum constructionand accessory work for this project as required by the schedules, keynotes and drawings, including, but not limited to the following:

NOTES:

- All glass material requirements and labor restrictions shallbe as specified in Section 08 80 00 ***and shall be provided as part of the work of this Section 08 40 00 for single source responsibility***.
- All materials furnished under this work and exposed to view shall be factory finished using a three-coat, shop-applied, baked-on fluoropolymer coating system based on Atochem NorthAmerica, Inc., Kynar 500 resin or Ausimont U.S.A., Inc., Hylar 5000 resin (polyvinylidene fluoride, PVDF), formulated by a licensed manufacturer and applied by manufacturer's approved applicator to meet AAMA Publication 2605. Coatingsystem shall provide minimum 1.0 mil dry film thickness consisting of minimum 0.25 ± 0.05 mil primer and minimum 1.0mil color coat and a 0.6 ± 0.2 mil clear top coat.

It should be noted that uniform color and system selection is required for all exposed architectural metalwork on the project including - sheet metal, windows, curtain wall framing, doors, louvers and the like.

1. Provide structural reinforcement of all vertical and horizontal elements in connection with the work of this section. Indications of size on drawings are for general guidance only, the Contractor shall submit information required by Paragraph 1.5 of this section.
2. Provide all anchors, supports, brackets, expansion devices, fasteners, blocking, insulation, vents, flashings, weeps andsimilar elements shown and/or required in conjunction with the required work.

NOTE - Anchorage devices shall be of such design and number so as to provide a secure mounting for a plumb and level installation without rack or warp or other distortion which may affect operation or weathertightness of window or any other element of this section.

Anchorage system shall allow for thermal and structural movement. Anchorage systems must be designed to -

a. Support dead load of window and/or wall assemblies;
b. Resist applied forces such as negative and positive wind loading;
c. Permit thermal movement.

3. Perform caulking/sealing of all metal to metal joints of workof this section; coordinate with Section 079200 for material requirements and labor restrictions.
4. Provide balance of all required paint finished aluminum breakmetal necessary for the support and closure of the workof this section. Minimum thickness = 0.078 inch

1.3 RELATED WORK SPECIFIED ELSEWHERE - Entire Project Specification.

1.4 QUALITY ASSURANCE

A. The intent of this Section is to establish sole responsibility forthe installation of the fixed window work including all appurtenancesas required to ensure watertightness and total performance.

B. The work of this Section shall be performed by a "Specialty Contractor". The Specialty Contractor shall have a minimum of five
(5) years experience installing curtain walls, windows, entrancesand glazing in buildings and shall provide a list of projects showing at least five years successful experience in these types of installations.

C. Coordinate all work of this section with others so as to insure structural stability, appearance and watertightness.

D. The manufacturers of aluminum framing, glass, insulation, sealants, etc. shall be a recognized manufacturer and shall have been regularly engaged in the production and installation of such materials for at least ten (10) years. Submit, in writing, evidence of same for approval.

E. Testing Agency Qualifications: An independent agency qualified according to ASTM E 699 for testing indicated and acceptable to Architect and Owner.

F. Pre-Installation Meetings: Conduct pre-installation meeting toverify project requirements, substrate conditions, manufacturer’s installation instructions, and manufacturer’s warranty requirements.

G. Conduct a quality control program that includes the following as aminimum:
1. Inspect conditions and materials to verify conformity withthe contract requirements.
2. Inspect conditions and materials and coordinate with the

Architect to verify proper substrate preparation in conformance with the contract requirements.

3. Inspect work in progress and during inclement weather to verify that the work is in compliance with established procedures, and that there are no leaks through the windows.
4. The Owner, at his/her discretion, will water test completed sections of the wall in accordance with ASTM E 1105 or AAMA 501.2 to verify contractor's compliance with specified performance criteria. Provide safe access to the work for the Owner's testing agency and provide contractor support for conducting tests. The Owner will pay for testing.
   a. In the event of failed tests, rebuild and retest at no additional cost to the Owner. Rebuild as many times as required to pass the test.
   b. Record any adjustment and/or design changes made as a result of rebuilding the walls to pass the water tests and implement them in all work whether they are completed or in progress.
   c. If required by the Architect, Contractor shall provide water hose for use by the testing agency to conduct water tests and shall assist with the construction of one test chamber to conduct pressure differential water tests at a location selected by the Owner and Architect.

H. Standards: Comply with the requirements and recommendations inapplicable specifications and standards by NAAMM, AAMA and AA, including the terminology, definitions except to the extent morestringent requirements are indicated.

1. AAMA - Metal Curtain Wall, Window, Storefront and Entrance Guide Specifications Manual.
2. AAMA - Aluminum Curtain Wall Design Guide Manual 1989.
3. AAMA - Curtain Wall Manual #10.
4. AAMA - Series No. 13 Structural Sealant Glazing Systems.
5. ASTM E 283-84 rate of air leakage through exterior Window, Curtain Walls and Doors.
6. ASTM E 331 - Test method for water penetration of Exterior Windows, Curtain Wall and Doors.
7. AAMA 501-83 - Test method for water penetration of Exterior Windows, Curtain Walls, and Doors by dynamic air pressure differential.
8. ASTM E 330-90. Uniform Load Deflection Test.
9. ASTM A 36 - Structural Steel.
10. ASTM A 386 - Zinc Coating (hot dip) or Zinc Chromate paint on assembled steel products.
11. AAMA 1503.1-88 - Test Method for Condensation Resistance Factor (CRF) and Test Method for Thermal Transmission Coefficient (U Value).
12. ASTM C 794 - Test method for adhesion-in-peel of elastomeric joint sealants.
13. SSPC - Steel Structures Painting Council.
14. ASTM E 783 – Standard test method for field measurement of air leakage through installed exterior windows and doors.
15. ASTM E 1105 – Standard test method for field determination of water penetration of installed exterior windows, skylights,doors, and curtain walls by uniform or cyclic static air pressure difference.
16. AAMA 501.2-03 – Quality assurance and diagnostic water leakage field check of installed storefronts, curtain walls,and sloped glazing systems.

17. AAMA 501.3 – Field check of metal storefronts, curtain walls, and sloped glazing by uniform air pressure difference.
18. AAMA 806-1 – Specification for bonding type back bedding glazing tapes for use with architectural aluminum.
19. ASTM E 1332 – Standard classification for determination of outdoor-indoor transmission class.

1.5 SUBMITTALS – Coordinate with Section 01 33 00

- Submittals shall be made in groupings where installations are complementary, i.e. steel, steel decking, steel stairs, stair railings; roof systems/flashings; mechanical and electrical apparatus and the like. Failure to comply with this requirement will be cause for rejection of any or all submittals.
- As set forth in Article 44 of the General Clauses and Sections 013300 and 013200 of Division 1, General Requirements, prepare and submit a fully developed submittal schedule; note review times set forth in Section 013300 are deemed "average", for large submissions allow longer review times.
- Attention is directed to Section 013114 for coordination drawing requirements for this project. These drawings are critical to the proper execution of the Work and failure to honor these requirements may become the basis for denial of any and all claims for either or both "time" and "money".
- The Contractor is encouraged to submit for approval products made from recycled and/or environmentally responsible material. Every effort will be made by the Design Team to approve these materials; the substitution request procedure shall be enforced.

A. 12 inch linear samples of all tubular, gasketing, angular, etc, materials to be used in the work.
B. 12 inch squares of all sheet type materials.
C. Certifications of specification compliance for test data for airtransmission and water transmission in accordance with specifiedstandards.
D. All fasteners and sealants to be used.
E. Corner section 12 inches of frame condition showing connection.
F. Entrance doors: Submit door manufacturer's product, specifications and instructions for each type of door and frame.
   1. Include details of core, stile and rail construction,including trim for lites and similar components.
   2. Include details of finish hardware mounting.
G. Individual shop drawings showing fabrication, installation details,plans, sections and elevations for all work including:
   1. Window wall construction details;
   2. Entrance framing details;
   3. Window construction details;
   4. Window installation and anchorage details.
H. Laboratory test results indicating actual testing versus minimumtesting requirements (as applicable for systems incorporated inproject) established in AAMA guidelines for nominated window types for -
   1. Air leakage;
   2. Water drainage;
   3. Water resistance;
   4. Uniform load deflection;
   5. Uniform load structural;
   6. Thermal performance;

each for the performance class of unit as listed in Part 2 of this Section.

I. Where and when practical, this Contractor or Contractors shall takeall necessary field measurements prior to fabrication and installation of work and shall assume complete responsibility for the accuracy of same.

J. Manufacturers Material Safety Data Sheet (MSDS) must be submitted for each manufactured product.

1.6 ENGINEERING REQUIREMENTS

Systems shall be engineered to the following requirements and evidence, in the form of drawings and calculations, shall be delivered to the Architect for approval.

A. Full engineering calculations signed and sealed by a ProfessionalEngineer registered in the jurisdiction showing conformance to thefollowing engineering data:

B. Wind Design Criteria: Wind loading is in accordance with the IBC 2015 and ASCE 7-05 requirements.

C. Window wall framing members to be designed to withstand 1 0 0 M P H wind loading.

D. Wall so constructed as to provide for such expansion and/or contraction of component materials as will be caused by an ambient temperature range of 140 degrees F. without causing harmful buckling, failure of joint seals, undue stress on fasteners or other detrimental effects.

E. The calculated deflection of any metal framing member in a direction normal to the plane of the wall shall not exceed $1/175^{th}$ of its' clear span or 3/4 inch, whichever is less, except that whena finished plaster type surface is affected, the deflection shallnot exceed $1/360^{th}$ of the span.

F. SEISMIC Design Criteria: Seismic loads are in accordance with theIBC 2015 and ASCE 7-05 requirements.

G. General Criteria

1. Glass shall be designed as required by applicable code governing wind loading for particular zone.
2. All structural components of the curtain walls, including members, weldments, and connections shall be capable of withstanding a static air pressure difference of 1.5 times the total design load, positive or negative, maintained without glass breakage, damage or distress to fasteners, or any other components when tested in accordance with ASTM E330. Permanent deformation of any member shall not exceed 0.2 percent of its span.
3. Where a framing member reaction is resisted by a continuous element, maximum assumed effective length of resisting element shall be four times the bearing length, but not more than 1 ft (305 mm).
4. Splice joints that permit movement shall be assumed to have zero moment capacity.
5. Where a framing member runs continuously past a deflecting support, combined deflection of member and support shall notexceed specified limits.
6. Thermal breaks and isolators shall be assumed to have no ability to transfer shear stress for composite action of flexural members. Elements joined by a thermal break shall be assumed to act separately.

1.7 GENERAL STANDARDS AND DESIGN REQUIREMENTS

A. General Standard: In addition to requirements shown or specified,comply with applicable provisions of Aluminum Curtain Wall Design Guide Manual for design, materials, fabrication and installation ofcomponent parts.

B. Design Requirements:

1. Metal stick framed systems with interior and exterior exposedmetal framing.
2. System manufacturer shall provide curtain wall systems, Including necessary modifications to meet specified requirements and maintaining visual design concepts.
3. Perimeter conditions shall allow for installation tolerances,expansion and contraction of adjacent materials, and sealant manufacturer's recommended joint design. Coordinate manufacturing and construction tolerances with tolerances for back-up structure such as structural steel and floor slabs.Verify all conditions can be constructed as required and within the specified tolerance ranges.
4. Drawings are diagrammatic and do not purport to identify norsolve problems of thermal or structural movement, glazing,anchorage or moisture disposal.
5. Requirements shown by details are intended to establish basic dimension of unit, sight lines and profiles of members.
6. Do not assume glass, sealants and interior finishes contribute to framing member strength, stiffness or lateral stability.
7. Assemblies shall be free from rattles, wind whistles and noise due to thermal and structural movement and wind pressure.
8. Attachment considerations are to take into account site peculiarities and expansion and contraction movements so there is no possibility of loosening, weakening or fracturing connection between units and building structure or between units themselves.
9. Anchors, fasteners and braces shall be structurally stressed not more than 50% of allowable stress when maximum loads are applied.
10. Allow for expansion and contraction without detriment to appearance or performance.
11. System shall drain to the exterior of system any water entering system.
12. Provide concealed fastening.
13. Metal faces are required to be visually flat under all lighting conditions, subject to acceptance of Architect.
14. Provide uniform color and profile appearance at components exposed to view.
15. Stresses placed on structural silicone sealants shall be keptwithin sealant manufacturer's recommended maximum.
16. ***NOT PERMITTED:*** Vibration harmonics, wind whistles, noisescaused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of system.
17. Weep System: Each glass glazing rabbet shall be wept. All weeps shall be located at the lowest drainage point of the section to drain all water from the section. Weeps shall consist of three holes/slots located at the center and near the ends of the spans and shall have a dimension of 3/8 in. diameter.

18. Thermal Isolator: Frame sections shall be thermally isolatedfrom interior trim with a solid, continuous, non-conducting isolation strip.
19. Compression flanges of flexural members shall be assumed to receive effective lateral bracing only from (a) anchors to building structure and (b) horizontal glazing rails or interior trim that contact the compression flange. Points of counter flexure shall not be regarded as lateral braces or asend points of an unbraced length; unbraced length shall be the distance between effective lateral braces.
20. Provide movable joints to accommodate full range of manufacturing tolerance, field tolerance, thermal movement, story drift due to wind and seismic loads, floor sag, beam sag, column shortening, and all other expected or required movements. Design for full values of all movements occurring simultaneously. Theoretical and as-built glass bite relative to metal frame shall not be less than 0.375 in. (9.5mm) after worst combination of movements. Theoretical and as-built glass edge clearance to nearest metal shall not be less than 0.25 in. (6.4mm) after worst combination of movements.
21. Tension shall be taken as sum of direct tension plus tensiondue to prying.
22. Consider bending, tension, and shear associated with conditions that will include shims or shim stacks. Design shall assume shims provide no resistance to bending.
23. In all cases, consider worst case combination of bending, tension and shear.
24. Unless otherwise specified, combined tension and shear shall be evaluated according to an interaction formula in which each term equals the square of actual force divided by the square of allowable force. Sum of terms shall not exceed 1.0.
25. Fastener penetrations are not allowed through gutters, glazing pockets, and all other horizontal areas that may collect or receive water, with the exception of trim covers located outboard of weeps.
26. Condensation Control: For conditions listed below (in Thermal Performance Analysis section), condensation or frost formation on indoor surfaces (including surfaces covered by insulation) is acceptable only if all of the following conditions are satisfied:
27. Water is immediately contained and drained to exterior.
28. There is no wetting of a surface that could be damaged by moisture or that would be visible to building occupants.
29. There would be no staining or other damage to completed building or its furnishings.
30. Glazing details shall permit glass replacement after initial construction, shall permit reuse of original gaskets, shall permit replacement glass of same nominal size as original glass, and shall not require cutting of framing members, removal of modules or removal of interior finishes. Vision glass in conventional frames shall be replaceable from exterior. Spandrel glass shall be replaceable from exterior.Silicone supported vision glass shall be replaceable from the exterior.

31. Snap engaged components shall be secured against migration,and shall not serve any primary structural function, such asretention of glass or panels. Snap engaged plastic components are not permitted, except as nonstructural thermalimprovement for interior trim. Joints in continuous snap covers and other continuous trim shall have splice sleeves of same material and finish as cover or trim and shall be sealed to prevent water infiltration. Exterior snap-engaged components that project more than 1 inch from the outside face of pressure bars shall be secured with fasteners.
32. Design shall provide waterproofing and air-vapor retarderthat is continuous at all penetrations, transition, and otherconditions. System shall integrate with the building's waterproofing and air-vapor retarder system to provide a watertight transition. System shall not allow the movementof interior or exterior air to flow vertically within the curtain wall assembly from the exterior as well as from the interior. Methods employed to prevent internal air movementshall not restrict water flow channels or prevent thermal movement of the glass and metal curtain wall systems.
33. All frames and sash shall be fabricated, cut, and assembled in the factory.
34. No frame or sash component, including glazing stops, shall beoffset from the plane of the adjacent section by more than 1/32 in. Metal-to-metal joint separations shall be limitedto less than 1/32 in. and all such exterior joints shall be positively and continuously sealed to prevent water penetration into the frame. Application of sealant to the face of joints (face-sealing) is prohibited. All metal-to-metal joints, glazing seals, and perimeter joints shall havesecondary drainage capacity to collect any penetrating waterand weep it back to the outside.
35. All fasteners shall be concealed and not visible after installation.
36. Frame corners shall be joined using screws and all corners shall be sealed watertight. Multiple layers of sealant are prohibited.
37. Weatherstripping: where applicable, operable sash shall contain double rows ofweatherstripping around sash perimeter. Weatherstripping shall meet the following requirements:
    a. Weatherstripping shall be continuous around opening and mitered together tightly and sealed at corners.
    b. Weatherstripping shall be replaceable without disassembly of sash or window/door frame or removal of frame from opening.

1.8 MOCKUPS

A. Visual Mockup: Provide mockup to demonstrate visual features and workmanship; refer to Section 014339 for requirements.

1.9 PRODUCT DELIVERY, STORAGE AND HANDLING (Coordinate with Section 01 61 00)

A. Protect finished surfaces to prevent damage.
B. Do not use adhesive papers or sprayed coatings which become firmly bonded when exposed to sun.
C. Do not leave coating residue on surfaces.

1.10 PROJECT CONDITIONS

A. Ensure ambient and surface temperatures and joint conditions are suitable for installation of materials

1.11 SYSTEM PERFORMANCE REQUIREMENTS – See Part 2 of this Section.

A. Air, Water and Structural Performance Requirements: When tested inaccordance with "Metal Curtainwall Manual", curtain wall shall meet or exceed performance criteria.

1.12 SPECIAL GUARANTEE/WARRANTY TERMS – Coordinate with Sections 074400 and 088000 for specific terms and language.

A. Special Assembly Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that deteriorate as defined in this Section within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures including, but not limited to, excessive deflection.
      b. Noise or vibration caused by thermal movements.
      c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
      d. Adhesive or cohesive sealant failures.
      e. Water leakage through fixed glazing and framing areas.
      f. Failure of operating components to function properly.
   2. Warranty Periods:
      a. Framing and seal systems: Two years from date of Substantial Completion.
      b. Provide an extended 10 year guarantee/warranty againstbreakage of glass edge seal system shall be given in addition to standard 1 year term.
      c. Aluminum Finish: Five years from date of substantial completing.

B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes fail within specified warranty period. Warranty does notinclude normal weathering.
   1. Warranty Period: **20** years from date of Substantial Completion.

C. Guarantee/warranty will be extended to cover both labor and material for total period.

1.13 SUSTAINABILITY

A. In the selection of the products and materials of this section as well as for the entire project, preference will be given to those with the following characteristics:
   1. Water based.
   2. Water-soluble.
   3. Can be cleaned up with water.
   4. Non-flammable.
   5. Biodegradable.
   6. Low or preferably no Volatile Organic Compound (VOC) content.
   7. Manufactured without compounds that contribute to ozone depletion in the upper atmosphere.
   8. Manufactured without compounds that contribute to smog in the lower atmosphere.
   9. Do not contain methylene-chloride.
   10. Do not contain chlorinated hydrocarbons.
   11. Contains the least possible of post-consumer or post-industrial waste.

Part 2 - PRODUCTS

2.1 SPECIFICATION STANDARD: For purposes of establishing standards of quality and levels of performance and not for the purposes of limiting competition, the basis of this specification is upon units as manufactured by one of the following and their respective model suitablefor the intended application.

A. Approved Manufacturers:
1. Framed Entrance Work - "500" Door Systems in Center Glazed Tubular Encore Aluminum Framing System as manufactured by the Kawneer Company and subject to specifications contained herein.
2. Window and Window Wall Systems – Kawneer Company, "Encore".

Equal systems matching profiles, construction and equaling or exceeding performance criteria furnished by Vistawall, Wausau,Traco, Efco or Leed Himmel will be considered for approval.

NOTE REQUIREMENTS SET FORTH IN SECTION 079200 REGARDING GLAZINGCOMPOUND/SEALANT SYSTEMS FOR INSULATED GLASS EDGE, SETTING AND WEATHERSEAL COMPATIBILITY.

B. Construction – See individual product specifications.
1. Fasteners - stainless steel or aluminum; perimeter anchorage,aluminum or insulated steel. COLOR MATCHED WHERE EXPOSED TOVIEW IN THE FINISHED WORK.
2. Reinforcing, internal or external - steel conforming to ASTM A 228-S4; if external, steel shall be capped by extrusions matching surrounding aluminum work.

C. Sealant Systems - Type II as specified in Section 079200.

2.2 FRAMED ENTRANCE WORK AND DOORS – None Required

A. Manufacturer: Subject to exact compliance with requirements, provide products of one of the following:
1. Kawneer “500” wide stile door.
2. Special-Lite, Inc. - Decatur, MI – Series “SL-15”
3. Vista Wall, Inc. - Lincoln, RI
4. YKK/AP America, Inc.

B. Aluminum Frame Members: Provide alloy and temper as recommended by manufacturer for strength, corrosion resistance, and application ofrequired finish and control of color; ASTM B 221 for extrusions,ASTM B 209 for sheet/plate, with a minimum wall thickness of 0.125inch.

C. Construction
1. Corners of all doors to be mechanically joined.
2. Doors to have integral pile weatherstripping.
3. Glazing stops for door shall be a snap-in type with neoprene bulb-type glazing and no exposed screws shall be required tosecure them in place. Stops on exterior side shall be lockin tamperproof type.
4. Frames shall be constructed using spline block, shear blockor other suitable method for intended application.
5. Aluminum and glass work shall be glazed with tempered glass provided under this Section and conforming to the requirements set forth in Section 088000, Glass and Glazing.

D. Furnish and install where necessary steel reinforcing of frames.

E. Hardware
   1. Thresholds - All extruded mill finished aluminum of size sufficient to cover entire jamb width or as shown on the drawings.

F. All materials shall be of the same manufacturer. No splitting of door, frame or components will be permitted.

G. Fasteners: Provide aluminum, non-magnetic stainless steel or othernon-corrosive metal fasteners, guaranteed by the manufacturer to becompatible with the doors, frames, stops, panels, hardware, anchors, and other items being fastened. For exposed fasteners (ifany), provide vandal proof flat head screws with finish matchingthe item to be fastened. Do not use exposed fasteners, except where unavoidable for the assembly of units, or unavoidable for thefastening of hardware. Provide only concealed screws in glazingstops.

H. Reinforcement and Brackets: Manufacturer's standard formed orfabricated steel units, of shapes, plates, or bars, with 2.0 ouncehot-dip zinc coating, complying with ASTM A 123, applied after fabrication.

I. Expansion Anchor Devices: Lead shield or toothed steel drill-in,expansion bolt anchors.

J. Bituminous Coating: Cold applied asphalt mastic complying withSSPC-PC 12, compounded for 30-mil thickness per coat.

K. Sealants and Gaskets: Provide sealants and gaskets in the fabrication, assembly and installation of the work, which are recommended by the manufacturer to remain permanently elastic, non-shrinking, non-migrating and weatherproof.

L. Glazing Gaskets: For glazing factory-installed glass, andfor gaskets which are factory-installed in "captive" assembly of glazing stops, provide manufacturer's standard stripping of molded neoprene, complying with ASTM D 2000 (Designation 2BC415 to 3BC620), or molded PVC complying with ASTM C 509, Grade 4.

M. Coordination of Fabrication: Check the actual frame or door openings in the construction work by accurate field measurementsbefore fabrication, and show recorded measurements on final shopdrawings.

N. Complete the cutting, fitting, forming, drilling and grinding ofall metal work prior to the cleaning, finishing, treatment and application for coatings. Remove burrs from cut edges, and eastedges and corners to a radius of approximately 1/6 inch.

O. No welding of any door or frame joints will be accepted.

P. Conceal fasteners, wherever possible, except as otherwise noted.

Q. Maintain continuity of line and accurate relation of planes and angles. Provide secure attachments and support at mechanical joints, with hairline fit at contacting members.

R. Reinforce the work as necessary for performance requirements, andas required for support to the structure. Separatedissimilar metals with bituminous paint or preformed separators which willprevent corrosion. Separate metal surfaces at moving joints withnon-metallic separators to prevent "freeze-up" of joints.

2.3 ENTRANCE AND INDIVIDUAL WINDOW FRAMING SYSTEMS

A. System shall be similar and equal to Kawneer “EnCORE Thermal Storefront System – 1-3/4" (44.5) x 6” (228.6)nominal dimension as shown on the drawings. Thermally improved; Exterior Glazed.

B. Performance:
   1. Wind loads: 100 MPH.

      Air Infiltration: The test specimen shall be tested in accordance with ASTM E 283. Air infiltration rate shall not exceed 0.06 cfm/sq.ft. at a static air

pressure differentialof 6.24 psf (300 Pa).

2. Water Resistance: The test specimen shall be tested in accordance with ASTM E 331. There shall be no leakage at a minimum static air pressure differential of 8 psf (383 Pa) asdefined in AAMA 501.
3. Uniform Load: A static air design load of 20 psf (958 Pa) shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection in excess of L/175 of the span of any framing member. At a structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur.

C. Finish/Color: See Part 1 above.

D. Materials: Aluminum (Framing and Components): Material Standard:ASTM B 221; 6063-T6 alloy and temper; Member Wall Thickness: Eachframing member shall provide structural strength to meet specified performance requirements; Tolerances: Reference to tolerances forwall thickness and other cross-sectional dimensions of storefront members are nominal and in compliance with AA Aluminum Standardsand Data.

E. Accessories
1. Fasteners: Where exposed, shall be Stainless Steel.
2. Gaskets: Glazing gaskets shall be extruded EPDM rubber.
3. Perimeter Anchors: Aluminum. When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.

F. Fabrication
1. Fabricate components per manufacturer's installation instructions and with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation anddynamic movement of perimeter seal.
2. Accurately fit and secure joints and corners. Make joints flush, hairline and weatherproof.
3. Prepare components to receive anchor devices. Fabricate anchors.
4. Arrange fasteners and attachments to conceal from view.

G. Source Quality Control:
1. Source Quality: Provide aluminum storefront specified hereinfrom a single source.
2. Building Enclosure System: When aluminum storefront is partof a building enclosure system, including entrances, entrance hardware, windows, curtain wall system and related products,provide building enclosure system products from a single source manufacturer.
3. Fabrication Tolerances: Fabricate aluminum storefront in accordance with framing manufacturer's prescribed tolerances.

2.4 WINDOW SYSTEMS

A. Unit assemblies shall be factory fabricated using component assemblies similar and equal to Kawneer “EnCore” thermally brokensystem in both structural and conventional glazed systems.

B. Unit assemblies shall be complete with perimeter trims, stools,accessories, shims and anchors, and perimeter sealing of storefrontunits. System shall be nominal 1-3/4 inch face dimension by 6 inch depth as shown on the drawings. Glazing position shall be “FRONT”.

C. Frame assembly system shall be factory assembled in as large a unit as practicable to minimize field jointing. Side-to-side jointing shall take place with "coupling mullion" system.

1. Extruded framing members shall be as per Paragraph 2.3 above in thicknesses as standard with the manufacturer of the system and suitable for intended use.
2. Framing members - two part construction incorporating thermalbarrier as per Paragraph 2.3 above for positive fastening and elimination of any direct metal-to-metal contact. Unitsshall have glass pocket depth of not less than 3/4 inch.
3. System shall provide for flush glazing on all sides with no projecting stops.

D. Framing system shall meet or exceed the following performance criteria - Air Infiltration 0.06 cfm/sq.ft. of fixed area (ASTM E283); Water infiltration - NO LEAKS at 9 psf test pressure (ASTM E 331); Structural performance as per Paragraph 1.5 of this Section.

E. Furnish all fasteners of stainless steel or aluminum; perimeter anchorage, aluminum or insulated steel; and a fully resilient glasssetting system with EPDM gaskets both sides.

2.5 PLUG IN WINDOWS

A. Test Procedures and Performance Requirements:

1. Air Infiltration: When closed and locked, the test specimenshall be tested in accordance with ASTM E 283. The air infiltration rate shall not exceed 0.06 cfm/ft2 at a static air pressure differential of 6.24 psf.
2. Water Resistance: When closed and locked, the test specimenshall be tested in accordance with ASTM E 331. There shall beno leakage as defined in the test method at a static air pressure differential of 12 psf.
3. Structural Performance: When tested in accordance with ASTME 330, deflection shall not exceed L/175 of the clear span at a uniform load of 50 psf (design wind pressure). At a structural load equal to 1.5 times the design wind pressure (positive and negative) no glass breakage, permanent damageto ventilators, panels, fasteners or anchors, shall occur andpermanent deformation to framing and ventilator member shallnot exceed 0.2% of their clear spans.
4. Thermal Movements: The glazed curtain wall system shall be capable of withstanding expansion and contraction of components caused by an ambient air temperature range from –

   10 degrees F to +120 degrees F without buckling, stress on glass, edge seal failure, excess stress on curtain wall structure, anchors and fasteners or reduction in performance.
5. Condensation Resistance Factor (CRF) will be determined in
   Accordance with AAMA Specification 1503.1 – 1988 Procedure.Test unit 6 feet by 6 feet 8 inches using two equal size lites of 1 inch insulating glass units composed of two nominal “clear lites with a nominal” air space and an aluminum spacer system. The thermal transmittance coefficient(U Value) will be determined in accordance with ASTM C 236-89and AAMA 1503.1 – 1988.
   Thermal Performance Ratings:
   Condensation Resistance Factor – Frame 70
   Condensation Resistance Factor – Glass 56 Thermal
   Transmittance due to conduction U = 0.65(U values

expressed in BTU/hr/ft2/°F).

B. Aluminum (Windows and Components):
   1. Extruded aluminum profiles shall be 6063-T5 alloy and temper(ASTM B 221 G.S. 10A-T5).
   2. The frame adaptor depth shall be not less than 21/4" (57.2):The ventilator depth shall not be less than 2" (50.8).
   3. All framing members shall have minimum wall thickness of 0.125 inch (3.2) and shall provide the structural strengthsufficient to meet the specified performance requirements.
   4. All ventilators shall be tubular.
   5. Weatherstripping shall be resilient elastomer.
   6. All references to dimensions for wall thicknesses and othercross-sectional dimensions of window members are nominal andin compliance with ANSI H35.2-1990.

C. Fasteners: Where exposed, shall be 300 Series, Stainless Steel.

D. Perimeter Anchors: Aluminum. When steel anchors are used, provideinsulation between steel material and aluminum material to preventgalvanic action.

E. Hardware – None Required
   1. Projected sash ventilators shall be balanced on heavy duty four (4) bar "Anderberg" type stainless steel hinges (AAMA 904.1) which shall include - a positive stop/limiter; an adjustable friction shoe, capable of holding vent in an openposition to approximately 45 degrees; and a standard cast bronze projected out cam handle with concealed strike for each unit. Provide multiple devices as required by vent size.
   2. Casement units shall be equipped with a minimum of 2 white bronze locking handles located on vent side rail. Units shall be equipped with a minimum of 2 heavy duty stainless steel, type 304, hinges fully concealed in the vent frame jamb. Provide guide blocks for correct alignment for closingof vent, custodial locks, key limit arms and signage. Provide multiple devices as required by vent size.
   3. Locking Hardware including strikes, keepers, and the like will be compatible with aluminum and manufacturer's recommendations. All mechanically fastened joints shall befactory sealed with resilient non-hardening compound.

      NOTE: All exposed hardware shall be finished in color as directed by the Architect in accordance with finish statement contained in Part 1 above.

2.6 GLASS AND GLAZING MATERIALS – See Section 088000 for material requirements; all work shall be accomplished by this Specialty contractorfor Aluminum Construction as noted in Part 1 of this Section.

A. Glass – Clear/Clear, Low “E” as specified in Section 088000 and provided as part of the work of this Contractor.

B. Glazing and Glazing Materials.
   1. Provide in general accordance with Section 088000.
   2. Glazing method shall be in general accordance with the AAMA Metal Curtainwall Manual (1989) and GANA Glazing Manual for specified glass type.
   3. Setting Blocks/Edge Blocking: Provide in sizes and locations recommended by GANA Glazing Manual.
   4. Expanded Cellular Glazing Tapes shall meet AAMA 800.
   5. Glazing Gaskets shall meet the requirements of ASTM C 509 (closed

cell) or ASTM C 864 (dense) and shall be extruded dense neoprene or EPDM, provided with molded corners wherever possible.
Structural silicone sealant shall meet the requirements of ASTM C 1184.

6. Spacer tape in continuous contact with structural silicone shall be tested for compatibility and approved by the sealant manufacturer for the intended application. Gaskets in continuous contact with structural silicone shall be extruded silicone or compatible material.

2.7 COMPOSITE ALUMINUM PANELS – See Section 074400

2.8 SCREENS – None Required.

A. Screens to be provided at all operating windows shall be as follows:

1. Standard screen members shall be of tubular extruded aluminum 6063-T5 of 6063-T6. Screens shall be provided when specifiedand shall be of manufacturer's standard approved design, applicable to the specific window for which it is intended, with minimum dimensions of 3/4 inch by 3/8 inch.
2. Corners shall be firmly joined in a secure and workmanlike manner. Frame shall be of sufficient rigidity and cross braced as required to be flat against window and prevent excess bow in frame members and sag in screening.
3. Standard screen cloth shall be aluminum in 18 by 16 mesh and shall meet the requirements of CS138-55 and FS-RR-W-365 "Insect Wire Screening" and shall be securely held in frame with vinyl spline.
4. Screen shall be provided with manufacturer's approved fastening devices suited particularly for application to thespecific window for which it is intended and shall be of aluminum or a material compatible with aluminum and of sufficient strength to perform satisfactorily.

Part 3 - EXECUTION

3.1 INSPECTION AND ACCEPTANCE

A. Examine all surfaces and contiguous elements to receive work ofthis section and correct, as part of the Work of this Contract, any defects affecting installation. Commencement of work will be construed as complete acceptability of surfaces and contiguous elements.

3.2 DELIVERY, ERECTION AND ADJUSTMENT

A. All work shall be manufactured in ample time so as to not delay progress of the building. Furnish and maintain sufficient mechanics to erect work in such manner so as not to delay other contractors.

B. All items furnished under the work of this Section shall be installed in accordance with the requirements of the drawings andwith the approved shop drawings of the manufacturer; accomplishedby an authorized representative of the manufacturer. All erection shall conform to details as shown on the drawings or as required by manfacuter.

3.3 TOLERANCES

A. Prepare building component surface(s) to be in contact with curtain wall and

window systems in compliance with building component manufacturers' published recommendations and those ofsystem manufacturers prior to installation of systems' components.

B. Below are minimum requirements; provide "tighter" tolerances ifneeded for proper installation of the curtain wall system:
   1. Provide anchor adjustment capability for full range of specified tolerances for building structure, but not less than one inch (25 mm) in all directions.
   2. Deviation from plumb, level or dimensioned angle shall not exceed 0.125 inch per 20 feet (3.2 mm per 3658 mm) of length of any member, 0.25 inch (6.4 mm) in any total run in any line.
   3. Deviation from theoretical position in plan or elevation, including deviation from plumb, level or dimensioned angle,shall not exceed 0.375 inch (9.5 mm) total at any location. Change in deviation shall not exceed 0.125 inch for any 20 foot (3.2 mm per 3658 mm) run in any direction.
   4. Maximum offset from true alignment between two consecutive members placed end to end shall not exceed 0.062 inch (1.6 mm).
   5. Maximum offset between glass framing members at corners of glazing pocket shall not exceed 0.031 inch (0.8 mm)
   6. Alignment:
      a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offsetfrom true alignment to 1/16 inch.
      b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.
      c. Where surfaces are separated by reveal or protruding element of 1 inch wide or greater, limit offset from true alignment to 1/4 inch.
      d. More stringent tolerances apply if needed for system tofunction properly and to achieve specified Design and Performance Requirements.

3.4 INSTALLATION - GENERAL

A. The erection of this work is to be accomplished by an authorized representative of the manufacturer. All erection shall conform todetails as shown on the drawings.

B. After erection and glazing, this Contractor shall check and readjust as required all items of operative hardware on doors andother units installed under this Section, as applicable.

C. All fastenings shall be concealed of the type shown on the Drawingsor as required or as approved and shall be stainless steel or other approved non-corroding metal.

D. All work under this Section shall be packaged to afford adequate protection to transit and storage and after installation shall beprotected in place by an approved opaque material which shall notbe removed until the Architect so instructs.

E. Extreme care shall be taken and all elements shall be erected plumb, level and true, relative to the building structure to provide proper contact and satisfactory operation. All work shall be weathertight and adjusted for proper operation.

3.5 INSTALLATION - SPECIFICS

A. Backseal, butter and properly fasten all assembled window unit materials prior to

erection.

B. Check corner seals prior to, and after installation to insure sameare intact; repair if damaged.

C. Window units shall be anchored at the jambs only with retainers placed at heads and sills.

D. Provide "isolation" medium at dissimilar materials, if same are used for anchorage elements.

E. The various component manufacturers shall supervise installation and adjustment to insure that both are accomplished in a suitable manner.

Install thermal insulation, vapor barrier, safing insulation with specified supports, and smoke seal as shown on drawings. Providecontinuous air, water, vapor, and thermal protection. Gapsin insulation or damage to the vapor retarder are unacceptable.

3.6 GLAZING INSTALLATION – See and coordinate with Section 088000

A. All glass and glazing products shall be set in accordance with the applicable setting guides of the "GANA" or "SIGMA" referenced in Paragraph 1.4.C &F of Section 088000 and as per requirements established by respective window/wall/door manufacturers in the referenced sections.

B. Surfaces shall be dry and free from dust, rust or ice before glazing. Dirty surfaces shall be cleaned with cloth saturated with turpentine or mineral spirits before glazing.

C. All sash settings shall be installed in longest practical length. Splices shall be made at joints in glass or as required. All joints shall be butt, anchored and sealed as per manufacturer's recommendations.

3.7 ANCHORAGE

A. Provide noncorrosive separators between dissimilar materials.

B. Remove weld slag and apply specified coating and paint over welds.Coat and paint exposed portions of embedded anchors. Touch up shopapplied coating that is damaged by welding or other causes if Architect does not require replacement of the damaged components.

C. Where slots or oversize holes are provided for adjustment only, secure connection after final adjustment. Interlocking serrationsin extruded aluminum brackets and washers are acceptable. Steelweld washers with 0.25 inch minimum thickness are acceptable withsteel brackets. Special washers or nuts that rely on friction and/or surface indentation of fastened part are not acceptable.

D. Remove temporary shims and fasteners. Leave expansion joints free to move as designed or as required.

E. Anchor to building at wind load girts and slab edges.

3.8 METAL PROTECTION

A. Where aluminum will contact dissimilar metals, protect against action by installing nonconductive spacers as recommended by manufacturer for this purpose.

B. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

3.9 MARKING DECALS – None Required

A. Install two marking decals (as specified in Section 088000) on each transparent glass door, and on each transparent glass sidelight which is wider than 20 inches between stiles. Locate decals midway between stiles 34 inches above the floor line.

3.10 REPLACEMENT AND CLEANING

A. All cracked, broken, scratched, stained or otherwise damaged glassand all glazing improperly set shall be replaced with perfect glass, properly set at no additional cost to the Owner.

B. Clean glass both sides after painting is complete and dry. Do not disturb glazing with scrapers. Do not use acid solution or water containing caustic soap.

C. At the time of final acceptance of the work, all glass shall be clean and undamaged and all setting materials in perfect condition.

D. Coordinate with requirements of Section 017329.

3.11 PROTECTION AND CLEANING

A. Be responsible for protecting all work of this Section during construction.

B. After installation, metal surfaces of all work of this section shall be cleaned on both interior and exterior of all mortar, paintand other contaminants. After being cleaned, all work shall be protected against damage until it is accepted by the Architect.

C. Materials used to protect and clean work shall not be damaging to the work and adjacent work, and the best of their respective kinds.

D. All concealed aluminum surfaces which will be in contact with concrete, plaster, lime, mortar, or other masonry materials, orwith galvanic dissimilar metals, shall receive an approved heavybodied bituminous paint or other approved isolating medium before delivery.

E. All aluminum shall be cleaned (after masonry work is cleaned) inaccordance with the recommendations of the Architectural AluminumManufacturers' Association and shall be left in a complete and perfect condition.

F. Clean up premises of any refuse and such materials removed as partof this work. All removed material shall be disposed of OFF the site. Working areas shall be left broom clean.

3.12 FIELD QUALITY CONTROL/CERTIFICATION AND TESTING

A. Field Tests: Independent testing laboratory will perform air infiltration, water infiltration and hose test; as indicated in AAMA field test performances for window and curtain wall systems

B. All tests referred to in these specifications shall be conducted by the recognized

independent testing laboratory as approved by the AAMA.

C. Certified test reports, must be submitted as Paragraph 1.4 above. All tests must meet or exceed the values as set by the AAMA, or as contained herein, whichever standard is higher.

D. The Architect, at his discretion, may make certain Air Infiltration and Water Resistance Tests, on a random basis, by static test method, of "In Place" units. Field testing shall be in accordancewith AAMA 502-90, Test Method "A".

E. Openings or units which fail to comply with subject test shall be rejected and all costs for corrections to meet the standards as well as future testing for verification shall be borne by the Contractor.

F. Notification by the Architect to the Contractor that his installation is sub standard and does not meet the specificationsshall be deemed sufficient notice to the Contractor that he is proceeding with any further installation at his own risk, until hehas corrected any of the problems which may have caused the failure of the installation.

G. Owners' acceptance of the installation as a result of the field testing shall have no bearing whatsoever on the terms and conditions of the guarantee/warranty requirements and shall not be used by either party as "self-serving" notice in any further dispute which may arise.

3.13 WASTE MANAGEMENT – Coordinate with Section 017419

A. Separate and recycle materials and material packaging in accordancewith Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.

B. Set aside and protect materials suitable for reuse and/or remanufacturing.

C. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 084000

SECTION 092900 – GYPSUM BOARD ASSEMBLIES

PART 1 – GENERAL

1.1 Drawings and General Provisions of the Contract, including information for Bidders, General Clauses and Division 1, General Requirements apply to this Section.

1.2 DESCRIPTION OF WORK

A. The work of this Section consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all gypsum drywall cladding, stud framing and accessory work for this project as required by the schedules, keynotes and drawings, including, but not limited to the following:

1 Furring of fill in wall opening at through-the-wall air conditioning unt, Computer room, 2nd. Floor

2. Patch work resulting from mechanical work.

3. Provide freestanding furring installation as required to complete the project work complete with insulation and mold/moisture resistant board systems.

4. Tape and finish all gypsum work to Level 4 guidelines with chemical set compounds ONLY.

All drywall joint compounds shall be dry or with setting type drywall joint compounds, hardened (set) prior to the application of subsequent coats.

All drywall joint compounds shall be dry prior to the application of drywall textures and paints/coatings.

Application: All joint compounds, textures and paints/coatings shall be mixed and applied in accordance with the nominated manufacturer's recommendations for particular products.

3. Provide all metal and/or PVC trim, casing beads, caulking, gaskets, control joints, fasteners, and all other appurtenances indicated on drawings, specified and/or required to provide a complete installation.

4. Caulk:

a. All door and window frames to surrounds

b. Dissimilar materials, i.e. – gypsum to concrete, hollow metal to masonry and/or gypsum, concrete masonry and the like both vertical and horizontal
c. All gypsum wallboard be installed with a fire sealant bead of 3/8 in. (9 mm) between the floor and the bottom edge of the gypsum.

5. Perform balance of gypsum construction as may be required to complete the work of the project.

1.3 RELATED WORK SPECIFIED ELSEWHERE

A. – Entire Project Specification.
B. Contract Drawings

1.4 QUALITY ASSURANCE

A. All gypsum construction required under this phase of the work shall be performed in strict accordance with the following Reference Standards:
1. Drywall Construction Guidelines promulgated by U.S. Gypsum within the 4th edition of the Gypsum Construction Handbook.
2. ASTM C 754, Specifications for Installation of Steel Framing Members to Receive Screw Attached Gypsum Wallboard.
3. ASTM C 840, Standard Specification for Application and Finishing of Gypsum Board.
4. ASTM C 1178 – Standard Specification for Glass Mat Water Resistant Gypsum Backing Panel; 2004.
5. ASTM D 3273 – Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2000 (2005).
6. ASTM E 90 – Standard Test Method for Laboratory Measurement of Airborne sound Transmission Los of Building Partitions and Elements; 2004.
7. Applicable publications of the Gypsum Association; 810 First Street NE, Washington, DC 20002.
8. Balance of ASTM Specifications governing gypsum construction, framing and fasteners as applicable to intended installation including – C 36, C 79, C 442, C 645, C 931, C 1002, C 1047 and as recognized by governing agencies/code facilitators ASTM C 1396.

B. Definitions: Gypsum Board Construction Technology; Refer to ASTM C 11 and GA-505 for definitions of terms for gypsum board assemblies not defined in this Section or in other referenced standards.

1.5 SUBMITTALS

A. Certification of Specification Compliance on all materials.

B. Product Data: Submit manufacturer's specifications for the following products: gypsum board, joint compound, acoustical sealant, insulation, metal studs and fasteners.

C. Samples:

1. Gypsum Board: 12 inches square, each type specified.
2. Fasteners: 10, each type.
3. Insulation: 12 inches square, each type specified.
4. Studs, tracks, shoes, furring channels and accessories: 12 inch lengths, each type specified/required.
5. Trim systems, including reveal shapes.

D. Manufacturers Material Safety Data Sheet (MSDS) must be submitted for each manufactured product.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING – Coordinate with Section 01 61 00)

A. Delivery and Handling

1. Deliver materials to the project site with manufacturer's labels intact and legible.
2. Handle materials with care to prevent damage.
3. Deliver fire rated materials bearing testing agency label and required fire classification numbers.

B. Storage

1. Store materials inside under cover, stack flat, off floor.
2. Stock wallboard so that long lengths are not over short lengths.
3. Do not overload floor system.
4. Store adhesives in dry area, provide protection against freezing at all times.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Temporary Climate control will be used to maintain dry bulb temperatures between 55 and 80 degrees F and relative humidity at less than 50% during installation, taping and curing of joint compound.

B. Ventilation

1. Provide ventilation during and following adhesives and joint treatment application.
2. Use temporary air circulators in enclosed areas lacking natural ventilation.

3. Under slow drying conditions, allow additional drying time between coats of joint treatment.
4. Protect installed materials from drafts during hot, dry weather.

C. The moisture content of the taped and sanded gypsum board walls be measured and documented by the general contractor at two locations on each wall: the bottom edge and halfway between floor and ceiling. Specify that the interior finish may not be applied until the moisture content of the wallboard is below 0.4% on a gypsum moisture meter or below 12% on a wood meter.

D. Protection: Protect adjacent surfaces against damage and stains.

1.8 SPECIAL MATERIAL AND CONSTRUCTION REQUIREMENTS

A. Tolerances: Do not exceed 1/8 inch in 8 feet variation from plumb or level in any exposed line or surface, except at joints between planes or abutting edges or ends. Shim as required to comply with specified tolerances.

B. Provide control joints in all partitions at 30 foot maximum spacing; at all ceilings at 30 foot maximum centers without perimeter relief (900 square foot increments); at all ceilings at 50 maximum centers with perimeter relief (2500 square foot increments) and where ceilings form “L”, “U” or “T” shaped configuration. Where joints are placed in rated partitions, conform to UL assembly data for particular installation; double framing at all joints.

1.9 SUSTAINABILITY

A. In the selection of the products and materials of this section as well as for the entire project, preference will be given to those with the following characteristics:
1. Water based
2. Water-soluble
3. Can be clean up with water
4. Non-flammable
5. Biodegradable
6. Low or preferably no Volatile Organic Compound (VOC) content.
7. Manufactured without compounds that contribute to smog in the lower atmosphere
8. Manufactured without compounds that contribute to smog in the lower atmosphere
9. Do not contain methylene-chloride
10. Do not contain chlorinated hydrocarbons
11. Contains the least possible of post-consumer or post-industrial waste.

PART 2 – PRODUCTS

2.1 MATERIALS – GENERAL

A. Basic gypsum wallboard materials for work in this section, unless otherwise specified, shall be as far as possible by one manufacturer.

Materials specified by trade name or model number are those of the United States Gypsum Company, similar and equal products of the following will be acceptable.

1. G-P Gypsum (Dens-Glass Products)
2. National Gypsum
3. BBP/Celotex
4. LaFarge North America
5. Temple Inland

NOTE: Material shall be furnished with tapered edge for taping systems specified below and subject to criteria established in Part 1 above.

2.2 WALLBOARD – SPECIFICS – Gypsum Wallboard shall conform to ASTM C 1396 for conventional material and C 1629 for abuse resistant material and shall be in 4 foot widths by largest practical length and as follows:

A. Humidity and mold resistant gypsum panels to have a non-combustible, moisture and mold resistant gypsum core encased in a mold and moisture-resistant, 100-percent recycled blue or purple face and brown back papers; 5/8 inch thickness, Type X.

1. US Gypsum “SHEETROCK brand MOLD TOUGH AR” gypsum panels
2. National Gypsum “Type XP/AR”
3. G-P Gypsum “Dens-Armor Plus/AG”
4. CertainTeed “ProRoc”

Or equal to having a non-combustible, moisture and mold-resistant gypsum core that is encased in moisture and mold-resistant, 100 percent recycled face and back cladding; panels shall be classified Type X.

2.3 STEEL STUD FRAMING – ASTM C 645

A. Stud and accessory systems shall be as manufactured by one of the following:

1. Dietrich Metal Framing, A Worthington Industries Company
2. MarinoWare; A Division of Ware Industries
3. ClarkWESTERN Building Systems
4. SCAFCO Corporation
5. The Steel Network

Or approved equal manufacturer.

B. Gauge – Minimum 20 (0.0312) for all framing; NO LIGHTER MATERIAL SHALL BE USED. Acceptable alternative is the UltraSTEEL assembly by Dietrich Metal Framing in 20 gauge equivalent (0.0296 inch).
   1. Steel studs adjacent to door bucks either:
      a. 16 gauge (0.055) minimum
      b. "Boxed" studs, 20 gauge (0.0312) minimum.
      c. Patented system of jamb studs and header systems in gauges determined by span of opening and certified by engineering calculations equal to:
         i. "ProX Heder System and Jamb Stud" by Brady Construction Innovations.
         ii. "Header Assembly and Jamb Stud" by Priceless Steel Products.
         3. "Red-Header Jamb and Header System" by ClarkWESTERN.
   2. Track systems, gauge as for studs: Leg height, 1-1/4 inch throughout unless modified by details.

C. All material shall be electro galvanized steel in locations and sized as indicated or required by "limiting height" criteria.

2.4 ACCESSORIES

A. Corner Beads – General: #25 gauge, perforated, galvanized steel, U.S.G. Dur-A-Bead (#103), flange width as recommended by the manufacturer for each thickness of wallboard. Corner beads to be installed at all outside corners of gypsum.

B. Casing Beads: U.S.G. No 400 Series or similar, as required where gypsum board abuts other materials unless noted otherwise.

C. Control Joints: U.S.G. No. 093 or similar.

D. Adhesive: Recommended by the approved gypsum wallboard manufacturer for each particular installation.

2.5 FASTENERS

A. Screws for fastening conventional gypsum board systems: Corrosion resistant U.S.G. Drywall Screws, minimum 1-5/8 inch, Type S Flat Phillips, Hex or Pan Head, self drilling screws or as recommended by the accessory manufacturer for the specific condition and thickness of materials being joined.

B. Anchor Bolts and Studs: ASTM A 307, Grade A, carbon steel, with hex-head carbon steel nuts and flat steel washers. Hot-dip zinc coated in accordance with ASTM A 153.

C. Expansion Anchors: Federal Specification FF-S-325, Group II, Type 4, Class 1. Provide bolts listed or approved by one or more of the following and of diameter and length as required by structural design calculations required by 1.05 above.
   1. Underwriters Laboratory.
   2. Warnock Hersey (ITS).
   3. International Conference of Building Officials.

D. Powder Actuated Fasteners: Federal Specification FF-P-395b. Manufacturer from AISI 1062 or 1065 steel, austempered to a minimum core hardness of 50 to 54 HRC and zinc plated in accordance with ASTM B 633. Provide fasteners listed or approved by one or more of the following and of type, diameter and length as appropriate for installation and construction type:
   1. Underwriters Laboratory.
   2. Warnock Hersey (ITS).
   3. International Conference of Building Officials.

2.6 JOINT FINISHING SYSTEM:

A. Perforated reinforcing joint tape – Similar and equal to "Perf-A-Tape" by U.S. Gypsum.

B. Joint Compound: Similar and equal to U.S. Gypsum :Durabond".

NOTE: SHEETROCK DURABOND setting-type joint compounds are chemically-setting powder compounds that permit same-day joint finishing and next-day decoration of drywall interiors and exterior soffits. They provide a hard, plaster-like surface when dry and are virtually unaffected by humidity. The compounds should be smoothed before setting as they are difficult to sand after drying. The compounds are available in a range of formulations that provide a choice in setting times. DURABOND 20 sets in about 20-30 minutes; DURABOND 45 in 30-80 minutes; DURABOND 90 in 85-130 minutes; and DURABOND 210 in 180-240 minutes. The compounds meet ASTM C 475.

NOTE: See Part 1 herein for restrictive measures to be taken for preparation, application and curing of compound systems.

2.7 CAULKING/SEALING: Type V for general work, Type VII for fire caulking requirements, reference Section 07 92 00.

2.8 INSULATION

A. Sound attenuation batt type thickness and locations shown on drawings shall be of mineral fiber formulation and designed for friction fitting within stud cavity. Material shall be Class "A" as per ASTM E 84 requirements.

B. Fully seal and tape joints when accessible, fully butt all others to insure sound tight joint.

C. Material shall be one of the following:
   1. Thermafiber, Inc.
   2. Roxul

   And shall conform to the following:
   1. Density: 2.5 pcf (nominal).
   2. Type: Fs 15 Unfaced Insulation Blanket.
   3. R-Value: 3.8 per inch.
   4. Density – Greater than 1 inch: 3.0 pcf (nominal).

PART 3 – EXECUTION

3.1 INSPECTION AND ACCEPTANCE

A. Examine all surfaces and contiguous elements to receive work of this section and correct, as part of the Work of this Contract, any defects affecting installation. Commencement of work will be construed as complete acceptability of surfaces and contiguous elements.

3.2 INSTALLATION – PARTITION FRAMING

A. At all partition floor and ceiling tracks and wherever drywall partitions abut vertical masonry or concrete surfaces, provide gaskets and/or caulking/sealing.

B. When double layer, face caulk on base layer top, bottom and edges.

C. Provide drywall furring channels on walls and partitions where indicated. Secure channels to masonry or concrete at 16 inches o.c. with suitable fasteners at maximum of 24 inches o.c.

D. Frames partitions shall be constructed with steel studs and channels true to line and fastened to construction top and bottom at 24 inches o.c. Studs shall be twist locked into tracks at 24 inches o.c. Double studs to structures at all openings. Place steel studs approximately 2 inches from abutting partitions and 2 inches from each side of interior angle of all corners. Secure steel studs to top tracks with galvanized steel adjustable stud shoes or within “flex track” or by use of double inset head track.

E. Stud Tracks – Standard 1-1/4 inch drywall floor and ceiling stud stacks securely fastened to beams, slabs or partitions with ½ inch stud bolts or other method approved by manufacturer spaced not more than 24 inches on centers. Gauge of steel, minimum 20 (0.0312) or as indicated on Drawings.

F. Horizontal Bracing – ¾ inch steel furring chemicals fastened to inside of stud with webs in a horizontal position. Spacing of channels shall not exceed 6 feet.

G. All free standing furring and/or solid partition shall be aligned accurately according to the partition layout and constructed as for D. above.

3.3 BOARD APPLICATION – General application shall be as for gypsum board following requirements set forth in basic specification and as supplemented by ASTM C 840 specifications for Application and Finishing of Gypsum Wallboard.

A. Cut wallboard by scoring and breaking or by sawing, working from the face side. Where board meets projecting surfaces, it shall be neatly scribed.

B. Apply wallboard first to ceiling then to walls at right angles to framing members.

C. Use board of maximum and practical length so an absolute minimum number of end joints occur.

D. Regular gypsum wallboard shall be brought into contact with each other, but shall not be forced into place.

E. Locate wallboard joins at openings so that no end joints will align with edges of openings. Stagger end joints. Joints on opposite side of partitions shall not occur on the same stud.

F. Center abutting ends or edges over the stud flanges. Where wallboard abutments are made between studs, free ends are to be back blocked. No two such joints should occur between the same two studs.

G. Locate all attaching screws 12 inches o.c. Attach all wallboard to studs with screws as specified.

3.4 CORNER AND TRIM TREATMENT

A. Internal Corners – Treat as specified for joints, except that the reinforcing tape shall be folded lengthwise through the middle and fitted neatly into the corner.

B. External Corners

1. Install a corner bead fitting neatly over the corner and secured with the same type fasteners used for applying the wallboard, spacing the fasteners approximately 6 inches on centers and driving through the wallboard into the framing and furring member.

2. After the corner piece has been secured into position, treat the corner with joint compound and reinforcing tape as specified for joints.

C. The drawings do not purport to show all locations and all requirements for metal trim in connection with the work of this Section. Carefully study the Drawings and the installation provide in place all meal trim normally recommended by the manufacturer of the gypsum wallboard used in strict accordance with the manufacturer’s recommended methods of installation.

3.5 GYPSUM WALLBOARD FINISHING

A. The following specification defines the level of finishing of gypsum board surfaces as defined in ASTM C 840, Article 22 and as amended by GA 214-90.
   - Level "4" – All joints and interior angles shall have tape embedded into joint compound and shall receive separate coats of joint compound applied over all joints, angels, fastener heads and accessories; surface shall be free of excess joint compound; all surfaces shall be smooth and free of tool marks and ridges.

B. Allow each application of compound applied to joints and fasteners to dry, then sand if necessary. Caution shall be used to avoid roughing of wallboard paper.

3.6 FIELD QUALITY CONTROL: Prior to any board installations, Architect or designee will conduct an above-ceiling observation to ensure compliance with UL criteria for all full-height fire-rated partitions, and report deficiencies observed. Do not proceed with installation of gypsum board until deficiencies have been corrected.

3.7 PROTECTION AND CLEANING

A. Protect, by suitable means, all work of this Section until responsibility for same shall have been relieved by next operation.

B. This Contractor shall sweep all his debris and remove same as work progresses.

3.8 WASTE MANAGEMENT – Coordinate with Section 01 74 19

A. Separate clean waste gypsum products from contaminants for recycling in accordance with the Waste Management Plan. Do not include wood, plastic, metal, asphalt-impregnated gypsum board, or any gypsum board coated with glass fiber, vinyl, decorative paper, paint, or other finish. Place in designated area and protect from moisture and contamination.

B. Recycle clean waste gypsum products:
   1. Return to gypsum board manufacturer.
   2. Pulverize and apply on-site as soil amendment in accordance with landscape specifications. Do not use products containing glass fiber. Protect granular material from moisture.

C. Separate metal waste in accordance with the Waste Management Plan and place in designated areas for recycling or reuse.

END OFSECTION 092900

SECTION 095123 - ACOUSTICAL TILE CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Information For Bidders, General Clauses and Special clauses apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. New ceiling system consisting of acoustical tiles, exposed suspension grid and hanging system at Cleaners Lounge room # 152 and NYS DOT Inspector's Office # 130.
2. Existing grid layout to be preserved for proper location of sprinkler heads on center with ceiling tiles.

1.3 SUBMITTALS

A. Product Data: For each type of product specified.

B. Samples for Verification: Full-size units of each type of ceiling assembly indicated; in sets for each color, texture, and pattern specified, showing the full range of variations expected in these characteristics.

1. Full-size samples of each acoustical tile type, pattern, and color.
2. Sets of 12-inch long samples of exposed suspension system members.
3. Set of 12-inch long samples of exposed moldings for each color and system type required.

C. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who has completed acoustical tile ceilings similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

B. Source Limitations for Ceiling Units: Obtain each acoustical ceiling tile from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

C. Source Limitations for Suspension System: Obtain each suspension system from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

1. Obtain both acoustical ceiling tiles and suspension system from the same manufacturer.

D. Fire-Test-Response Characteristics: Provide acoustical tile ceilings that comply with the following requirements:

1. Fire-response tests were performed by UL.
2. Surface-burning characteristics of acoustical tiles comply with ASTM E 1264 for Class A materials as determined by testing identical products per ASTM E 84.
3. Fire-resistance-rated assemblies, which are indicated by design designations from UL's "Fire Resistance Directory," are identical in materials and construction to those tested per ASTM E 119.
4. Products are identified with appropriate markings of applicable testing and inspecting agency.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical tiles and suspension system components 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, and other causes.

B. Before installing acoustical tiles, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical tiles carefully to avoid chipping edges or damaging units in any way.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install acoustical tile ceilings until spaces are enclosed and weatherproof, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.7 COORDINATION

A. Coordinate layout and installation of acoustical tiles and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.8 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.

1. Acoustical Ceiling Units: Full-size units equal to 10 percent of amount installed.
2. Suspension System Components: Quantity of each grid and exposed component equal to 10 percent of amount installed.

PART 2 - PRODUCTS

2.2 ACOUSTICAL TILES

A. MANUFACTURERS

B. Acoustical Tile Standard: Provide manufacturer's standard tiles of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.

C. Acoustical Tile:
1. Armstrong 1940 Ultima High NRC, 24 x 24 in.

2.3 METAL SUSPENSION SYSTEMS

A. Metal Suspension System :
1. Tegular Armstrong Prelude XL WH 15/16” grid.
a. Color: White.
2. 7800 7/8 in. by 7/8 in. hemmed angle at perimeter.

B. Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.

C. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung, unless otherwise indicated.

D. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

1. Zinc-Coated Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635, Table 1, Direct Hung) will be less than yield stress of wire, but provide not less than 0.106-inch diameter wire.

E. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.

F. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.

G. Angle Hangers: Angles with legs not less than 7/8 inch wide; formed with 0.04-inch thick, galvanized steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation; with bolted connections and 5/16-inch diameter bolts.

H. New hangers at Staff Lounge shall be installed to coordinate location of new grid to miss existing sprinkler heads.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and structural framing to which acoustical tile ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage, and other conditions affecting performance of acoustical tile ceilings.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other Sections.

B. Measure each ceiling area and establish layout of acoustical tiles to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width units at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION

A. General: Install acoustical tile ceilings to comply with manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
2. Splay hangers only where required and, if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure; that are appropriate for substrate; and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.

5. Space hangers not more than 48 inches o.c. along each member supported directly from hangers, unless otherwise indicated; and provide hangers not more than 8 inches from ends of each member.

C. Install edge moldings and trim of type indicated at perimeter of acoustical tile ceiling area and where necessary to conceal edges of acoustical units.
1. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
2. Do not use exposed fasteners, including pop rivets, on moldings and trim.

B. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

C. Arrange directionally patterned acoustical tiles as follows:

1. As indicated on reflected ceiling plans.

D. Install acoustical tiles in coordination with suspension system and exposed moldings and trim. Place splines or suspension system flanges into kerfed edges so tile-to-tile joints are closed by double lap of material.

1. Fit adjoining tile to form flush, tight joints. Scribe and/or rabbet cut tile for accurate and level fit at borders and around penetrations through tile.
2. Protect lighting fixtures and air ducts to comply with requirements indicated for fire-resistance-rated assembly.

3.4 CLEANING

A. Clean exposed surfaces of acoustical tile ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace tiles and other ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095123

SECTION 099000 – PAINTING

PART 1 – GENERAL

1.1 Drawings and General Provisions of the Contract, including information for Bidders, General Clauses and Division 1, General Requirements apply to this Section.

1.2 DESCRIPTION OF WORK

A. The work of this Section consists of the provision of all materials, labor and equipment and the like necessary and/or required for the complete execution of the preparation, painting and finishing work for this project as required by the keynotes and drawings. including, but not limited to the following:

I. Infill of exterior wall at through-the-wall air conditioning unit, Computer Room, 2nd .floor. Paint the entire wall where the wall infill work is performed. Gypsum board finish

II. Patch work where duct modification work requires partial removal and reinstallin wall material e.g. gypsum board, convcrete masonty units (c.m.u.).

1.3 RELATED WORK SPECIFIED ELSEWHERE –

A Entire Project Specification.

B Construction drawings.

1.4 QUALITY ASSURANCE

A. The work of this Section shall be accomplished by a “Specialty Contractor”.

B. Field quality control shall be obtained by review of first finished area of item of each color scheme as required by the Architect for color, texture and workmanship. Said area, or areas, when accepted will serve as the minimum project standard for all ensuing work.

C. All workmanship, restrictions, preparation, and the like shall be in accordance with the “Spec-Data” guidelines as published by the manufacturer for the particular product line as well as the standards as promulgated by the Painting and Decorating Contractors Association for high quality institutional applications.

1. SSPC-SP 1 – Solvent Cleaning
2. SSPC-SP 2 – Hand Tool Cleaning
3. SSPC-SP 3 – Power Tool Cleaning
4. SSPC-SP 13 / NACE No. 6 Surface Preparation for Concrete
5. EPA-Method 24

D. Before and during the application of interior finishing, varnishing, painting, etc. and until final acceptance by the Owner of all work covered by the Contract, the Contractor shall, unless otherwise specified in the Contract Documents, provide sufficient heat to produce a temperature of not less than 68 degrees F nor more than 78 degrees F.

E. Regulatory Requirements
   1. Applicable building code
   2. New York State Department of Environmental Conservation – Part 205 in "Architectural Surface Coatings" – for Volatile Organic Compound (VOC)
   3. U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) Construction Industry Standards Part 1926.62, Lead Standard.

F. Materials used for the work of this Section shall, where applicable be VOC compliant with the latest rulings from the EPA and shall further meet LEED requirements which are set by Green Seal, Inc. In addition, the Green Seal recommendations that paints be formulated without specific harmful ingredients (e.g., formaldehyde, benzene) and heavy metals (e.g., cadmium lead, mercury) shall be enforced. For architectural coatings other than paint, system shall comply with the California Air Resources Board (ARB) Suggested Control Measure for Architectural Coatings (June 2000) and/or the South Coast Air Quality Management District's Rule 1113.

1.5 SUBMITTALS

A. Certification of specification compliance with manufacturer's certificates and test reports as may be required by the Architect.

B. Product Data: Provide manufacturer's product literature for all materials specified and material manufacturer's printed directions and recommendations for environmental conditions, surface preparation, priming, mixing, reduction, spreading rate, application, and storage, as applicable for each of the materials specified; further –
   1. Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
   2. Indicate relative dollar value of recycled content product to total dollar value of product included in project.
   3. If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
   4. If recycled content product is part of an assembly, indicated relative dollar value of recycled content product to total dollar value of assembly.

C. Samples
   1. Initial Selection: Submit manufacturer's full color charts for each type of finish and paint for selection by the Architect. Verify colors specified with manufacturer's color charts for availability and notify the Architect if any discrepancies should occur.
   2. Verification prior to application
      a. When required by Architect, submit without cost to the Owner, two samples of each color and material on 12 inch by 12 inch hard-board.
      b. Submit two samples of finish on concrete masonry, drywall, metal or other surfaces as required until acceptable color, sheen and texture are achieved.
   3. Submit samples of finished (stained and painted) wood in triplicate for approval. Samples shall be 4 inched by 8 inches samples of the species of wood specified, stained and/or painted as required and clearly labeled with type of coating, amount of coats applied, etc.
   4. All samples shall be labeled; and include the following information:
      a. Manufacturer's name
      b. Type of paint/stain/hardener
      c. Manufacturer's stock number
      d. Color: name and number
      e. Instructions for reducing, where applicable
      f. VOC content

D. Manufacturer's Material Safety Data Sheet (MSDS) must be submitted for each manufactured product.

E. Local/Regional Materials:
   1. Sourcing location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the project site.
   2. Manufacturing location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.
   3. Product Value: Indicate dollar value of product containing local/regional materials; include materials cost only.
   4. Product Component(s) Value: Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component per unit of product.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Each container of material delivered to the project site shall contain label with the following information contained thereon:
   1. Manufacturer's name and location
   2. Type of paint/stain/hardener (type of coating)
   3. Manufacturer's stock number
   4. Color: Name and Number
   5. Instructions for reducing, where applicable
   6. Label analysis including solids (weight and volume); component mix; flash point; VOC analysis; viscosity and like components as well as any and all restrictions on use.

B. Sampling and Materials:
   1. When requested by the Architect, obtain test samples from material stored at project site or source of supply.
   2. Furnish from materials designated by the Architect:
      a. 1 quart (0.946 liters) – From batches of 50 gallons (37.84 liters) or less
      b. 2 quarts (1.892 liters) – From batches over 50 gallons (37.84 liters).
   3. Select samples at random from sealed containers.

C. Store all materials in designated spaces in a manner which meets the requirement of applicable codes and fire regulations. When not in use, keep such spaced locked and inaccessible to those not employed under this Section. Each space shall be provided with a fire extinguisher of Carbon Dioxide or Dry Chemical type bearing the label of the National Board of Fire Underwriter's and tag of most recent inspection.

D. Protect work at all times. Protect adjacent work and materials by suitable coverings or other methods as work progresses.

E. Comply with manufacturer's recommendations as to environmental conditions under which coatings and coating systems can be applied. Do not apply finished in any areas where dust is being generated.
   1. Do not apply initial coating until moisture content is within limitations recommended by paint manufacturer.
      a. Test with moisture meter

1.7 SUSTAINABILITY

A. In the selection of the products and materials of this section as well as for the entire project, preference will be given to those with the following characteristics:
   1. Water based.
   2. Water-soluble.
   3. Can be cleaned up with water.
   4. Non-flammable.
   5. Biodegradable.
   6. Low or preferably no Volatile Organic Compound (VOC) content.
   7. Manufactured without compounds that contribute to ozone depletion in the upper atmosphere.
   8. Manufactured without compounds that contribute to smog in the lower atmosphere.
   9. Do not contain methylene-chloride.
   10. Do not contain chlorinated hydrocarbon.
   11. Contains the least possible of post-consumer or post-industrial waste.

PART 2 – PRODUCTS

2.1 GENERAL

A. All materials used in the work shall be pure, of best quality, and "Top-of-Line" of approved manufacturer.

   ALL MATERIALS USED IN THE WORK OF THIS PROJECT SHALL BE V.O.C. COMPLIANT IN ACCORDANE WITH LATEST RULINGS OF THE FEDERAL EPA AND THOSE ESTABLISHED JURISDICTION AS REFERENCED IN PARAGRAPH 1.04 OF THIS SECTION.

B. Materials which are specified by brand and make shall be furnished and used as specified.

C. Where other brands are considered by the Contractor as equal or desirable, such brands shall be used only after written approval of the Architect is obtained.

D. If proposed brand has not been specified, the name of the manufacturer shall be submitted to the Architect for approval, and these materials shall be of such grades and makes as to produce perfect and durable finishes.

E. Paint used for all interior work shall contain an anti-mildew additive which shall be lead free. Paint shall contain less than 0.06 percent lead by weight (of total non-volatile solids).

2.2 ACCEPTABLE MANUFACTURERS – PAINT

A. Bruning

B. Benjamin

C. Sherwin-Williams

D. PPG Industries

E. Pratt & Lambert

F. ICI Industries

G. Tnemec

2.3 ACCEPTABLE MANUFACTURERS – STAIN

A. Samuel Cabots, Inc.

B. Sherwin-Williams

C. PPG Industries

D. Olympic/PPG

E. Benjamin Moore

2.4 MIXING

A. All paint shall be thoroughly mixed, the mixture shall be of uniform color and consistency, and shall be in thoroughly strained condition before being applied.

B. Thinning will not be permitted unless the manufacturer's directions require same or the method of application to be used (e.g., brush, roller or spray).

PART 3 – EXECUTION

3.1 INSPECTION AND ACCEPTANCE

A. Examine all surfaces and contiguous elements to receive work of this Section and correct, as part of the Work of this Contract, any defects affecting installation. Commencement of work will be construed as complete acceptability of surfaces and contiguous elements.

3.2 WORKMANSHIP AND APPLICATION

A. Mix and apply all materials in strict accordance with the manufacturer's instructions and shall be performed by experienced mechanics trained in the application of the specified finish materials.
B. Spread all materials evenly without runs, sags or blemishes.
C. Surface preparation, both initial and intermediate, shall include any required sanding, steel wool wiping, or other such treatment to even out any imperfections in base substrate before application of ensuing coats. Further, thoroughly clean, smooth and properly prepare all surfaces scheduled to receive finishing and/or exposed to view in the finished construction. Surfaces shall be dust and dirt free. Surface conditions and substances which may bleed through and which cause non-uniformity of finish or otherwise may spoil the final appearance desired by the Architect or affect the durability of the finish shall be removed, primed, or otherwise treated, as necessary to insure full coverage.
D. Prior to finishing, fill all holes, dents, joints, cracks, and irregularities in surfaces scheduled for paint finish with an approved spackle mixture suitable for the material and purpose. When dry these areas shall be sandpapered smooth and flush with adjoining surfaces.
E. Where multiple coats of paint are specified, tint each preceding coat.
F. All coats shall be thoroughly dry before applying succeeding coats.
G. Do no exterior painting while surface is damp, or during rainy or frosty weather.
H. For shop primed material follow applicable specification for intended use as per schedule.
I. Back prime all wood work with single coat of stain primer prior to erection. Seal all cut edges. Runs on faces not permitted.
J. Leave all parts of moldings and ornaments clean and true to details with no undue amount of paint in corners and depressions.
K. Make edges of paint adjoining other materials or colors clean and sharp with no overlapping.
L. Apply primer on all work before glazing.
M. Refinish whole surface area where portion of finish has been damaged or is not acceptable.

3.3 CLEANING

A. Remove spilled, splashed, or splattered paint from all surfaces. Touchup and restore finish where damaged.
B. Do not mar surface finish on item being cleaned.
C. Leave storage spaces used in the work of this Section clean and in proper condition for required usage originally intended.

3.4 WASTE MANAGEMENT

A. Separate waste in accordance with the Waste Management Plan. Set aside extra paint for future color matches, or reuse by Owner. Where local options exist for leftover paint recycling, collect all waste paint by type and provide for delivery to recycling or collection facility.
B. Close and tightly seal all partly used paint and finish containers and store protected in well-ventilated, fire-safe area at moderate temperature.
C. Place empty containers of solvent-based paints in areas designated for hazardous materials.
D. Do not dispose of paints or solvents by pouring on the ground. Place in designated containers for proper disposal.

3.5 PAINT SCHEDULE

A. Interior Gypsum Board Walls: Eggshell Interior Latex.
   1. Prpe: Contractor shall spackle, tape all wall joints and imperfections
   2. Prime coat: Benjamin Moore EcoSpec WB Interior Latex Primer 372.
   3. Two finish coats: Benjamin Moore EcoSpec WB Interior Latex Eggshell Finish 376.
   4. Color: As selected from manufacturer's standard colors. Contractor shall provide manufacturers sample to be approved by Architect.

B. Interior CMU: Interior Latex Eggshell.
   1. Apply 206 Super Spec Masonry Hi-Build Block Filler
   2. Two finish coats: Benjamin Moore EcoSpec WB Interior Latex Eggshell Finish N374.
   3. Color: As selected from manufacturer's standard colors.

END OF SECTION 099000

SECTION 220500 - GENERAL PROVISIONS FOR PLUMBING

1.1 GENERAL

A. SUMMARY

1) This Section shall be coordinated with and is complementary to the General Conditions, Information for Bidders, General Clauses and Special Clauses.

2) Where items of the General Conditions are repeated in this Section of the Specifications, it is intended to qualify or to call particular attention to them; it is not intended that any other parts of the General Conditions shall be assumed to be omitted if not repeated herein.

3) This Section applies equally and specifically to all Contractors and Subcontractors supplying labor and/or equipment and/or materials as required under the Plumbing, Sections of the Specifications.

1.2 CODES AND STANDARDS

A. BOCA Basic Building Code, Basic National Mechanical Code, Energy Conservation Code
B. N.Y. State Uniform Fire Prevention and Building Code
C. NFPA National Fire Protection Association
D. AWWA American Water Works Association
E. IBR Institute of Boiler and Radiator Manufacturers
F. NEMA National Electrical Manufacturers Association
G. ASHRAE American Society of Heating, Refrigeration and Air Condition Engineers.
H. ARI Air Conditioning and Refrigeration Institute
I. AMCA Air Moving and Conditioning Association
J. National Standard Plumbing Code with all Amendments
K. Local Water Company Rules and Regulations
L. NFPA-90A Air Conditioning and Ventilation Systems

1.3 INTENT

A. It is the intention of the Specifications and Drawings to call for finished Work, tested, and ready for operation. All materials, equipment, and apparatus shall be new and of first-class quality.

B. Any apparatus, appliance, material, or work not shown on Drawings, but mentioned in the Specifications, or vice versa, or any incidental accessories, or minor details not shown but necessary to make the work complete and perfect in all respects and ready for operation, even if not particularly specified, shall be provided without additional expense to the Owner.

1.4 DRAWINGS

A. The Drawings are generally diagrammatic and are intended to convey the scope of Work and indicate general arrangement of equipment, piping, and fixtures.

B. The locations of all items shown on the Drawings or called for in the Specifications that are not

definitely fixed by dimensions are approximate only. The exact locations necessary to secure the best conditions and results must be determined at the project and shall have the approval of the Engineer before being installed. Do not scale Drawings.

C. Follow Drawings in laying out to verify spaces in which work will be installed. Maintain maximum headroom and space conditions at all points. Where headroom and space conditions appear inadequate, Engineer shall be notified before proceeding with installation.

D. Piping connected to equipment may require different size connection than indicated on the Drawings. The Contractor shall provide transition pieces as required at the equipment.

E. Contractor shall provide coordinated shop drawings of all plumbing work.

1.5 VISITING THE SITE

A. Before submitting the final proposal, examine the site of the proposed work to determine the existing conditions that may affect work, as this Section will be held responsible for any assumptions in regard thereto.

1.6 EQUIPMENT AND MATERIALS

A. The proposal and bid must cover all items on the Drawings and in the Specifications exactly as drawn and specified.

B. Substitutions are NOT allowed to meet Department of Health requirements.

C. Note that the approval of shop drawings or other information submitted in accordance with the requirements herein specified does not assure that the Engineer or any other Owner's representative attests to the dimensional accuracy or dimensional suitability of the material or equipment involved or the mechanical performance of equipment. Approval of shop drawings does not invalidate the Plans and Specifications if the shop drawings are in conflict with the Plans and Specifications.

D. Within twenty (20) working days after the acceptance of the proposal, and prior to the submission of any shop drawings for approval, a complete list of manufacturers shall be submitted to the Engineer for approval of all equipment and materials proposed for the work. No approvals will be rendered on shop drawings submitted before the complete list of manufacturers is approved.

E. If material or equipment is installed before it is approved, and/or in the opinion of the Engineer the material or equipment does not meet the intent of the Drawings and Specifications, the removal and replacement shall be made at no extra cost to the Owner.

F. The materials, workmanship, design, and arrangement of all work installed under the Contract shall be subject to the approval of the Engineer.

G. All equipment and materials required for installation under these Specifications shall be new and without blemish or defect. All electrical equipment shall bear labels attesting to Underwriter's Laboratories approval. Where no specific indication as to the type or quality of the material or equipment is indicated, a first class standard article shall be furnished.

H. Where it is proposed to use an item of equipment other than specified or detailed on the Drawings which requires any redesign of the structure, partitions, foundations, piping, or of any other part of

the mechanical layout, all such redesign, and all new drawings and detailing required therefore shall, with the approval of the Engineer, be prepared at no additional cost to the Owner.

I. Where such approved deviation requires a different quantity and arrangement of, piping, wiring, conduit, and equipment from that specified or indicated on the Drawings, with the approval of the Engineer, furnish and install any such, piping, structural supports, insulation, and any other additional equipment required by the system, at no additional cost to the Owner.

1.7 SHOP DRAWINGS

A. Prior to delivery to job site, but sufficiently in advance of requirements necessary to allow Engineer ample time for review, submit for approval (5) copies of shop drawings of all equipment, materials, piping, and sleeves, etc., and further obtain written approval for same from the Engineer, before installing any of these items.

B. Shop drawings shall consist of manufacturer's certified scale drawings, cuts, or catalogs, including descriptive literature and complete certified characteristics of equipment, showing dimensions, capacity, code requirements, motor and drive testing, as indicated on the Drawings or Specifications. The Contractor shall generate detailed pipe layout shop drawing indicating dimensions and routing of proposed piping, supports and connection to existing piping and equipment for review and approval.

C. Approval rendered on shop drawings shall not be considered as a guarantee of measurements or building conditions. Where drawings are approved, said approval does not in any was relieve responsibility, or necessity, of furnishing material or performing work as required by the Contract Drawings and Specifications.

D. Failure to submit shop drawings in ample time for checking shall not entitle an extension of Contract time, and no claim for extension by reason of such default will be allowed.

E. Prior to submission of shop drawings, thoroughly check each shop drawing, reject those not conforming to the Specifications, and indicate (by signature) that the shop drawings submitted meet Contract Requirements.

F. Incorporate a numbering system to help keep track of shop drawing submittals as follows:

P.....Plumbing shop drawings

G. Label resubmitted shop drawings with a stamp indicating the submittal number, for example: SECOND SUBMISSION; THIRD SUBMISSION, etc. and send separate transmittals for each item being submitted so that one transmittal does not cover more than one specific item or group of items from one manufacturer.

H. See general clause 44 for additional requirement.

I. Contractor shall provide full scaled piping, coordinated shop drawings for all plumbing work for review and approval prior to proceeding.

1.8 RECORD DRAWINGS

A. During construction keep an accurate record of all deviations between the work as shown on the Drawings and that which is actually installed.

B. Secure from the Engineer, a complete set of Mylar transparencies of the Drawings and note

thereon all changes. Make a complete record of all changes and revisions in the original design which exist in the complete work. The cost for the Mylar transparencies shall be paid for by each trade.

C. Contractor shall submit as-built drawings in autoCad format on CD, minimum 2002 or later format.

D. Refer to General Clause Section 53 (Record Drawing) for additional requirements.

1.9 LAWS, ORDINANCES, PERMITS AND FEES

A. Give all necessary notices, obtain all permits and pay all governmental taxes, fees, and other costs in connection with the work; file all necessary plans, prepare all documents, and obtain all necessary approvals of all governmental departments having jurisdiction; obtain all required certificates of Inspection for the work and deliver to the Engineer before request for acceptance and final payment for the work.

B. Include in the work, without extra cost to the Owner, any labor, materials, services, apparatus, drawings, (in addition to Contract Drawings and Documents) in order to comply with all applicable laws, ordinances, rules and regulations, whether or not shown on Drawings and/or specified.

C. All materials furnished and all work installed shall comply with the rules and recommendations of the National Fire Protection Association, with all requirements of local utility companies, with the recommendations of the fire insurance rating organization having jurisdiction, and with the requirements of all governmental departments having jurisdiction, including New York City Building Code and New York State Health Code.

1.10 ORGANIZATION OF WORK

A. The work throughout shall be executed in the best and most thorough manner under the direction of and to the satisfaction of the Engineers, Owners and Project Coordinators, who will jointly interpret the meaning of the Drawings and Specifications, and shall have the power to reject any work and materials which, in the judgment, are not in full accordance therewith.

B. The work called for under this Contract shall be carried on simultaneously with the work of other trades in a manner such as not to delay the overall progress of the work. Furnish promptly to other trades involved at the project, all information and measurements relating to the work which they may require. Cooperate with them in order to secure the harmony necessary in the interest of the project as a whole.

C. Furnish and install all work as fast as possible to meet all construction schedules.

D. Employ a competent superintendent in charge of the work at all times. Such superintendent shall be replaced if unsatisfactory to the Owner.

E. Maintain a complete file of shop drawings at all times available to the Owner's representative.

F. Where items of equipment and/or materials are indicated in the Specifications as being furnished by other trades for installation, assume responsibility for the unloading of such equipment and/or materials from the delivery trucks, and for providing safe storage for same as required pending installation.

G. Where the work is to be installed in close proximity to work of other trades, or where there is

evidence that the work is to interfere with work of other trades, assist in working out space conditions to make a satisfactory adjustment.

H. Prepare composite working coordinated shop drawings and sections at a suitable scale not less than 3/8" = 1'-0" clearly showing how the work is to be installed in relation to the work of other trades. If the installation is made before coordinating with other trades, make all necessary changes in the work without extra charge to the Owner.

I. Provide a "Logical Sequence Method" construction schedule for review prior to the start of any work. Update the construction schedule as required during the project.

1.11 PROTECTION OF WORK AND PROPERTY

A. Maintain and protect all equipment, materials and tools from loss or damage from all causes until final acceptance by the Owner.

B. Assume responsibility for the protection of any finished work or other trades from damage or defacement by the operations and remedy any such injury or damages.

1.12 SHUTDOWNS

A. The Owner shall be notified of the estimated duration of the shutdown period at least ten (10) days in advance of the date the work is to be performed. Contractor shall be responsible for planning, scheduling, and coordinating shutdowns.

B. Work shall be arranged for continuous performance, including night work and overtime, as required, to assure that existing operating services will be shut down and work complete and ready for return to service for building occupancy and use. No additional payment will be made for performing shut down, removals, and installation related work on weekends and night time hours to maintain services to occupied parts of the building.

C. Coordinate all shutdowns through construction manager..

1.13 SCAFOLDING, RIGGING, HOISTING

A. Provide all scaffolding, rigging, hoisting and services necessary for erection and delivery into the premises of all equipment and materials furnished under this Section of the Specifications, and remove same from premises when no longer required.

B. In the event that supplementary bracing of the basic building structure is required to assure a secure rigging procedure and a secure route for the equipment being handled, assume full responsibility for such supplementary bracing.

1.14 BASES AND SUPPORTS

A. Provide all bases and supports not part of the building structure of required size, type and strength, as approved by the Engineer, for all equipment and materials furnished by him. All equipment, bases, and supports shall be adequately anchored to the building structure to prevent shifting of position under operation conditions.

1.15 SLEEVES, PIPE, AND CONDUIT INSERT AND ANCHOR BOLTS

A. Provide and assume responsibility for the location and maintenance in proper position of all sleeves, inserts, and anchor bolts required for the work. In the event that failure to do so requires cutting and patching of finished work, it shall be done without additional cost to the Owner.

B. All pipes and conduits passing through masonry walls or partitions shall be provided with sleeves having an internal diameter larger than the outside diameter of the pipe or insulation enclosing the pipe or conduit. Sleeves shall be Schedule 40 black steel pipe.

C. Sleeves through foundation walls shall be James B. Clow and Sons No. F-1430 or F-1435 cast iron wall sleeve with intermediate integral flange. Sleeves shall be set with ends flush with each face of wall. The space between sleeve and pipe shall be packed with oakum to within 2" of each face of the wall. The remaining space shall be packed and made watertight with a waterproof compound.

D. Sleeves through concrete floors or interior masonry walls shall be Schedule 40 black steel pipe, set flush with finished wall surfaces, but extended 1/2" above finished floors. The open sleeve space shall be packed with non-combustible materials.

E. Sleeves through non-masonry partitions shall be 22 gauge galvanized sheet steel, set flush with finished surfaces of partitions.

F. Inserts shall be individual type of malleable iron construction with accommodation for removable nuts and threaded rods up to 3/4" diameter, permitting lateral adjustment, except as otherwise noted. Individual inserts shall be Grinnell Fig. 279 up to 5" pipe and conduit, Fig. 282.6" up to 8" pipe and conduit, Fig. 152 above 8" and up to 12" pipe and conduit. For figures 282 and 152, they shall come with an opening at the tip to allow reinforcing rods up to 1/2" diameter to be passed through the insert body. Rods shall extend a minimum of 4" on either side of the insert.

G. In general, all piping and conduit shall be supported from structural steel building members only or approved malleable steel inserts imbedded in concrete pours.

H. Where revisions are required and are approved, piping and conduit 3" and smaller may be supported at Intermediate Points by Phillips' 3/4" expansion bolts with lead shields, provided main supports are welded to structural steel and are not more than twenty feet on centers. Intermediate supports, for pipe 4" and larger shall be attached to concrete by means of 4" x4" x 3/8" clip knee angles with 3/4" expansion bolt in shear and supporting rod at 90 degree from another bolt.

I. Piping 3" and smaller shall be supported from existing slab by "Phillips" 3/4 expansion bolts with lead shields. Piping 4" and larger shall be supported by means of 4" x 4" x 3/8" clip knee angle with 3/4" expansion bolts in shear and supporting rod at 90 degree from another bolt.

J. Provide sleeves for pipes passing through roofs. Sleeves passing thru roofs shall be as described on drawings extending min. 12" above finished roof. All pipes passing through roof shall be a minimum of 10" from walls or other construction to permit proper flashing. Provide counter flashing.

K. Where sleeves pass through waterproofed floors, they shall be IPS brass pipe sleeves of the required diameter, brazed at the bottom to 18" x 18", 16-ounce copper flashing for bond with waterproofing. The tops of the sleeves shall extend 1/2" above.

L. No piping or equipment shall be supported from corrugated decking construction. For this area provide supplementary steel to support ductwork, piping, conduit or equipment. Supplemental steel members shall be welded to building structural steel.

M. All hangers, rods and supports shall be installed prior to construction fireproofing.

N. The required fire resistance rating of floor or floor/ceiling assemblies and walls shall be maintained where a penetration is made for electrical, mechanical, plumbing pipes, conduits, ducts and systems. Fire stopping shall be provided at openings around vents, pipes, ducts, conduits at floor levels and walls with non-combustible materials, such as rockwool or equal.

1.16 ESCUTCHEONS

A. Provide escutcheons on pipes wherever they pass through ceilings, walls, or partitions.

B. Escutcheons or pipes passing through outside walls shall be Ritter Pattern and Casting Co., No. 1, solid, cast brass, flat type secured to pipe with set screw.

C. Escutcheons for pipes passing through floors shall be Ritter Pattern and Casting Co., No. 36A, split-hinged, cast brass type, designed to fit pipe on one end and cover sleeve projecting through floor on the other end.

D. Escutcheons for pipes passing through interior walls, partitions, and ceilings shall be Ritter Pattern and Casting Co., No. 3A, split-hinged, cast beams chromium plated type.

1.17 MANUFACTURER'S IDENTIFICATION

A. Manufacturer's nameplate, name or trademark, shall be permanently affixed to all equipment and material furnished under this Specification. Where such equipment is in a finished occupied space, the nameplate shall be in a concealed but accessible location. The nameplate of a Subcontractor or Distributor will not be acceptable.

1.18 TAGS AND CHARTS

A. Furnish and attach to each valve as hereinafter specified, a 1-1/2" diameter brass tag with 1/2" indented numerals filled with durable black compound. Tags shall be securely attached to stems of valves with copper wire and "S" hooks.

B. Provide tags for the following valves:
   1) Building and area shut-off valves.

1.19 IDENTIFICATION

A. Identification shall be in accordance with "Scheme for Identification of Piping System ANSI A13.1" and OSHA safety color regulation.

B. Markers shall be snap on type as manufactured by Seton Nameplate Corp., New Haven, Conn. (Setmark System) or approved equal. Markers shall completely encircle the pipe with a substantial overlap. No adhesive shall be used. They shall be manufactured of U.L. approved, self-extinguishing plastic. When the pipe including insulation (if any) is larger than 6 inches diameter and larger, markers shall be strap-on type.

C. Provide identification of piping for all mechanical work.

D. Pipe shall be lettered and valves tagged in accordance with the schedule below. Lettering shall be located near each valve and branch connection and at intervals of not over 40 feet (10 feet on fire lines) on straight runs of pipe. Provide flow arrows for all piping at each marker. Adjacent to the legend, stencil the size of the pipe, conduit or ductwork.

STENCIL AND VALVE TAG SCHEDULE

Service	Stencil	Color	Tag Designation
Domestic Water	Domestic Water	Green	DCWS
Domestic Hot Water	Domestic Hot Water	Red	DHWS
Domestic Hot Water Return	Domestic Hot Water Return	Yellow	DWHR
Waste	Waste	Blue	W
Equipment Drain	Drain	Blue	DRAIN
Vent	Vent	Yellow	V
Acid Waste	Acid Waste	Blue	AW
Storm Sewer	Storm Sewer	Green	SS

1.20 TOOLS

A. All specified tools for proper operation and maintenance of the equipment shall be delivered to the Owner's representative and a receipt requested for same at no additional cost to the Owner.

1.21 QUIET OPERATION

A. All equipment and material shall operate under all conditions of load without any sound or vibration which, in the opinion of the Engineer, is objectionable. Where sound or vibration conditions arise which are considered objectionable by the Engineer, eliminate same in a manner approved by the Engineer.

1.22 RUBBISH REMOVAL

A. See to it that the Project is, at all times, maintained free of all rubbish, rubble, waste material, packaging materials, etc. accumulating as a result of his work. Assume responsibility for the cleaning up of packaging removed from materials and equipment furnished by other trades for the installation. Note that final acceptance of the work is contingent upon the project being free of all excess and waste materials resulting from the work.

1.23 CLEANING PIPING AND EQUIPMENT

A. Clean all piping, and equipment of all foreign substances inside and out before being placed in operation.

B. If any part of a system should be stopped by foreign matter after being placed in operation, the system shall be disconnected, cleaned, and reconnected wherever necessary to locate and remove obstructions. Any work damaged in the course of removing obstructions shall be repaired when the system is reconnected at no additional cost to the Owner.

C. During construction, properly cap all pipes and equipment nozzles so as to prevent the entrance of sand, dirt, etc.

D. After the water piping systems have been properly cleaned, each water system shall be operated for a minimum of three days with 1/2" surgical felt, bonded to baskets on each pump strainer. The felt filters shall be removed and replaced each day and the system shall be run for as long a

time as necessary to thoroughly clean all piping until approved by the Engineer. Open flushout valves where provided, during the cleaning period.

1.24 DELIVERY OF MATERIAL

A. Deliver the material and store same in spaces indicated by the Engineer and assume full responsibility for damage to structure caused by any overloading of the material. Contractor shall be aware that the building does not have a loading dock and limited space will be available for storage of materials. Coordinate delivery with building access and site activities. Deliveries shall be coordinated with building representative.

1.25 ALTERATIONS

A. When new work and alterations render equipment and piping useless, such equipment and piping when exposed to view, shall be removed and connections thereof to lines or ducts remaining shall be properly capped or plugged and left in construction. If construction, such as hung ceiling, furred beams, chase, etc., is opened up and removed during the course of the construction, the useless pipe therein shall be treated as though exposed to view. When required to accommodate new work, useless piping concealed in construction shall be treated as though exposed to view.

B. When existing piping systems, at points of connection to new work or in rerouting are found defective, such defective portions shall be removed and replaced with new materials without cost to the Owner.

C. Provide temporary supports where required.

D. Where alterations reveal piping, conduit circuits, wiring, and accessories that must necessarily remain in service, same shall be rerouted, replaced or altered as required to make same completely concealed in the new work at no additional cost to the Owner.

E. Where existing piping insulation is damaged by the requirements of the work, replace all damaged insulation to match existing.

F. Cutting in existing building shall be done by each Contractor as approved by the Engineer. Rough patching shall be done by each Contractor. Finish patching, plaster ceiling construction removal and repair shall be done under this Section.

1.26 EXCAVATION AND BACKFILL

A. All interior excavation and backfill and trenching, if applicable, shall be done by each Contractor.

1.27 PAINTING

A. Paint all new (and existing where listed under this contract) unpainted, non-insulated, non-galvanized, ferrous metal surfaces of pipes, conduits, ducts, equipment, fixtures, hangers, supports and accessories as follows:

B. Exposed - one prime coat of oil varnish based paint.

C. Concealed - one coat of black asphaltum paint.

D. Underground - two coats of black asphaltum paint.

E. Nameplates on all equipment shall be cleaned and left free of paint.

F. All lead bends and lead safes and flashing shall be painted with two coats of waterproof black asphaltum varnish.

1.28 TESTS

A. All piping, wiring, and equipment shall be tested as specified under the various section of the work. Labor materials, instruments and power required for testing shall be furnished under the particular Section of the Specification.

B. Tests shall be performed satisfaction of the Engineer. The Engineer will be present at such test, when he deems necessary and such other parties as may have legal jurisdiction.

C. Pressure tests shall be applied to piping only before connection of equipment and installation of insulation. In no case shall piping, equipment, or accessories be subjected to pressure exceeding their rating.

D. All defective work shall be promptly repaired or replaced and the tests shall be repeated until the particular system and component parts thereof receive the approval of the Engineer.

E. Any damages resulting from tests shall be repaired or replaced and the tests shall be repeated until the particular system and component parts thereof receive the approval of the Engineer.

F. Tests shall be performed on individual equipment, systems, and their controls. Whenever the equipment or system under test is interrelated with and depends upon the operation of other equipment, systems and controls for proper operation, functioning, and performance, the latter shall be operated simultaneously with the equipment or system being tested.

G. Perform required test for Backflow Devices.

1.29 GUARANTEE

A. The Contractor guarantees by his acceptance of the Contract that all work installed will be free from any and all defects and that all apparatus will develop capacities and characteristics specified, and that if during a period of one year from date of completion and acceptance of work any such defects in workmanship, material or performance appear, he shall immediately replace, repair, or otherwise correct the defect or deficiency without cost to the Owner within a reasonable time. Notify the Engineer in writing of the time required to do work

B. Replace or repair to the satisfaction of the Owner any and all damage done to the building or its contents or to the work of other trades in consequence of work performed in fulfilling guarantee.

C. This Article is general in nature and will not waive stipulations of other claims which specify guarantee periods in excess of one (1) year or manufacturing warranties exceeding one (1) year.

D. In the event default on this Guarantee, the Owner may have such work done as required & charge the cost to the Contractor.

E. The date of acceptance shall be the date of final payment by the Owner or notice of acceptance by the Owner, whichever is later.

1.30 OPERATION PRIOR TO COMPLETION

A. The Owner may require operation of parts or all of the installation for the beneficial occupancy prior to final completion and acceptance of the building.

B. The operation shall not be construed to mean acceptance of the work by the Engineer for the Owner. The Owner will furnish supervisory personnel to direct operation of the entire system and the Contractor shall continue to assume this responsibility until final acceptance.

1.31 ABATEMENT

A. Contractor shall notify Engineer immediately if asbestos or lead is encountered. Abatement, if needed, shall be performed by others.

--- END OF SECTION 220500 ---

SECTION 220523 - GENERAL-DUTY VALVES FOR PLUMBING PIPING

1.1 SUMMARY

A. This Section includes the furnishing and installation of general duty valves for the domestic water piping.

1.2 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Special Clauses.

B. Product Data for each valve type. Include body material, valve design, pressure and temperature classification, end connection details, seating materials, trim material and arrangement, dimensions and required clearances, and installation instructions. Include list indicating valve and its application.

1.3 QUALITY ASSURANCE

A. ASME Compliance: Comply with ASME B31.9 for building services piping and ASME B31.1 for power piping.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Prepare valves for shipping as follows:

1. Protect internal parts against rust and corrosion.
2. Protect threads, flange faces, grooves, and weld ends.

B. Use the following precautions during storage:

1. Maintain valve end protection.
2. Store indoors and maintain valve temperature higher than ambient dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.

1.5 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:

1. Ball Valves:
   a. Crane Company; Valves and Fitting Division.
   b. NIBCO Inc.
   c. Stockham Valves & Fittings, Inc.

2. Gate Valves:

a. Crane Company; Valves and Fitting Division.
b. Stockham Valves & Fittings, Inc.

1.6 BASIC, COMMON FEATURES

A. Pressure and Temperature Ratings: As indicated in the "Application Schedule" of Part 3 of this Section and as required to suit system pressures and temperatures.

B. Sizes: Same size as upstream pipe, unless otherwise indicated.

C. Operators: Use specified operators and handwheels, except provide the following special operator features:

1. Lever Handles: For quarter-turn valves 6 inches and smaller.

D. Threads: ASME B1.20.1.

E. Solder Joint: ASME B16.18.

1.7 BALL VALVES

1. Ball Valves, 4 Inches and Smaller: MSS SP-110, Class 150, 600-psi CWP, ASTM B 584 bronze body and bonnet, 2-piece construction; chrome-plated brass ball, standard port for 1/2-inch valves and smaller and conventional port for 3/4-inch valves and larger; blowout proof; bronze or brass stem; teflon seats and seals; threaded or soldered end connections: Stockham Model S-206-BRI-R-T, or approved equal with extension stem when used for insulated pipe application.

2. Operator: Vinyl-covered steel lever handle.

1.8 BRONZE GATE VALVES

1. Valves 2-1/2” and smaller, Bronze, Rising-Stem, Solid Wedge, Union Bonnet Type, threaded, provide union for servicing:

a. Stockham Model B-105
b. Approved Equal

1.9 HOSE VALVES

2. Heavy cast brass faucets with composition washer and ¾” hose connection Chrome plated angle silcock for toilet room installations with removable operating handle key. Watts Inc, Nibco inc, or approved equal.
3. Freeze protected hose-bib – Woodford model-24P, zurn or equal

1.10 VACUUM BREAKERS

1. Install vacuum breakers on water supply piping to hose bibs located in pipe chase. Vacuum breaker shall be Watts series 289 or approved equal.

1.11 EXAMINATION

A. Examine piping system for compliance with requirements for installation tolerances and other conditions affecting performance of valves. Do not proceed with installation until unsatisfactory conditions have been corrected.

B. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.

C. Operate valves from fully open to fully closed positions. Examine guides and seats made accessible by such operation.

D. Examine threads on valve and mating pipe for form and cleanliness.

E. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Check gasket material for proper size, material composition suitable for service, and freedom from defects and damage.

F. Do not attempt to repair defective valves; replace with new valves.

1.12 INSTALLATION

A. Install valves as indicated, according to manufacturer's written instructions.

B. Piping installation requirements are specified in other Division 15 Sections.

C. Install valves with unions at each piece of equipment arranged to allow servicing, maintenance, and equipment removal without system shutdown.

D. Locate valves for easy access and provide separate support where necessary.

E. Install valves in horizontal piping with stem at or above the center of the pipe.

F. Install valves in a position to allow full stem movement.

1.13 SOLDERED CONNECTIONS

A. Cut tube square and to exact lengths.

B. Clean end of tube to depth of valve socket with steel wool, sand cloth, or a steel wire brush to a bright finish. Clean valve socket.

C. Apply proper soldering flux in an even coat to inside of valve socket and outside of tube.

D. Open gate valves to fully open position.

E. Remove the cap and disc holder of swing check valves having composition discs.

F. Insert tube into valve socket, making sure the end rests against the shoulder inside valve. Rotate tube or valve slightly to ensure even distribution of the flux.

G. Apply heat evenly to outside of valve around joint until solder melts on contact. Feed solder until it completely fills the joint around tube. Avoid hot spots or overheating valve. Once the solder starts cooling, remove excess amounts around the joint with a cloth or brush.

1.14 THREADED CONNECTIONS

A. Note the internal length of threads in valve ends and proximity of valve internal seat or wall to determine how far pipe should be threaded into valve.

B. Align threads at point of assembly.

C. Apply appropriate tape or thread compound to the external pipe threads, except where dry seal threading is specified.

D. Assemble joint, wrench tight. Wrench on valve shall be on the valve end into which the pipe is being threaded.

1.15 APPLICATION SCHEDULE

A. General Application: Use ball for throttling duty. Refer to piping system Specification Sections for specific valve applications and arrangements.

B. Domestic Water Systems: Use the following valve types:

1. Ball Valves: Class 150, 600-psi CWP, with stem extension.
2. Gate Valves: Class 150, 600 psi CWP
3. Provide stem extension of insulate piping.

1.16 ADJUSTING

A. Adjust or replace packing after piping systems have been tested and put into service, but before final adjusting and balancing. Replace valves if leak persists.

--- END OF SECTION 220523 ---

SECTION 220529 - HANGERS AND SUPPORT FOR PLUMBING

1.1 GENERAL

A. SUMMARY: Section includes requirements for the following:

1) Pipe hangers and supports.
2) Hanger rods.
3) Inserts.
4) Flashing.

1.2 CITED STANDARDS

A. American Society of Mechanical Engineers:
1) ASME B31.9 - Building Services Piping.

B. ASTM International:
1) ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.

C. American Welding Society:
1) AWS D1.1 - Structural Welding Code - Steel.

1.3 SUBMITTALS

A. Submit the following in accordance with the requirements of General Clause 44 - Shop Drawings.

B. Shop Drawings: Indicate system layout with location including critical dimensions, sizes, and pipe hanger and support locations and detail of trapeze hangers.
1) Product Data:
a. Hangers and Supports: Submit manufacturers catalog data including load capacity.
2) Design Data:
a. Indicate load carrying capacity of trapeze, multiple pipe, and riser support hangers.
3) Indicate calculations used to determine load carrying capacity of trapeze, multiple pipe, and riser support hangers.
4) Manufacturer's Installation Instructions:
a. Hangers and Supports: Submit special procedures and assembly of components.
5) Firestopping:
a. Submit preparation and installation instructions.
6) Manufacturer's Certificate: Certify products meet or exceed specified requirements.

a) Engineering Judgments: For conditions not covered by UL or WH listed designs, submit judgments by licensed professional engineer suitable for presentation to authority having jurisdiction for acceptance as meeting code fire protection requirements.

1.4 QUALITY ASSURANCE

A. Surface Burning Characteristics: 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

B. Perform Work in accordance with applicable authority AWS D1.1 for welding hanger and support attachments to building structure.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years experience.

B. Installer: Company specializing in performing Work of this section with minimum three years experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site in original factory packaging, labeled with manufacturer's identification.

B. Protect from weather and construction traffic, dirt, water, chemical, and damage, by storing in original packaging.

1.7 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.8 PIPE HANGERS AND SUPPORTS

A. Manufacturers:
1) Anvil Inc.
2) Carpenter & Paterson Inc.
3) Michigan Hanger Co.
4) Superior Valve Co.

B. Plumbing Piping:
1) Conform to ASME B31.9.
2) Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Malleable iron, adjustable swivel, split ring.

3) Hangers for Cold Pipe Sizes 2 inches and Larger: Carbon steel, adjustable, clevis.
4) Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
5) Wall Support for Pipe Sizes 3 inches and Smaller: Cast iron hook.
6) Wall Support for Pipe Sizes 4 inches and Larger: Welded steel bracket and wrought steel clamp.
7) Copper Pipe Support: Copper-plated, Carbon-steel ring.

1.9 ACCESSORIES

A. Hanger Rods: Mild steel threaded both ends, threaded on one end, or continuous threaded.

B. INSERTS

Manufacturers:
1) Anvil Inc.
2) Carpenter & Paterson Inc.
3) Michigan Hanger Co.
4) Superior Valve Co.
5) Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

C. SLEEVES
1) Sleeves for Pipes Through Non-fire Rated Floors: 18 gage thick galvanized steel.
2) Sleeves for Pipes Through Non-fire Rated Beams, Walls, Footings, and Potentially Wet Floors: Steel pipe or 18 gage thick galvanized steel.

D. MECHANICAL SLEEVE SEALS

Manufacturers:
1) Thunderline Link-Seal, Inc.
2) NMP Corporation.
3) Product Description: Modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between object and sleeve, connected with bolts and pressure plates causing rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.

E. FORMED STEEL CHANNEL

Manufacturers:

1) Allied Tube & Conduit Corp.
2) B-Line Systems.
3) Unistrut Corp.
4) Product Description: Galvanized 12 gage thick steel. With holes 1-1/2 inches on center.

1.10 EXAMINATION

A. Verify openings are ready to receive sleeves.

B. Verify openings are ready to receive firestopping.

1.11 PREPARATION

A. Obtain permission from Architect/Engineer before using powder-actuated anchors.

B. Do not drill or cut structural members.

C. Obtain permission from structural engineer before drilling or cutting structural members.

1.12 INSTALLATION - INSERTS

A. Install inserts for placement in concrete forms.

B. Install inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.

C. Provide hooked rod to concrete reinforcement section for inserts carrying pipe 4 inches and larger.

D. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.

1.13 INSTALLATION - PIPE HANGERS AND SUPPORTS

A. Install in accordance with ASME 31.9

B. Support horizontal piping as scheduled.

C. Install hangers with minimum 1/2 inch space between finished covering and adjacent work.

D. Place hangers within 12 inches of each horizontal elbow.

E. Use hangers with 1-1/2 inch minimum vertical adjustment.

F. Where piping is installed in parallel and at same elevation, provide multiple pipe or trapeze hangers.

G. Support riser piping independently of connected horizontal piping.

H. Provide copper plated hangers and supports for copper piping.

I. Design hangers for pipe movement without disengagement of supported pipe.

1.14 INSTALLATION – FLASHING

A. Provide flexible flashing and metal counterflashing where piping penetrates weather or waterproofed walls, floors, and roofs.

B. Flash floor drains in floors with topping over finished areas with lead, 10 inches clear on sides with minimum 36 x 36 inch sheet size. Fasten flashing to drain clamp device.

C. Seal floor drains watertight to adjacent materials.

D. Adjust storm collars tight to pipe with bolts; caulk around top edge. Use storm collars above roof jacks. Screw vertical flange section to face of curb.

1.15 HANGER SPACING

PIPE HANGER SPACING (to IPC or better)		
PIPE MATERIAL	MAXIMUM HANGER SPACING Feet	HANGER ROD DIAMETER Inches
Copper Tube, 1-1/4 inches and smaller	6	1/2
Copper Tube, 1-1/2 inches and larger	10	1/2
Steel, 3 inches and smaller	12	1/2
Steel, 4 inches and larger	12	5/8

--- END OF SECTION 220529 ---

SECTION 220540 - THROUGH-PENETRATION FIRESTOP SYSTEMS

1.1 GENERAL

A. Drawings and general provisions of the Contract, including General and Special Clauses, apply to this Section.

1.2 SUMMARY

A. This Section includes through-penetration firestop systems for penetrations through the following fire-resistance-rated assemblies, including openings containing penetrating items:

1. Floors.
2. Walls and partitions.
3. Smoke barriers.

1.3 SUBMITTALS

A. Product Data: For each type of through-penetration firestop system product indicated.

B. Shop Drawings: For each through-penetration firestop system, show each kind of construction condition penetrated, relationships to adjoining construction, and kind of penetrating item. Include firestop design designation of testing agency approval. Revise subparagraph below if a different pressure differential is required from the 0.01 inch wg 2.5 Pa specified in ASTM E 814.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.5 PROJECT CONDITIONS

A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

1.6 PRODUCTS

A. Subject to compliance with requirements, provide one of the through-penetration firestop systems by one of the following manufacturers:

1. Hilti Construction Chemicals, Inc.
2. Isolatek International.

3. Nelson Firestop Products.
4. Specified Technologies Inc.
5. 3M Fire Protection Products.

1.7 FIRESTOPPING, GENERAL

A. Compatibility: Provide through-penetration firestop systems that are compatible with one another, with the substrates forming openings, and with the items penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.

B. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by the qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:

1. Permanent forming/damming/backing materials, including the following:

a. Slag-/rock-wool-fiber insulation.
b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
c. Fire-rated form board.
d. Fillers for sealants.

2. Temporary forming materials.
3. Substrate primers.
4. Collars.
5. Steel sleeves.

1.8 FILL MATERIAL

A. General: Provide through-penetration firestop systems containing the types of fill materials indicated in the Through-Penetration Firestop System Schedule at the end of Part 3 by reference to the types of materials described in this Article. Fill materials are those referred to in directories of the referenced testing and inspecting agencies as fill, void, or cavity materials.

B. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.

C. Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.

D. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

E. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized steel sheet.

F. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.

G. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.

H. Mortars: Prepackaged, dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.

I. Pillows/Bags: Reusable, heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents and fire-retardant additives.

J. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

K. Silicone Sealants: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
   1. Grade for Horizontal Surfaces: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces.
   2. Grade for Vertical Surfaces: Nonsag formulation for openings in vertical and other surfaces.

1.9 MIXING

A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

1.10 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

1.11 PREPARATION

A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with written recommendations of firestop system manufacturer and the following requirements:

   1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
   2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.

3. Remove laitance and form-release agents from concrete.

B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

1.12 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

A. General: Install through-penetration firestop systems to comply with "Performance Requirements" Article and firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.

B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

1. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.

C. Install fill materials for firestop systems by proven techniques to produce the following results:

1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

1.13 IDENTIFICATION

A. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:

1. The words: "Warning--Through-Penetration Firestop System--Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Through-penetration firestop system designation of applicable testing.
4. Date of installation.
5. Through-penetration firestop system manufacturer's name.
6. Installer's name.

1.14 GLEANING AND PROTECTION

A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.

B. Provide final protection and maintain conditions during and after installation that ensure through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce through-penetration firestop systems complying with specified requirements.

1.15 THROUGH-PENETRATION FIRESTOP SYSTEM SCHEDULE

A. Where UL-classified systems are indicated, they refer to the alpha-alpha-numeric designations listed in UL's "Fire Resistance Directory" under product Category XHEZ.

B. Firestop Systems for , Conduit, Pipe, or Tubing FS-1: Comply with the following:

1. UL-Classified Systems: C-AJ-1005.

C. Firestop Systems for Miscellaneous Electrical Penetrants FS-2: Comply with the following:

1. UL-Classified Systems: C-AJ-6002.

D. Firestop Systems for Groupings of Penetrations FS-3: Comply with the following:

1. UL-Classified Systems: C-AJ-8001.

--- END OF SECTION 220540 ---

SECTION 220553 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

1.1 GENERAL

A. SUMMARY: Section includes requirements for the following:
   1. Nameplates.
   2. Tags.
   3. Pipe markers.
   4. Equipment markers
   5. Labels.

1.2 REFERENCED SECTIONS

A. Drawings and general provisions of the Contract, including General and Division 1 Specifications Sections, apply to this Section.

1.3 CITED STANDARDS

A. American Society of Mechanical Engineers:
   1. ASME A13.1 - Scheme for the Identification of Piping Systems.

1.4 SUBMITTALS

A. Submit the following in accordance with the requirements of General Clause 44 - Shop Drawings.
   1. Product Data: Submit manufacturers catalog literature for each product required.
   2. Shop Drawings: Submit list of wording, symbols, letter size, and color coding for mechanical identification and valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.
   3. Manufacturer's Installation Instructions: Indicate installation instructions, special procedures, and installation.

1.5 QUALITY ASSURANCE

A. Conform to ASME A13.1 for color scheme for identification of piping systems and accessories.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.

1.7 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.8 PRODUCTS

A. Manufacturers:
   1. Brady Corp
   2. Champion America, Inc.
   3. Safety Sign Co.
   4. Seton Identification Products

1.9 NAMEPLATES

A. Product Description: Laminated three-layer plastic with engraved black letters on light contrasting background color.

1.10 TAGS

A. Plastic Tags:
   1. Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inches diameter.

B. Metal Tags:
   1. Brass or Aluminum with stamped letters; tag size minimum 1-1/2 inches diameter with finished edges.

C. Tag Chart: Typewritten letter size list of applied tags and location in anodized aluminum frame.

1.11 PIPE MARKERS

A. Color and Lettering: Conform to ASME A13.1.

B. Plastic Pipe Markers:
   1. Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering. Larger sizes may have maximum sheet size with spring fastener.

C. Plastic Tape Pipe Markers:
   1. Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.

D. Valve Chart:
   1. Valve Chart Frame: Aluminum frame, plastic window; sized to accommodate included chart, minimum size 8-1/2 by 11 inches.

1.12 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

B. Prepare surfaces in accordance with Section 099000 for stencil painting.

1.13 INSTALLATION

A. Apply stencil painting in accordance with Section 099000.

B. Install identifying devices after completion of coverings and painting.

C. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive.

D. Install labels with sufficient adhesive for permanent adhesion and seal with clear lacquer. For unfinished canvas covering, apply paint primer before applying labels.

E. Install tags using corrosion resistant chain. Number tags consecutively by location.

F. Identify equipment with plastic nameplates. Identify in-line pumps and other small devices with tags.

G. Identify control panels and major control components outside panels with plastic nameplates.

H. Identify valves in main and branch piping with tags.

I. Identify piping, concealed or exposed, with plastic pipe markers or plastic tape pipe markers. Use tags on piping 3/4 inch diameter and smaller. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and tee, at each side of penetration of structure or enclosure, and at each obstruction.

--- END OF SECTION 220553 ---

SECTION 220719 - PLUMBING PIPING INSULATION

1.1 GENERAL

A. SECTION INCLUDES

1) Piping insulation.
2) Jackets and accessories.

1.2 PRODUCTS

A. ACCEPTABLE MANUFACTURERS

1) Manufacturer: Pittsburgh Corning Corporation
2) Certainteed Corporation.
3) Owens-Corning Fiberglass Corporation (SSL II with ASJ)

1.3 INSULATION

A. Type A: Glass fiber insulation; ANSI/ASTM C547; 'k' value of 0.23 at 75º F; noncombustible. Minimum density of 3.5 lbs./cu. Ft.; temperature range 35º F to 450º F.

1.4 JACKETS

A. Interior Applications:

1. Insulation Type A - Factory applied, white, flame retardant, all service (ASJ) vapor barrier jacket of .001" aluminum foil laminated to Kraft paper with a flame retardant snuffer type adhesive reinforced with glass fibers and having a self sealing lap. Provide 2" longitudinal lap and 4" circumferential sealing strips. Permeability .02 perm.
John Manville HPT insulation.

1.5 ACCESSORIES

A. Insulation Bands: ¾" wide; 0.007 inch thick aluminum.

B. Metal Jacket Bands: 3/8" wide; 0.015 inch thick aluminum.

C. Insulating Cement: ANSI/ASTM C195; hydraulic setting mineral wool.

D. Finishing Cement: ASTM C449

E. Fibrous Glass Cloth: Untreated; 9 oz/sq. yd weight.

F. Adhesives: Compatible with insulation and fire retardant.

1.6 EXAMINATION

A. Verify that piping has been tested before applying insulation materials.

B. Verify that surfaces are clean and dry, with all foreign material removed. This includes but is not limited to water, oil, dirt, scale and rust.

A. Only insulation and finish materials including adhesive cements and mastic, which conform to the requirements of all-governing codes and ordinances, shall be used.

1.7 INSTALLATION

A. Install materials in accordance with manufacturer's instructions and the best practice of the trade.

B. Install in accordance with NAIMA National Insulation Standards.

C. Repair or replace any existing insulation and surface finish disturbed or damaged by installation of new work using materials to match existing.

D. Apply insulation to completely cover metal surface. Surface shall be applied to present a tight, smooth appearance.

E. Do not use staples on vapor barrier insulation.

L. Inserts and Shields:

1. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
2. Insert location: Between support shield and piping and under the finish jacket.
3. Insert material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.

M. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions.

1.8 SCHEDULE

Piping	Type	Pipe Size	Insulation Thickness
Storm Drain (existing where shown and new)	A	All	1-1/2"
Domestic Cold Water (existing where disturbed and New)	A	All	1"
Condensate Drain	A	All	1/2"

--- END OF SECTION 220719 ---

SECTION 221116 - DOMESTIC WATER PIPING

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Clauses, apply to this Section.

1.2 SUMMARY

A. This Section includes domestic water piping inside the building.

1.3 PERFORMANCE REQUIREMENTS

A. Provide components and installation capable of producing domestic water piping systems with 125 psig, unless otherwise indicated.

1.4 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

B. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9," for potable domestic water piping and components.

1.5 MANUFACTURERS

1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.
2. Nibco pipe and fittings, or equal

1.6 PIPING MATERIALS

A. Transition Couplings for Aboveground Pressure Piping: Coupling or other manufactured fitting the same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.

1.7 COPPER TUBE AND FITTINGS

A. Hard Copper Tube: ASTM B 88, Types L, water tube, drawn temper.

1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought- copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
2. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends. Furnish Class 300 flanges if required to match piping.
3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

1.8 VALVES

A. Union Ball Valves: MSS SP-122, with full-port ball, threaded detachable end connectors, and pressure rating not less than 125 psig at 73 deg F.

B. Check Valves: Swing or ball-check design and pressure rating not less than 150 psig at 73 deg F.

1.9 PIPE AND FITTING APPLICATIONS

A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below, unless otherwise indicated.

B. Flanges may be used on aboveground piping, unless otherwise indicated.

C. Fitting Option: Extruded-tee connections and brazed joints may be used on aboveground copper tubing.

D. Domestic Water Piping, NPS 4 and Smaller: Hard copper tube, Type L; copper pressure fittings; and soldered joints.

E. Aboveground Domestic Water Piping: Use any of the following piping materials for each size range:

1. NPS 1 and Smaller: Hard copper tube, Type L; copper pressure fittings; and soldered joints.
2. NPS 1-1/4 and NPS 1-1/2: Hard copper tube, Type L; copper pressure fittings; and soldered joints.
3. NPS 2: Hard copper tube, Type L copper pressure fittings; and soldered joints.
4. NPS 2-1/2 to NPS 3-1/2: Hard copper tube, Type L; copper pressure fittings; and soldered joints.

F. Non-Potable-Water Piping: Use any of the following piping materials for each size range:

1. NPS 3-1/2 and Smaller: Hard copper tube, Type L; copper pressure fittings; and soldered joints.

1.10 VALVE APPLICATIONS

A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:

1. Shutoff Duty: Use bronze ball or gate valves for piping NPS 2 and smaller. Use gate valves with flanged ends for piping NPS 2-1/2 and larger.
2. Throttling Duty: Use bronze ball or globe valves for piping NPS 2 and smaller. Use cast-iron butterfly valves with flanged ends for piping NPS 2-1/2 and larger.
3. Drain Duty: Hose-end drain valves.

B. Install shutoff valve close to water main on each branch and riser serving plumbing fixtures or equipment, on each water supply to equipment, and on each water supply to plumbing fixtures that do not have supply stops. Use ball or gate valves for piping NPS 2 and smaller. Use gate valves for piping NPS 2-1/2 and larger.

C. Install drain valves for equipment at base of each water riser, at low points in horizontal piping, and where required to drain water piping.

1. Install hose-end drain valves at low points in water mains, risers, and branches.
2. Install stop-and-waste drain valves where indicated.

1.11 PIPING INSTALLATION

A. Install shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve, inside the building at each domestic water service entrance.

B. Install domestic water piping level with 0.25 percent slope downward toward drain and plumb.

1.12 JOINT CONSTRUCTION

A. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.

B. Threaded Joints: make up threaded joints with proper sealing compounds.

1.13 HANGER AND SUPPORT INSTALLATION

A. Install the following:

1. Vertical Piping: MSS Type 8 or Type 42, clamps.
2. Individual, Straight, Horizontal Piping Runs: According to the following:

a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
c. Longer Than 100 Feet: MSS Type 49, spring cushion rolls, if indicated.

3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
4. Base of Vertical Piping: MSS Type 52, spring hangers.

B. Support vertical piping and tubing at base and at each floor.

C. Rod diameter may be reduced 1 size for double-rod hangers, to a minimum of 3/8 inch.

D. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 3/4 and Smaller: 60 inches with 3/8-inch rod.

2. NPS 1 and NPS 1-1/4: 72 inches with 3/8-inch rod.
3. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
4. NPS 2-1/2: 108 inches with 1/2-inch rod.
5. NPS 3 to NPS 5: 10 feet with 1/2-inch rod.

E. Install supports for vertical copper tubing every 10 feet.

1.14 CONNECTIONS

A. Install piping adjacent to equipment and machines to allow service and maintenance.

B. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.

C. Connect domestic water piping to water-service piping with shutoff valve, and extend and connect to the following:
1. Plumbing Fixtures: Cold- and hot-water supply piping in sizes indicated, but not smaller than required by plumbing code. Refer to Division 22 Section "Plumbing Fixtures." Valves shall be provide to isolate fixtures for service.
2. Equipment: Cold- and hot-water supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 and larger.

1.15 FIELD QUALITY CONTROL

A. Inspect domestic water piping as follows:

1. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
2. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:

a. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
b. Final Inspection: Arrange final inspection for authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

B. Test domestic water piping as follows:

1. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
2. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired.
3. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.

4. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
5. Repair leaks and defects with new materials and retest piping or portion thereof until satisfactory results are obtained.
6. Prepare reports for tests and required corrective action.

1.16 ADJUSTING

A. Perform the following adjustments before operation:

1. Close drain valves, hydrants, and hose bibs.
2. Open shutoff valves to fully open position.
3. Open throttling valves to proper setting.
4. Remove plugs used during testing of piping and plugs used for temporary sealing of piping during installation.
5. Remove and clean strainer screens. Close drain valves and replace drain plugs.
6. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
7. Check plumbing specialties and verify proper settings, adjustments, and operation.

1.17 CLEANING

A. Clean and disinfect potable and non-potable domestic water piping as follows:

1. Purge new piping and parts of existing domestic water piping that have been altered, extended, or repaired before using.
2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction or, if methods are not prescribed, procedures described in either AWWA C651 or AWWA C652:

B. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

--- END OF SECTION 221116 ---

SECTION 221400 – FACILITY STORM DRAINAGE

1.1 SUMMARY: Section includes requirements for the following

A. Storm water piping above grade.

1.2 REFERECED SECTIONS:

A. Drawings and general provisions of the Contract, including General and Division 1 Specifications Sections, apply to this Section.

B. Section 220529 - Hangers and Supports for Plumbing Piping and Equipment

C. Section 220553 - Identification for Plumbing Piping and Equipment

D. Section 220719 - Plumbing Insulation

1.3 CITED STANDARDS:

A. American Society of Mechanical Engineers:
1. ASME A112.21.2M - Roof Drains.
2. ASME B31.9 - Building Services Piping.

B. ASTM International:
1. ASTM A74 - Standard Specification for Cast Iron Soil Pipe and Fittings.
2. ASTM C564 - Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.

C. Cast Iron Soil Pipe Institute:
1. CISPI 301 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.
2. CISPI 310 - Specification for Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.

1.4 SUBMITTALS

A. Submit the following in accordance with the requirements of General Clause 44 - Shop Drawings.
1. Product Data:
a. Piping: Submit data on pipe materials, fittings, and accessories. Submit manufacturers catalog information.

b. Storm Drainage Specialties: Submit manufacturers catalog information, component sizes, rough-in requirements, service sizes, and finishes.

2. Manufacturer's Installation Instructions: Submit installation instructions for material and equipment.

3. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of equipment and clean-outs in accordance with the requirements of General Clause 53.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with State of New York standard.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.

B. Installer: Company specializing in performing Work of this section with minimum three years experience.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the Work, and isolating parts of completed system.

1.9 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication

1.10 STORM WATER PIPING, ABOVE GRADE

A. Cast Iron Pipe: CISPI 301, hubless, service weight.
1. Fittings: Cast iron, CISPI 301.
2. Joints: Neoprene gaskets and stainless steel clamp-and-shield assemblies.

1.11 EXAMINATION

A. Verify excavations are to required grade, dry, and not over-excavated.

1.12 PREPARATION

A. Ream pipe and tube ends. Remove burrs.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

D. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

1.13 INSTALLATION - HANGERS AND SUPPORTS

A. Pipe Hangers and Supports: Install hangers and supports in accordance with Section 22 05 29.

1.14 INSTALLATION - ABOVE GROUND PIPING

A. Establish invert elevations, slopes for drainage to 1/8 inch per foot minimum. Maintain gradients.

B. Install piping to maintain headroom. Group piping to conserve space.

C. Group piping whenever practical at common elevations.

D. Support cast iron drainage piping at every joint.

E. Provide clearance in hangers and from structure and other equipment for installation of insulation. Refer to Section 220719.

F. Install piping penetrating roofed areas to maintain integrity of roof assembly.

G. Install bell and spigot pipe with bell end upstream.

1.15 FIELD QUALITY CONTROL

A. Test storm drainage piping system in accordance with applicable code.

--- END OF SECTION 221400 ---

SECTION 223300 - ELECTRIC, DOMESTIC-WATER HEATERS

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Commercial, light-duty, storage, electric, domestic-water heaters.
   2. Domestic-water heater accessories.

1.3 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Commercial domestic-water heaters shall withstand the effects of earthquake motions determined according to **ASCE/SEI 7**.

   1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified **and the unit will be fully operational after the seismic event**."

1.4 ACTION SUBMITTALS

A. Product Data: For each type and size of domestic-water heater indicated. **include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.**

B. Shop Drawings:

   1. Wiring Diagrams: For power, signal, and control wiring.

1.5 INFORMATIONAL SUBMITTALS

A. Seismic Qualification Certificates: For commercial domestic-water heaters, accessories, and components, from manufacturer.

   1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
   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.

B. Product Certificates: For each type of **commercial**, electric, domestic-water heater, from manufacturer.

C. Domestic-Water Heater Labeling: Certified and labeled by testing agency acceptable to authorities having jurisdiction.

D. Source quality-control reports.

E. Field quality-control reports.

F. Warranty: Sample of special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For electric, domestic-water heaters to include in emergency, operation, and maintenance manuals.

1.7 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1.

C. ASME Compliance: Where ASME-code construction is indicated, fabricate and label commercial, domestic-water heater storage tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.

D. NSF Compliance: Fabricate and label equipment components that will be in contact with potable water to comply with NSF 61, "Drinking Water System Components - Health Effects."

1.8 COORDINATION

A. Coordinate sizes and locations of concrete bases with actual equipment provided.

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of electric, domestic-water heaters that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

   a. Structural failures including storage tank and supports.
   b. Faulty operation of controls.
   c. Deterioration of metals, metal finishes, and other materials beyond normal use.

2. Warranty Periods: From date of Substantial Completion.

a. Commercial, Light-Duty, Storage, Electric, Domestic-Water Heaters:

1) Storage Tank: **Five** years.
2) Controls and Other Components: **Five** years.

1.10 COMMERCIAL, ELECTRIC, domestic-WATER HEATERS

A. Commercial, Light-Duty, Storage, Electric, Domestic-Water Heaters:
1. Subject to compliance with requirements, provide **product indicated on Drawings** or approved equal:

2. Standard: UL 174.
3. Storage-Tank Construction: Steel, vertical arrangement.

a. Tappings: ASME B1.20.1 pipe thread.
b. Pressure Rating: 150 psig.
c. Interior Finish: Comply with NSF 61 barrier materials for potable-water tank linings, including extending lining material into tappings.

4. Factory-Installed Storage-Tank Appurtenances:

a. Anode Rod: Replaceable magnesium.
b. Dip Tube: Required unless cold-water inlet is near bottom of tank.
c. Drain Valve: ASSE 1005.
d. Insulation: Comply with ASHRAE/IESNA 90.1 **or ASHRAE 90.2**.
e. Jacket: Steel with enameled finish.
f. Heat-Trap Fittings: Inlet type in cold-water inlet and outlet type in hot-water outlet.
g. Heating Elements: Two; electric, screw-in immersion type; wired for simultaneous operation unless otherwise indicated. Limited to 12 kW total.
h. Temperature Control: Adjustable thermostat.
i. Safety Control: High-temperature-limit cutoff device or system.
j. Relief Valve: ASME rated and stamped for combination temperature-and-pressure relief valves. Include relieving capacity at least as great as heat input, and include pressure setting less than domestic-water heater working-pressure rating. Select relief valve with sensing element that extends into storage tank.

5. Special Requirements: NSF 5 construction with legs for off-floor installation.

B. Capacity and Characteristics:

1. Capacity: 50 **gal.**
2. Recovery: 23 **gph** at 8**0 deg F** temperature rise.
3. Temperature Setting: **140 deg F**.
4. Power Demand: 4.5 kW.
5. Heating Elements:

a. Number of Elements: 2
b. Kilowatts Each Element: 4.5 non-simultaneous.
c. Number of Stages: **One**.

6. Electrical Characteristics:

    a. Volts: 208.
    b. Phases: **Single**
    c. Hertz: 60.
    d. Full-Load Amperes: 22
    e. Maximum Overcurrent Protection: 30A.

1.11 domestic-WATER HEATER ACCESSORIES

A. Domestic-Water Compression Tanks:
1. Basis-of-Design Product: Subject to compliance with requirements, provide Amtrol THERM-X-TROL Thermal Expansion tanks Diaphragm ST-5C Series ASME or approved equal.

2. Description: Steel pressure-rated tank constructed with welded joints and factory-installed butyl-rubber diaphragm.
3. Construction:
    a. Polypropylene liner
    b. Stainless steel system connection
    c. Red oxide primer finish
    d. Schrader Air Valve w/EPDM seat
    e. Heavy duty butyl NSFANSI 61 diaphragm

4. Capacity and Characteristics:

    a. Working-Pressure Rating: **150 psig**.
    b. Capacity Acceptable: **2 gal.** minimum.
    c. Air Pre-charge Pressure: 55 psig.

B. Drain Pans: Corrosion-resistant metal with raised edge. Comply with ANSI/CSA LC 3. Include dimensions not less than base of domestic-water heater, and include drain outlet not less than NPS 3/4 with ASME B1.20.1 pipe threads or with ASME B1.20.7 garden-hose threads.

C. Piping-Type Heat Traps: Field-fabricated piping arrangement according to ASHRAE/IESNA 90.1**or ASHRAE 90.2**.

D. Heat-Trap Fittings: ASHRAE 90.2.

E. Manifold Kits: Domestic-water heater manufacturer's factory-fabricated inlet and outlet piping for field installation, for multiple domestic-water heater installation. Include ball-, butterfly-, or gate-type shutoff valves to isolate each domestic-water heater and **calibrated memory stop** balancing valves to provide balanced flow through each domestic-water heater.

1. Comply with requirements for ball-, butterfly-, or gate-type shutoff valves specified in Section 220523 "General-Duty Valves for Plumbing Piping."
2. Comply with requirements for balancing valves specified in Section 221119 "Domestic Water Piping Specialties."

F. Pressure-Reducing Valves: ASSE 1003 for water. Set at 25-psig-maximum outlet pressure unless otherwise indicated.

G. Combination Temperature-and-Pressure Relief Valves: ASME rated and stamped. Include relieving capacity at least as great as heat input, and include pressure setting less than domestic-water heater working-pressure rating. Select relief valves with sensing element that extends into storage tank.

H. Pressure Relief Valves: ASME rated and stamped. Include pressure setting less than domestic-water heater working-pressure rating.

I. Vacuum Relief Valves: ANSI Z21.22/CSA 4.4.

J. Shock Absorbers: ASSE 1010 or PDI-WH 201, Size A water hammer arrester.

K. Domestic-Water Heater Stands: Manufacturer's factory-fabricated steel stand for floor mounting, capable of supporting domestic-water heater and water. Include dimension that will support bottom of domestic-water heater a minimum of 18 inches above the floor.

L. Domestic-Water Heater Mounting Brackets: Manufacturer's factory-fabricated steel bracket for wall mounting, capable of supporting domestic-water heater and water.

1.12 SOURCE QUALITY CONTROL

A. Factory Tests: Test and inspect domestic-water heaters specified to be ASME-code construction, according to ASME Boiler and Pressure Vessel Code.

B. Hydrostatically test **commercial** domestic-water heaters to minimum of one and one-half times pressure rating before shipment.

C. Electric, domestic-water heaters will be considered defective if they do not pass tests and inspections. Comply with requirements in Section 014000 "Quality Requirements" for retesting and reinspecting requirements and Section 017300 "Execution" for requirements for correcting the Work.

D. Prepare test and inspection reports.

1.13 DOMESTIC-WATER HEATER INSTALLATION

A. Commercial, Electric, Domestic-Water Heater Mounting: Install commercial, electric, domestic-water heaters on on stand, bracket, suspended platform, or directly on floor is indicated.
   1. Maintain manufacturer's recommended clearances.
   2. Arrange units so controls and devices that require servicing are accessible.
   3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
   4. Install anchor bolts to elevations required for proper attachment to supported equipment.
   5. Anchor domestic-water heaters to substrate.

B. Install electric, domestic-water heaters level and plumb, according to layout drawings, original design, and referenced standards. Maintain manufacturer's recommended clearances. Arrange units so controls and devices needing service are accessible.

1. Install shutoff valves on domestic-water-supply piping to domestic-water heaters and on domestic-hot-water outlet piping. Comply with requirements for shutoff valves specified in Section 220523 "General-Duty Valves for Plumbing Piping."

C. Install commercial, electric, domestic-water heaters with seismic-restraint devices. Comply with requirements for seismic-restraint devices specified in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."

D. Install combination temperature-and-pressure relief valves in top portion of storage tanks. Use relief valves with sensing elements that extend into tanks. Extend commercial-water-heater relief-valve outlet, with drain piping same as domestic-water piping in continuous downward pitch, and discharge by positive air gap onto closest floor drain.

E. Install water-heater drain piping as indirect waste to spill by positive air gap into open drains or over floor drains. Install hose-end drain valves at low points in water piping for electric, domestic-water heaters that do not have tank drains. Comply with requirements for hose-end drain valves specified in Section 221119 "Domestic Water Piping Specialties."

F. Install piping-type heat traps on inlet and outlet piping of electric, domestic-water heater storage tanks without integral or fitting-type heat traps.

G. Fill electric, domestic-water heaters with water.

H. Charge domestic-water compression tanks with air.

1.14 CONNECTIONS

A. Comply with requirements for piping specified in Section 221116 "Domestic Water Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

B. Where installing piping adjacent to electric, domestic-water heaters, allow space for service and maintenance of water heaters. Arrange piping for easy removal of domestic-water heaters.

1.15 IDENTIFICATION

A. Identify system components. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

1.16 FIELD QUALITY CONTROL

A. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
2. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
3. Operational Test: After electrical circuitry has been energized, start units to confirm proper operation.
4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

--- END OF SECTION 223300 ---

SECTION 226313 - GAS PIPING

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Clause apply to this Section.

1.2 SUMMARY

A. This Section includes fuel gas piping. Products include the following:

1. Pipe, tube, fittings, and joining materials.
2. Piping specialties.
3. Gas valves.
4. Gas Pipe Testing (new Sections of Gas Piping only)

B. All details of gas piping installation and appliance connections shall conform to con Edison requirements for gas distribution piping, National Fuel Gas Code, and NYS Fuel Gas Code.

C. Plumbing contractor to furnish and install new gas supply to new Rooftop Units.

1.3 SUBMITTALS

A. Product Data: For the following:

1. Piping materials, valves, regulators, flexible connectors. Include associated components.

B. Shop Drawings: For fuel gas piping. Include plans and attachments to other work.

C. Field quality-control test reports, pressure test reports.

D. Operation and Maintenance Data: For natural gas specialties and accessories to include in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

A. Electrical Components and Devices: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. NYS building code, NFPA Standard: Comply with NYS fuels gas code and NFPA 54, "National Fuel Gas Code."

C. **Welding that may be required a tie-in point to existing gas main and all other welds must be performed by a certified welder authorized for gas work.**

D. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code. Steel pipe welding if required must be performed by qualified welder

meeting AWS and Con-Ed Inc. requirement for the type of welds needed. Contractor shall submit copies of Con Ed certification prior to proceeding with any work.

E. Any welding on new piping shall be performed by certified welders and subject to radiographic inspection.

F. All costs associated with radiographic inspection shall be paid by contractor. Weld inspection shall be performed by a firm specializing in x-ray weld inspection. (Eastern Testing and Inspection, 43 Herkomer St, New Hyde Park, NY 11040 – Jim Letts (516-488-6650), or approved equal). All gas piping 3" and above shall be welded.

1.5 DELIVERY, STORAGE, AND HANDLING

A. All material for gas system shall be stored and handled accordingly.

1.6 PROJECT CONDITIONS

A. Perform site survey, research public utility records, and verify existing utility locations. In addition, the Contractor must retain the services of a qualified private property Utility mark-out company to perform a blind survey in area of the proposed work for the full pipe routing. Cost for private utility mark-out shall be included in contractor bid, no additional payment will be given for mark out. WC DPW will share general information with the contractor about known utilities at the site.

B. The Contractor shall immediately notify the Engineer if any interferences are encountered.

C. All protection work and general operations shall be governed by the requirements of OSHA, as most recently amended; as well as by Local and State environmental requirements.

D. Existing grades and other existing conditions are shown on the drawings to the best knowledge of the Engineer. It is the responsibility of the Contractor to visit the site and to verify all existing conditions.

E. The Contractor shall take proper precautions not to damage any existing site conditions not intended to be affected by the work required in this contract and will be held solely responsible for any damage occurring during the course of the work under construction. The contractor shall, at his own expense, make any and all repairs as required to restore to the original condition any area or item so damaged of disturbed due to work required by this contract.

F. The Contractor shall take all necessary measures to keep driveways, parking areas over which equipment and service for project travel, clean and free from dirt, dust, mud and debris resulting from constriction operation. The actions taken shall meet the requirements of all parties having jurisdiction.

1.7 PIPES, TUBES, FITTINGS, AND JOINING MATERIALS

A. Steel Pipe: ASTM A 53/A 53M; Type S; Grade B; black. Wall thickness of wrought-steel pipe shall comply with ASME B36.10M. Schedule 40 for welded gas piping.

1. Malleable-Iron Threaded Fittings: ASME B16.3, Class 150, standard pattern, with threaded ends according to ASME B1.20.1. Pipe 2-1/2" and below shall be threaded.
2. Steel Threaded Fittings: ASME B16.11, forged steel with threaded ends according to ASME B1.20.1.
3. Unions: ASME B16.39, Class 150, malleable iron with brass-to-iron seat, ground joint, and threaded ends according to ASME B1.20.1.
4. Cast-Iron Flanges and Flanged Fittings: ASME B16.1, Class 125.
5. Joint Compound and Tape: Suitable for natural gas.
6. Steel Flanges and Flanged Fittings: ASME B16.5.
7. Gasket Material: Thickness, material, and type suitable for natural gas.
8. Welded pipe, as needed, sized 3" and above for pipe routed on building exterior and roof. Pipe 2-1/2" and below shall be threaded.

1.8 SPECIALTY VALVES

A. Valves, NPS 2 and Smaller: Threaded ends according to ASME B1.20.1 for pipe threads.

B. Appliance Connector Valves: ANSI Z21.15 and CSA International listed.

1. Manufacturers:

a. American Valve Inc.
b. Conbraco Industries, Inc.; Apollo Div.
c. Key Gas Components, Inc.
d. Mueller Co.; Mueller Gas Products Div.
e. Watts Industries, Inc.; Water Products Div.
f. Approved equal.

C. Gas Stops: Bronze body with AGA stamp, plug type with bronze plug and flat or square head, ball type with chrome-plated brass ball and lever handle, or butterfly valve with stainless-steel disc and fluorocarbon elastomer seal and lever handle; 2-psig minimum pressure rating.

D. Gas Valves, NPS 2 and Smaller: ASME B16.33 and CSA International-listed bronze body and 125-psig pressure rating. Rockwell/flowserv Nordstrom series 142, or approved equal.

1. Manufacturers:

a. Crane Valves.
b. Mueller Co.; Mueller Gas Products Div.
c. NIBCO INC.
d. Watts Industries, Inc.; Water Products Div.
e. Approved equal.

2. Tamperproof Feature: Include design for locking.

1.9 PREPARATION

A. Close equipment shutoff valves before turning off fuel gas to premises or section of piping. Perform leakage test as specified in "Field Quality Control" Article to determine that all equipment is turned off in affected piping section.

1.10 PIPING APPLICATIONS

A. Flanges, unions, transition, and special fittings with pressure ratings same as or higher than system pressure rating may be used in applications below, unless otherwise indicated.

B. Fuel Gas Piping, 1/2 psig or Less: Exposed distribution piping.
1. NPS 3/4 and NPS 1: Steel pipe, malleable-iron threaded fittings, and threaded joints.
2. NPS 1-1/4 to NPS 2-1/2: Steel pipe, malleable-iron threaded fittings, and threaded joints.
3. NPS 3" and larger outdoor exposed on roof – welded pipe and fittings.

1.11 PREPARATION

A. Close equipment shutoff valves before turning off natural gas to premises or piping section.

B. Inspect natural-gas piping according to **NFPA 54, Con Edison of NY standards, and New York State Building Code** to determine that natural-gas utilization devices are turned off in piping section affected.

C. Comply with **NFPA 54, Con Edison of NY standards, and New York State Building Code** requirements for installation and prevention of accidental ignition.

1.12 INDOOR PIPING INSTALLATION

A. Comply with **NFPA 54, Con Edison of New York, and NY State Building** codes for piping installation.

B. Locate valves for easy access.

C. Extend relief vent connections for service regulators, line regulators, and overpressure protection devices to outdoors and terminate with weatherproof vent cap.

D. Conceal pipe installations in walls, pipe spaces, utility spaces, above ceilings, below grade or floors, and in floor channels unless indicated to be exposed to view.

E. Do not install piping in concealed locations.

F. Install sleeve seals for piping penetrations of concrete walls and slabs. Drill, chop exterior wall as required for route new piping into building. Provide steel pipe sleeve. Fill sleeve space with sealant or grout.

1.13 VALVE APPLICATIONS

A. Appliance Shutoff Valves at appliance for Pressure 0.5 psig or Less: gas valve or gas stop.

B. Appliance Shutoff Valves at appliance for Pressure 0.5 to 2 psig: Gas stop or gas valve.

C. Piping Line Valves, NPS 3 and larger: Plug valve. Approved for gas service.

D. Piping Line Valves under 3" as listed under paragraph 2.3. Specialty Valves, under valves or gas valves.

1.14 PIPING INSTALLATION

A. Applicable fuel gas codes shall be followed.

B. Drips and Sediment Traps: Install drips at points where condensate may collect. Include outlets of service meters. Locate where readily accessible for cleaning and emptying. Do not install where condensate would be subject to freezing.

1. Construct drips and sediment traps using tee fitting with bottom outlet plugged or capped. Use minimum-length nipple of 3 pipe diameters, but not less than 3 inches long, and same size as connected pipe. Install with space between bottom of drip and floor for removal of plug or cap.

C. Install fuel gas piping at uniform grade of 0.1 percent slope upward toward risers.

D. Use eccentric reducer fittings to make reductions in pipe sizes. Install fittings with level side down.

E. Connect branch piping from top or side of horizontal piping.

F. Install unions in pipes NPS 2 and smaller, adjacent to each valve, at final connection to each piece of equipment, and elsewhere as indicated. Unions are not required on flanged devices.

G. Install strainer on inlet of each line pressure regulator and automatic and electrically operated valve.

H. Install flanges on valves, specialties, and equipment having NPS 2-1/2 and larger connections.

1.15 JOINT CONSTRUCTION

A. Basic piping joint construction is specified in Section "General Provisions for Plumbing Work." Provisions off applicable fuel gas codes shall be followed.

A. Ream ends of pipes and tubes and remove burrs.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Threaded Joints:

1. Thread pipe with tapered pipe threads complying with ASME B1.20.1.
2. Cut threads full and clean using sharp dies.
3. Ream threaded pipe ends to remove burrs and restore full inside diameter of pipe.
4. Apply appropriate tape or thread compound to external pipe threads unless dryseal threading is specified.
5. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

D. Welded Joints:
1. Construct joints according to AWS D10.12/D10.12M, using qualified processes and welding operators.
2. Bevel plain ends of steel pipe.
3. Patch factory-applied protective coating as recommended by manufacturer at field welds and where damage to coating occurs during construction.

1.16 HANGER AND SUPPORT INSTALLATION

A. Pipe hanger and support and equipment support materials and installation requirements are specified in Division 220529 Section "Hangers and Supports."

B. Install hangers for horizontal steel piping with the following maximum spacing and minimum rod sizes:

1. NPS 1 and Smaller: Maximum span, 6 feet; minimum rod size, 3/8 inch.
2. NPS 1-1/4: Maximum span, 8 feet; minimum rod size, 3/8 inch.
3. NPS 1-1/2 and NPS 2: Maximum span, 8 feet; minimum rod size, 3/8 inch.

C. Contractor shall provide heavy duty welded pipe support fabricated for support of vertical pipe to building exterior. Fabricated wall support, Carpenter and Paterson, Anvil, piping tech and products or approved equal.

1.17 CONNECTIONS

A. Drawings indicate general arrangement of fuel gas piping, fittings, and specialties.

B. Install piping adjacent to appliances to allow service and maintenance.

C. **Connect piping to appliances using gas with shutoff valves and unions. Install valve upstream from and within 72 inches of each appliance. Install union downstream from valve.**

D. Sediment Traps: Install tee fitting with capped nipple in bottom to form drip, as close as practical to inlet of each appliance using gas.

1.18 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. Test, inspect, and purge natural gas according to **NFPA 54, Con Edison of New York Standards, New York State building codes.** and authorities having jurisdiction.

C. Prepare test and inspection reports, furnish owner with "Integrity Test Affidavit."

D. Provide documentation indicating that all fusion welding was performed by certified welders along with copies of coned certification for the individuals performing the work.

1.19 LABELING AND IDENTIFYING

A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign on or near each valve.

1. Text: In addition to name of identified unit, distinguish between multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations.
2. Nameplates, pipe identification, and signs shall be provided and rigidly attached to piping using stainless steel straps. Pipe Id signs shall state "Caution: GAS."

1.20 TESTING

A. GENERAL

1. All tests shall be maintained for a length of time and pressure required per Con Edison of New York, NYS Building Code, NFPA 54. Tests shall be repeated until satisfactory results are obtained. Contractor must submit an "Integrity Test Affidavit" signed by licensed plumber stating that all piping tested and met the requirements.
2. All tests shall be made in the presence of the representatives of the County. Provide at least two (2) days notice to these parties before making tests.
3. Conduct any additional tests that may be requested or required.
4. Prior to full backfill, buried piping shall be tested.
5. All leaks shall be corrected with new materials. This contractor shall pay for and make good for all damage to work and materials resulting form tests.

B. GAS SYSTEM

Gas: Test under air pressure of 90 psi for 1/2 hour without loss on the pressure gauge, before fixtures or other outlets are connected. After all gas regulating equipment is installed and adjusted, retest the entire system in accordance with the Con Edison Requirements for 24 hours with no drop in pressure. Contractor shall make all connections inside of the building to the existing gas piping.

1.21 PAINT

A. **All <u>NEW</u> gas piping and valves shall be painted to match existing gas piping within building**.

B. Product used for coating all gas piping shall be Rust-Oleum Virtual Solutions Coating Solution 32, Industrial Choice 5200 System DTM Acrylic for Steel Substrates in mild industrial

environments or approved equal. Coating shall be applied according to Manufacturer's Specifications.

1.22 FIELD QUALITY CONTROL

A. Test, inspect, and purge piping according to NFPA 54 and requirements of authorities having jurisdiction.

B. Repair leaks and defects with new materials and retest system until satisfactory results are obtained. Verify capacities and pressure ratings of service meters, pressure regulators, valves, and specialties. Verify correct pressure settings for pressure regulators.

C. Verify that specified piping tests are complete. Verify equipment operation.

--- END OF SECTION 226313 ---

SECTION 230510 - GENERAL PROVISIONS FOR MECHANICAL WORK

1.1 RELATED DOCUMENTS

A. This Section shall be coordinated with and is complementary to the General Conditions, Information for Bidders, General Clauses and Special Clauses.

B. Where items of the General Conditions are repeated in this Section of the Specifications, it is intended to qualify or to call particular attention to them; it is not intended that any other parts of the General Conditions shall be assumed to be omitted if not repeated herein.

C. This Section applies equally and specifically to all Contractors and Subcontractors supplying labor and/or equipment and/or materials as required under the Heating, Ventilating and Air Conditioning, Sections of the Specifications

1.2 DEFINITIONS

A. "Provide" means to supply, erect, install, and connect up in complete readiness for regular operation, the particular work referred to.

B. "Furnish" means to supply and deliver to the job.

C. "Piping" includes, in addition to pipe, all fittings, valves, hangers, and other accessories related to such piping.

D. "Concealed" means hidden sight as in chases, furred spaces shafts, hung ceilings, or embedded in construction.

E. "Exposed" means, "not concealed" as defined above. Work in trenches, crawl spaces, and tunnels shall be considered "concealed" unless otherwise specifically noted.

F. "Approved equal" means any equipment or material which, in the opinion of the Engineer, is equal in quality, durability, appearance, strength, design, performance, physical dimension, and arrangement to the equipment of material specified, and will function adequately in accordance with the general design.

G. "Governmental" means all municipal, state and federal governmental agencies

1.3 CODES AND STANDARDS

A. BOCA Basic Building Code, Basic National Mechanical Code, Energy Conservation Code

B. N.Y. State Uniform Fire Prevention and Building Code

C. NFPA National Fire Protection Association

D. ASME American Society of Mechanical Engineers

E. ANSI American National Standards Institute

F. ASTM American Society for Testing Materials

G. AWWA American Water Works Association

H. IBR Institute of Boiler and Radiator Manufacturers

I. NEMA National Electrical Manufacturers Association

J. ASHRAE American Society of Heating, Refrigeration and Air Condition Engineers.

K. SMACNA Sheet Metal and Air Conditioning Contractors National Association, Inc.

L. ARI Air Conditioning and Refrigeration Institute

M. AMCA Air Moving and Conditioning Association

N. ADC Air Diffusion Council

O. AABC Associated Air Balance Council

P. National Standard Plumbing Code with all Amendments

Q. NFPA-90A Air Conditioning and Ventilation Systems

1.4 INTENT

A. It is the intention of the Specifications and Drawings to call for finished Work, tested, and ready for operation. All materials, equipment, and apparatus shall be new and of first-class quality.

B. Any apparatus, appliance, material, or work not shown on Drawings, but mentioned in the Specifications, or vice versa, or any incidental accessories, or minor details not shown but necessary to make the work complete and perfect in all respects and ready for operation, even if not particularly specified, shall be provided without additional expense to the Owner.

1.5 DRAWINGS

A. CONTRACT DRAWINGS
1. The Drawings are generally diagrammatic and are intended to convey the scope of Work and indicate general arrangement of equipment, piping, and fixtures.
2. The locations of all items shown on the Drawings or called for in the Specifications that are not definitely fixed by dimensions are approximate only. The exact locations necessary to secure the best conditions and results must be determined at the project and shall have the approval of the Engineer before being installed. Do not scale Drawings.
3. Follow Drawings in laying out work and check Drawings of other trades to verify spaces in which work will be installed. Maintain maximum headroom and space conditions at all points. Where headroom and space conditions appear inadequate, Engineer shall be notified before proceeding with installation.
4. If directed by the Engineer, without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of other trades or for proper execution of the work.

5. Contractor shall provide full coordination shop drawings for review & approval.

B. SHOP DRAWINGS
1. Prior to delivery to job site, but sufficiently in advance of requirements necessary to allow Engineer ample time for review, submit for approval (5) copies of shop drawings of all equipment, materials, piping, and sleeves, etc., and further obtain written approval for same from the Engineer, before installing any of these items.
2. Shop drawings shall consist of manufacturer's certified scale drawings, cuts, or catalogs, including descriptive literature and complete certified characteristics of equipment, showing dimensions, capacity, code requirements, motor and drive testing, as indicated on the Drawings or Specifications.
3. Approval rendered on shop drawings shall not be considered as a guarantee of measurements or building conditions. Where drawings are approved, said approval does not in any was relieve responsibility, or necessity, of furnishing material or performing work as required by the Contract Drawings and Specifications.
4. Failure to submit shop drawings in ample time for checking shall not entitle an extension of Contract time, and no claim for extension by reason of such default will be allowed.
5. Prior to submission of shop drawings, thoroughly check each shop drawing, reject those not conforming to the Specifications, and indicate (by signature) that the shop drawings submitted meet Contract Requirements.
6. Incorporate a numbering system to help keep track of shop drawing submittals as follows:
   a. HV.....HVAC shop drawings
7. Label resubmitted shop drawings with a stamp indicating the submittal number, for example: SECOND SUBMISSION; THIRD SUBMISSION, etc. and send separate transmittals for each item being submitted so that one transmittal does not cover more than one specific item or group of items from one manufacturer.
8. Refer to General Clause section for shop drawings for additional requirements.
9. Contractor shall provide full coordination shop drawing detailing their proposed work for review & approval.

C. RECORD DRAWINGS
1. During construction keep an accurate record of all deviations between the work as shown on the Drawings and that which is actually installed.
2. Secure from the Engineer, a complete set of Mylar transparencies of the Drawings and note thereon all changes. Make a complete record of all changes and revisions in the original design which exist in the complete work. The cost for the Mylar transparencies shall be paid for by each trade.
3. Contractor shall submit as-built drawings in AutoCAD format on CD, minimum 2002 or later format.
4. Refer to General Clause Section 53 for additional requirements.

1.6 PRE-BID MEETING

A. Refer to special clauses.

1.7 EQUIPMENT AND MATERIALS

A. The proposal and bid must cover all items on the Drawings and in the Specifications as drawn and specified.

B. Substitution of material and equipment of makes other than specifically named on the Drawings and in the Specifications according to the provisions of the general clause sections 28 and 29.

C. To receive consideration, requests for substitutions must be accompanied by documentary proof of equality and difference in price and delivery, if any, in the form of certified quotations from suppliers of both specified and proposed equipment. In case of a difference in price, the Owner shall receive in the form of a credit on all benefit of the difference in cost involved in any substitution.

D. The words "or approved equal" shall be understood to apply only to those items of equipment and material listed under the paragraph "List of Approved Manufacturers" or as otherwise indicated on the Drawings or in the Specifications.

E. Within twenty (20) working days after the acceptance of the proposal, and prior to the submission of any shop drawings for approval, a complete list of manufacturers shall be submitted to the Engineer for approval of all equipment and materials proposed for the work. No approvals will be rendered on shop drawings submitted before the complete list of manufacturers is approved.

F. If material or equipment is installed before it is approved, and/or in the opinion of the Engineer the material or equipment does not meet the intent of the Drawings and Specifications, the removal and replacement shall be made at no extra cost to the Owner.

G. The materials, workmanship, design, and arrangement of all work installed under the Contract shall be subject to the approval of the Engineer.

H. If material or equipment is installed before it is approved, each trade installing same shall be liable for the removal and replacement at no extra charge to the Owner if, in the opinion of the Engineer, the material or equipment does not meet the intent of the Drawings and Specifications.

I. The words "or approved equal" are understood to follow:
   1. The name of any manufacturer, vendor, equipment or materials;
   2. Any trade name, plate number, or catalog number;
   3. Any detailed description used to define equipment or material; except where otherwise indicated on the Drawings or in the Specifications.

J. It is the intent of these Specifications that wherever a manufacturer of a product is specified, and the terms "other approved" or "or approved equal" are used, the substituted item must conform in all respects to the specified item. Consideration will not be given to claim that the substituted item meets the performance requirements with lesser construction (such as lesser heat exchange surface, etc.) Performance as delineated in schedules and in the Specifications shall be interpreted as minimum performance.

K. All equipment and materials required for installation under these Specifications shall be new and without blemish or defect. All electrical equipment shall bear labels attesting to Underwriter's Laboratories approval. Where no specific indication as to the type or quality of the material or equipment is indicated, a first class standard article shall be furnished.

L. Where it is proposed to use an item of equipment other than specified or detailed on the Drawings which requires any redesign of the structure, partitions, foundations, piping, or of any other part of the mechanical layout, all such redesign, and all new drawings and detailing required therefore shall, with the approval of the Engineer, be prepared at no additional cost to the Owner.

M. Where such approved deviation requires a different quantity and arrangement of, piping, wiring, conduit, and equipment from that specified or indicated on the Drawings, with the approval of the Engineer, furnish and install any such , piping, structural supports, insulation, and any other additional equipment required by the system, at no additional cost to the Owner.

N. All equipment of one type (such as vav's, diffusers, etc.) shall be the product of the same manufacturer.

O. Note that the approval of shop drawings or other information submitted in accordance with the requirements herein specified does not assure that the Engineer or any other Owner's representative attests to the dimensional accuracy or dimensional suitability of the material or equipment involved or the mechanical performance of equipment. Approval of shop drawings does not invalidate the Plans and Specifications if the shop drawings are in conflict with the Plans and Specifications.

P. EQUIPMENT NAMEPLATES

1. Provide for domestic hot water heater, a permanently attached nameplate made of black surface, white core laminated backlight with incised letters. Subcontractor furnishing equipment shall provide nameplate. Pneumatic, electric and mechanically actuated gauges shall have a brief, but complete description of their function. Stating the air pressure or voltage range alone is not acceptable. Nameplates shall be a minimum of 3" long by 1/2" high white letters as designated in the equipment schedule. Mounting screws shall have chrome plated acorn headed screws.

1.8 LAWS, ORDINANCES, PERMITS AND FEES

A. Give all necessary notices, obtain all permits and pay all governmental taxes, fees, and other costs in connection with the work; file all necessary plans, prepare all documents, and obtain all necessary approvals of all governmental departments having jurisdiction; obtain all required certificates of Inspection for the work and deliver to the Engineer before request for acceptance and final payment for the work.

B. Include in the work, without extra cost to the Owner, any labor, materials, services, apparatus, drawings, (in addition to Contract Drawings and Documents) in order to comply with all applicable laws, ordinances, rules and regulations, whether or not shown on Drawings and/or specified.

C. All materials furnished and all work installed shall comply with the rules and recommendations of the National Fire Protection Association, with all requirements of local utility companies, with the recommendations of the fire insurance rating organization having jurisdiction, and with the requirements of all governmental departments having jurisdiction, including New York State Building Code and New York State Health Code.

1.9 ORGANIZATION OF WORK

A. The work throughout shall be executed in the best and most thorough manner under the direction of and to the satisfaction of the Engineers, Owners and Project Coordinators, who will jointly interpret the meaning of the Drawings and Specifications, and shall have the power to reject any work and materials which, in the judgment, are not in full accordance therewith.

B. The work called for under this Contract shall be carried on simultaneously with the work of other trades in a manner such as not to delay the overall progress of the work. Furnish promptly to other trades involved at the project, all information and measurements relating to the work which they may require. Cooperate with them in order to secure the harmony necessary in the interest of the project as a whole.

C. Furnish and install all work as fast as possible to meet all construction schedules.

D. Keep a competent superintendent in charge of the work at all times. Such superintendent shall be replaced if unsatisfactory to the Owner.

E. Upon award of contract, consult with the Engineer and negotiate with subcontractors and manufacturers, and within thirty (30) days submit five (5) copies of a preliminary list of major equipment, for approval, complete with name of manufacturer, dates of purchase orders, and delivery dates to the site. Also submit within thirty (30) days, five (5) copies of a preliminary schedule of installation of the various systems. This list shall be revised monthly and five (5) copies shall be submitted. The second submittal shall contain the names of manufacturers of scheduled equipment (with names, addresses, and telephone numbers of local representatives).

F. Maintain a complete file of shop drawings at all times available to the Owner's representative.

G. Where the work is to be installed in close proximity to work of other trades, or where there is evidence that the work is to interfere with work of other trades, assist in working out space conditions to make a satisfactory adjustment.

H. Prepare composite working shop drawings (coordination drawings) and sections at a suitable scale not less than 3/8" = 1'-0" clearly showing how the work is to be installed in relation to the work of other trades. If the installation is made before coordinating with other trades, make all necessary changes in the work without extra charge to the Owner.

I. Provide a "Logical Sequence Method" construction schedule for review prior to the start of any work. Update the construction schedule as required during the project.

J. Shutdowns
1. When installation of a new system requires the temporary shutdown of an existing operating system, the connection of the new system shall be performed at such regular time or at overtime when requested by the Owner. No additional payment will be made for shutdowns that are required to be performed on nights and weekends.
2. The Owner shall be notified of the estimated duration of the shutdown period at least ten (10) days in advance of the date the work is to be performed.
3. Work shall be arranged for continuous performance, including overtime, if required, to assure that existing operating services will be shut down only during the time actually required to make necessary connections. No additional payment will be given for overtime to perform shutdowns, tie-ins.

K. Phasing
1. Contractor shall only be permitted to work in areas as authorized. Refer to phasing, work schedule special notice on contract drawings. Contractor shall coordinate with other trades on site.
2. Work at other than normal hours – Refer to Contract Drawings for special working-hours restrictions for this project.

1.10 PROTECTION OF WORK AND PROPERTY

A. Maintain and protect all equipment, materials and tools from loss or damage from all causes until final acceptance by the Owner.

B. Assume responsibility for the protection of any finished work or other trades from damage or defacement by the operations and remedy any such injury or damages.

1.11 MANUFACTURERS' IDENTIFICATION

A. Manufacturer's nameplate, name or trademark, shall be permanently affixed to all equipment and material furnished under this Specification. Where such equipment is in a finished occupied space, the nameplate shall be in a concealed but accessible location. The nameplate of a Subcontractor or Distributor will not be acceptable.

1.12 QUIET OPERATION

A. All equipment and material shall operate under all conditions of load without any sound or vibration which, in the opinion of the Engineer, is objectionable. Where sound or vibration conditions arise which are considered objectionable by the Engineer, eliminate same in a manner approved by the Engineer.

1.13 DELIVERY OF MATERIAL

A. Deliver the material and store same in spaces indicated by the Engineer and assume full responsibility for damage to structure caused by any overloading of the material. Contractor shall be aware that the building does not have a loading dock and limited space will be available for storage of materials. Coordinate delivery with building access and site activities. Deliveries shall be coordinated with building representative.

1.14 ALTERATIONS

A. When new work and alterations render equipment and piping useless, such equipment and piping when exposed to view shall be removed and connections thereof to lines or ducts remaining shall be properly capped or plugged and left in construction. If construction, such as hung ceiling, furred beams, chase, etc., is opened up and removed during the course of the construction, the useless pipe therein shall be treated as though exposed to view. When required to accommodate new work, useless piping concealed in construction shall be treated as though exposed to view, and shall be removed.

B. When existing piping systems, at points of connection to new work or in rerouting are found defective, such defective portions shall be removed and replaced with new materials without cost to the Owner.

C. Provide temporary supports where required.

D. Where alterations reveal piping, conduit circuits, wiring, and accessories that must necessarily remain in service, same shall be rerouted, replaced or altered as required to make same completely concealed in the new work at no additional cost to the Owner.

E. Cutting in existing building and rough patching shall be done by each Contractor. Finish patching, ceiling construction removal, new ceiling will be done by the General Contractor unless otherwise noted.

1.15 OPERATING INSTRUCTIONS

A. Prior to final inspection of the installation by the Owner, five (5) copies of a complete Instruction Manual, bound in booklet form and suitably indexed, shall be submitted to the Engineer for approval.

B. The Manual shall contain the following items:
1. Table of Contents
   a. Introduction –Explanation of Manual and its use.
   b. Description of Systems
      1) Complete schematic drawings of all systems
      2) Functional and sequential description of all systems
      3) Relationship of system where applicable to the supervisory data system.
   c. Systems of Operation
      1) Start-up Procedures
      2) Shut-down Procedures
      3) Reset, Adjustment and Balancing Procedures
      4) Seasonal Operation
      5) All posted Instruction Charts
   d. Maintenance
      1) Cleaning and replacement - lines, components, filters, strainers, ducts, fans, etc.
      2) Lubrication
      3) Charging and Filling
      4) Purging and Draining
      5) Systems Trouble-shooting Charts
      6) Instruments checking and Calibration
      7) Recommended list of Spare Parts
   e. List of Manufacturers
   f. Manufacturers' Data – (Where multiple model, type and size listings are included, clearly and conspicuously indicate those that are pertinent to this installation)
      1) Description – Literature, drawings, illustration, certified performance charts, technical data, etc.
      2) Operation
      3) Maintenance – Including complete trouble shooting charts.
      4) Parts List
      5) Names, addresses and telephone numbers of local recommended repair and service companies.
      6) Guarantee Data
      7) Model No. and Serial no. of all equipment.

1.16 GUARANTEE

A. The Contractor guarantees by his acceptance of the Contract that all work installed will be free from any and all defects and that all apparatus will develop capacities and characteristics specified, and that if during a period of one year from date of completion and acceptance of work any such defects in workmanship, material or performance appear, he shall immediately replace, repair, or otherwise correct the defect or deficiency without cost to the Owner within a reasonable time. Notify the Engineer in writing of the time required to do work

B. Replace or repair to the satisfaction of the Owner any and all damage done to the building or its contents or to the work of other trades in consequence of work performed in fulfilling guarantee.

C. This Article is general in nature and will not waive stipulations of other claims which specify guarantee periods in excess of one (1) year, or manufacturer's warranties that may exceed 1 year.

D. In the event default on this Guarantee, the Owner may have such work done as required & charge the cost to the Contractor.

E. The date of acceptance shall be the date of final payment by the Owner or notice of acceptance by the Owner, whichever is later.

1.17 OPERATION PRIOR TO COMPLETION

A. The Owner may require operation of parts or all of the installation for the beneficial occupancy prior to final completion and acceptance of the building.

B. The operation shall not be construed to mean acceptance of the work by the Engineer for the Owner. The Owner will furnish supervisory personnel to direct operation of the entire system and the Contractor shall continue to assume this responsibility until final acceptance.

1.18 ABATEMENT

A. Contractor shall notify Engineer immediately if asbestos or lead is encountered. Abatement shall be performed by others.

1.19 BASES AND SUPPORTS

A. Provide all bases and supports not part of the building structure of required size, type and strength, as approved by the Engineer, for all equipment and materials furnished by him. All equipment, bases, and supports shall be adequately anchored to the building structure to prevent shifting of position under operation conditions.

1.20 TAGS AND CHARTS

A. Furnish and attach to each valve as hereinafter specified, a 1-1/2" diameter brass tag with 1/2" indented numerals filled with durable black compound. Tags shall be securely attached to stems of valves with copper wire and "S" hooks.

B. Valve charts shall consist of schematic drawings of piping layouts, showing and identifying each valve and describing the function. Upon completion of the work, one (1) copy of each chart, sealed to rigid backboard with clear lacquer placed under glass and framed, shall be hung in a conspicuous location in the main equipment room, unless otherwise directed by the Engineer. Two (2) additional unmounted copies in 8-1/2" x 11" leather ring binders shall be delivered to the Engineer. Also furnish three (3) copies of schematic flow chart with corresponding valve numbers noted on chart.

C. Provide tags for the following valves:
1. Zone control, bypass, shut-off, check and balancing valves.
2. Building and area shut-off and balancing valves.
3. Control, by-pass, shut-off, balancing and drain valves.
4. System drain valves, safety and relief valves. Vacuum breakers.
5. All system valves provided.

1.21 TOOLS

A. All specified tools required for proper operation and maintenance of the equipment shall be delivered to the Owner's representative and a receipt requested for same at no additional cost to the Owner.

1.22 SLEEVES, PIPE AND CONDUIT INSERTS AND ANCHOR BOLTS

A. Provide and assume responsibility for the location and maintenance in proper position of all sleeves, inserts, and anchor bolts required for the work. In the event that failure to do so requires cutting and patching of finished work, it shall be done without additional cost to the Owner.

B. All pipes and conduits passing through masonry walls or partitions shall be provided with sleeves having an internal diameter larger than the outside diameter of the pipe or insulation enclosing the pipe or conduit. Sleeves shall be Schedule 40 black steel pipe.

C. Sleeves through foundation walls shall be James B. Clow and Sons No. F-1430 or F-1435 cast iron wall sleeve with intermediate integral flange. Sleeves shall be set with ends flush with each face of wall. The space between sleeve and pipe shall be packed with oakum to within 2" of each face of the wall. The remaining space shall be packed and made watertight with a waterproof compound.

D. Sleeves through concrete floors or interior masonry walls shall be Schedule 40 black steel pipe, set flush with finished wall surfaces, but extended 1/2" above finished floors. The open sleeve space shall be packed with non-combustible materials.

E. Sleeves through non-masonry partitions shall be 22 gauge galvanized sheet steel, set flush with finished surfaces of partitions.

F. Inserts shall be individual type of malleable iron construction with accommodation for removable nuts and threaded rods up to 3/4" diameter, permitting lateral adjustment, except as otherwise noted. Individual inserts shall be Grinnell Fig. 279 up to 5" pipe and conduit, Fig. 282.6" up to 8" pipe and conduit, Fig. 152 above 8" and up to 12" pipe and conduit. For figures 282 and 152, they shall come with an opening at the tip to allow reinforcing rods up to 1/2" diameter to be passed through the insert body. Rods shall extend a minimum of 4" on either side of the insert.

G. In general, all piping and conduit shall be supported from structural steel building members only or approved malleable steel inserts imbedded in concrete pours.

H. Where revisions are required and are approved, piping and conduit 3" and smaller may be supported at Intermediate Points by Phillips' 3/4" expansion bolts with lead shields, provided main supports are welded to structural steel and are not more than twenty feet on centers. Intermediate supports, for pipe 4" and larger shall be attached to concrete by means of 4" x4" x 3/8" clip knee angles with 3/4" expansion bolt in shear and supporting rod at 90 degree from another bolt.

I. Piping 3" and smaller shall be supported from existing slab by "Phillips" 3/4 expansion bolts with lead shields. Piping 4" and larger shall be supported by means of 4" x 4" x 3/8" clip knee angle with 3/4" expansion bolts in shear and supporting rod at 90 degree from another bolt.

J. Where sleeves pass through waterproofed floors, they shall be IPS brass pipe sleeves of the required diameter, brazed at the bottom to 18" x 18", 16-ounce copper flashing for bond with waterproofing. The tops of the sleeves shall extend 1/2" above.

K. No piping or equipment shall be supported from corrugated decking construction. For this area provide supplementary steel to support ductwork, piping, conduit or equipment. Supplemental steel members shall be welded to building structural steel.

L. All hangers, rods and supports shall be installed prior to construction fireproofing.

M. The required fire resistance rating of floor or floor/ceiling assemblies and walls shall be maintained where a penetration is made for electrical, mechanical, plumbing pipes, conduits, ducts and systems. Fire stopping shall be provided at openings around vents, pipes, ducts, conduits at floor levels and walls with non-combustible materials, such as Rockwool or equal.

1.23 ESCUTCHEON PLATES

A. Escutcheons for pipes passing through outside walls shall be Ritter Pattern and Casting Co., No. 1, solid, cast brass, flat type secured to pipe with set screw.

B. Escutcheons for pipes passing through floors shall be Ritter Pattern and Casting Co., No. 36A, split-hinged, cast brass type, designed to fit pipe on one end and cover sleeve projecting through floor on the other end.

C. Escutcheons for pipes passing through interior walls, partitions, and ceilings shall be Ritter Pattern and Casting Co., No. 3A, split-hinged, cast beams chromium plated type.

1.24 PIPE EXPANSION

A. All pipe connections shall be installed to allow for freedom of movement of the pipe during the expansion and contraction without proper anchors and guides shall be provided where necessary and/or when shown on the Drawings. Anchors and guides shall be subject to the approval of the Engineer.

1.25 SCAFFOLDING, RIGGING, HOISTING

A. Provide all scaffolding, rigging, hoisting and services necessary for erection and delivery into the premises of all equipment and materials furnished under this Section of the Specifications, and remove same from premises when no longer required.

B. In the event that supplementary bracing of the basic building structure is required to assure a secure rigging procedure and a secure route for the equipment being handled, assume full responsibility for such supplementary bracing.

C. Provide all rigging & Hoisting for rooftop equipment. Provide rigging plan for rooftop equipment lifts.

1.26 PIPE IDENTIFICATION

A. Identification shall be in accordance with "Scheme for Identification of Piping System ANSI A13.1" and OSHA safety color regulation.

B. All piping shall receive nameplate tags by Marking Services Inc., Phone: (800) 234-0135. Tags shall be rigid type, bolt on or stainless steel straps Style MS-995 Maxilar Markers.

C. Provide identification of piping for all mechanical work.

D. Pipe shall be lettered and valves tagged in accordance with the schedule below. Lettering shall be located near each valve and branch connection and at intervals of not over 40 feet (10 feet on fire lines) on straight runs of pipe. Provide flow arrows for all piping at each marker. Adjacent to the legend, stencil the size of the pipe, conduit or ductwork.

STENCIL AND VALVE TAG SCHEDULE

Service	Stencil	Color	Tag Designation
Heating Hot Water	Heating Hot Water Supply	Yellow	HHWS
Heating Hot Water	Heating Hot Water Return	Yellow	HHWR
Condensate	Condensate	Green	COND
Gas	Natural Gas	Yellow	GAS

1.27 CLEANING, PIPING AND EQUIPMENT

A. Clean all piping, and equipment of all foreign substances inside and out before being placed in operation.

B. If any part of a system should be stopped by foreign matter after being placed in operation, the system shall be disconnected, cleaned, and reconnected wherever necessary to locate and remove obstructions. Any work damaged in the course of removing obstructions shall be repaired when the system is reconnected at no additional cost to the Owner.

C. During construction, properly cap all pipes and equipment nozzles so as to prevent the entrance of sand, dirt, etc.

1.28 ESCUTCHEON PLATES

A. Provide escutcheons on pipes wherever they pass through ceilings, walls, or partitions.

1.29 EXCAVATION AND BACKFILL

A. All excavation and backfill and trenching, if required under this section of the contract, shall be done by the General Contractor. Refer to general clauses.

1.30 RUBBISH REMOVAL

A. See to it that the Project is, at all times, maintained free of all rubbish, rubble, waste material, packaging materials, etc. accumulating as a result of his work. Assume responsibility for the cleaning up of packaging removed from materials and equipment furnished by other trades for the installation. Note that final acceptance of the work is contingent upon the project being free of all excess and waste materials resulting from the work.

1.31 PAINTING

A. Paint all unpainted, no insulated, no galvanized, ferrous metal surfaces of pipes, conduits, ducts, equipment, fixtures, hangers, supports and accessories as follows:

B. Exposed - one prime coat of oil varnish based paint. One top coat of oil based industrial varnish.

C. Concealed - one coat of black asphaltum paint.

D. Underground - two coats of black asphaltum paint.

E. Nameplates on all equipment shall be cleaned and left free of paint.

1.32 CONTROLS CONTRACTOR

A. Note: The existing Countywide Building Automation System Network is an Andover Controls System. New System shall be fully functional with the existing Andover System.

B. Interoperability: Control module shall be configured to connect to BACnet, or TCPIP and compliant network, resulting in extending control to any network-compliant devices such as occupancy switches.

C. The Building Automation System (BAS) manufacturer's local corporate branch office or Factory authorized representative, or Factory authorized independent distributor of the Controls manufacturer shall furnish and install a fully integrated building automation system, incorporating direct digital control for energy management, equipment monitoring and control and subsystems with open communications capabilities as herein specified.

1.33 TESTS

A. All piping, wiring, and equipment shall be tested as specified under the various section of the work. Labor materials, instruments and power required for testing shall be furnished under the particular Section of the Specification.

B. Tests shall be performed satisfaction of the Engineer. The Engineer will be present at such test, when he deems necessary and such other parties as may have legal jurisdiction.

C. Pressure tests shall be applied to piping only before connection of equipment and installation of insulation. In no case shall piping, equipment, or accessories be subjected to pressure exceeding their rating.

D. All defective work shall be promptly repaired or replaced and the tests shall be repeated until the particular system and component parts thereof receive the approval of the Engineer.

E. Any damages resulting from tests shall be repaired or replaced and the tests shall be repeated until the particular system and component parts thereof receive the approval of the Engineer.

F. The duration of tests shall be as determined by all authorities having jurisdiction, but in no case less than the time prescribed in each Section of the Specification.

G. Tests shall be performed on individual equipment, systems, and their controls. Whenever the equipment or system under test is interrelated with and depends upon the operation of other equipment, systems and controls for proper operation, functioning, and performance, the latter shall be operated simultaneously with the equipment or system being tested.

H. Perform Testing and Balancing procedures on each system according to the procedures contained in SMACNA's "HVAC Systems—Testing, Adjusting, and balancing" and this section.

I. Adjust terminal inlets for each space to design airflows within specified tolerances of design values. Make adjustments using the dampers at the air terminals.

J. Set HVAC system airflow rates within the flowing tolerances:
   1. Exhaust: Plus 5 to plus 10 percent.
   2. Air inlets: 0 to minus 10 percent.

K. Final Report: Provide a typewritten report for tested and balanced system including the following test data:
   1. Total airflow rate in CFM.
   2. Total system static pressure in inches WG.
   3. Fan RPM.
   4. Discharge static pressure in inches WG.
   5. Suction static pressure in inches WG.
   6. Chilled water, hot water flow pressure temperatures in deg F.

--- END OF SECTION 230510 ---

SECTION 230512 - THROUGH-PENETRATION FIRESTOP SYSTEMS

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Clauses, apply to this Section.

1.2 SUMMARY

A. This Section includes through-penetration firestop systems for penetrations through the following fire-resistance-rated assemblies, including openings containing penetrating items:

1. Floors.
2. Walls and partitions.
3. Smoke barriers.

1.3 PERFORMANCE REQUIREMENTS

A. General: For the following constructions, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly penetrated.

1. Fire-resistance-rated load-bearing walls, including partitions, with fire-protection-rated openings.
2. Fire-resistance-rated non-load-bearing walls, including partitions, with fire-protection-rated openings.
3. Fire-resistance-rated floor assemblies.

B. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, as determined per ASTM E 814, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.

C. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that after curing do not deteriorate when exposed to these conditions both during and after construction.

D. For through-penetration firestop systems exposed to view, provide products with flame-spread ratings of less than 25 and smoke-developed ratings of less than 450, as determined per ASTM E 84.

1.4 SUBMITTALS

A. Product Data: For each type of through-penetration firestop system product indicated.

B. Shop Drawings: For each through-penetration firestop system, show each kind of construction condition penetrated, relationships to adjoining construction, and kind of penetrating item.

Include firestop design designation of testing and inspecting agency acceptable to authorities having jurisdiction that evidences 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 system configuration for construction and penetrating items.

C. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of five (5) completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

D. Product Certificates: Signed by manufacturers of through-penetration firestop system products certifying that products furnished comply with requirements.

E. Product Test Reports: From a qualified testing agency indicating through-penetration firestop system complies with requirements, based on comprehensive testing of current products.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed through-penetration firestop systems similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, from a single manufacturer.

C. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in "Performance Requirements" Article:

1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL.
2. Through-penetration firestop systems are identical to those tested per ASTM E 814. Provide rated systems complying with the following requirements:

    a. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.
    b. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by the following:

        1) UL in "Fire Resistance Directory."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multicomponent materials.

B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

1.8 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.

1.9 PRODUCTS AND MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the through-penetration firestop systems indicated for each application in the Through-Penetration Firestop System Schedule at the end of Part 3 that are produced by one of the following manufacturers:

1. Firestop Systems Inc.
2. Hilti Construction Chemicals, Inc.
3. International Protective Coatings Corp.
4. Isolatek International.
5. NUCO Industries.
6. RectorSeal Corporation (The).
7. Specified Technologies Inc.
8. 3M Fire Protection Products.
9. Tremco.
10. United States Gypsum Company.

1.10 FIRESTOPPING, GENERAL

A. Compatibility: Provide through-penetration firestop systems that are compatible with one another, with the substrates forming openings, and with the items penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.

B. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by the

qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:

1. Permanent forming/damming/backing materials, including the following:

    a. Slag-/rock-wool-fiber insulation.
    b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
    c. Fire-rated form board.
    d. Fillers for sealants.

2. Temporary forming materials.
3. Substrate primers.
4. Collars.
5. Steel sleeves.

1.11 FILL MATERIALS

A. General: Provide through-penetration firestop systems containing the types of fill materials indicated in the Through-Penetration Firestop System Schedule at the end of Part 3 by reference to the types of materials described in this Article. Fill materials are those referred to in directories of the referenced testing and inspecting agencies as fill, void, or cavity materials.

B. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.

C. Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.

D. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

E. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized steel sheet.

F. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.

G. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.

H. Mortars: Prepackaged, dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.

I. Pillows/Bags: Reusable, heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents and fire-retardant additives.

J. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

K. Silicone Sealants: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
   1. Grade for Horizontal Surfaces: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces.
   2. Grade for Vertical Surfaces: Nonsag formulation for openings in vertical and other surfaces.

1.12 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

1.13 PREPARATION

A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with written recommendations of firestop system manufacturer and the following requirements:

   1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
   2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
   3. Remove laitance and form-release agents from concrete.

B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

1.14 MIXING

A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

1.15 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

A. General: Install through-penetration firestop systems to comply with "Performance Requirements" Article and firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.

B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

1. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.

C. Install fill materials for firestop systems by proven techniques to produce the following results:

1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

1.16 IDENTIFICATION

A. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:

1. The words: "Warning--Through-Penetration Firestop System--Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Through-penetration firestop system designation of applicable testing.
4. Date of installation.
5. Through-penetration firestop system manufacturer's name.
6. Installer's name.

1.17 CLEANING AND PROTECTION

A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.

B. Provide final protection and maintain conditions during and after installation that ensure through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce through-penetration firestop systems complying with specified requirements.

1.18 THROUGH-PENETRATION FIRESTOP SYSTEM SCHEDULE

A. Where UL-classified systems are indicated, they refer to the alpha-alpha-numeric designations listed in UL's "Fire Resistance Directory" under product Category XHEZ.

B. Firestop Systems for, Steel Duct 12x24 or smaller: Comply with the following:

1. UL-Classified Systems: W-J-7068.

C. Firestop Systems for , Steel Duct up to 100in x 100in: Comply with the following:
1. UL-Classified Systems: W-J-7169

--- END OF SECTION 230512 ---

SECTION 230523 – GENERAL DUTY VALVES FOR HVAC PIPING

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following general-duty valves:

1. Ball Valves.
2. Bronze gate Valves.
3. Globe Valves
4. Swing Check Valves
5. Lubricated Plug valves
6. Needle Valves

1.3 DEFINITIONS

A. The following are standard abbreviations for valves:

1. CWP: Cold working pressure.
2. SWP: Steam working pressure.

1.4 SUBMITTALS

A. Product Data: For each type of valve indicated. Include body, seating, and trim materials; valve design; pressure and temperature classifications; end connections; arrangement; dimensions; and required clearances. Include list indicating valve and its application. Include rated capacities; shipping, installed, and operating weights; furnished specialties; and accessories.

1.5 QUALITY ASSURANCE

A. ASME Compliance: ASME B31.9 for building services piping valves.

1. Exceptions: Domestic hot water, cold-water**,** sanitary waste piping valves unless referenced.

B. ASME Compliance for Ferrous Valves: ASME B16.10 and ASME B16.34 for dimension and design criteria.

C. NSF Compliance: NSF 61 for valve materials for potable-water service.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Prepare valves for shipping as follows:

1. Protect internal parts against rust and corrosion.
2. Protect threads, flange faces, grooves, and weld ends.
3. Set gate, and globe valves closed to prevent rattling.
4. Set ball and plug valves open to minimize exposure of functional surfaces.
5. Set butterfly valves closed or slightly open.
6. Block check valves in either closed or open position.

B. Use the following precautions during storage:

1. Maintain valve end protection.
2. Store valves indoors and maintain at higher than ambient dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures

1.7 VALVES, GENERAL

A. Refer to Part 3 "Valve Applications" Article for applications of valves.

B. Bronze Valves: NPS 3 and smaller with threaded ends, unless otherwise indicated or required.

C. Gate Valves: NPS 4 and larger with flanged ends, unless otherwise indicated.

D. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.

E. Valve Sizes: Same as upstream pipe, unless otherwise indicated.

F. Extended Valve Stems: On insulated valves, required.

G. Valve Flanges: ASME B16.1 for cast-iron valves, ASME B16.5 for steel valves and ASME B16.24 for bronze valves.

H. Valve Bypass and Drain Connections: MSS SP-45.

1.8 BRONZE BALL VALVES

A. Class 125, Cast Bronze Ball Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following (Valves 3” and smaller, Bronze)Type:

a. Stockham Model T-285-BR
b. Approved Equal

2. Description:

a. Standard: MSS SP-110

b. CWP Rating: 150 psig
c. Body Material: Bronze ASTM B-584
d. Ball: Brass ASTM B-16, B-124
e. Ends: Threaded joint.
f. Stem Packing: PTEF
g. Thrust Washer: RTEF
h. Handle: Steel
i. Extension stem when used for insulated piping application.

1.9 BRONZE GATE VALVES

A. Class 125, Bronze Gate Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following (Valves 3" and smaller, Bronze, Rising-Stem, Solid Wedge, Union Bonnet Type):

a. Stockham Model B-105
b. Approved Equal

2. Description:

a. Standard: MSS SP-80, Type 2.
b. CWP Rating: 125 psig
c. Body Material: Bronze ASTM B 62, bronze bonnet.
d. Ends: Threaded joint.
e. Stem/Wedge: Bronze/Bronze.
f. Packing: Asbestos free.
g. Hand wheel: Malleable iron or bronze.

1.10 BRONZE GLOBE VALVES

A. Class 150, Bronze Globe Valves with PTFE Disc:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following (Valves 3" and smaller, Bronze, PTEF Disc, Union Bonnet Type):

a. Stockham Model B-22T.
b. Approved Equal

2. Description:

a. Standard: MSS SP-80, Type 2.
b. CWP Rating: 150 psig
c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
d. Ends: Threaded joint.
e. Stem/Disc: Bronze/PTFE.
f. Packing: Asbestos free.
g. Hand wheel: Malleable iron or bronze.

1.11 BRONZE CHECK VALVES

A. Class 125, Bronze Swing Check Valves with Bronze Disc:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following (Valves 3" and smaller, Bronze, Bronze disc Type) :

a. Stockham Model B-319Y, threaded end
b. Approved Equal.

2. Description:

a. Standard: MSS SP-80, Type 3.
b. CWP Rating: 125 psig
c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
d. Ends: Threaded joint.
e. Stem/Disc: Bronze/Bronze.
f. Hinge: Bronze
g. Hinge Pin: Stainless Steel
h. Hinge Pin Plug: Brass

1.12 LUBRICATED PLUG VALVES

A. Class 125, Regular-Gland, Lubricated Plug Valves with Threaded Ends:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following (Valves 3" and smaller, gray iron, short pattern type) :

a. Dezurik valves
b. Approved Equal.

2. Description:

a. Standard: MSS SP-78, Type II.
b. NPS 1-1/2 to NPS 12, CWP Rating: 200 psig.
c. Body Material: ASTM A 126, gray iron with lubrication-sealing system.
d. Ends: Threaded joint
e. Pattern: short.
f. Plug/Stem: Gray iron
g. Spring: Stainless Steel

1.13 NEEDLE VALVES

A. Brass with PTEF packing:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Parker Instrumentation Valve Series V8

b. Approved Equal.

2. Description:

a. CWP Rating: 3000 psig
b. Body Material: ASTM B 283 brass
c. Handle Screw: Stainless Steel
d. Upper Packing Washer: Brass
e. Optional O-ring elastomeric stem seals

1.14 EXAMINATION

A. Examine piping system for compliance with requirements for installation tolerances and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.

C. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.

D. Examine threads on valve and mating pipe for form and cleanliness.

E. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.

F. Do not attempt to repair defective valves; replace with new valves.

1.15 VALVE APPLICATIONS

A. Refer to piping Sections and contract drawings for specific valve applications. If valve applications are not indicated, use the following:

1. Shutoff Service: Ball or gate valves.
2. Throttling Service: Ball or Globe valves.

B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP class or CWP ratings may be substituted.

C. Heating Water Piping: Use the following types of valves:

1. Ball Valves or gate valves, NPS 3 and Smaller: 400-psig, CWP rating, copper alloy.
2. Swing Check Valves, and Smaller: Type 4, Class 150, bronze.
3. Swing Check Valves, NPS 2-1/2 and Larger: Type II, Class 250, gray iron.

D. Select valves, except wafer and flangeless types, with the following end connections:

1. For Copper Tubing, NPS 3 and Smaller: Solder-joint or threaded ends, except provide valves with threaded ends for chilled and heating hot water, steam, and steam condensate services.
2. For Copper Tubing, NPS 3 to NPS 4: Flanged ends.
3. For Steel Piping, NPS 3 and Smaller: Threaded ends.
4. For Steel Piping, NPS 3 to NPS 4: Flanged ends.

1.16 VALVE INSTALLATION

A. Piping installation requirements are specified in other Division 15 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown. When installing threaded valves, provide unions sweat to thread adaptors to allow future removal and service of valve.

C. Locate valves for easy access and provide separate support where necessary.

D. Install valves in horizontal piping with stem at or above center of pipe.

E. Install valves in position to allow full stem movement.

F. Install check valves for proper direction of flow and as follows:

1. Swing Check Valves: In horizontal position with hinge pin level.

1.17 JOINT CONSTRUCTION

A. Thread joints with suitable sealing compounds.

B. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.

1.18 ADJUSTING

A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

--- END OF SECTION 230523 ---

SECTION 230529 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

1.1 SUMMARY

A. This Section includes hangers and supports for mechanical system piping and equipment.

1.2 DEFINITIONS

A. MSS: Manufacturers Standardization Society for the Valve and Fittings Industry.

B. Terminology: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

1.3 PERFORMANCE REQUIREMENTS

A. If needed for multiple pipe runs, design channel support systems for piping to support multiple pipes capable of supporting combined weight of supported systems, system contents, and test water.

B. If needed for multiple pipe runs, design heavy-duty steel trapezes for piping to support multiple pipes capable of supporting combined weight of supported systems, system contents, and test water.

C. In general all pipe supports shall be standard products available from industrial pipe support manufacturers for fire protection piping applications.

1.4 SUBMITTALS

A. Product Data: For each type of pipe hanger and channel support system component.

1.5 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Pipe Hangers:
   a. Carpenter & Patterson, Inc.
   b. Empire Tool & Manufacturing Co., Inc.
   c. Grinnell Corp.
   d. National Pipe Hanger Corp.
   e. Anvil corporation

2. Channel Support Systems:
   a. Grinnell Corp.; Power-Strut Unit.
   b. National Pipe Hanger Corp.

c. Thomas & Betts Corp.
d. Unistrut Corp.

1.6 MANUFACTURED UNITS

A. Pipe Hangers, Supports, and Components: MSS SP-58, factory-fabricated components. Refer to "Hanger and Support Applications" Article in Part 3 for where to use specific hanger and support types.
   1. Nonmetallic Coatings: On attachments for electrolytic protection where attachments are in direct contact with copper tubing.
   2. All pipe supports shall be galvanized steel and receive two coats of paint upon final installation.

B. Channel Support Systems: MFMA-2, factory-fabricated components for field assembly.

   1. Coatings: Manufacturer's standard galvanized finish. All supports shall be galvanized and receive two coats of paint upon installation.
   2. Nonmetallic Coatings: On attachments for electrolytic protection where attachments are in direct contact with copper tubing.

1.7 PIPE STANDS

A. General Requirements for Pipe Stands: Shop- or field-fabricated assemblies made of manufactured corrosion-resistant components to support roof-mounted piping.

B. Compact Pipe Stand: One-piece plastic unit with integral-rod roller, pipe clamps, or V-shaped cradle to support pipe, for roof installation without membrane penetration.

C. Low-Type, Single-Pipe Stand: One-piece stainless-steel base unit with plastic roller, for roof installation without membrane penetration.

1.8 EQUIPMENT SUPPORTS

A. Description: Welded, shop- or field-fabricated equipment support made from structural carbon-steel shapes.

1.9 MISCELLANEOUS MATERIALS

A. Mechanical-Anchor Fasteners: Insert-type attachments with pull-out and shear capacities appropriate for supported loads and building materials where used.

B. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars, black and galvanized.

C. Grout: ASTM C 1107, Grade B, factory-mixed and -packaged, nonshrink and nonmetallic, dry, hydraulic-cement grout.

1. Characteristics: Post hardening and volume adjusting; recommended for both interior and exterior applications.
2. Properties: Nonstaining, noncorrosive, and nongaseous.
3. Design Mix: 5000-psi, 28-day compressive strength.

1.10 HANGER AND SUPPORT APPLICATIONS

A. General Hanger requirements are specified in Sections specifying equipment and systems.

B. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping system Specification Sections. Seismic support details for pipe supports shall be provided. All pipes shall meet seismic requirements of NFPA and New York State Building Codes.

C. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:

1. Adjustable Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 30. All supports shall be galvanized.
2. Adjustable Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes, NPS 2-1/2 to NPS 36, if vertical adjustment is required, with steel pipe base stanchion support and cast-iron floor flange. All supports shall be galvanized.
3. Sway bracing, and offsets shall be furnished and installed to meet the seismic code requirements for all installed piping.

D. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20. All supports shall be galvanized.

E. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types: All hardware associated with supports shall be galvanized.

1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
2. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.

F. Building Attachments: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:

1. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction to attach to top flange of structural shape.
2. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
3. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
4. C-Clamps (MSS Type 23): For structural shapes.
5. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.

6. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
7. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
8. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
9. Malleable Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
10. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.

    a. Horizontal (MSS Type 54): Mounted horizontally.
    b. Vertical (MSS Type 55): Mounted vertically.
    c. Trapeze (MSS Type 56): Two vertical-type supports and one trapeze member.
11. Contractor shall provide suitable supports for anchoring and threading into existing beams, walls, and similar construction. Beam attachments shall be into the side of beam. Expansion anchors/shields shall be suitable for pipe application.

1.11 HANGER AND SUPPORT INSTALLATION

A. Pipe Hanger and Support Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.

B. Hangers and Supports: Comply with NFPA 13 for hanger materials. All supports shall be galvanized steel.

C. Earthquake Protection: Install piping according to NFPA 13 to protect from earthquake damage.

D. Channel Support System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled channel systems.

    1. Field assemble and install according to manufacturer's written instructions.

E. Install building attachments to structural members. Space attachments within maximum piping span length indicated in MSS SP-69. Install additional attachments at concentrated loads, including valves, flanges, guides, strainers, and expansion joints, and at changes in direction of piping.

F. Install mechanical-anchor fasteners in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

G. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.

H. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion bends, and similar units.

I. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

J. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.9, "Building Services Piping," are not exceeded.

1.12 EQUIPMENT SUPPORTS

A. Fabricate structural-steel stands to suspend equipment from structure above or to support equipment above floor.

B. Provide lateral bracing, to prevent swaying, for equipment supports.

C. Grouting: Place grout under supports for equipment and make smooth bearing surface.

1.13 METAL FABRICATION

A. Cut, drill, and fit miscellaneous metal fabrications for heavy-duty steel trapezes and equipment supports.

B. Fit exposed connections together to form hairline joints. Field-weld connections that cannot be shop-welded because of shipping size limitations.

1.14 ADJUSTING

A. Hanger Adjustment: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

1.15 PAINTING

A. Touching Up: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal. All pipe supports shall receive two coats of paint as detailed for piping systems.

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

1.16 HANGER AND SUPPORT SCHEDULE

A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.

B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.

C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.

D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

E. Use carbon-steel pipe hangers and supports, metal trapeze pipe hangers and/or metal framing systems and attachments for general service applications.

F. Use copper-plated pipe hangers and copper attachments for copper piping and tubing.

G. Use padded hangers for piping that is subject to scratching.

H. Use thermal-hanger shield inserts for insulated piping and tubing.

I. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of up to 1050 deg F, pipes NPS 4 to NPS 24, requiring up to 4 inches of insulation.
3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36, requiring clamp flexibility and up to 4 inches of insulation.
4. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes NPS 1/2 to NPS 24 if little or no insulation is required.
5. Pipe Hangers (MSS Type 5): For suspension of pipes NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.
6. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of noninsulated, stationary pipes NPS 3/4 to NPS 8.
7. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
8. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
9. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
10. Split Pipe Ring with or without Turnbuckle Hangers (MSS Type 11): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 8.
11. Extension Hinged or Two-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 3.
12. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30.
13. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
14. Pipe Saddle Supports (MSS Type 36): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate.

15. Pipe Stanchion Saddles (MSS Type 37): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate, and with U-bolt to retain pipe.
16. Adjustable Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes NPS 2-1/2 to NPS 36 if vertical adjustment is required, with steel-pipe base stanchion support and cast-iron floor flange.
17. Single-Pipe Rolls (MSS Type 41): For suspension of pipes NPS 1 to NPS 30, from two rods if longitudinal movement caused by expansion and contraction might occur.
18. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes NPS 2-1/2 to NPS 24, from single rod if horizontal movement caused by expansion and contraction might occur.
19. Complete Pipe Rolls (MSS Type 44): For support of pipes NPS 2 to NPS 42 if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.
20. Pipe Roll and Plate Units (MSS Type 45): For support of pipes NPS 2 to NPS 24 if small horizontal movement caused by expansion and contraction might occur and vertical adjustment is not necessary.
21. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes NPS 2 to NPS 30 if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.

J. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.

K. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.

L. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.

2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction, to attach to top flange of structural shape.
3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
6. C-Clamps (MSS Type 23): For structural shapes.
7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
11. Malleable-Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
12. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:

    a. Light (MSS Type 31): 750 lb.
    b. Medium (MSS Type 32): 1500 lb.
    c. Heavy (MSS Type 33): 3000 lb.

13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.

M. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.

N. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches.

3. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41, roll hanger with springs.
4. Spring Sway Braces (MSS Type 50): To retard sway, shock, vibration, or thermal expansion in piping systems.
5. Variable-Spring Hangers (MSS Type 51): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from hanger.
6. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from base support.
7. Variable-Spring Trapeze Hangers (MSS Type 53): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from trapeze support.
8. Constant Supports: For critical piping stress and if necessary to avoid transfer of stress from one support to another support, critical terminal, or connected equipment. Include auxiliary stops for erection, hydrostatic test, and load-adjustment capability. These supports include the following types:

    a. Horizontal (MSS Type 54): Mounted horizontally.
    b. Vertical (MSS Type 55): Mounted vertically.
    c. Trapeze (MSS Type 56): Two vertical-type supports and one trapeze member.

O. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.

P. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.

Q. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

--- END OF SECTION 230529 ---

SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, General Requirements that apply to this Section.

1.2 SUMMARY

A. This Section Includes:
   1. Testing, Adjusting & Balancing of New Air *Systems* as well as Existing Air Systems to be modified under this Contract:
      a. Constant-volume air systems (AC-2A,2B,5A/B; RTU-2).
      b. Variable-volume air systems (AC-6).
      c. Exhaust Air Systems
         1) Bathroom Exhausts
         2) General Exhausts to Fuel Pump Room.
   2. Balancing the airflow within the HVAC distribution systems shall include supply, return and exhaust fans, including sub mains, branches, VAV terminals, diffusers, coils, piping, VFD drive motors, return registers and electrical data. This applies to both new and existing systems.
   3. Balancing New Hydronic Piping Systems and Associated Equipment New as well as Existing to be modified under this contract:
      a. Hot Water Coil in AC-2A Distribution Duct

B. Once the entire Mechanical System has been installed, the TAB firm shall work with the installing contractor & controls vendor to set all parameters. Contractor shall set-up the new units to match new design setpoints as close as practical. Upon award of the Contract, the Contractor will be provided with a copy of original Mechanical Drawings indicating design parameters (for those that remain unchanged by this contract).

C. Coordinate with controls contractor to calibrate controls system.

1.3 ACTION SUBMITTALS

A. LEED Submittals:

   1. Air-Balance Report for Prerequisite IEQ 1: Documentation of work performed for ASHRAE 62.1, Section 7.2.2 - "Air Balancing."
   2. TAB Report for Prerequisite EA 2: Documentation of work performed for ASHRAE/IESNA 90.1, Section 6.7.2.3 - "System Balancing."

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: Within 10 days of Contractor's Notice to Proceed, submit documentation that the TAB contractor and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.

B. Contract Documents Examination Report: Within 10 days of Contractor's Notice to Proceed, submit the Contract Documents review report as specified in Part 3.

C. Strategies and Procedures Plan: Within 10 days of Contractor's Notice to Proceed, submit TAB strategies and step-by-step procedures as specified in "Preparation" Article.

D. Certified TAB reports.

E. Sample report forms.

F. Instrument calibration reports, to include the following:

1. Instrument type and make.
2. Serial number.
3. Application.
4. Dates of use.
5. Dates of calibration.

1.5 QUALITY ASSURANCE

A. TAB Contractor Qualifications: Engage a TAB entity certified by **AABC**.

1. TAB Field Supervisor: Employee of the TAB contractor and certified by **AABC**.
2. TAB Technician: Employee of the TAB contractor and who is certified by **AABC** as a TAB technician.

B. Instrumentation Type, Quantity, Accuracy, and Calibration: As described in ASHRAE 111, Section 5, "Instrumentation."

C. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 7.2.2 - "Air Balancing."

D. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6.7.2.3 - "System Balancing."

1.6 PROJECT CONDITIONS

A. Full Owner Occupancy: Owner or Passengers at Westchester County Liberty Lines Bus Garage will occupy the site and existing building during entire TAB period. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

1.7 COORDINATION

A. Notice: Provide **(seven)** 7 days' advance notice for each test. Include scheduled test dates and times.

B. Perform TAB after leakage and pressure tests on air and water distribution systems have been satisfactorily completed.

1.8 EXAMINATION

A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.

B. Examine systems for installed balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are accessible.

C. Examine the approved submittals for HVAC systems and equipment.

D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.

E. Examine ceiling plenums and under floor air plenums used for supply, return, or relief air to verify that they meet the leakage class of connected ducts and are properly separated from adjacent areas. Verify that penetrations in plenum walls are sealed and fire-stopped if required.

F. Examine equipment performance data including fan and pump curves.

1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.

G. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.

H. Examine test reports specified in individual system and equipment Sections.

I. Examine HVAC equipment and filters and verify that bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.

J. Examine terminal units; such as variable-air-volume boxes, and verify that they are accessible and their controls are connected and functioning.

K. Examine strainers. Verify that startup screens are replaced by permanent screens with indicated perforations.

L. Examine three-way valves for proper installation for their intended function of diverting or mixing fluid flows.

M. Examine heat-transfer coils for correct piping connections and for clean and straight fins.

N. Examine system pumps to ensure absence of entrained air in the suction piping.

O. Examine operating safety interlocks and controls on HVAC equipment.

P. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

1.9 PREPARATION

A. Prepare a TAB plan that includes strategies and step-by-step procedures.

B. Complete system-readiness checks and prepare reports. Verify the following:

1. Permanent electrical-power wiring is complete.
2. Hydronic systems are filled, clean, and free of air.
3. Automatic temperature-control systems are operational.
4. Equipment and duct access doors are securely closed.
5. Balance, smoke, and fire dampers are open.
6. Isolating and balancing valves are open and control valves are operational.
7. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
8. Windows and doors can be closed so indicated conditions for system operations can be met.

1.10 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. Perform testing and balancing procedures on each system according to the procedures contained in [AABC's "National Standards for Total System Balance"] [ASHRAE 111] [NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems"] [SMACNA's "HVAC Systems - Testing, Adjusting, and Balancing"] and in this Section.

1. Comply with requirements in ASHRAE 62.1, Section 7.2.2 - "Air Balancing."

B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.

1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
2. After testing and balancing, install test ports and duct access doors.
3. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish.

C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.

D. Take and report testing and balancing measurements in inch-pound units.

1.11 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.

B. Prepare schematic diagrams of systems' "as-built" duct layouts.

C. For variable-air-volume systems, develop a plan to simulate diversity.

D. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.

E. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.

F. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.

G. Verify that motor starters are equipped with properly sized thermal protection.

H. Check dampers for proper position to achieve desired airflow path.

I. Check for airflow blockages.

J. Check condensate drains for proper connections and functioning.

K. Check for proper sealing of air-handling-unit components.

L. Verify that air duct system is sealed as specified in Section 233113 "Metal Ducts."

1.12 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.

1. Measure total airflow.

a. Where sufficient space in ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow.

2. Measure fan static pressures as follows to determine actual static pressure:

a. Measure outlet static pressure as far downstream from the fan as practical and upstream from restrictions in ducts such as elbows and transitions.
b. Measure static pressure directly at the fan outlet or through the flexible connection.
c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from the flexible connection, and downstream from duct restrictions.
d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.

3. Measure static pressure across each component that makes up an air-handling unit, rooftop unit, and other air-handling and -treating equipment.

    a. Report the cleanliness status of filters and the time static pressures are measured.

4. Measure static pressures entering and leaving other devices, such as sound traps, heat-recovery equipment, and air washers, under final balanced conditions.
5. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
6. Obtain approval from Construction Manager for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in HVAC Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
7. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.

B. Adjust volume dampers for main duct, sub-main ducts, and major branch ducts to indicated airflows within specified tolerances.

1. Measure airflow of sub-main and branch ducts.

    a. Where sufficient space in sub-main and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.

2. Measure static pressure at a point downstream from the balancing damper, and adjust volume dampers until the proper static pressure is achieved.
3. Remeasure each sub-main and branch duct after all have been adjusted. Continue to adjust sub-main and branch ducts to indicated airflows within specified tolerances.

C. Measure air outlets and inlets without making adjustments.

1. Measure terminal outlets using a direct-reading hood or outlet manufacturer's written instructions and calculating factors.

D. Adjust air outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using branch volume dampers rather than extractors and the dampers at air terminals.

1. Adjust each outlet in same room or space to within specified tolerances of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents.
2. Adjust patterns of adjustable outlets for proper distribution without drafts.

1.13 PROCEDURES FOR VARIABLE-AIR-VOLUME SYSTEMS

A. Compensating for Diversity: When the total airflow of all terminal units is more than the indicated airflow of the fan, place a selected number of terminal units at a minimum set-point airflow with the remainder at maximum-airflow condition until the total airflow of the terminal units equals the indicated airflow of the fan. Select the reduced-airflow terminal units so they are distributed evenly among the branch ducts.

B. Pressure-Independent, Variable-Air-Volume Systems: After the fan systems have been adjusted, adjust the variable-air-volume systems as follows:

1. Set outdoor-air dampers at minimum, and set return- and exhaust-air dampers at a position that simulates full-cooling load.
2. Select the terminal unit that is most critical to the supply-fan airflow and static pressure. Measure static pressure. Adjust system static pressure so the entering static pressure for the critical terminal unit is not less than the sum of the terminal-unit manufacturer's recommended minimum inlet static pressure plus the static pressure needed to overcome terminal-unit discharge system losses.
3. Measure total system airflow. Adjust to within indicated airflow.
4. Set terminal units at maximum airflow and adjust controller or regulator to deliver the designed maximum airflow. Use terminal-unit manufacturer's written instructions to make this adjustment. When total airflow is correct, balance the air outlets downstream from terminal units the same as described for constant-volume air systems.
5. Set terminal units at minimum airflow and adjust controller or regulator to deliver the designed minimum airflow. Check air outlets for a proportional reduction in airflow the same as described for constant-volume air systems.

    a. If air outlets are out of balance at minimum airflow, report the condition but leave outlets balanced for maximum airflow.

6. Remeasure the return airflow to the fan while operating at maximum return airflow and minimum outdoor airflow.

    a. Adjust the fan and balance the return-air ducts and inlets the same as described for constant-volume air systems.

7. Measure static pressure at the most critical terminal unit and adjust the static-pressure controller at the main supply-air sensing station to ensure that adequate static pressure is maintained at the most critical unit.
8. Record final fan-performance data.

C. Pressure-Dependent, Variable-Air-Volume Systems without Diversity: After the fan systems have been adjusted, adjust the variable-air-volume systems as follows:

1. Balance variable-air-volume systems the same as described for constant-volume air systems.
2. Set terminal units and supply fan at full-airflow condition.
3. Adjust inlet dampers of each terminal unit to indicated airflow and verify operation of the static-pressure controller. When total airflow is correct, balance the air outlets downstream from terminal units the same as described for constant-volume air systems.
4. Readjust fan airflow for final maximum readings.

5. Measure operating static pressure at the sensor that controls the supply fan if one is installed, and verify operation of the static-pressure controller.
6. Set supply fan at minimum airflow if minimum airflow is indicated. Measure static pressure to verify that it is being maintained by the controller.
7. Set terminal units at minimum airflow and adjust controller or regulator to deliver the designed minimum airflow. Check air outlets for a proportional reduction in airflow the same as described for constant-volume air systems.

    a. If air outlets are out of balance at minimum airflow, report the condition but leave the outlets balanced for maximum airflow.

8. Measure the return airflow to the fan while operating at maximum return airflow and minimum outdoor airflow.

    a. Adjust the fan and balance the return-air ducts and inlets the same as described for constant-volume air systems.

D. Pressure-Dependent, Variable-Air-Volume Systems with Diversity: After the fan systems have been adjusted, adjust the variable-air-volume systems as follows:

1. Set system at maximum indicated airflow by setting the required number of terminal units at minimum airflow. Select the reduced-airflow terminal units so they are distributed evenly among the branch ducts.
2. Adjust supply fan to maximum indicated airflow with the variable-airflow controller set at maximum airflow.
3. Set terminal units at full-airflow condition.
4. Adjust terminal units starting at the supply-fan end of the system and continuing progressively to the end of the system. Adjust inlet dampers of each terminal unit to indicated airflow. When total airflow is correct, balance the air outlets downstream from terminal units the same as described for constant-volume air systems.
5. Adjust terminal units for minimum airflow.
6. Measure static pressure at the sensor.
7. Measure the return airflow to the fan while operating at maximum return airflow and minimum outdoor airflow. Adjust the fan and balance the return-air ducts and inlets the same as described for constant-volume air systems.

1.14 GENERAL PROCEDURES FOR HYDRONIC SYSTEMS

A. Prepare test reports with pertinent design data, and number in sequence starting at pump to end of system. Check the sum of branch-circuit flows against the approved pump flow rate. Correct variations that exceed plus or minus 5 percent.

B. Prepare schematic diagrams of systems' "as-built" piping layouts.

C. Prepare hydronic systems for testing and balancing according to the following, in addition to the general preparation procedures specified above:

1. Open all manual valves for maximum flow.
2. Check liquid level in expansion tank.
3. Check makeup water-station pressure gage for adequate pressure for highest vent.

4. Check flow-control valves for specified sequence of operation, and set at indicated flow.
5. Set differential-pressure control valves at the specified differential pressure. Do not set at fully closed position when pump is positive-displacement type unless several terminal valves are kept open.
6. Set system controls so automatic valves are wide open to heat exchangers.
7. Check pump-motor load. If motor is overloaded, throttle main flow-balancing device so motor nameplate rating is not exceeded.
8. Check air vents for a forceful liquid flow exiting from vents when manually operated.

1.15 PROCEDURES FOR CONSTANT-FLOW HYDRONIC SYSTEMS

A. Measure water flow at pumps. Use the following procedures except for positive-displacement pumps:

1. Verify impeller size by operating the pump with the discharge valve closed. Read pressure differential across the pump. Convert pressure to head and correct for differences in gage heights. Note the point on manufacturer's pump curve at zero flow and verify that the pump has the intended impeller size.

    a. If impeller sizes must be adjusted to achieve pump performance, obtain approval from Construction Manager.

2. Check system resistance. With all valves open, read pressure differential across the pump and mark pump manufacturer's head-capacity curve. Adjust pump discharge valve until indicated water flow is achieved.

    a. Monitor motor performance during procedures and do not operate motors in overload conditions.

3. Verify pump-motor brake horsepower. Calculate the intended brake horsepower for the system based on pump manufacturer's performance data. Compare calculated brake horsepower with nameplate data on the pump motor. Report conditions where actual amperage exceeds motor nameplate amperage.
4. Report flow rates that are not within plus or minus 10 percent of design.

B. Measure flow at all automatic flow control valves to verify that valves are functioning as designed.

C. Measure flow at all pressure-independent characterized control valves, with valves in fully open position, to verify that valves are functioning as designed.

D. Set calibrated balancing valves, if installed, at calculated pre settings.

E. Measure flow at all stations and adjust, where necessary, to obtain first balance.

1. System components that have Cv rating or an accurately cataloged flow-pressure-drop relationship may be used as a flow-indicating device.

F. Measure flow at main balancing station and set main balancing device to achieve flow that is 5 percent greater than indicated flow.

G. Adjust balancing stations to within specified tolerances of indicated flow rate as follows:

1. Determine the balancing station with the highest percentage over indicated flow.
2. Adjust each station in turn, beginning with the station with the highest percentage over indicated flow and proceeding to the station with the lowest percentage over indicated flow.
3. Record settings and mark balancing devices.

H. Measure pump flow rate and make final measurements of pump amperage, voltage, rpm, pump heads, and systems' pressures and temperatures including outdoor-air temperature.

I. Measure the differential-pressure-control-valve settings existing at the conclusion of balancing.

J. Check settings and operation of each safety valve. Record settings.

1.16 PROCEDURES FOR VARIABLE-FLOW HYDRONIC SYSTEMS

A. Balance systems with automatic two- and three-way control valves by setting systems at maximum flow through heat-exchange terminals and proceed as specified above for hydronic systems.

1.17 PROCEDURES FOR MOTORS

A. Motors, 1/2 HP and Larger: Test at final balanced conditions and record the following data:

1. Manufacturer's name, model number, and serial number.
2. Motor horsepower rating.
3. Motor rpm.
4. Efficiency rating.
5. Nameplate and measured voltage, each phase.
6. Nameplate and measured amperage, each phase.
7. Starter thermal-protection-element rating.

B. Motors Driven by Variable-Frequency Controllers: Test for proper operation at speeds varying from minimum to maximum. Test the manual bypass of the controller to prove proper operation. Record observations including name of controller manufacturer, model number, serial number, and nameplate data.

1.18 PROCEDURES FOR CONDENSING UNITS

A. Verify proper rotation of fans.

B. Measure entering- and leaving-air temperatures.

C. Record compressor data.

1.19 PROCEDURES FOR TESTING, ADJUSTING, AND BALANCING EXISTING SYSTEMS

A. Perform a preconstruction inspection of existing equipment that is to remain and be reused.

1. Measure and record the operating speed, airflow, and static pressure of each fan.
2. Measure motor voltage and amperage. Compare the values to motor nameplate information.
3. Check the refrigerant charge.
4. Check the condition of filters.
5. Check the condition of coils.
6. Check the operation of the drain pan and condensate-drain trap.
7. Check bearings and other lubricated parts for proper lubrication.
8. Report on the operating condition of the equipment and the results of the measurements taken. Report deficiencies.

B. Before performing testing and balancing of existing systems, inspect existing equipment that is to remain and be reused to verify that existing equipment has been cleaned and refurbished. Verify the following:

1. New filters are installed.
2. Coils are clean and fins combed.
3. Drain pans are clean.
4. Fans are clean.
5. Bearings and other parts are properly lubricated.
6. Deficiencies noted in the preconstruction report are corrected.

C. Perform testing and balancing of existing systems to the extent that existing systems are affected by the renovation work.

1. Compare the indicated airflow of the renovated work to the measured fan airflows, and determine the new fan speed and the face velocity of filters and coils.
2. Verify that the indicated airflows of the renovated work result in filter and coil face velocities and fan speeds that are within the acceptable limits defined by equipment manufacturer.
3. If calculations increase or decrease the air flow rates and water flow rates by more than 5 percent, make equipment adjustments to achieve the calculated rates. If increase or decrease is 5 percent or less, equipment adjustments are not required.
4. Balance each air outlet.

1.20 TOLERANCES

A. Set HVAC system's air flow rates and water flow rates within the following tolerances:

1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent
2. Air Outlets and Inlets: Plus or minus 10 percent
3. Heating-Water Flow Rate: Plus or minus 10 percent
4. Cooling-Water Flow Rate: Plus or minus 10 percent

1.21 REPORTING

A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems' balancing devices. Recommend changes and additions to systems' balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.

B. Status Reports: Prepare weekly progress reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

1.22 FINAL REPORT

A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.

1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
2. Include a list of instruments used for procedures, along with proof of calibration.

B. Final Report Contents: In addition to certified field-report data, include the following:

1. Pump curves.
2. Fan curves.
3. Manufacturers' test data.
4. Field test reports prepared by system and equipment installers.
5. Other information relative to equipment performance; do not include Shop Drawings and product data.

C. General Report Data: In addition to form titles and entries, include the following data:

1. Title page.
2. Name and address of the TAB contractor.
3. Project name.
4. Project location.
5. Architect's name and address.
6. Engineer's name and address.
7. Contractor's name and address.
8. Report date.
9. Signature of TAB supervisor who certifies the report.
10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
11. Summary of contents including the following:

a. Indicated versus final performance.
b. Notable characteristics of systems.

c. Description of system operation sequence if it varies from the Contract Documents.

12. Nomenclature sheets for each item of equipment.
13. Data for terminal units, including manufacturer's name, type, size, and fittings.
14. Notes to explain why certain final data in the body of reports vary from indicated values.
15. Test conditions for fans and pump performance forms including the following:

    a. Settings for outdoor-, return-, and exhaust-air dampers.
    b. Conditions of filters.
    c. Cooling coil, wet- and dry-bulb conditions.
    d. Face and bypass damper settings at coils.
    e. Fan drive settings including settings and percentage of maximum pitch diameter.
    f. Inlet vane settings for variable-air-volume systems.
    g. Settings for supply-air, static-pressure controller.
    h. Other system operating conditions that affect performance.

D. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:

1. Quantities of outdoor, supply, return, and exhaust airflows.
2. Water and steam flow rates.
3. Duct, outlet, and inlet sizes.
4. Pipe and valve sizes and locations.
5. Terminal units.
6. Balancing stations.
7. Position of balancing devices.

E. Air-Handling-Unit Test Reports: For air-handling units with coils, include the following:

1. Unit Data:

    a. Unit identification.
    b. Location.
    c. Make and type.
    d. Model number and unit size.
    e. Manufacturer's serial number.
    f. Unit arrangement and class.
    g. Discharge arrangement.
    h. Sheave make, size in inches, and bore.
    i. Center-to-center dimensions of sheave, and amount of adjustments in inches.
    j. Number, make, and size of belts.
    k. Number, type, and size of filters.

2. Motor Data:

    a. Motor make, and frame type and size.
    b. Horsepower and rpm.
    c. Volts, phase, and hertz.
    d. Full-load amperage and service factor.
    e. Sheave make, size in inches, and bore.

f. Center-to-center dimensions of sheave, and amount of adjustments in inches.

3. Test Data (Indicated and Actual Values):

a. Total air flow rate in cfm.
b. Total system static pressure in inches wg.
c. Fan rpm.
d. Discharge static pressure in inches wg.
e. Filter static-pressure differential in inches wg.
f. Preheat-coil static-pressure differential in inches wg.
g. Cooling-coil static-pressure differential in inches wg.
h. Heating-coil static-pressure differential in inches wg.
i. Outdoor airflow in cfm.
j. Return airflow in cfm.
k. Outdoor-air damper position.
l. Return-air damper position.
m. Vortex damper position.

F. Apparatus-Coil Test Reports:

1. Coil Data:

a. System identification.
b. Location.
c. Coil type.
d. Number of rows.
e. Fin spacing in fins per inch o.c.
f. Make and model number.
g. Face area in sq. ft.
h. Tube size in NPS.
i. Tube and fin materials.
j. Circuiting arrangement.

2. Test Data (Indicated and Actual Values):

a. Air flow rate in cfm.
b. Average face velocity in fpm.
c. Air pressure drop in inches wg.
d. Outdoor-air, wet- and dry-bulb temperatures in deg F.
e. Return-air, wet- and dry-bulb temperatures in deg F.
f. Entering-air, wet- and dry-bulb temperatures in deg F.
g. Leaving-air, wet- and dry-bulb temperatures in deg F.
h. Water flow rate in gpm.
i. Water pressure differential in feet of head or psig.
j. Entering-water temperature in deg F.
k. Leaving-water temperature in deg F.
l. Refrigerant expansion valve and refrigerant types.
m. Refrigerant suction pressure in psig.
n. Refrigerant suction temperature in deg F.
o. Inlet steam pressure in psig.

G. Fan Test Reports: For supply, return, and exhaust fans, include the following:

1. Fan Data:

a. System identification.
b. Location.
c. Make and type.
d. Model number and size.
e. Manufacturer's serial number.
f. Arrangement and class.
g. Sheave make, size in inches, and bore.
h. Center-to-center dimensions of sheave, and amount of adjustments in inches.

2. Motor Data:

a. Motor make, and frame type and size.
b. Horsepower and rpm.
c. Volts, phase, and hertz.
d. Full-load amperage and service factor.
e. Sheave make, size in inches, and bore.
f. Center-to-center dimensions of sheave, and amount of adjustments in inches.
g. Number, make, and size of belts.

3. Test Data (Indicated and Actual Values):

a. Total airflow rate in cfm.
b. Total system static pressure in inches wg.
c. Fan rpm.
d. Discharge static pressure in inches wg.
e. Suction static pressure in inches wg.

H. Round, Flat-Oval, and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:

1. Report Data:

a. System and air-handling-unit number.
b. Location and zone.
c. Traverse air temperature in deg F.
d. Duct static pressure in inches wg.
e. Duct size in inches.
f. Duct area in sq. ft.
g. Indicated air flow rate in cfm.
h. Indicated velocity in fpm.
i. Actual air flow rate in cfm.
j. Actual average velocity in fpm.
k. Barometric pressure in psig.

I. Air-Terminal-Device Reports:

1. Unit Data:

a. System and air-handling unit identification.
b. Location and zone.
c. Apparatus used for test.
d. Area served.
e. Make.
f. Number from system diagram.
g. Type and model number.
h. Size.
i. Effective area in sq. ft.

2. Test Data (Indicated and Actual Values):

a. Air flow rate in cfm.
b. Air velocity in fpm.
c. Preliminary air flow rate as needed in cfm.
d. Preliminary velocity as needed in fpm.
e. Final air flow rate in cfm.
f. Final velocity in fpm.
g. Space temperature in deg F.

J. System-Coil Reports: For reheat coils and water coils of terminal units, include the following:

1. Unit Data:

a. System and air-handling-unit identification.
b. Location and zone.
c. Room or riser served.
d. Coil make and size.
e. Flow-meter type.

2. Test Data (Indicated and Actual Values):

a. Air flow rate in cfm.
b. Entering-water temperature in deg F.
c. Leaving-water temperature in deg F.
d. Water pressure drop in feet of head or psig.
e. Entering-air temperature in deg F.
f. Leaving-air temperature in deg F.

K. Pump Test Reports: Calculate impeller size by plotting the shutoff head on pump curves and include the following:

1. Unit Data:

a. Unit identification.
b. Location.
c. Service.
d. Make and size.
e. Model number and serial number.
f. Water flow rate in gpm.
g. Water pressure differential in feet of head or psig.

h. Required net positive suction head in feet of head or psig.
i. Pump rpm.
j. Impeller diameter in inches.
k. Motor make and frame size.
l. Motor horsepower and rpm.
m. Voltage at each connection.
n. Amperage for each phase.
o. Full-load amperage and service factor.
p. Seal type.

2. Test Data (Indicated and Actual Values):

a. Static head in feet of head or psig.
b. Pump shutoff pressure in feet of head or psig.
c. Actual impeller size in inches.
d. Full-open flow rate in gpm.
e. Full-open pressure in feet of head or psig.
f. Final discharge pressure in feet of head or psig.
g. Final suction pressure in feet of head or psig.
h. Final total pressure in feet of head or psig.
i. Final water flow rate in gpm.
j. Voltage at each connection.
k. Amperage for each phase.

L. Instrument Calibration Reports:

1. Report Data:

a. Instrument type and make.
b. Serial number.
c. Application.
d. Dates of use.
e. Dates of calibration.

1.23 INSPECTIONS

A. Initial Inspection:

1. After testing and balancing are complete, operate each system and randomly check measurements to verify that the system is operating according to the final test and balance readings documented in the final report.
2. Check the following for each system:

a. Measure airflow of at least 10 percent of air outlets.
b. Measure water flow of at least 5 percent of terminals.
c. Measure room temperature at each thermostat/temperature sensor. Compare the reading to the set point.
d. Verify that balancing devices are marked with final balance position.
e. Note deviations from the Contract Documents in the final report.

B. Final Inspection:

1. After initial inspection is complete and documentation by random checks verifies that testing and balancing are complete and accurately documented in the final report, request that a final inspection be made by Construction Manager.
2. The TAB contractor's test and balance engineer shall conduct the inspection in the presence of Construction Manager.
3. Construction Manager shall randomly select measurements, documented in the final report, to be rechecked. Rechecking shall be limited to either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business day.
4. If rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."
5. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.

C. TAB Work will be considered defective if it does not pass final inspections. If TAB Work fails, proceed as follows:

1. Recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection.
2. If the second final inspection also fails, Owner may contract the services of another TAB contractor to complete TAB Work according to the Contract Documents and deduct the cost of the services from the original TAB contractor's final payment.

D. Prepare test and inspection reports.

1.24 ADDITIONAL TESTS

A. Within 90 days of completing TAB, perform additional TAB to verify that balanced conditions are being maintained throughout and to correct unusual conditions.

B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional TAB during near-peak summer and winter conditions.

--- END OF SECTION 230593 ---

SECTION 230713 - DUCT INSULATION

1.1 SUMMARY

A. This Section includes duct insulation for indoor and outdoor locations. Field applied jackets; accessories and attachments; and sealing compounds

1.2 SUBMITTALS

A. Product Data: Identify thermal conductivity, thickness, and jackets (both factory and field applied, if any), for each type of product indicated. List duct application insulation shall be used for.

1.3 QUALITY ASSURANCE

A. Insulation Installed Indoors: Flame-spread rating of 25 or less and smoke-developed rating of 50 or less.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Ship insulation materials in containers marked by manufacturer with appropriate ASTM specification designation, type and grade, and maximum use temperature.

1.5 COORDINATION

A. Coordinate clearance requirements with duct Installer for insulation application.

1.6 SCHEDULING

A. Schedule insulation application after testing duct systems. Insulation application may begin on segments of ducts that have satisfactory test results.

1.7 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Mineral-Fiber Insulation:
      a. CertainTeed Manson.
      b. Knauf FiberGlass GmbH.
      c. Owens-Corning Fiberglas Corp.
      d. Johns Manville

1.8 INSULATION MATERIALS

A. Mineral-Fiber Blanket Thermal Insulation (TYPE-A): Indoor application: concealed area: ductwork insulation: Johns Manville-Microlite Fiberglass Duct Wrap, Knauf Duct wrap or approved equal.
   1. Duct wrap shall be flexible (blanket) fiberglass (Density 1.0 P.C.F., K=0.29/75F) with factory applied foil reinforced kraft facing. Insulation shall be applied with duct insulation adhesive. Insulation to be applied with edges tightly butted and seams stapled approximately 6" on center. Insulation shall be additionally secured with ¾" wide aluminum bands, 007" thick installed on 12" centers. All joints and clips shall be taped and sealed with 3" wide strips of foil reinforced-kraft vapor barrier facing applied with insulation adhesive. On ducts over 24" wide, to prevent sagging, welded pins and clips shall be used on the underside and shall be coated with vapor barrier coating or tape.
   2. Insulation thickness shall be 1-1/2" minimum.

B. Mineral-Fiber Thermal Insulation (TYPE-B): Indoor Application: Duct liner. All area designated to receive acoustical duct liner. Duct liner shall be Certainteed Toughgard rigid liner board with enhanced surface, Knauf duct liner E-M, or approved equal.
   1. Liner shall be density 3.0 P.C.F. Liner shall be meet ASTM C 1071. Duct liner shall meet the requirements of NFPA 90A, Flame spread 25 or less, smoke developed less than 50. Leading edge facing airflow shall have a metal nosing. The liner shall be adhered with adhesive with 100% coverage. The liner shall be additional secured using mechanical fasteners similar to Standard FM-1-1971, following SMACNA guidelines. Fasteners shall be installed at 6" o.c. and 3" from joints. All exposed edges shall be sealed. Manufacturer's application guidelines for liner board installation and sealing shall be followed.
   2. Insulation thickness shall be 1" minimum.

C. Rigid board type insulation (TYPE-C): Indoor Application: exposed areas. ductwork insulation: Owens-Corning Fiberglass Corp. Industrial series board type 705 vapor seal duct insulation canvas finish or approved equal.
   1. Board type insulation shall be 705 FRK rigid board type, glass fiber with a resin binder, Minimum Density - 6 pcf, K-factor - 0.22 at 75°F mean, Temperature Range - 35°F to 350°F.
   2. Factory applied facing - White embossed, flame retardant, all service vapor barrier jacket of aluminum foil laminated to Kraft paper with a flame retardant snuffer type adhesive, and reinforced with glass fibers. Permeability 0.02 perm.
   3. Impale insulation panels on pin and clip fasteners located not less than 3" from edge or corner of board and spaced 12" on centers on the metal surface. Apply top and bottom panels to lap side panels. Apply white pressure sensitive all service tape patches over fasteners. On curved surfaces score insulation to a depth of half the thickness, scoring on side to be place against duct. Where required, use wire or bands in addition to fasteners. Fill all voids with loose insulation and seal all joints and breaks in facing with white pressure sensitive all service type tape. Use 3" wide tape on flat surfaces and at edges and transverse joints where vapor barrier is lapped or butted. Use 5" tape where insulation edges are exposed without vapor barrier.
   4. Insulation thickness shall be 1" minimum.
   5. In exposed areas the Contractor shall paint insulation ASJ facing material after all joints have been patched, taped and sealed. Duct insulation shall be painted white using high

quality latex paint suitable for service requirements to provide a clean consistent appearance.

1.9 FIELD-APPLIED JACKETS

A. General: ASTM C 921, Type 1, unless otherwise indicated.

B. Foil and Paper Jacket: Laminated, glass-fiber-reinforced, flame-retardant kraft paper and aluminum foil.

1.10 ACCESSORIES AND ATTACHMENTS

A. Glass Cloth and Tape: Comply with MIL-C-20079H, Type I for cloth and Type II for tape. Woven glass-fiber fabrics, plain weave, pre-sized a minimum of 8 oz. /sq. yd.
1. Tape Width: 4 inches.

B. Bands: 3/4 inch wide, in one of the following materials compatible with jacket:
1. Aluminum: 0.007 inch thick.

C. Punch Pins.

1.11 VAPOR RETARDERS

A. Mastics: Materials recommended by insulation material manufacturer that are compatible with insulation materials, jackets, and substrates.

1.12 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

1.13 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

1.14 GENERAL APPLICATION REQUIREMENTS

A. Apply insulation materials, accessories, and finishes according to the manufacturer's written instructions; with smooth, straight, and even surfaces; and free of voids throughout the length of ducts and fittings.

B. Refer to schedules at the end of this Section for materials, forms, jackets, and thicknesses required for each duct system.

C. Use accessories compatible with insulation materials and suitable for the service. Use accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Seal joints and seams with vapor-retarder mastic on insulation indicated to receive a vapor retarder.

E. Keep insulation materials dry during application and finishing.

F. Apply insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by the insulation material manufacturer.

G. Apply insulation with the least number of joints practical.

H. Apply insulation over fittings and specialties, with continuous thermal and vapor-retarder integrity, unless otherwise indicated.

I. Hangers and Anchors: Where vapor retarder is indicated, seal penetrations in insulation at hangers, supports, anchors, and other projections with vapor-retarder mastic. Apply insulation continuously through hangers and around anchor attachments.

J. Insulation Terminations: For insulation application where vapor retarders are indicated, seal ends with a compound recommended by the insulation material manufacturer to maintain vapor retarder.

K. Apply insulation with integral jackets as follows:
   1. Pull jacket tight and smooth.
   2. Joints and Seams: Cover with tape and vapor retarder as recommended by insulation material manufacturer to maintain vapor seal.
   3. Vapor-Retarder Mastics: Apply mastic on seams and joints and at ends adjacent to duct flanges and fittings.

L. Cut insulation according to manufacturer's written instructions to prevent compressing insulation to less than 75 percent of its nominal thickness.

M. Install vapor-retarder mastic on ducts.
   1. Ducts with Vapor Retarders: Overlap insulation facing at seams and seal with vapor-retarder mastic and pressure-sensitive tape having same facing as insulation. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-retarder seal.

1.15 MINERAL-FIBER INSULATION APPLICATION

A. Blanket Applications for Ducts: Secure blanket insulation with adhesive and anchor pins and speed washers.
   1. Apply adhesives according to manufacturer's recommended coverage rates per square foot, for 100 percent coverage of duct and plenum surfaces.

2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
3. Install anchor pins and speed washers on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
   a. On duct sides with dimensions 18 inches and smaller, along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
   b. On duct sides with dimensions larger than 18 inches. Space 16 inches o.c. each way, and 3 inches maximum from insulation joints. Apply additional pins and clips to hold insulation tightly against surface at cross bracing.
   c. Anchor pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
   d. Do not over compress insulation during installation.
4. Impale insulation over anchors and attach speed washers.
5. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
6. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation segment with 1/2-inch staples, 1 inch o.c., and cover with pressure-sensitive tape having same facing as insulation.
7. Overlap unfaced blankets a minimum of 2 inches on longitudinal seams and end joints. Secure with steel band at end joints and spaced a maximum of 18 inches o.c.
8. Apply insulation on rectangular duct elbows and transitions with a full insulation segment for each surface. Apply insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
9. Insulate duct stiffeners, hangers, and flanges that protrude beyond the insulation surface with 6-inch-wide strips of the same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with anchor pins spaced 6 inches o.c.
10. Apply vapor-retarder mastic to open joints, breaks, and punctures for insulation.

1.16 FIELD-APPLIED JACKET APPLICATION

A. Apply glass-cloth jacket, where indicated, directly over bare insulation or insulation with factory-applied jackets.
   1. Apply jacket smooth and tight to surface with 2-inch overlap at seams and joints.
   2. Embed glass cloth between two 0.062-inch-thick coats of jacket manufacturer's recommended adhesive.
   3. Completely encapsulate insulation with jacket, leaving no exposed raw insulation.

1.17 DUCT SYSTEM APPLICATIONS

A. Insulate the following new duct systems:
   1. All indoor, concealed, supply and return air ductwork shall have TYPE A insulation.
   2. All indoor, exposed, supply and return ductwork shall have 1” thick fiberglass board insulation with canvas finish TYPE C.
   3. Following ductwork shall have internal insulation TYPE B.

a. 25’-0” from supply and return of roof top units.
b. 10’-0” downstream of VAV units.
c. As shown on contract drawings.

4. Insulate/Ductwrap Existing Outside air Plenum Intake ductwork as indicated from Outside air intake to Doorway N-27.

B. Items Not Insulated: Unless otherwise indicated, do not apply insulation to the following systems, materials, and equipment:
1. Flexible connectors.
2. Vibration-control devices.
3. Testing agency labels and stamps.
4. Nameplates and data plates.

--- END OF SECTION 230713 ---

SECTION 230719 – HVAC PIPING INSULATION

1.1 SUMMARY

A. This Section includes furnishing and installing preformed, rigid and flexible pipe insulation; insulating cements; field-applied jackets; accessories and attachments.

1.2 SUBMITTALS

A. Product Data: Identify thermal conductivity, thickness, and jackets (both factory and field applied, if any), for each type of product indicated.

1.3 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: As determined by testing materials identical to those specified in this Section according to ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and sealer and cement material containers with appropriate markings of applicable testing and inspecting agency.
   1. Insulation Installed Indoors: Flame-spread rating of 25 or less and smoke-developed rating of 50 or less.

1.4 COORDINATION

A. Coordinate size and location of supports, hangers, and insulation shields specified in Division 23, Section 230510 - General Provisions for Mechanical Work.

B. Coordinate clearance requirements with piping Installer for insulation application.

1.5 SCHEDULING

A. Schedule insulation application after testing piping systems and, where required, after installing and testing heat-trace tape. Insulation application may begin on segments of piping that have satisfactory test results.

1.6 INSULATION MATERIALS

A. Mineral-Fiber Insulation: Glass fibers bonded with a thermosetting resin complying with the following:
   1. Preformed Pipe Insulation: Comply with ASTM C 547, Type 1, with factory-applied, all-purpose, vapor-retarder jacket.
   2. Blanket Insulation: Comply with ASTM C 553, Type II, without facing.
   3. Fire-Resistant Adhesive: Comply with MIL-A-3316C in the following classes and grades:

a. Class 1, Grade A for bonding glass cloth and tape to unfaced glass-fiber insulation, for sealing edges of glass-fiber insulation, and for bonding lagging cloth to unfaced glass-fiber insulation.
b. Class 2, Grade A for bonding glass-fiber insulation to metal surfaces.

4. Vapor-Retarder Mastics: Fire- and water-resistant, vapor-retarder mastic for indoor applications. Comply with MIL-C-19565C, Type II.
5. Mineral-Fiber Insulating Cements: Comply with ASTM C 195.
6. Manufacturers: Subject to compliance with requirements, provide products by one of the following: Pipe insulation Johns Manville, Micro lok HP-t Plus, or approved equal. Zeston 2000 PVC insulated fitting and valve covers with Hi-Lo temperature insert covers for heating hot water and chilled water service, Johns Manville International, or approved equal.

B. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials.
1. Products:
a. Aeroflex USA Inc.; Aerocel.
b. Armacell LLC; AP Armaflex.
c. RBX Corporation; Insul-Sheet 1800 and Insul-Tube 180.
d. Approved equal.

C. Prefabricated Thermal Insulating Fitting Covers: Comply with ASTM C 450 for dimensions used in preforming insulation to cover valves, elbows, tees, and flanges.

D. All fitting and valves on piping systems for chilled water and heating hot water requiring insulation shall be insulated with Zeston 2000 PVC insulation covers with Ho-lo temperature inserts, or approved equal. All fitting covers shall be banded, taped and sealed according Manufacturer's requirements. Vapor retarder mastic shall be used.

E. Fittings and valves on steam and hot condensate piping, if applicable, shall molded insulation fitting and shall be sealed with cement, mastic and compounds suitable for high temperature application.

F. All Refrigerant suction lines shall be insulated with high density rubberized insulation. All insulation for outdoor piping (glycol chilled water, glycol hot water) and fittings shall be sealed for outdoor environment to protect from mechanical damage, sun and weather, Alumaguard 60, or approved equal shall be applied.

1.7 ACCESSORIES AND ATTACHMENTS

A. Glass Cloth and Tape: Comply with MIL-C-20079H, Type I for cloth and Type II for tape. Woven glass-fiber fabrics, plain weave, presized a minimum of 8 oz. /sq. yd.
1. Tape Width: 4 inches.

B. Wire: 0.080-inch, nickel-copper alloy; 0.062-inch, soft-annealed, stainless steel; or 0.062-inch, soft-annealed, galvanized steel.

1.8 VAPOR RETARDERS

A. Mastics: Materials recommended by insulation material manufacturer that are compatible with insulation materials, jackets, and substrates.

1.9 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.

1.10 PREPARATION

A. Surface Preparation: Clean and dry pipe and fitting surfaces. Remove materials that will adversely affect insulation application.

1.11 GENERAL APPLICATION REQUIREMENTS

A. Apply insulation materials, accessories, and finishes according to the manufacturer's written instructions; with smooth, straight, and even surfaces; free of voids throughout the length of piping, including fittings, valves, and specialties.

B. Refer to schedules at the end of this Section for materials, forms, jackets, and thicknesses required for each piping system.

C. Use accessories compatible with insulation materials and suitable for the service. Use accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Apply insulation with longitudinal seams at top and bottom of horizontal pipe runs.

E. Apply multiple layers of insulation with longitudinal and end seams staggered.

F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

G. Seal joints and seams with vapor-retarder mastic on insulation indicated to receive a vapor retarder.

H. Keep insulation materials dry during application and finishing.

I. Apply insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by the insulation material manufacturer.

J. Apply insulation with the least number of joints practical.

K. Apply insulation over fittings, valves, and specialties, with continuous thermal and vapor-retarder integrity, unless otherwise indicated. Refer to special instructions for applying insulation over fittings, valves, and specialties.

L. Hangers and Anchors: Where vapor retarder is indicated, seal penetrations in insulation at hangers, supports, anchors, and other projections with vapor-retarder mastic.
   1. Apply insulation continuously through hangers and around anchor attachments.
   2. For insulation application where vapor retarders are indicated, extend insulation on anchor legs at least 12 inches from point of attachment to pipe and taper insulation ends. Seal tapered ends with a compound recommended by the insulation material manufacturer to maintain vapor retarder.
   3. Install insert materials and apply insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by the insulation material manufacturer.
   4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect the jacket from tear or puncture by the hanger, support, and shield.

M. Insulation Terminations: For insulation application where vapor retarders are indicated, taper insulation ends. Seal tapered ends with a compound recommended by the insulation material manufacturer to maintain vapor retarder.

N. Apply adhesives and mastics at the manufacturer's recommended coverage rate.

O. Apply insulation with integral jackets as follows:
   1. Pull jacket tight and smooth.
   2. Circumferential Joints: Cover with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip and spaced 4 inches o.c.
   3. Longitudinal Seams: Overlap jacket seams at least 1-1/2 inches. Apply insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches o.c.
      a. Exception: Do not staple longitudinal laps on insulation having a vapor retarder.
   4. Vapor-Retarder Mastics: Where vapor retarders are indicated, apply mastic on seams and joints and at ends adjacent to flanges, unions, valves, and fittings.
   5. At penetrations in jackets for thermometers and pressure gages, fill and seal voids with vapor-retarder mastic.

P. Exterior Wall Penetrations: For penetrations of below-grade exterior walls, terminate insulation flush with mechanical sleeve seal. Seal terminations with vapor-retarder mastic.

Q. Interior Wall and Partition Penetrations: Apply insulation continuously through walls and floors.

R. Fire-Rated Wall and Partition Penetrations: Apply insulation continuously through penetrations of fire-rated walls and partitions. Fire-stop using jacket sleeve, intumescent strips. Refer to fire stopping requirements.

1.12 MINERAL-FIBER INSULATION APPLICATION

A. Apply insulation to straight pipes and tubes as follows:
   1. Secure each layer of preformed pipe insulation to pipe with wire or tape without deforming insulation materials.

2. Where vapor retarders are indicated, seal longitudinal seams and end joints with vapor-retarder mastic. Apply vapor retarder to ends of insulation at intervals of 15 to 20 feet to form a vapor retarder between pipe insulation segments.
3. For insulation with factory-applied jackets with vapor retarders, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by the insulation material manufacturer and seal with vapor-retarder mastic.

B. Apply insulation to fittings and elbows as follows:
1. Apply premolded insulation sections of the same material as straight segments of pipe insulation when available. Secure according to manufacturer's instructions.
2. When premolded insulation elbows and fittings are not available, apply mitered sections of pipe insulation, or glass-fiber blankets insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire, tape, or bands.
3. Cover fittings with heavy PVC fitting covers for hot water supply and return. Overlap PVC covers on pipe insulation jackets at least 1 inch at each end. Secure fitting covers with manufacturer's attachments and accessories. Seal seams with tape and vapor-retarder mastic.

C. Apply insulation to valves and specialties as follows:
1. Apply premolded insulation sections of the same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
2. When premolded insulation sections are not available, apply glass-fiber blanket insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation. For check valves, arrange insulation for access to stainer basket without disturbing insulation.
3. Apply insulation to flanges as specified for flange insulation application.
4. Use preformed heavy PVC fitting covers for valve sizes where available. Secure fitting covers with manufacturer's attachments and accessories. Seal seams with tape and vapor-retarder mastic.

1.13 INSULATION APPLICATION SCHEDULE, GENERAL

A. Refer to insulation application schedules for required insulation materials, vapor retarders, and field-applied jackets.

B. Application schedules identify piping system and indicate pipe size ranges and material, thickness, and jacket requirements.

1.14 INSULATION APPLICATION SCHEDULE

A. Service: Heating Hot Water Supply and Return. Interior locations exposed or concealed.
1. Operating Temperature: 200 deg F and below.
2. Pipe Size: NPS 4” and Smaller
3. Insulation Material: Mineral fiber
4. Insulation Thickness:
   a. Up to 2” Pipe: 1” thick with vapor barrier
   b. 2 ½” – 6” Pipe: 2” thick
   c. Over 6” Pipe: 2.5” thick

5. Field-Applied Jacket: Foil and paper
6. Vapor Retarder Required: Yes
7. Premolded insulation fitting covers, covers PVC

B. Refrigerant Suction and Hot-Gas Piping:
   1. All Pipe Sizes: Insulation shall be of the following:
      a. Cellular Glass: 2 inches thick.
      b. Flexible Elastomeric: 2 inches thick.

C. Outdoor water piping to coils: Follow requirement for indoor piping. Route all piping in roof curb or pipe chase of AHU. No hot water Hydronic piping shall be run exposed outdoors.

D. Refrigerant Piping outdoors insulated and sealed water & weather tight.

--- END OF SECTION 230719 ---

SECTION 230900 - INSTRUMENTATION AND CONTROL FOR HVAC

1.1 CONTROLS CONTRACTOR

A. The existing Liberty Lines Building Automation System Network is an Andover Controls System. New System shall be fully functional with the existing Andover System.

B. Interoperability: Control module shall be configured to connect to BACnet, or TCPIP and compliant network, resulting in extending control to any network-compliant devices such as but not limited to occupancy switches.

C. The Andover Control Building Automation System (BAS) manufacturer's local corporate branch office or Factory authorized representative, or Factory authorized independent distributor of the Controls manufacturer shall furnish and install a fully integrated building automation system, incorporating direct digital control for energy management, equipment monitoring and control and subsystems with open communications capabilities as herein specified.

1.2 RELATED DOCUMENTS

A. Drawings and general clauses, information for bidders of the Contract, including General and Supplementary Conditions, apply to this Section.

1.3 SUMMARY

A. This Section includes control sequences for HVAC systems, subsystems, and equipment.

B. Related Sections include the following:

1. Division 23 Section "Sequence of Operations for HVAC Controls" for equipment that relates to this section.

C. AC-2A, AC-2B. AC-5A/5B, AC-6, AC-25, RTU-2 Systems

1.4 DEFINITIONS

A. DDC: Direct digital control.

B. I/O: Input/output.

C. PC: Personal computer.

D. PID: Proportional plus integral plus derivative.

E. RTD: Resistance temperature detector.

F. LCU: Local Control Unit

1.5 SYSTEM PERFORMANCE

A. Comply with the following performance requirements:

1. Graphic Display: Display graphic with minimum 20 dynamic points with current data within 10 seconds.
2. Graphic Refresh: Update graphic with minimum 20 dynamic points with current data within 8 seconds.
3. Object Command: Reaction time of less than two seconds between operator command of a binary object and device reaction.
4. Object Scan: Transmit change of state and change of analog values to control units or workstation within six seconds.
5. Alarm Response Time: Annunciate alarm at workstation within 45 seconds. Multiple workstations must receive alarms within five seconds of each other.
6. Program Execution Frequency: Run capability of applications as often as five seconds, but selected consistent with mechanical process under control.
7. Performance: Programmable controllers shall execute DDC PID control loops, and scan and update process values and outputs at least once per second.
8. Reporting Accuracy and Stability of Control: Report values and maintain measured variables within tolerances as follows:

a. Water Temperature: Plus or minus 1 deg F (0.5 deg C).
b. Space Temperature: Plus or minus 1 deg F (0.5 deg C).
c. Ducted Air Temperature: Plus or minus 1 deg F (0.5 deg C).
d. Outside Air Temperature: Plus or minus 2 deg F (1.0 deg C).
e. Dew Point Temperature: Plus or minus 3 deg F (1.5 deg C).
f. Temperature Differential: Plus or minus 0.25 deg F (0.15 deg C).
g. Relative Humidity: Plus or minus 5 percent.
h. Airflow (Pressurized Spaces): Plus or minus 3 percent of full scale.
i. Airflow (Measuring Stations): Plus or minus 5 percent of full scale.
j. Airflow (Terminal): Plus or minus 5 percent of full scale.
k. Air Pressure (Space): Plus or minus 0.01-inch wg (2.5 Pa).
l. Air Pressure (Ducts): Plus or minus 0.1-inch wg (25 Pa).
m. Carbon Monoxide: Plus or minus 5 percent of reading.
n. Carbon Dioxide: Plus or minus 50 ppm.
o. Electrical: Plus or minus 5 percent of reading.

1.6 SUBMITTALS

A. Product Data: Include manufacturer's technical literature for each control device. Indicate dimensions, capacities, performance characteristics, electrical characteristics, finishes for materials, and installation and startup instructions for each type of product indicated.

1. DDC System Hardware: Bill of materials of equipment indicating quantity, manufacturer, and model number. Include technical data for interface equipment, control

units, transducers/transmitters, sensors, actuators, valves, relays/switches, control panels, and operator interface equipment.

2. Control System Software: Include technical data for operator interface, color graphics, and other third-party applications.
3. Controlled Systems: Instrumentation list with element name, type of device, manufacturer, model number, and product data. Include written description of sequence of operation including schematic diagram.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

1. Bill of materials of equipment indicating quantity, manufacturer, and model number.
2. Schematic flow diagrams showing fans, pumps, coils, dampers, valves, and control devices, as applicable.
3. Wiring Diagrams: Power, signal, and control wiring.
4. Details of control panel faces, including controls, instruments, and labeling.
5. Written description of sequence of operation.
6. Schedule of dampers including size, leakage, and flow characteristics.
7. Schedule of valves including flow characteristics.
8. DDC System Hardware:

    a. Wiring diagrams for control units with termination numbers.
    b. Schematic diagrams and floor plans for field sensors and control hardware.
    c. Schematic diagrams for control, communication, and power wiring, showing trunk data conductors and wiring between operator workstation and control unit locations.

9. Control System Software: List of color graphics indicating monitored systems, data (connected and calculated) point addresses, output schedule, and operator notations.
10. Controlled Systems:

    a. Schematic diagrams of each controlled system with control points labeled and control elements graphically shown, with wiring.
    b. Scaled drawings showing mounting, routing, and wiring of elements including bases and special construction.
    c. Written description of sequence of operation including schematic diagram.
    d. Points list.

C. Data Communications Protocol Certificates: Certify that each proposed DDC system component complies with ASHRAE 135.

D. Samples for Initial Selection: For each Room Sensor required. Contractor shall provide various cut sheets and make recommendations to the Engineer on the type of Room Sensors suitable for use. Contractor shall furnish Room Sensors/Enclosures only as approved by the Engineer.

E. Software and Firmware Operational Documentation (Existing: Existing BMS is run on Andover Continuum LAN Software, Version 1.9. Contractor shall work on existing software.): Include the following:

1. Software operating and upgrade manuals.
2. Program Software Backup: On a magnetic media or compact disc, complete with data files.
3. Device address list.
4. Printout of software application and graphic screens.

F. Qualification Data: For Installer and manufacturer.

G. Field quality-control test reports.

H. Operation and Maintenance Data: For HVAC instrumentation and control system to include in emergency, operation, and maintenance manuals. Include the following:

1. Maintenance instructions and lists of spare parts for each type of control device.
2. Interconnection wiring diagrams with identified and numbered system components and devices.
3. Keyboard illustrations and step-by-step procedures indexed for each operator function.
4. Inspection period, cleaning methods, cleaning materials recommended, and calibration tolerances.
5. Calibration records and list of set points.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Automatic Temperature Controls System Manufacturer's, Factory Authorized and Certified Representative who is trained and approved for installation, service and programming of system components required for this Project.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with ASHRAE 135 for DDC system components.

D. Electrical components, wiring shall be installed per National Electric Code.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Factory-Mounted Components: Where control devices specified in this Section are indicated to be factory mounted on equipment, arrange for shipping of control devices to equipment manufacturer.

1.9 COORDINATION

A. Controls Contractor shall be aware, the new Equipment is intended to come stripped down from the factory, with the exception of factory mounted unit dampers, VFD Drive (when applicable) and Compressor Control/Safeties. Controls Contractor is responsible for programming the unit as recommended by the Manufacturer. Controls Contractor is responsible for coordinating with

the Unit Manufacturer for information needed, to properly program the units and integrate into the existing Andover Controls BMS.

B. Controls Contractor responsible for obtaining the proper unit control sequences for programming, from the Original Equipment Manufacturer, to properly communicate and program the units.

C. Controls Contractor shall coordinate with the Original Equipment Manufacturer during start-up, trouble shooting, testing and training.

D. Coordinate location of thermostats, humidi-stats, and other exposed control sensors with plans and room details before installation, as may be applicable. Indicate location of space sensors on shop drawings.

E. Coordinate with Contractor for all ductwork, diffuser locations, sensor locations, sprinkler heads, piping, equipment installation, power supply, wiring, plumbing work and timings. Coordinate with Project Manager and Building Operations Personnel. Coordinate locations of panels, conduit and routing.

1.10 MANUFACTURERS

A. The following requirements apply to product selection:

1. Note the existing Building Management System is by Andover Controls system. Any new work under this contract shall be fully compatible with the existing system such that all temperatures, pressures, status, etc. shall be readable / writable and controlled by the existing system. New equipment shall be Andover or approved equal.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified. Note the existing Building Management System is provided by Andover Controls Corporation.

1.11 CONTROL SYSTEM

A. Manufacturers: (Existing)
The existing Building Management System is provided by Andover Controls Corporation. The Software is Andover Continuum, LAN Version 1.9. All new work shall be fully integrated into Network and Andover Controls Building Management System.

B. Control system consists of sensors, indicators, valves, actuators, final control elements, interface equipment, other apparatus, accessories, and software connected to distributed controllers operating in multi-user, multitasking environment on TCP/IP network and programmed to control mechanical systems. An operator workstation permits interface with the network via dynamic color graphics with each mechanical system, building floor plan, and control device depicted by point-and-click graphics.

C. Control system is capable of communicating with and receiving contact points from other systems.

1.12 DDC EQUIPMENT

A. Operator Workstation: (existing): Located as shown on dwg plans shall be used for new controls work.

1. Application Software (existing):

a. The Contractor shall work with the existing application software to create new points, add new controllers, create new graphics, write new programs, create new schedules, create workstation alarms, write custom reports, etc. Contractor shall work from any of the existing Andover Workstations.

B. Control Unit: Existing Net Controller 254 node, bCX-CR254 is located in the Boiler Room next to existing net controller. Contractor shall tie-in the new Local Control Units or Field Controllers to existing Net Controller. The Contractor is completely responsible to perform any system backups, if needed. Contractor is responsible for restoring backups if needed. Contractor shall notify/coordinate with building operations personnel prior to proceeding with the tie-in. Contractor shall notify Building Operations Personnel after tie-in is complete, confirming proper operation. Contractor is responsible to resolve any issues bought by Building Operations Personnel resulting from the tie-in of new Field Controllers to existing Building Management System.

1. Units monitor or control each I/O point; process information; execute commands from other control units, devices, and operator stations; and download from or upload to operator workstation or diagnostic terminal unit.
2. Stand-alone mode control functions operate regardless of network status. Functions include the following:

a. Global communications.
b. Discrete/digital, analog, and pulse I/O.
c. Monitoring, controlling, or addressing data points.
d. Software applications, scheduling, and alarm processing.
e. Testing and developing control algorithms without disrupting field hardware and controlled environment.

3. Standard Application Programs:

a. Electric Control Programs: Demand limiting, duty cycling, automatic time scheduling, start/stop time optimization, night setback/setup, on-off control with differential sequencing, staggered start, antishort cycling, PID control, DDC with fine tuning, and trend logging.
b. HVAC Control Programs: Optimal run time, supply-air reset, and enthalpy switchover.
c. Programming Application Features: Include trend point; alarm processing and messaging; weekly, monthly, and annual scheduling; energy calculations; run-time totalization; and security access.
d. Remote communications.
e. Maintenance management.
f. Units of Measure: Inch-pound and SI (metric).

4. Local operator interface provides for download from or upload to operator workstation or diagnostic terminal unit.
5. ASHRAE 135 Compliance: Control units shall use ASHRAE 135 protocol and communicate using ISO 8802-3 (Ethernet) datalink/physical layer protocol.

C. Local Control Units: The contractor shall furnish and install new local control units for the new and existing HVAC equipment as shown on Contract Drawings. Contractor shall furnish and install new Local Control Units in new Nema 4x or Nema 4 Enclosures. Contractor responsible to furnish and install new I/O Boards as needed. Contractor shall be aware any new Net Controllers or Local Control Units tied into the existing system must be compatible and identifiable with existing Continuum Software LAN Version 1.9. Contractor is responsible to furnish and install new Local Control Units that are compatible and identifiable with existing Continuum Software LAN Version 1.9. New LCU shall have local keypad and display panel.

Units shall be Modular, comprising processor board with electronically programmable, nonvolatile, read-only memory; and backup power source.

1. Units monitor or control each I/O point, process information, and download from or upload to operator workstation or diagnostic terminal unit.
2. Stand-alone mode control functions operate regardless of network status. Functions include the following:

    a. Global communications.
    b. Discrete/digital, analog, and pulse I/O.
    c. Monitoring, controlling, or addressing data points.

3. Local operator interface provides for download from or upload to operator workstation or diagnostic terminal unit.
4. ASHRAE 135 Compliance: Control units shall use ASHRAE 135 protocol and communicate using ISO 8802-3 (Ethernet) datalink/physical layer protocol.

D. I/O Interface: Hardwired inputs and outputs may tie into system through new I/O controllers. Contractor responsible to furnish and install new I/O Boards as needed. Protect points so that shorting will cause no damage to controllers.

1. Binary Inputs: Allow monitoring of on-off signals without external power.
2. Pulse Accumulation Inputs: Accept up to 10 pulses per second.
3. Analog Inputs: Allow monitoring of low-voltage (0- to 10-V dc), current (4 to 20 mA), or resistance signals.
4. Binary Outputs: Provide on-off or pulsed low-voltage signal, selectable for normally open or normally closed operation with three-position (on-off-auto) override switches and status lights.
5. Analog Outputs: Provide modulating signal, either low voltage (0- to 10-V dc) or current (4 to 20 mA) with status lights, two-position (auto-manual) switch, and manually adjustable potentiometer.
6. Universal I/Os: Provide software selectable binary or analog outputs.

E. Power Supplies: Transformers with Class 2 current-limiting type or overcurrent protection; limit connected loads to 80 percent of rated capacity. DC power supply shall match output current and voltage requirements and be full-wave rectifier type with the following:

1. Output ripple of 5.0 mV maximum peak to peak.
2. Combined 1 percent line and load regulation with 100-mic.sec. response time for 50 percent load changes.
3. Built-in overvoltage and overcurrent protection and be able to withstand 150 percent overload for at least 3 seconds without failure.

F. Power Line Filtering: Internal or external transient voltage and surge suppression for workstations or controllers with the following:

1. Minimum dielectric strength of 1000 V.
2. Maximum response time of 10 nanoseconds.
3. Minimum transverse-mode noise attenuation of 65 dB.
4. Minimum common-mode noise attenuation of 150 dB at 40 to 100 Hz.

1.13 ANALOG CONTROLLERS

A. Step Controllers: 6- or 10-stage type, with heavy-duty switching rated to handle loads and operated by electric motor.

B. Electric, Outdoor-Reset Controllers: Remote-bulb or bimetal rod-and-tube type, proportioning action with adjustable throttling range, adjustable set point, scale range minus 10 to plus 70 deg F (minus 23 to plus 21 deg C), and single- or double-pole contacts.

C. Electronic Controllers: Wheatstone-bridge-amplifier type, in steel enclosure with provision for remote-resistance readjustment. Identify adjustments on controllers, including proportional band and authority.

1. Single controllers can be integral with control motor if provided with accessible control readjustment potentiometer.

D. Receiver Controllers: Single- or multiple-input models with control-point adjustment, direct or reverse acting with mechanical set-point adjustment with locking device, proportional band adjustment, authority adjustment, and proportional control mode.

1. Remote-control-point adjustment shall be plus or minus 20 percent of sensor span, input signal of 3 to 13 psig (21 to 90 kPa).
2. Proportional band shall extend from 2 to 20 percent for 5 psig (35 kPa).
3. Authority shall be 20 to 200 percent.
4. Air-supply pressure of 18 psig (124 kPa), input signal of 3 to 15 psig (21 to 103 kPa), and output signal of zero to supply pressure.
5. Gages: 1-1/2 inches (38 mm) in diameter, 2.5 percent wide-scale accuracy, and range to match transmitter input or output pressure.

1.14 TIME CLOCKS

A. Manufacturers:

1. ATC-Diversified Electronics.

2. Grasslin Controls Corporation.
3. Paragon Electric Co., Inc.
4. Precision Multiple Controls, Inc.
5. SSAC Inc.; ABB USA.
6. TCS/Basys Controls.
7. Theben AG - Lumilite Control Technology, Inc.
8. Time Mark Corporation.

B. Seven-day, programming-switch timer with synchronous-timing motor and seven-day dial; continuously charged, nickel-cadmium-battery-driven, eight-hour, power-failure carryover; multiple-switch trippers; minimum of two and maximum of eight signals per day with two normally open and two normally closed output contacts.

C. Solid-state, programmable time control with 4 separate programs each with up to 100 on-off operations; 1-second resolution; lithium battery backup; keyboard interface and manual override; individual on-off-auto switches for each program; 365-day calendar with 20 programmable holidays; choice of fail-safe operation for each program; system fault alarm; and communications package allowing networking of time controls and programming from PC.

1.15 ELECTRONIC SENSORS:

Note: New room sensors shall be furnished, installed and tied into existing systems/equipment serving existing spaces. Not all room sensors shown for existing systems/equipment. Contractor responsible for coordinating with CM for existing spaces requiring room temp. sensors.

A. Description: Vibration and corrosion resistant; for wall, immersion, or duct mounting as required.

B. Thermistor Temperature Sensors and Transmitters:

1. Manufacturers:

a. Andover.
b. Ebtron, Inc.
c. Heat-Timer Corporation.
d. I.T.M. Instruments Inc.
e. MAMAC Systems, Inc.
f. RDF Corporation.

2. Accuracy: Plus or minus 0.5 deg F (0.3 deg C) 0.36 deg F (0.2 deg C) at calibration point.
3. Wire: Twisted, shielded-pair cable.
4. Insertion Elements in Ducts: Single point, 8 inches (200 mm) 18 inches (460 mm) long; use where not affected by temperature stratification or where ducts are smaller than 9 sq. ft. (0.84 sq. m).
5. Averaging Elements in Ducts: 36 inches (915 mm) long, flexible; use where prone to temperature stratification or where ducts are larger than 10 sq. ft. (1 sq. m).

6. Insertion Elements for Liquids: Brass or stainless-steel socket with minimum insertion length of 2-1/2 inches (64 mm).
7. Room Sensor Cover Construction: Stainless Steel Cover Plate, Tamper proof, Shock Proof, Flush Mount with Security Screws.

    a. Set-Point Adjustment: Concealed.
    b. Set-Point Indication: Concealed.
    c. Thermometer: Concealed.
    d. Orientation: Vertical.

8. Outside-Air Sensors: Watertight inlet fitting, shielded from direct sunlight.
9. Room Security Sensors: Stainless-steel cover plate with insulated back and security screws.

C. RTDs and Transmitters:

1. Manufacturers:

    a. Andover.
    b. MAMAC Systems, Inc.
    c. RDF Corporation.

2. Accuracy: Plus or minus 0.2 percent at calibration point.
3. Wire: Twisted, shielded-pair cable.
4. Insertion Elements in Ducts: Single point, 8 inches (200 mm) 18 inches (460 mm) long; use where not affected by temperature stratification or where ducts are smaller than 9 sq. ft. (0.84 sq. m).
5. Averaging Elements in Ducts: 18 inches (460 mm) long, rigid; use where prone to temperature stratification or where ducts are larger than 9 sq. ft. (0.84 sq. m); length as required.
6. Insertion Elements for Liquids: Brass socket with minimum insertion length of 2-1/2 inches (64 mm).
7. Room Sensor Cover Construction: Stainless Steel Cover Plate, Tamper proof, Shock Proof, Flush Mount with Security Screws.

    a. Set-Point Adjustment: Concealed.
    b. Set-Point Indication: Concealed.
    c. Thermometer: Concealed.
    d. Orientation: Vertical.

8. Outside-Air Sensors: Watertight inlet fitting, shielded from direct sunlight.
9. Room Security Sensors: Stainless-steel cover plate with insulated back and security screws.

D. Humidity Sensors:

1. Manufacturers:

    a. Andover.
    b. General Eastern Instruments.

c. MAMAC Systems, Inc.
d. ROTRONIC Instrument Corp.
e. TCS/Basys Controls.
f. Vaisala.

2. Accuracy: 5 percent full range with linear output.
3. Room Sensor Range: 20 to 80 percent relative humidity.
4. Room Sensor Cover Construction: Stainless Steel Cover Plate, Tamper proof, Shock Proof, Flush Mount.

a. Set-Point Adjustment: Concealed.
b. Set-Point Indication: Concealed.
c. Thermometer: Concealed.
d. Orientation: Vertical.

5. Duct Sensor: 20 to 80 percent relative humidity range with element guard and mounting plate.
6. Outside-Air Sensor: 20 to 80 percent relative humidity range with mounting enclosure, suitable for operation at outdoor temperatures of 32 to 120 deg F (0 to 50 deg C) minus 22 to plus 185 deg F (minus 30 to plus 85 deg C) minus 40 to plus 170 deg F (minus 40 to plus 76 deg C).
7. Duct and Sensors: With element guard and mounting plate, range of 0 to 100 percent relative humidity.

E. Pressure Transmitters/Transducers:

1. Manufacturers:

a. BEC Controls Corporation.
b. General Eastern Instruments.
c. MAMAC Systems, Inc.
d. ROTRONIC Instrument Corp.
e. TCS/Basys Controls.
f. Vaisala.

2. Static-Pressure Transmitter: Nondirectional sensor with suitable range for expected input, and temperature compensated.

a. Accuracy: 2 percent of full scale with repeatability of 0.5 percent.
b. Output: 4 to 20 mA.
c. Building Static-Pressure Range: 0- to 0.25-inch wg (0 to 62 Pa).
d. Duct Static-Pressure Range: 0- to 5-inch wg (0 to 1240 Pa).

3. Water Pressure Transducers: Stainless-steel diaphragm construction, suitable for service; minimum 150-psig (1034-kPa) operating pressure; linear output 4 to 20 mA.
4. Water Differential-Pressure Transducers: Stainless-steel diaphragm construction, suitable for service; minimum 150-psig (1034-kPa) operating pressure and tested to 300-psig (2070-kPa); linear output 4 to 20 mA.
5. Differential-Pressure Switch (Air or Water): Snap acting, with pilot-duty rating and with suitable scale range and differential.

6. Pressure Transmitters: Direct acting for gas, liquid, or steam service; range suitable for system; linear output 4 to 20 mA.

F. Air Velocity Transmitters (for mounting on Lab Hood ductwork):

1. Manufacturers:

a. Dwyer Model 641RM-12-LED Series.
b. or approved equal.

2. Air Velocity Transmitter: Instrument for monitoring air flow using a heated mass flow sensor, which allows for precise velocity measurements at various flow rates and temperatures.

a. Accuracy: 3 percent of full scale process gas.
b. Output: 4 to 20 mA.
c. Current Consumption: 300 mA max
d. Cable Length: 6’
e. Display: 4-1/2 digit, ½” red LED
f. Resolution 1fpm, 0.01 mps
g. Media Compatibility: Clean Air and Compatible non-combustible gases
h. Operating Pressure: 100 psi max.
i. Power requirements 12 to 35 VDC, 10 to 16 VAC, 1.5A

G. Fume Hood Sash Sensors (for mounting on Lab Hood Sash):

1. Manufacturers:

a. Siemens, Model UniTrak Fume Hood Sash Sensors.
b. or approved equal.

2. Fume Hood Sash Sensors: Sensors measure the sash position and provide precise values and alarms to Fume Hood Controller. Contractor responsible to field verify for configuration needed.

a. Shall be constructed of chemical and corrosion resistant materials.
b. Can be washed if needed when hoods are scrubbed.
c. Can be mounted inside or outside with no interference to hood users.
d. Sensing range: 0” to 71”.
e. Expected Life: >1,000,000 cycles
f. Operating Temp: 0 to 120 degF
g. Operating Humidity: 20% to 80% RH non-condensing
h. Construction: stainless steel

H. Room Sensor Cover Construction: Stainless Steel Cover Plate, Tamper proof, Shock Proof, Flush Mount with Security Screws.

1. Set-Point Adjustment: Concealed.
2. Set-Point Indication: Concealed.
3. Thermometer: Concealed.

4. Orientation: Vertical.

I. Room sensor accessories include the following:

1. Insulating Bases: For sensors located on exterior walls.
2. Guards: Locking; heavy-duty, transparent plastic; mounted on separate base.
3. Adjusting Key: As required for calibration and cover screws.

1.16 STATUS SENSORS

A. Status Inputs for Fans: Differential-pressure switch with pilot-duty rating and with adjustable range of 0- to 5-inch wg (0 to 1240 Pa).

B. Status Inputs for Pumps: Differential-pressure switch with pilot-duty rating and with adjustable pressure-differential range of 8 to 60 psig (55 to 414 kPa), piped across pump.

C. Status Inputs for Electric Motors: Comply with ISA 50.00.01, current-sensing fixed- or split-core transformers with self-powered transmitter, adjustable and suitable for 175 percent of rated motor current.

D. Voltage Transmitter (100- to 600-V ac): Comply with ISA 50.00.01, single-loop, self-powered transmitter, adjustable, with suitable range and 1 percent full-scale accuracy.

E. Power Monitor: 3-phase type with disconnect/shorting switch assembly, listed voltage and current transformers, with pulse kilowatt hour output and 4- to 20-mA kW output, with maximum 2 percent error at 1.0 power factor and 2.5 percent error at 0.5 power factor.

F. Current Switches: Self-powered, solid-state with adjustable trip current, selected to match current and system output requirements.

G. Electronic Valve/Damper Position Indicator: Visual scale indicating percent of travel and 2- to 10-V dc, feedback signal.

H. Water-Flow Switches: Bellows-actuated mercury or snap-acting type with pilot-duty rating, stainless-steel or bronze paddle, with appropriate range and differential adjustment, in NEMA 250, Type 1 enclosure.

1. Manufacturers:

a. BEC Controls Corporation.
b. I.T.M. Instruments Inc.

1.17 THERMOSTATS

A. Manufacturers:

1. Erie Controls.
2. Danfoss Inc.; Air-Conditioning and Refrigeration Div.

3. Heat-Timer Corporation.
4. Sauter Controls Corporation.
5. tekmar Control Systems, Inc.
6. Theben AG - Lumilite Control Technology, Inc.
7. Or Approved Equal

B. Combination Thermostat and Fan Switches: Line-voltage thermostat with push-button or lever-operated fan switch.

1. Label switches "FAN ON-OFF".
2. Mount on single electric switch box.

C. Electric, solid-state, microcomputer-based room thermostat with remote sensor.

1. Automatic switching from heating to cooling.
2. Preferential rate control to minimize overshoot and deviation from set point.
3. Set up for four separate temperatures per day.
4. Instant override of set point for continuous or timed period from 1 hour to 31 days.
5. Short-cycle protection.
6. Programming based on every day of week.
7. Selection features include degree F or degree C display, 12- or 24-hour clock, keyboard disable, remote sensor, and fan on-auto.
8. Battery replacement without program loss.
9. Thermostat display features include the following:

    a. Time of day.
    b. Actual room temperature.
    c. Programmed temperature.
    d. Programmed time.
    e. Duration of timed override.
    f. Day of week.
    g. System mode indications include "heating," "off," "fan auto," and "fan on."

D. Low-Voltage, On-Off Thermostats: NEMA DC 3, 24-V, bimetal-operated, mercury-switch type, with adjustable or fixed anticipation heater, concealed set-point adjustment, 55 to 85 deg F (13 to 30 deg C) set-point range, and 2 deg F (1 deg C) maximum differential.

E. Line-Voltage, On-Off Thermostats: Bimetal-actuated, open contact or bellows-actuated, enclosed, snap-switch or equivalent solid-state type, with heat anticipator; listed for electrical rating; with concealed set-point adjustment, 55 to 85 deg F (13 to 30 deg C) set-point range, and 2 deg F (1 deg C) maximum differential.

1. Electric Heating Thermostats: Equip with off position on dial wired to break ungrounded conductors.
2. Selector Switch: Integral, manual on-off-auto.

F. Remote-Bulb Thermostats: On-off or modulating type, liquid filled to compensate for changes in ambient temperature; with copper capillary and bulb, unless otherwise indicated.

1. Bulbs in water lines with separate wells of same material as bulb.

2. Bulbs in air ducts with flanges and shields.
3. Averaging Elements: Copper tubing with either single- or multiple-unit elements, extended to cover full width of duct or unit; adequately supported.
4. Scale settings and differential settings are clearly visible and adjustable from front of instrument.
5. On-Off Thermostat: With precision snap switches and with electrical ratings required by application.
6. Modulating Thermostats: Construct so complete potentiometer coil and wiper assembly is removable for inspection or replacement without disturbing calibration of instrument.

G. Fire-Protection Thermostats: Listed and labeled by an NRTL acceptable to authorities having jurisdiction; with fixed or adjustable settings to operate at not less than 75 deg F (24 deg C) above normal maximum operating temperature, and the following:

1. Reset: Manual.
2. Reset: Automatic, with control circuit arranged to require manual reset at central control panel; with pilot light and reset switch on panel labeled to indicate operation.

H. Immersion Thermostat: Remote-bulb or bimetal rod-and-tube type, proportioning action with adjustable throttling range and adjustable set point.

I. Airstream Thermostats: Two-pipe, fully proportional, single-temperature type; with adjustable set point in middle of range, adjustable throttling range, plug-in test fitting or permanent pressure gage, remote bulb, bimetal rod and tube, or averaging element.

J. Electric, Low-Limit Duct Thermostat: Snap-acting, single-pole, single-throw, manual- or automatic- reset switch that trips if temperature sensed across any 12 inches (300 mm) of bulb length is equal to or below set point.

1. Bulb Length: Minimum 20 feet (6 m).
2. Quantity: One thermostat for every 20 sq. ft. (2 sq. m) of coil surface.

K. Electric, High-Limit Duct Thermostat: Snap-acting, single-pole, single-throw, manual- or automatic- reset switch that trips if temperature sensed across any 12 inches (300 mm) of bulb length is equal to or above set point.

1. Bulb Length: Minimum 20 feet (6 m).
2. Quantity: One thermostat for every 20 sq. ft. (2 sq. m) of coil surface.

L. Heating/Cooling Valve-Top Thermostats: Proportional acting for proportional flow, with molded-rubber diaphragm, remote-bulb liquid-filled element, direct and reverse acting at minimum shutoff pressure of 25 psig (172 kPa), and cast housing with position indicator and adjusting knob.

1.18 GAS DETECTION EQUIPMENT

A. [**Available**]Manufacturers:
1. B. W. Technologies.
2. CEA Instruments, Inc.

3. Ebtron, Inc.
4. Gems Sensors Inc.
5. Greystone Energy Systems Inc.
6. Honeywell International Inc.; Home & Building Control.
7. INTEC Controls, Inc.
8. I.T.M. Instruments Inc.
9. MSA Canada Inc.
10. QEL/Quatrosense Environmental Limited.
11. Sauter Controls Corporation.
12. Sensidyne, Inc.
13. TSI Incorporated.
14. Vaisala.
15. Vulcain Inc.

B. Carbon Dioxide Sensor and Transmitter: Single detectors using solid-state infrared sensors; suitable over a temperature range of 23 to 130 deg F (minus 5 to plus 55 deg C) and calibrated for 0 to 2 percent, with continuous or averaged reading, 4- to 20-mA output;, for wall mounting.

1.19 FLOW MEASURING STATIONS

A. Duct Airflow Station (For Supply, Return and Exhaust ducts): Combination of air straightener and multiport, self-averaging pitot tube station.
   1. Manufacturers:
      a. Air Monitor Corporation.
      b. Wetmaster Co., Ltd.
      c. Approved Equal
   2. Casing: Galvanized-steel frame.
   3. Flow Straightener: Aluminum honeycomb, 3/4-inch parallel cell, 3 inches deep.
   4. Sensing Manifold: Copper manifold with bullet-nosed static pressure sensors positioned on equal area basis.

1.20 CONTROL VALVES

A. Manufacturers:
   1. Danfoss Inc.; Air Conditioning & Refrigeration Div.
   2. Erie Controls.
   3. Hayward Industrial Products, Inc.
   4. Magnatrol Valve Corporation.
   5. Neles-Jamesbury.
   6. Parker Hannifin Corporation; Skinner Valve Division.
   7. Pneuline Controls.
   8. Sauter Controls Corporation.
   9. or approved equal.

B. Control Valves: Factory fabricated, of type, body material, and pressure class based on maximum pressure and temperature rating of piping system, unless otherwise indicated. Control valves shall be provided by the controls systems vendor. Controls Contractor shall furnish and install new control valves to replace existing control valves on ATC's, Fin Tubes,

CUH's, etc. Contractor shall also furnish and install new control valves for the new equipment as shown on the drawings or as required.

C. Hydronic system globe valves shall have the following characteristics:
   1. NPS 2 and Smaller: Class 125 bronze body, bronze trim, rising stem, renewable composition disc, and screwed ends with backseating capacity repackable under pressure.
   2. NPS 2-1/2 and Larger: Class 125 iron body, bronze trim, rising stem, plug-type disc, flanged ends, and renewable seat and disc.
   3. Internal Construction: Replaceable plugs and stainless-steel or brass seats.
      a. Single-Seated Valves: Cage trim provides seating and guiding surfaces for plug on top and bottom.
      b. Double-Seated Valves: Balanced plug; cage trim provides seating and guiding surfaces for plugs on top and bottom.
   4. Sizing: 3-psig maximum pressure drop at design flow rate or the following:
      a. Two Position: Line size.
      b. Two-Way Modulating: Either the value specified above or twice the load pressure drop, whichever is more.
      c. Three-Way Modulating: Twice the load pressure drop, but not more than value specified above.
   5. Flow Characteristics: Two-way valves shall have equal percentage characteristics; three-way valves shall have linear characteristics.
   6. Close-Off (Differential) Pressure Rating: Combination of actuator and trim shall provide minimum close-off pressure rating of 150 percent of total system (pump) head for two-way valves and 100 percent of pressure differential across valve or 100 percent of total system (pump) head.

D. Terminal Unit/Fin Tube Radiator Control Valves: Bronze body, bronze trim, two or three ports as indicated, replaceable plugs and seats, and union and threaded ends.
   1. Rating: Class 125 for service at 125 psig and 250 deg F operating conditions.
   2. Sizing: 3-psig maximum pressure drop at design flow rate, to close against pump shutoff head.
   3. Flow Characteristics: Two-way valves shall have equal percentage characteristics; three-way valves shall have linear characteristics.

1.21 ACTUATORS

A. Electric Motors: Size to operate with sufficient reserve power to provide smooth modulating action.

   1. Permanent Split-Capacitor or Shaded-Pole Type: Gear trains completely oil immersed and sealed. Equip spring-return motors with integral spiral-spring mechanism in housings designed for easy removal for service or adjustment of limit switches, auxiliary switches, or feedback potentiometer.
   2. Spring-Return Motors for Valves Larger Than NPS 2-1/2 (DN 65): Size for running and breakaway torque of 150 in. x lbf (16.9 N x m).
   3. Spring-Return Motors for Dampers Larger Than 25 Sq. Ft. (2.3 sq. m): Size for running and breakaway torque of 150 in. x lbf (16.9 N x m).

B. Electronic Actuators: Direct-coupled type designed for minimum 60,000 full-stroke cycles at rated torque. (Note: All actuators must have spring-return mechanism. Contractor shall get prior approval from the Project Manager for non spring-return actuators)

1. Manufacturers:

   a. Belimo Aircontrols (USA), Inc.
   b. Or approved equal.

2. Valves: Size for torque required for valve close off at maximum pump differential pressure.
3. Dampers: Size for running torque calculated as follows:

   a. Parallel-Blade Damper with Edge Seals: 7 inch-lb/sq. ft. (86.8 kg-cm/sq. m) of damper.
   b. Opposed-Blade Damper with Edge Seals: 5 inch-lb/sq. ft. (62 kg-cm/sq. m) of damper.
   c. Parallel-Blade Damper without Edge Seals: 4 inch-lb/sq. ft (49.6 kg-cm/sq. m) of damper.
   d. Opposed-Blade Damper without Edge Seals: 3 inch-lb/sq. ft. (37.2 kg-cm/sq. m) of damper.
   e. Dampers with 2- to 3-Inch wg (500 to 750 Pa) of Pressure Drop or Face Velocities of 1000 to 2500 fpm (5 to 13 m/s): Increase running torque by 1.5.
   f. Dampers with 3- to 4-Inch wg (750 to 1000 Pa) of Pressure Drop or Face Velocities of 2500 to 3000 fpm (13 to 15 m/s): Increase running torque by 2.0.

4. Coupling: V-bolt and V-shaped, toothed cradle.
5. Overload Protection: Electronic overload or digital rotation-sensing circuitry.
6. Fail-Safe Operation: Mechanical, spring-return mechanism. Provide external, manual gear release on non spring-return actuators.
7. Power Requirements (Two-Position Spring Return): 24 120 230-V ac.
8. Power Requirements (Modulating): Maximum 10 VA at 24-V ac or 8 W at 24-V dc.
9. Proportional Signal: 2- to 10-V dc or 4 to 20 mA, and 2- to 10-V dc position feedback signal.
10. Temperature Rating: Minus 22 to plus 122 deg F (Minus 30 to plus 50 deg C) 40 to 104 deg F (5 to 40 deg C).
11. Temperature Rating (Smoke Dampers): Minus 22 to plus 250 deg F (Minus 30 to plus 121 deg C).
12. Run Time: 12 seconds open, 5 seconds closed.

NOTE: New Roof Top Units are equipped with factory mounted dampers for outdoor air, return air and exhaust air. Contractor is responsible to furnish and install damper actuators. Verify torque requirements with the manufacturer. Other than the new Roof Top Dampers and VAV Dampers, the remaining Dampers shown on the contract drawings shall be furnished and installed by the Controls Contractor.

1.22 DAMPERS

A. NOTE: with the exception of Dampers on Rooftop Units and VAV Boxes , Controls Contractor shall furnish and install dampers as shown on the drawings. On the Roof Top Units and VAV Boxes dampers will be furnished by the Unit Manufacturer and shall be installed by Controls Contractor. Controls Contractor responsible for furnishing and installing all control damper actuators. Controls Contractor shall furnish and install direct coupled type spring return modulating electric actuators to control dampers.

B. Available Manufacturers:
   1. Air Balance Inc.
   2. Don Park Inc.; Autodamp Div.
   3. TAMCO (T. A. Morrison & Co. Inc.).
   4. United Enertech Corp.
   5. Vent Products Company, Inc.
   6. Or approved equal

C. Dampers: AMCA-rated, opposed-blade design; 0.125-inch- minimum thick, extruded-aluminum frames with holes for duct mounting; damper blades shall not be less than 0.064-inch- thick galvanized steel with maximum blade width of 8 inches and length of 48 inches .
   1. Secure blades to 1/2-inch- diameter, zinc-plated axles using zinc-plated hardware, with nylon blade bearings, blade-linkage hardware of zinc-plated steel and brass, ends sealed against spring-stainless-steel blade bearings, and thrust bearings at each end of every blade.
   2. Operating Temperature Range: From minus 40 to plus 200 deg F.
   3. Edge Seals, Standard Pressure Applications: Closed-cell neoprene.
   4. Edge Seals, Low-Leakage Applications: Use inflatable blade edging or replaceable rubber blade seals and spring-loaded stainless-steel side seals, rated for leakage at less than 10 cfm per sq. ft. of damper area, at differential pressure of 4-inch wg when damper is held by torque of 50 in. x lbf ; when tested according to AMCA 500D.

1.23 VFD DRIVES

A. VFD Drives for New Roof Top Units (where applicable) will be furnished by the Unit Manufacturer. Control Contractor is responsible for installation and tie-in of the VFD drives and control of the VFD drives. Control Contractor shall program/configure VFD drives for VAV application.

1.24 ENCLOSURES

A. For all I/O requiring field interface devices, these devices shall be mounted in field interface panel (FIP). Control Contractor shall provide an enclosure, which protects the devices from dust, moisture, conceals integral wiring and moving parts.

B. All FIP enclosures/mounting plates shall be of stainless steel construction and shall meet the NEMA-4X rating. Enclosures shall be sized for 30% spare mounting space. All locks shall be keyed identically.

1.25 IDENTIFICATION

A. Identify all control wires with labeling tape or sleeves using either words, letters or numbers that can be exactly cross-referenced with As-Built Drawings.

B. All field enclosures shall be identified with a Bakelite nameplate. the lettering shall be in white against black background.

C. Junction box covers shall be marked to indicate that they are part of Building Automation System.

1.26 CONTROL WIRING

A. All interlocking wiring (regardless of voltage), conduit and installation of control devices associated shall be furnished and installed by the Control Contractor.

B. Power wiring will be furnished and installed by the Electrical Contractor. Refer to the electrical section for details.

C. Control Contractor shall provide power wiring and conduit for all control equipment from available spare circuits or as directed by the Electrical Engineer. Shall coordinate with Electrical Contractor for power requirements on Control Equipment.

D. Any wiring installed above drop ceilings shall be plenum rated. Any indoor exposed or outdoor wiring shall be installed in conduit. All indoor type shall be EMT with steel compression fittings. All outdoors shall be galvanized steel conduit. Conduit shall be minimum ¾ inch. Conduit penetrations shall be properly sealed to meet original construction conditions. Network signal cable shall be plenum rated concealed above drop ceilings.

E. Liquid tight flexible metallic conduit (max. 3 feet) shall be used for connections to motors, actuators, controllers and sensors mounted on vibration producing equipment.

F. Cast Alloy FS junction boxes with threaded hubs and gasket covers shall be provided at all cable splices, equipment termination and transitions from EMT to flexible conduit.

G. All controls wiring and conduit is the responsibility of the Contractor.

1.27 EXAMINATION

A. Verify that conditioned power supply is available to control units.

B. Verify that pneumatic piping and duct-, pipe-, and equipment-mounted devices are installed before proceeding with installation.

1.28 INSTALLATION

A. Install software in control units. Implement all features of programs to specified requirements and as appropriate to sequence of operation.

B. Connect and configure equipment and software to achieve sequence of operation specified.

C. Verify location of thermostats, humidistats, and other exposed control sensors with Drawings and room details before installation. Install devices 48 inches above the floor.

1. Install averaging elements in ducts and plenums in crossing or zigzag pattern.

D. Install guards on thermostats in the following locations:

1. Entrances.
2. Public areas.
3. Where indicated.

E. Install automatic dampers actuators.

F. Install damper motors on outside of duct in warm areas, not in locations exposed to outdoor temperatures.

G. Install labels and nameplates to identify control components according to Division 23 Section specifying Mechanical Identification.

H. Install hydronic instrument wells, valves, and other accessories according to Division 23 Section specifying Hydronic Piping.

I. Install wiring and conduit according to Division 26 Electrical and meet requirements for electrical code

1.29 ELECTRICAL WIRING AND CONNECTION INSTALLATION

A. This Contractor is responsible for all cable, wire, conduit, raceway required for control work. Materials and Installation requirements shall be according to the National Electric Code.

B. Install raceways, boxes, and cabinets to meet requirements for electrical code.

C. Install building wire and cable to meet requirements for electrical code.

D. Install signal and communication cable to meet requirements for electrical code.

1. Conceal cable, except in mechanical rooms and areas where other conduit and piping are exposed.
2. Install exposed cable in raceway.
3. Install concealed cable in raceway.
4. Bundle and harness multi-conductor instrument cable in place of single cables where several cables follow a common path.
5. Fasten flexible conductors, bridging cabinets and doors, along hinge side; protect against abrasion. Tie and support conductors.
6. Number-code or color-code conductors for future identification and service of control system, except local individual room control cables.

7. Install wire and cable with sufficient slack and flexible connections to allow for vibration of piping and equipment.

E. Connect manual-reset limit controls independent of manual-control switch positions. Automatic duct heater resets may be connected in interlock circuit of power controllers.

F. Connect hand-off-auto selector switches to override automatic interlock controls when switch is in hand position.

1.30 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.

B. Coordinate start-up and proper operation of mechanical equipment.

C. Perform the following field tests and inspections and prepare test reports:

1. Operational Test: After electrical circuitry has been energized, start units to confirm proper unit operation. Remove and replace malfunctioning units and retest.
2. Test and adjust controls and safeties.
3. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
4. Pressure test control air piping at 30 psig (207 kPa) or 1.5 times the operating pressure for 24 hours, with maximum 5-psig (35-kPa) loss.
5. Pressure test high-pressure control air piping at 150 psig (1034 kPa) and low-pressure control air piping at 30 psig (207 kPa) for 2 hours, with maximum 1-psig (7-kPa) loss.
6. Test calibration of electronic controllers by disconnecting input sensors and stimulating operation with compatible signal generator.
7. Test each point through its full operating range to verify that safety and operating control set points are as required.
8. Test each control loop to verify stable mode of operation and compliance with sequence of operation. Adjust PID actions.
9. Test each system for compliance with sequence of operation.
10. Test software and hardware interlocks.

D. DDC Verification:

1. Verify that instruments are installed before calibration, testing, and loop or leak checks.
2. Check instruments for proper location and accessibility.
3. Check instrument installation for direction of flow, elevation, orientation, insertion depth, and other applicable considerations.
4. Check instrument tubing for proper fittings, slope, material, and support.
5. Check installation of air supply for each instrument.
6. Check flow instruments. Inspect tag number and line and bore size, and verify that inlet side is identified and that meters are installed correctly.
7. Check pressure instruments, piping slope, installation of valve manifold, and self-contained pressure regulators.

8. Check temperature instruments and material and length of sensing elements.
9. Check control valves. Verify that they are in correct direction.
10. Check air-operated dampers. Verify that pressure gages are provided and that proper blade alignment, either parallel or opposed, has been provided.
11. Check DDC system as follows:

    a. Verify that DDC controller power supply is from emergency power supply, if applicable.
    b. Verify that wires at control panels are tagged with their service designation and approved tagging system.
    c. Verify that spare I/O capacity has been provided.
    d. Verify that DDC controllers are protected from power supply surges.

E. Replace damaged or malfunctioning controls and equipment and repeat testing procedures.

F. Coordinate with test and balance Contractor for system set up and start up.

G. Coordinate with Building Electrical/Fire Alarm Service Vendor for proper shutdown or inter connections. Shutdown wiring from Building Fire Alarm Panel, by Fire Alarm Service Vendor and is not part of this Contract.

1.31 ADJUSTING

A. Calibrating and Adjusting:

1. Calibrate instruments.
2. Make three-point calibration test for both linearity and accuracy for each analog instrument.
3. Calibrate equipment and procedures using manufacturer's written recommendations and instruction manuals. Use test equipment with accuracy at least double that of instrument being calibrated.
4. Control System Inputs and Outputs:

    a. Check analog inputs at 0, 50, and 100 percent of span.
    b. Check analog outputs using milliampere meter at 0, 50, and 100 percent output.
    c. Check digital inputs using jumper wire.
    d. Check digital outputs using ohmmeter to test for contact making or breaking.
    e. Check resistance temperature inputs at 0, 50, and 100 percent of span using a precision-resistant source.

5. Flow:

    a. Set differential pressure flow transmitters for 0 and 100 percent values with 3-point calibration accomplished at 50, 90, and 100 percent of span.
    b. Manually operate flow switches to verify that they make or break contact.

6. Pressure:

    a. Calibrate pressure transmitters at 0, 50, and 100 percent of span.

b. Calibrate pressure switches to make or break contacts, with adjustable differential set at minimum.

7. Temperature:

a. Calibrate resistance temperature transmitters at 0, 50, and 100 percent of span using a precision-resistance source.
b. Calibrate temperature switches to make or break contacts.

8. Stroke and adjust control valves and dampers without positioners, following the manufacturer's recommended procedure, so that valve or damper is 100 percent open and closed.
9. Stroke and adjust control valves and dampers with positioners, following manufacturer's recommended procedure, so that valve and damper is 0, 50, and 100 percent closed.
10. Provide diagnostic and test instruments for calibration and adjustment of system.
11. Provide written description of procedures and equipment for calibrating each type of instrument. Submit procedures review and approval before initiating startup procedures.

B. Adjust initial temperature and humidity set points.

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 three visits to Project during other than normal occupancy hours for this purpose.

1.32 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain HVAC instrumentation and controls for a minimum of 8 hours.

B. Review Graphics setup with Building Operations to ensure all monitored points are displayed, functioning and properly identified.

C. Controls Contractor responsible for providing on-site technical support personnel to work with Original Equipment Manufacturer, if needed during start-up, testing and trouble shooting of new equipment.

D. Controls Contractor is responsible for all programming and unit controls. Controls Contractor is responsible for all programming required for proper operation of the new equipment.

1.33 GENERAL NOTES

A. Coordinate work with balancer for all new and existing equipment.

--- END OF SECTION 230900 ---

SECTION 230993 - SEQUENCE OF OPERATIONS FOR HVAC CONTROLS

1.1 RELATED DOCUMENTS

A. Drawings and general clauses, information for bidders of the Contract, including General and Supplementary Conditions, apply to this Section.

B. Related contract sections

1.2 SUMMARY

A. This Section includes control sequences for HVAC systems, subsystems, and equipment.

B. Related Sections include the following:
1. Division 23 Section "Centrifugal HVAC Fans" for requirements that relate to this Section.
2. Division 23 Section "Air Terminal Units" for requirements that relate to this Section.
3. Division 23 Section "Split System" for requirements that relate to this Section.
4. Division 23 Section "Instrumentation and Control for HVAC" for equipment that relates to this section.

C. Brief description of “Existing Building Management System” and “General Scope of New Controls Work”.

EXISTING BUILDING MANAGEMENT SYSTEM:

1. Existing Andover system is LAN Building Management System (BMS). Existing BMS includes Controls Software, Continuum Version 1.9 or above, three (3) Cyber Stations, one (1) Master Controller 254 nodes, field controllers/components/sensors/etc., one (1) SQL Server and windows software.
2. CMF Operations Personnel oversees all temperature control issues and maintenance issues using existing Workstations. Existing Workstation and Master Controller communicate and networked using CMFS Intranet, using TCP/IP. Master Controllers and field controllers communicate using low capacitance shielded communications cable, using COMM1 & COMM2.
3. Existing Workstation has Windows based Operating System and Andover Controls Single User Application Software (Continuum Version 1.9).
4. Existing Andover Controls Building Management System database, graphics, programming, etc. reside on existing SQL Server loaded on existing BMS Workstation.

GENERAL SCOPE OF NEW CONTROLS WORK:

1. Contractor shall provide new Andover BMS Controls for all new equipment as shown on the Contract Drawings. New BMS Controls shall include and not limited to
   a. Programming,
   b. Graphics,
   c. Automatic Monitoring Of Set Points, Etc.
   d. Histories,
   e. Email Notifications,
   f. Start/Stop Equipment,

g. Communications,
h. Commissioning
i. Putting New Equipment In Service.

2. Contractor responsible for mounting and tie-in of any components or valves that require field installation. Contractor responsible to furnish and install any piping, wiring/conduit etc. needed for tie-in of field mounted components into control boards on the new equipment.
3. Provide hardwire Safety Interlocks and Building Fire Alarm Interlock for the new equipment. Fire Alarm Service Vendor responsible to provide the wiring needed from the Building Fire Alarm Panel to the respective equipment. Controls Contractor responsible for landing the wires on the Controls Boards and interlocking to the new equipment.
4. Furnish and install new local control units (control boards) and tie-in the new Input / Output Control Points from the new equipment as mentioned in this section.
5. Tie-in new Local Control Units to the new 127 node Continuum Net Controller, located in the Boiler Room at the lower level and establish communications. Trouble shoot if any communication issues.
6. Program, Schedule and Provide New Graphics for New and Existing Equipment (Roof Top Units, VAV Boxes, Toilet Exhausts, Split Systems, Hot Water Control Valves, Etc) using existing Andover Controls Building Management System. Contractor shall program and provide new graphic display points as mentioned in this section. Contractor shall perform work using the existing Andover Controls Operator Workstation located in the Engineer's office at Operation Building, Grasslands Campus, Valhalla.
7. Create and Provide Alarm and Event Notification as mentioned in this section.
8. Create Data logs and reports on new equipment, to hold data at a minimum, for the last 96 hours.
9. Test and Trouble Shoot for proper operation of all mechanical devices and field installed devices.
10. Coordinate with test and balance Contractor for proper commissioning, setup and balance of new Mechanical Devices (ex: RTU's ,VAV's, Split Systems, Unit Heaters, Toilet Exhaust's, etc).
11. Provide a minimum of 40 hours in Training to County Personnel and As-Built Control Drawings on new Controls Work.

1.3 DEFINITIONS

A. DDC: Direct Digital Control.

B. LCU: Local Control Unit

C. BMS: Building Management System

1.4 ROOF TOP UNITS CONTROL SEQUENCES (AC-6 VARIABLE VOLUME UNIT), RTU-2 (CONSTANT VOLUME UNITS). PROGRAM CONTROL SEQUENCES AS APPLICABLE)

A. Start and Stop Supply Fan(s):

1. Enable: Unit Safeties:

a. Input Device: Factory Installed Unit Safeties Outputs to DDC.

b. Output Device: Hard wired through motor starter; DDC system alarm.
c. Action: Allow start if all Unit Safeties are normal; signal alarm if fan fails to start as commanded.

2. Enable: Freeze Control:

a. Input Device: Duct-mounted freeze stat, located in supply air.
b. Output Device: Hard wired through motor starter; DDC system alarm.
c. Action: Allow start if freeze normal.

3. Enable: Smoke Control:

a. Input Device: Duct-mounted smoke detector, located in supply air.
b. Output Device: Hard wired through motor starter; DDC system alarm.
c. Action: Allow start if duct is free of products of combustion.

4. Initiate: Occupied Time Schedule:

a. Input Device: DDC system time schedule.
b. Output Device: Binary output to motor starter.
c. Action: Energize fan(s).

5. Initiate: Unoccupied Time Schedule:

a. Input Device: DDC system demand.
b. Output Device: Binary output to motor starter.
c. Action: De-Energize fan(s).

6. Display: Supply-fan on-off indication.

B. Supply Fan(s) Variable-Volume Control:

1. Occupied Time Schedule:

a. Input Device: DDC system time schedule.
b. Output Device: Binary output.
c. Action: Enable control.

2. Volume Control:

a. Input Device: Static-pressure transmitters and Flow Measuring Stations sensing supply-duct static pressures and cfm referenced to conditioned-space static pressure and cfm.
b. Output Device: DDC system analog output to motor speed controller. Set variable-speed drive to minimum speed when fan is stopped.
c. Action: Maintain constant supply-duct static pressure and cfm set point.

3. High Pressure:

a. Input Device: Static-pressure transmitters sensing supply-duct static pressures referenced to static pressure outside the duct.

b. Output Device: DDC system binary output to alarm panel.
c. Action: Stop fan and signal alarm when static pressure rises above excessive-static-pressure set point.

4. Display:

a. Supply-fan-discharge static-pressures indication.
b. Supply-fan-discharge static-pressure set point.
c. Supply-fan airflow rate in CFM indication.
d. Supply-fan airflow setpoint in CFM indication.
e. Supply-fan speed.
f. Supply-fan VFD Alarm

C. Start and Stop Power Exhaust Fan(s) at the RTU's:

1. Initiate: Occupied Time Schedule:

a. Input Device: DDC system time schedule.
b. Output Device: Binary output to motor starter.
c. Action: Energize fans when supply fans are energized.

2. Initiate: Unoccupied Time Schedule:

a. Input Device: DDC system demand.
b. Output Device: Binary output to motor starter.
c. Action: Energize fans when supply fans are energized.

3. Display: Power Exhaust-fan on-off indication.

D. Heating Stages: NOTE: RTU's provided with gas heating section with gas fired controller.

1. Unit Safeties:

a. Input Device: Factory Installed Unit Alarm Outputs to DDC, Flow Measuring Stations, Duct Static Pressure Sensors .
b. Output Device: Hard wired through Gas Heat Section; DDC system alarm.
c. Action: Prevent Heat Stages from turning on. Allow start if all safety interlocks are normal, duct static and cfms match to heat start setpoints.

2. Occupied Time Schedule:

a. Input Device: DDC system time schedule.
b. Output Device: Binary output.
c. Action: Enable control.

3. Discharge-Air Temperature:

a. Input Device: Electronic temperature sensor.
b. Output Device: Heat stages.
c. Action: Sequence the Heat Stages ON or OFF, to maintain the supply-air temperature at supply-air set point.

4. Temperature Reset:

    a. Input Device: Electronic temperature sensor in return air, outdoor air and rooms.
    b. Output Device: DDC system
    c. Action: Reset supply-air temperature set point based on return, room, outdoor temp sensors and greatest heating demand.

5. Unoccupied Time Schedule:

    a. Input Device: DDC system time schedule and output.
    b. Output Device: DDC system binary output.
    c. Action: Turn Heat stages OFF when unit safeties are normal and fan is cycled off.

6. Display:

    a. Fan-discharge air-temperature indication.
    b. Fan-discharge air-temperature set point.
    c. Heat Stages air-temperature indication.
    d. Heat Stages air-temperature set point.
    e. Heat Stages operation indication.
    f. Heat Stages operation status
    g. Room Air Temperature Indication.
    h. Room Air temperature Setpoint.

E. Mixed-Air Control:

1. Occupied Time Schedule:

    a. Input Device: DDC system time schedule.
    b. Output Device: DDC system output.
    c. Action: Enable control.

2. Dampers Position:

    a. Input Device: DDC system time schedule.
    b. Output Device: DDC system analog outputs to modulating damper actuator(s).
    c. Action: Modulate Outdoor-Air, Mixed-Air and Power Exhaust-Air dampers to minimum position and Mixed-Air to open position.

3. Heating Reset:

    a. Input Device: DDC system software.
    b. Output Device: DDC system analog output to modulating damper actuator(s).
    c. Action: Modulate Outdoor-Air, Power Exhaust-Air dampers to closed position and Mixed-Air to open position.

4. Supply-Air Temperature:

    a. Input Device: Electronic temperature sensor.
    b. Output Device: DDC system analog output to modulating damper actuator(s).

c. Action: Modulate Outdoor-, Mixed-, and Power Exhaust-air dampers to maintain air temperature set point of 55 deg F (13 deg C).

5. Cooling Reset:

a. Input Device: Outdoor- and return-air, duct-mounted electronic temperature sensors.
b. Output Device: DDC system analog output to damper actuator(s).
c. Action: Set Outdoor-air, Power Exhaust-air dampers to minimum position when outdoor-air enthalpy exceeds return-air enthalpy.

6. Unoccupied Time Schedule:

a. Input Device: DDC system time schedule.
b. Output Device: DDC system analog output to modulating damper actuator(s).
c. Action: Position Outdoor- and Power Exhaust-air dampers closed and Mixed-air dampers open.

7. Display:

a. Mixed-air-temperature indication.
b. Mixed-air-temperature set point.
c. Power Exhaust damper position.
d. Outdoor Air damper position
e. Mixed Air damper position

F. Economizer -Air Control:

1. Occupied Time Schedule:

a. Input Device: DDC system time schedule.
b. Output Device: DDC system output.
c. Action: Enable control.

2. Dampers Position:

a. Input Device: DDC system time schedule, Indoor/Return/Outdoor Air Enthalpies.
b. Output Device: DDC system analog outputs to modulating damper actuator(s).
c. Action: Modulate Outdoor-Air, and Power Exhaust-Air dampers to maximum position and Mixed-Air Dampers to minimum position.

3. Supply-Air Temperature:

a. Input Device: Electronic temperature sensor.
b. Output Device: DDC system analog output to modulating damper actuator(s).
c. Action: Modulate Outdoor-, and Power Exhaust-air dampers to maintain air temperature set point of 55 deg F (13 deg C).

4. Unoccupied Time Schedule:

a. Input Device: DDC system time schedule.

b. Output Device: DDC system analog output to modulating damper actuator(s).
c. Action: Position Outdoor- and Power Exhaust-air dampers closed and Mixed-air dampers open.

5. Display:

a. Outdoor-air-enthalpy indication.
b. Return-air-enthalpy indication.
c. Room-air-enthalpy indication.
d. Power Exhaust damper position.
e. Outdoor Air damper position
f. Mixed Air damper position

G. Co2 Demand Ventilation-Indoor Air Quality:

1. Occupied Time Schedule:

a. Input Device: DDC system time schedule.
b. Output Device: DDC system output.
c. Action: Enable control.

2. Dampers Position:

a. Input Device: Space/Return Co2 sensors.
b. Output Device: DDC system analog outputs to modulating damper actuator(s).
c. Action: Modulate Outdoor-Air and Power Exhaust-Air dampers, Modulate Mixed-Air dampers to minimum position.

3. Unoccupied Time Schedule:

a. Input Device: DDC system time schedule.
b. Output Device: DDC system analog output to modulating damper actuator(s).
c. Action: Position Outdoor- and Power Exhaust-air dampers closed and Mixed-air dampers open.

4. Display:

a. Co2 Space indication.
b. Co2 Return indication.
c. Co2 Outdoor indication.
d. Power Exhaust damper position.
e. Outdoor Air damper position
f. Mixed Air damper position

H. Direct Expansion Coil:

1. Occupied Time Schedule:

a. Input Device: DDC system time schedule.
b. Output Device: Binary output.
c. Action: Enable control.

2. Discharge-Air Temperature:

    a. Input Device: Electronic temperature sensor.
    b. Output Device: Stage1 Cooling and Stage2 Cooling.
    c. Action: Maintain supply-air temperature set point of 55 deg F (13 deg C).

3. Temperature Reset:

    a. Input Device: Electronic temperature sensor in return air.
    b. Output Device: DDC system in straight-line relationship for the following conditions:

        1) 60 deg F (18 deg C) when return-air temperature is 70 deg F (21 deg C).
        2) 55 deg F (13 deg C) when return-air temperature is 75 deg F (24 deg C).

    c. Action: Reset supply-air temperature set point of 55 deg F (13 deg C).

4. Temperature Reset:

    a. Input Device: DDC system with input from room temperature sensors (Average of Room Sensors).
    b. Output Device: DDC system.
    c. Action: Reset supply-air temperature in response to greatest cooling demand.

5. Unoccupied Time Schedule:

    a. Input Device: DDC system time schedule.
    b. Output Device: Binary output.
    c. Action: Disable control.

6. Display:

    a. Fan-discharge air-temperature indication.
    b. Fan-discharge air-temperature set point.
    c. Cooling Stages air-temperature indication.
    d. Cooling Stages air-temperature set point.
    e. Stage1 Cooling Command.
    f. Stage2 Cooling Command.
    g. Cooling Stages Status.

I. Filters: During occupied periods, when fan is running, differential air-pressure transmitters exist.

1. Occupied Time Schedule:

    a. Input Device: DDC system time schedule.
    b. Output Device: DDC system output.
    c. Action: Enable control.

2. Differential Pressure:

    a. Input Device: Pressure transmitter.

b. Output Device: DDC system alarm.
c. Action: Signal alarm on low- and high-pressure conditions.

3. Display:

a. Filter air-pressure-drop indication.
b. Filter low-air-pressure set point.
c. Filter high-air-pressure set point.

J. Freeze Pump: During winter operation of unit when the outside air temperature falls below freeze pump start set point.

1. Outdoor Air Temperature:

a. Input Device: Temperature Sensor.
b. Output Device: Freeze Pump.
c. Action: Start Freeze Pump and Send Alarm to BMS.

2. Display:

a. Freeze Pump Start/Stop Command.
b. Freeze Pump Status.
c. Freeze Pump Start set point.
d. Outdoor Air Temp.

K. Coordination of Air-Handling Unit Sequences: Ensure that mixed-air, heating stages, and direct expansion coil controls have common inputs and do not overlap in function.

L. Operator Station Display: Indicate the following on operator workstation display terminal:

1. DDC system graphic.
2. DDC system on-off indication.
3. DDC system occupied/unoccupied mode.
4. Outdoor-air-temperature indication.
5. Supply fan VFD Alarms
6. Duct Smoke Detected Indication.(Smoke Detector)
7. Building Fire Alarm indication. (input to Andover Panel from Building Fire Alarm Panel) NOTE: Building Fire Alarm Contractor responsible to provide the wiring needed from the Building Fire Alarm Panel to the respective RTU's and not part of this Contract. Controls Contractor responsible for landing the wires on the Control Boards and interlocking to the RTU's. Coordinate with Building Operations Personnel, Project Manager and Fire Alarm Vendor for connection points.
8. Supply-fan on-off indication.
9. Supply-fan-discharge static-pressure indication.
10. Supply-fan-discharge static-pressure set point.
11. Supply-fan airflow rate (CFM).
12. Supply-fan speed.
13. Freeze Stat Indication
14. Freeze Pump output indication
15. Freeze Pump Status Indication
16. Power Exhaust-fan on-off indication.

17. Return airflow rate (CFM).
18. Exhaust airflow rate (CFM)
19. Heating Stages air-temperature indication.
20. Heating Stages air-temperature set point.
21. Heating Stage-1 output and status indications.
22. Heating Stage-2 output and status indications.
23. Mixed-air-temperature indication.
24. Mixed-air-temperature set point.
25. Outdoor-Air damper position.
26. Mixed-Air damper position.
27. Exhaust-Air damper position.
28. Filter air-pressure-drop indication.
29. Filter low-air-pressure set point.
30. Filter high-air-pressure set point.
31. Fan-discharge air-temperature indication.
32. Fan-discharge air-temperature set point.
33. DX Cooling air-temperature indication.
34. DX Cooling air-temperature set point.
35. Cooling Stage-1 output and status indications.
36. Cooling Stage-2 output and status indications.
37. Room temperature indication (Average of all Room Temps).
38. Room temperature set point (Average of all Room Set Points).
39. Supply enthalpy indication.
40. Return enthalpy indication.
41. Outdoor enthalpy indication.
42. CO2 sensor space indication.
43. CO2 sensor return indication.
44. CO2 sensor outdoor indication.
45. Condenser fans status indications.
46. Unit safeties normal indications.

1.5 INDOOR AIR HANDLING UNIT CONTROL SEQUENCE (AC-2A / AC-5A/5B: CONSTANT VOLUME UNITS)

A. Start and Stop Supply Fan(s):

1. Enable: Unit Safeties:

   a. Input Device: Factory Installed Unit Safeties Outputs to DDC.
   b. Output Device: Hard wired through motor starter; DDC system alarm.
   c. Action: Allow start if all Unit Safeties are normal; signal alarm if fan fails to start as commanded.

2. Enable: Freeze Control:

   a. Input Device: Duct-mounted freeze stat, located in supply air.
   b. Output Device: Hard wired through motor starter; DDC system alarm.
   c. Action: Allow start if freeze normal.

3. Enable: Smoke Control:

a. Input Device: Duct-mounted smoke detector, located in supply air.
b. Output Device: Hard wired through motor starter; DDC system alarm.
c. Action: Allow start if duct is free of products of combustion.

4. Initiate: Occupied Time Schedule:

a. Input Device: DDC system time schedule.
b. Output Device: Binary output to motor starter.
c. Action: Energize fan(s).

5. Initiate: Unoccupied Time Schedule:

a. Input Device: DDC system demand.
b. Output Device: Binary output to motor starter.
c. Action: De-Energize fan(s).

6. Display: Supply-fan on-off indication.

B. Heating Coil:

1. Unit Safeties:

a. Input Device: Flow Measuring Stations.
b. Output Device: Hard wired through Hot Water Coil; DDC system alarm.
c. Action: Prevent modulation of HW Control Valve. Allow start if all safety interlocks are normal, cfms match to heat start setpoints.

2. Occupied Time Schedule:

a. Input Device: DDC system time schedule.
b. Output Device: Binary output.
c. Action: Enable control.

3. Discharge-Air Temperature:

a. Input Device: Electronic temperature sensor.
b. Output Device: Hot Water Control Valve.
c. Action: Modulate Control Valve, to maintain the supply-air temperature at supply-air set point.

4. Temperature Reset:

a. Input Device: Electronic temperature sensor in return air, outdoor air and rooms.
b. Output Device: DDC system
c. Action: Reset supply-air temperature set point based on return, room, outdoor temp sensors and greatest heating demand (Based on 4 Room Temp Sensors installed at various locations as shown on the contract drawings).

5. Unoccupied Time Schedule:

a. Input Device: DDC system time schedule and output.

b. Output Device: DDC system binary output.
c. Action: Close Control Valve when unit safeties are normal and fan is cycled off.

6. Display:

a. Fan-discharge air-temperature indication.
b. Fan-discharge air-temperature set point.
c. Hot Water Coil air-temperature indication.
d. Hot Water Coil air-temperature set point.
e. Hot Water Coil Control Valve Percentage Open
f. Room Air Temperature Indication.
g. Room Air temperature Setpoint.

C. Mixed-Air Control:

1. Occupied Time Schedule:

a. Input Device: DDC system time schedule.
b. Output Device: DDC system output.
c. Action: Enable control.

2. Dampers Position:

a. Input Device: DDC system time schedule.
b. Output Device: DDC system analog outputs to modulating damper actuator(s).
c. Action: Modulate Outdoor-Air, Return-Air to minimum position and mixed-air open position.

3. Heating Reset:

a. Input Device: DDC system software.
b. Output Device: DDC system analog output to modulating damper actuator(s).
c. Action: Modulate Outdoor-Air and Return-Air to closed position and Mixed-Air to open position.

4. Supply-Air Temperature:

a. Input Device: Electronic temperature sensor.
b. Output Device: DDC system analog output to modulating damper actuator(s).
c. Action: Modulate Outdoor-, Return-, and Mixed-air dampers to maintain air temperature set point of 55 deg F (13 deg C).

5. Cooling Reset:

a. Input Device: Outdoor- and return-air, duct-mounted electronic temperature sensors.
b. Output Device: DDC system analog output to damper actuator(s).
c. Action: Set Outdoor-air, Return-air dampers to minimum position when outdoor-air enthalpy exceeds return-air enthalpy.

6. Unoccupied Time Schedule:

    a. Input Device: DDC system time schedule.
    b. Output Device: DDC system analog output to modulating damper actuator(s).
    c. Action: Position Outdoor- and Return-air dampers closed and Mixed-air dampers open.

7. Display:

    a. Mixed-air-temperature indication.
    b. Mixed-air-temperature set point.
    c. Power Exhaust damper position.
    d. Outdoor Air damper position
    e. Mixed Air damper position

D. Economizer -Air Control:

1. Occupied Time Schedule:

    a. Input Device: DDC system time schedule.
    b. Output Device: DDC system output.
    c. Action: Enable control.

2. Dampers Position:

    a. Input Device: DDC system time schedule, Indoor/Return/Outdoor Air Enthalpies.
    b. Output Device: DDC system analog outputs to modulating damper actuator(s).
    c. Action: Modulate Outdoor-Air, and Return-Air dampers to maximum position and Mixed-Air Dampers to minimum position.

3. Supply-Air Temperature:

    a. Input Device: Electronic temperature sensor.
    b. Output Device: DDC system analog output to modulating damper actuator(s).
    c. Action: Modulate Outdoor-, and Return-air dampers to maintain air temperature set point of 55 deg F (13 deg C).

4. Unoccupied Time Schedule:

    a. Input Device: DDC system time schedule.
    b. Output Device: DDC system analog output to modulating damper actuator(s).
    c. Action: Position Outdoor- and Return-air dampers closed and Mixed-air dampers open.

5. Display:

    a. Outdoor-air-enthalpy indication.
    b. Return-air-enthalpy indication.
    c. Room-air-enthalpy indication.
    d. Return damper position.
    e. Outdoor Air damper position

f. Mixed Air damper position

E. Co2 Demand Ventilation-Indoor Air Quality:

1. Occupied Time Schedule:

a. Input Device: DDC system time schedule.
b. Output Device: DDC system output.
c. Action: Enable control.

2. Dampers Position:

a. Input Device: Space/Return Co2 sensors.
b. Output Device: DDC system analog outputs to modulating damper actuator(s).
c. Action: Modulate Outdoor-Air and Return-Air dampers, Modulate Mixed-Air dampers to minimum position.

3. Unoccupied Time Schedule:

a. Input Device: DDC system time schedule.
b. Output Device: DDC system analog output to modulating damper actuator(s).
c. Action: Position Outdoor- and Return-air dampers closed and Mixed-air dampers open.

4. Display:

a. Co2 Space indication.
b. Co2 Return indication.
c. Co2 Outdoor indication.
d. Return Air damper position.
e. Outdoor Air damper position
f. Mixed Air damper position

F. Direct Expansion Coil:

1. Occupied Time Schedule:

a. Input Device: DDC system time schedule.
b. Output Device: Binary output.
c. Action: Enable control.

2. Discharge-Air Temperature:

a. Input Device: Electronic temperature sensor.
b. Output Device: Stage1 Cooling and Stage2 Cooling.
c. Action: Maintain supply-air temperature set point of 55 deg F (13 deg C).

3. Temperature Reset:

a. Input Device: Electronic temperature sensor in return air.

b. Output Device: DDC system in straight-line relationship for the following conditions:

1) 60 deg F (18 deg C) when return-air temperature is 70 deg F (21 deg C).
2) 55 deg F (13 deg C) when return-air temperature is 75 deg F (24 deg C).

c. Action: Reset supply-air temperature set point of 55 deg F (13 deg C).

4. Temperature Reset:

a. Input Device: DDC system with input from room temperature sensors (Average of four (4) Room Sensors).
b. Output Device: DDC system.
c. Action: Reset supply-air temperature in response to greatest cooling demand.

5. Unoccupied Time Schedule:

a. Input Device: DDC system time schedule.
b. Output Device: Binary output.
c. Action: Disable control.

6. Display:

a. Fan-discharge air-temperature indication.
b. Fan-discharge air-temperature set point.
c. Cooling Stages air-temperature indication.
d. Cooling Stages air-temperature set point.
e. Stage1 Cooling Command.
f. Stage2 Cooling Command.
g. Cooling Stages Status.

G. Filters: During occupied periods, when fan is running, differential air-pressure transmitters exist.

1. Occupied Time Schedule:

a. Input Device: DDC system time schedule.
b. Output Device: DDC system output.
c. Action: Enable control.

2. Differential Pressure:

a. Input Device: Pressure transmitter.
b. Output Device: DDC system alarm.
c. Action: Signal alarm on low- and high-pressure conditions.

3. Display:

a. Filter air-pressure-drop indication.
b. Filter low-air-pressure set point.
c. Filter high-air-pressure set point.

H. Freeze Pump: During winter operation of unit when the outside air temperature falls below freeze pump start set point.

1. Outdoor Air Temperature:

a. Input Device: Temperature Sensor.
b. Output Device: Freeze Pump.
c. Action: Start Freeze Pump and Send Alarm to BMS.

2. Display:

a. Freeze Pump Start/Stop Command.
b. Freeze Pump Status.
c. Freeze Pump Start set point.
d. Outdoor Air Temp.

I. Condensate Pump: Condensate Pan Level Sensor.

1. Condensate Pump Start/Stop:

a. Input Device: Drain Pan Level Sensor.
b. Output Device: Condensate Pump.
c. Action: Start Condensate Pump and Send Alarm to BMS.

2. Display:

a. Condensate Pump Start/Stop Command.
b. Condensate Pump Status.
c. Condensate Drain Pan Alarm Indication.

J. Coordination of Air-Handling Unit Sequences: Ensure that mixed-air, heating stages, and direct expansion coil controls have common inputs and do not overlap in function.

K. Operator Station Display: Indicate the following on operator workstation display terminal:

1. DDC system graphic.
2. DDC system on-off indication.
3. DDC system occupied/unoccupied mode.
4. Outdoor-air-temperature indication.
5. Duct Smoke Detected Indication.(Smoke Detector)
6. Building Fire Alarm indication. (input to Andover Panel from Building Fire Alarm Panel) NOTE: Building Fire Alarm Contractor responsible to provide the wiring needed from the Building Fire Alarm Panel to the respective Air Handling Unit (AHU) and not part of this Contract. Controls Contractor responsible for landing the wires on the Control Boards and interlocking to the AHU. Coordinate with Building Operations Personnel, Project Manager and Fire Alarm Vendor for connection points.
7. Supply-fan on-off indication.
8. Supply-fan airflow rate (CFM).
9. Freeze Stat Indication
10. Freeze Pump output indication
11. Freeze Pump Status Indication

12. Return airflow rate (CFM).
13. Exhaust airflow rate (CFM)
14. Hot Water Coil temperature indication.
15. Hot Water Coil temperature set point.
16. Hot Water Control Valve Percentage Open Indication.
17. Mixed-air-temperature indication.
18. Mixed-air-temperature set point.
19. Outdoor-Air damper position.
20. Mixed-Air damper position.
21. Return-Air damper position.
22. Filter air-pressure-drop indication.
23. Filter low-air-pressure set point.
24. Filter high-air-pressure set point.
25. Fan-discharge air-temperature indication.
26. Fan-discharge air-temperature set point.
27. DX Cooling air-temperature indication.
28. DX Cooling air-temperature set point.
29. Cooling Stage-1 output and status indications.
30. Cooling Stage-2 output and status indications.
31. Room temperature indication (Average of all four (4) Room Temps).
32. Room temperature set point (Average of all four (4) Rooms, Set Points).
33. Supply enthalpy indication.
34. Return enthalpy indication.
35. Outdoor enthalpy indication.
36. CO2 sensor space indication.
37. CO2 sensor return indication.
38. CO2 sensor outdoor indication.
39. Condensate Pump Status Indication
40. Condensate Drain Pan Alarm Indication
41. Condenser fans status indications.
42. Unit safeties normal indications.

1.6 DEDICATED OUTDOOR AIR UNIT CONTROL SEQUENCES (AC-2B)

A. Start and Stop Supply Fan(s), Energy Recovery Wheel:

1. Enable: Unit Safeties:

   a. Input Device: Factory Installed Unit Safeties Outputs to DDC.
   b. Output Device: Hard wired through motor starter; DDC system alarm.
   c. Action: Allow start if all Unit Safeties are normal; signal alarm if fan fails to start as commanded.

2. Enable: Smoke Control:

   a. Input Device: Duct-mounted smoke detector, located in supply air.
   b. Output Device: Hard wired through motor starter; DDC system alarm.
   c. Action: Allow start if duct is free of products of combustion.

3. Initiate: Occupied Time Schedule:

a. Input Device: DDC system time schedule.
b. Output Device: Binary output to motor starter.
c. Action: Energize fan(s).

4. Initiate: Unoccupied Time Schedule:

a. Input Device: DDC system demand.
b. Output Device: Binary output to motor starter.
c. Action: De-Energize fan(s).

5. Display: Supply-fan, Energy Recovery Wheel on-off indication.

B. Supply Fan(s) Variable-Volume Control:

1. Occupied Time Schedule:

a. Input Device: DDC system time schedule.
b. Output Device: Binary output.
c. Action: Enable control.

2. Volume Control:

a. Input Device: Static-pressure transmitters and Flow Measuring Stations sensing supply-duct static pressures and cfm referenced to conditioned-space static pressure and cfm.
b. Output Device: DDC system analog output to motor speed controller. Set variable-speed drive to minimum speed when fan is stopped.
c. Action: Maintain constant supply-duct static pressure and cfm set point.

3. High Pressure:

a. Input Device: Static-pressure transmitters sensing supply-duct static pressures referenced to static pressure outside the duct.
b. Output Device: DDC system binary output to alarm panel.
c. Action: Stop fan, Energy Recovery Wheel and signal alarm when static pressure rises above excessive-static-pressure set point.

4. Display:

a. Supply-fan-discharge static-pressures indication.
b. Supply-fan-discharge static-pressure set point.
c. Supply-fan airflow rate in CFM indication.
d. Supply-fan airflow setpoint in CFM indication.
e. Supply-fan speed.
f. Supply-fan VFD Alarm\
g. Energy Recovery Wheel Status Indication.
h. Energy Recovery Wheel Speed.

C. Start and Stop Exhaust Fan(s) at the ERV's:

1. Initiate: Occupied Time Schedule:

    a. Input Device: DDC system time schedule.
    b. Output Device: Binary output to motor starter.
    c. Action: Energize fans when supply fans are energized.

2. Initiate: Unoccupied Time Schedule:

    a. Input Device: DDC system demand.
    b. Output Device: Binary output to motor starter.
    c. Action: De-Energize fans when supply fans are De-energized.

3. Display: Power Exhaust-fan on-off indication.

D. Exhaust Fan(s) Variable-Volume Control:

1. Occupied Time Schedule:

    a. Input Device: DDC system time schedule.
    b. Output Device: Binary output.
    c. Action: Enable control.

2. Volume Control:

    a. Input Device: Static-pressure transmitters and Flow Measuring Stations sensing exhaust-duct static pressures and cfm referenced to conditioned-space static pressure and cfm.
    b. Output Device: DDC system analog output to motor speed controller. Set variable-speed drive to minimum speed when fan is stopped.
    c. Action: Maintain exhaust-duct static pressure and cfm set point.

3. Display:

    a. Exhaust-fan-discharge static-pressures indication.
    b. Exhaust-fan-discharge static-pressure set point.
    c. Exhaust-fan airflow rate in CFM indication.
    d. Exhaust-fan airflow setpoint in CFM indication.
    e. Exhaust-fan speed.
    f. Exhaust-fan VFD Alarm.

E. Heating Stages: NOTE: ERV's provided with gas heating section with gas fired controller.

1. Unit Safeties:

    a. Input Device: Factory Installed Unit Alarm Outputs to DDC, Flow Measuring Stations, Duct Static Pressure Sensors .
    b. Output Device: Hard wired through Gas Heat Section; DDC system alarm.
    c. Action: Prevent Heat Stages from turning on. Allow start if all safety interlocks are normal, duct static and cfms match to heat start setpoints.

2. Occupied Time Schedule:

a. Input Device: DDC system time schedule.
b. Output Device: Binary output.
c. Action: Enable control.

3. Discharge-Air Temperature:

a. Input Device: Electronic temperature sensor.
b. Output Device: Heat stages.
c. Action: Sequence the Heat Stages ON or OFF, to maintain the supply-air temperature at supply-air set point.

4. Temperature Reset:

a. Input Device: Electronic temperature sensor in exhaust air, outdoor air and rooms.
b. Output Device: DDC system
c. Action: Reset supply-air temperature set point based on exhaust, room, outdoor temp sensors and greatest heating demand.

5. Unoccupied Time Schedule:

a. Input Device: DDC system time schedule and output.
b. Output Device: DDC system binary output.
c. Action: Turn Heat stages OFF when unit safeties are normal and fan is cycled off.

6. Display:

a. Fan-discharge air-temperature indication.
b. Fan-discharge air-temperature set point.
c. Heat Stages air-temperature indication.
d. Heat Stages air-temperature set point.
e. Heat Stages operation indication.
f. Heat Stages operation status
g. Room Air Temperature Indication.
h. Room Air temperature Setpoint.

F. Supply-Air Control:

1. Occupied Time Schedule:

a. Input Device: DDC system time schedule.
b. Output Device: DDC system output.
c. Action: Enable control.

2. Dampers Position:

a. Input Device: DDC system time schedule.
b. Output Device: DDC system analog outputs to modulating damper actuator(s).
c. Action: Modulate Outdoor-Air, Supply-Air and Exhaust-Air dampers to minimum position.

3. Heating Reset:

   a. Input Device: DDC system software.
   b. Output Device: DDC system analog output to modulating damper actuator(s).
   c. Action: Modulate Outdoor-Air, Supply-Air, Exhaust-Air dampers to closed position.

4. Supply-Air Temperature:

   a. Input Device: Electronic temperature sensor.
   b. Output Device: DDC system analog output to modulating damper actuator(s).
   c. Action: Modulate Outdoor-, Supply-, and Exhaust-air dampers to maintain air temperature set point of 55 deg F (13 deg C).

5. Cooling Reset:

   a. Input Device: Outdoor- and Exhaust-air, duct-mounted electronic temperature sensors.
   b. Output Device: DDC system analog output to damper actuator(s).
   c. Action: Set Outdoor-air, Power Exhaust-air dampers to minimum position when outdoor-air enthalpy exceeds exhaust-air enthalpy.

6. Unoccupied Time Schedule:

   a. Input Device: DDC system time schedule.
   b. Output Device: DDC system analog output to modulating damper actuator(s).
   c. Action: Position Outdoor- and Power Exhaust-air dampers and Supply-air dampers closed.

7. Display:

   a. Supply-air-temperature indication.
   b. Supply-air-temperature set point.
   c. Exhaust Air damper position.
   d. Outdoor Air damper position
   e. Supply Air damper position

G. Frost Control:

1. Occupied Time Schedule:

   a. Input Device: DDC system time schedule.
   b. Output Device: DDC system output.
   c. Action: Enable control.

2. Energy Recovery Wheel:

   a. Input Device: DDC system time schedule, Indoor/Exhaust/Outdoor Air Enthalpies.
   b. Output Device: DDC system analog outputs to Modulating Wheel Frost Control.
   c. Action: Modulate Energy Recovery Wheel.

3. Supply-Air Temperature:

   a. Input Device: Electronic temperature sensor.
   b. Output Device: DDC system analog output to modulating damper actuator(s).
   c. Action: Modulate Outdoor-, and Exhaust-air dampers to maintain air temperature set point.

4. Unoccupied Time Schedule:

   a. Input Device: DDC system time schedule.
   b. Output Device: DDC system analog output to Modulating Wheel Frost Control.
   c. Action: Turn off Modulating Wheel Frost Control..

5. Display:

   a. Frost Control indication.
   b. Modulating Wheel Status Indication.
   c. Modulating Wheel Speed Indication.

H. Economizer -Air Control:

1. Occupied Time Schedule:

   a. Input Device: DDC system time schedule.
   b. Output Device: DDC system output.
   c. Action: Enable control.

2. Dampers and Energy Recovery Wheel Position:

   a. Input Device: DDC system time schedule, Indoor/Exhaust/Outdoor Air Enthalpies.
   b. Output Device: DDC system analog outputs to modulating damper actuator(s) and Energy Recovery Wheel.
   c. Action: Modulate Outdoor-Air Supply-Air, and Exhaust-Air dampers to maximum position and turn off Energy Recovery Wheel.

3. Supply-Air Temperature:

   a. Input Device: Electronic temperature sensor.
   b. Output Device: DDC system analog output to modulating damper actuator(s).
   c. Action: Modulate Outdoor-, and Exhaust-air dampers to maintain air temperature set point of 55 deg F (13 deg C).

4. Unoccupied Time Schedule:

   a. Input Device: DDC system time schedule.
   b. Output Device: DDC system analog output to modulating damper actuator(s).
   c. Action: Position Outdoor-, Supply- and Exhaust-air dampers closed .

5. Display:

a. Outdoor-air-enthalpy indication.
b. Exhaust-air-enthalpy indication.
c. Room-air-enthalpy indication.
d. Power Exhaust damper position.
e. Outdoor Air damper position
f. Supply Air damper position

I. Filters: During occupied periods, when fan is running, differential air-pressure transmitters exist.

1. Occupied Time Schedule:

a. Input Device: DDC system time schedule.
b. Output Device: DDC system output.
c. Action: Enable control.

2. Differential Pressure:

a. Input Device: Pressure transmitter.
b. Output Device: DDC system alarm.
c. Action: Signal alarm on low- and high-pressure conditions.

3. Display:

a. Filter air-pressure-drop indication.
b. Filter low-air-pressure set point.
c. Filter high-air-pressure set point.

J. Coordination of Energy Recovery Ventilator Sequences: Ensure that exhaust-air and heating stages controls have common inputs and do not overlap in function.

K. Operator Station Display: Indicate the following on operator workstation display terminal:

1. DDC system graphic.
2. DDC system on-off indication.
3. DDC system occupied/unoccupied mode.
4. Outdoor-air-temperature indication.
5. Supply fan VFD Alarms
6. Exhaust fan VFD Alarms
7. Duct Smoke Detected Indication.(Smoke Detector)
8. Building Fire Alarm indication. (input to Andover Panel from Building Fire Alarm Panel) NOTE: Fire Alarm Service Vendor is responsible to provide the wiring needed from the Building Fire Alarm Panel to the respective ERU's and not part of this Contract. Controls Contractor responsible for landing the wires on the Control Boards and interlocking to the ERU's. Coordinate with Building Operations Personnel, Project Manager and Fire Alarm Service Vendor for connection points.
9. Supply-fan on-off indication.
10. Supply-fan-discharge static-pressure indication.
11. Supply-fan-discharge static-pressure set point.
12. Supply-fan airflow rate (CFM).
13. Supply-fan speed.

14. Energy Recovery Wheel on/off indication.
15. Energy Recovery Wheel Status.
16. Energy Recovery Wheel Speed.
17. Exhaust-fan on-off indication.
18. Exhaust-fan speed.
19. Exhaust-fan-CFM indication.
20. Exhaust-fan-CFM set point.
21. Supply-fan airflow rate (CFM).
22. Exhaust airflow rate (CFM)
23. Heating Stages air-temperature indication.
24. Heating Stages air-temperature set point.
25. Heating Stage-1 output and status indications.
26. Heating Stage-2 output and status indications.
27. Exhaust-air-temperature indication.
28. Exhaust-air-temperature set point.
29. Outdoor-Air damper position.
30. Exhaust-Air damper position.
31. Filter air-pressure-drop indication.
32. Filter low-air-pressure set point.
33. Filter high-air-pressure set point.
34. Fan-discharge air-temperature indication.
35. Fan-discharge air-temperature set point.
36. Room temperature indication (Average of all Room Temps).
37. Room temperature set point (Average of all Room Set Points).
38. Supply enthalpy indication.
39. Exhaust enthalpy indication.
40. Outdoor enthalpy indication.
41. CO2 sensor space indication.
42. CO2 sensor exhaust indication.
43. CO2 sensor outdoor indication.
44. Condenser fans status indications.
45. Unit safeties normal indications.

1.7 TERMINAL UNIT OPERATING SEQUENCE (Cleaners Lounge Area, Money Room, Farebox Room)

A. Single-Duct, VAV, Terminal Air Units:
   1. Occupancy:
      a. Input Device: Associated Roof Top Unit Occupancy Schedule.
      b. Output Device: DDC system binary output.
      c. Action: Report occupancy.

   2. Room Temperature:
      a. Input Device: Room Temperature Sensor.
      b. Output Device: Electronic damper actuators. (Voltage Signal only. Digital Tri-State Signal to damper actuators is not acceptable)
      c. Action: Modulate dampers to maintain CFM set point and room temperature.
         1) Sequence: Reset CFM set point between minimum (Room Temp. at Set point) and maximum (Room Temp. 2˚F above set point (cooling) or 2˚F

below set point (heating) in proportion to the difference between room set point and temperature.

2) In cooling mode the CFM set point shall be at minimum when room temp. is at or below set point and shall increase proportionately to maximum when the room temp. is 2˚F above set point.

3) In heating mode (when associated Roof Top Unit Discharge Temp. is above 85˚F) the CFM reset shall reverse, with CFM set point minimum when room temp. is at set point and shall increase proportionately to maximum when the room temp. is 2˚F below set point.

3. Display:
   a. Room/area served.
   b. Room occupied/unoccupied.
   c. Room temperature indication.
   d. Room temperature set point.
   e. Actual CFM Set point.
   f. Actual CFM.
   g. Maximum CFM set point
   h. Minimum CFM set point.
   i. VAV damper position as percent open.
   j. Associated Air Handling Unit Discharge Temp.
   k. Associated Air Handling Unit Static Pressure.
   l. Associated Air Handling Unit Discharge CFM

1.8 TOILET EXHAUST OPERATING SEQUENCE (EFT-64 , EFT-65)

A. Toilet Exhaust for Bathrooms:
   1. Occupancy:
      a. Input Device: Associated Roof Top Units Occupancy Schedule OR Space Temp. Sensor.
      b. Output Device: DDC system binary output.
      c. Action: Report occupancy.

   2. Exhaust Fan
      a. Input Device: Associated Roof Top Units Occupancy Schedule OR Space Temp. Sensor
      b. Output Device: Exhaust Fan.
      c. Action: Run Exhaust Fan continuously during Occupancy Schedule and turn on/off to maintain Space Sensor Set Point during unoccupied periods .

   3. Display:
      a. Room Occupied/Unoccupied
      b. Room/area served.
      c. Exhaust Fan ON/OFF Command.
      d. Exhaust Fan Status.
      e. Room Temp. Indication.
      f. Note: For Toilet Exhaust, Provide Room Temps for Basement, First Floor and Second Floor Toilet Rooms a total of three (3) temp. sensors.

1.9 SPLIT SYSTEMS OPERATING SEQUENCE (AC-2A, AC-25, AC-5A / 5B)

1. Occupancy:
   a. Input Device: Split System Occupancy Schedule.
   b. Output Device: DDC system binary output.
   c. Action: Report occupancy and provide power supply to Start/Stop AC Unit.

      NOTE: Split Systems will be provided with Mfg. Wall Controller to maintain room temp at set point (without BMS interface). Controls Contractor shall provide the capability to override the unit controls, by means of enabling or disabling the power supply to the unit (for BMS interface). The power supply to the unit shall be enabled by the BMS interface prior to the unit operating to maintain the Wall Controller Set Point without the BMS interface.

2. Room Temperature:
   a. Input Device: Wall Mounted wired Remote Controller.
   b. Output Device: AC unit.
   c. Action: Run AC Unit maintain Room Temperature Set Point.
   d. Provide additional Room Temperature sensor in Room to monitor Room Temperature with BMS.

3. Condensate Pump Float Switch:
   a. Input Device: Float Switch.
   b. Output Device: AC unit.
   c. Action: Stop AC Unit and alarm indication to BMS. Start AC unit on Float Switch Normal.

4. Display:
   a. Room Occupied/Unoccupied
   b. Room/area served.
   c. Room temperature indication.
   d. Split System ON/OFF Command
   e. Split System ON/OFF Status.
   f. Split System Alarm Status.
   g. Condensate Pump Start/Stop Command
   h. Condensate Pump Status
   i. Condensate Pump Float Switch Indication.

5. NOTE: The new split system units are heat pumps, that can provide both cooling and heating. Lock out heating on the new split systems below Mfg. recommended efficient operating point (based on outdoor temp.).

--- END OF SECTION 230993 ---

SECTION 232113 – HYDRONIC PIPING

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Clauses apply to this Section.

1.2 SUMMARY

A. This Section includes pipe and fitting materials, joining methods, special-duty valves, and specialties for the following:

1. Hot-water heating piping.
2. Condensate Drain Piping.

1.3 SUBMITTALS

A. Product Data: For each type of the following:

1. Piping and fittings.
2. Valves. Include flow and pressure drop curves based on manufacturer's testing for calibrated-orifice balancing valves and automatic flow-control valves.
3. HVAC piping specialties.

B. Operation and Maintenance Data: For valves, air vents, vacuum breakers, and piping related components in operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installers shall be trained and qualified to join piping and equipment related to the work.

1.5 COPPER TUBE AND FITTINGS:

A. Application:

1. Heating Hot Water Supply & Return Piping
2. Condensate drain Piping
3. Refrigerant Piping

B. Copper Tubing: ASTM B 88, Type L.

C. Type K Pressure Fittings.

D. Solder Fittings, 95-5 leadless solder. Refrigerant piping shall be silver brazed.

E. Wrought-Copper Fittings: ASME B16.22.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Anvil International, Inc.
b. NIBCO
c. Anaconda
d. Approved equal.

F. Wrought-Copper Unions: ASME B16.22.

G. Flanges, if required, shall be class 150 ANSI B16.24

1.6 JOINING MATERIALS

A. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.

1. ASME B16.21, nonmetallic, flat, asbestos free, 1/8-inch maximum thickness unless thickness or specific material is indicated.

a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.

B. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813. Solder shall be 95-5 Tin Antimony, Mfg. Hand and Harmon, Harris or approved equal.

C. Screwed joints for connection to valves, unions, equipment, and controls, as required. Use Teflon pasted similar compounds on threads.

D. Gasket Material: Thickness, material, and type suitable for fluid to be handled and working temperatures and pressures.

1.7 DIELECTRIC FITTINGS

A. Description: Combination fitting of copper-alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.

B. Insulating Material: Suitable for system fluid, pressure, and temperature.

C. Dielectric Unions: Couplings/fittings when required to connect dissimilar materials.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
b. Zurn Plumbing Products Group; AquaSpec Commercial Products Division.
c. Calpico.

d. Approved Equal.

2. Factory-fabricated union assembly, for 250-psig minimum working pressure at 180 deg F.

1.8 PIPING SPECIALTIES

A. Gate and Ball Valves: Comply with requirements specified in Division 230523 Section "General Duty Valves for HVAC Piping."

B. Balancing Valves/Circuit Setter Valves:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Bell & Gossett Model CB specified, sized as indicated or as required.
b. Hoffman.
c. Griswold Controls.
d. Taco.

2. Body: Bronze, ball or plug type with calibrated orifice or venturi.
3. Ball: Brass or stainless steel.
4. Plug: Resin.
5. Seat: PTFE.
6. End Connections: Threaded or socket.
7. Pressure Gage Connections: Integral seals for portable differential pressure meter.
8. Handle Style: Lever, with memory stop to retain set position.
9. CWP Rating: Minimum 125 psig.
10. Maximum Operating Temperature: 250 deg F.

C. Diaphragm-Operated Safety Valves: Pressure relief valves

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Amtrol, Inc.
b. Armstrong Pumps, Inc.
c. Bell & Gossett Domestic Pump; a division of ITT Industries.
d. Conbraco Industries, Inc.
e. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Body: Bronze or brass.
3. Disc: Glass and carbon-filled PTFE.
4. Seat: Brass.
5. Stem Seals: EPDM O-rings.
6. Diaphragm: EPT.
7. Wetted, Internal Work Parts: Brass and rubber.
8. Inlet Strainer: removable without system shutdown.

9. Valve Seat and Stem: Noncorrosive.
10. Valve Size, Capacity, and Operating Pressure: Comply with ASME Boiler and Pressure Vessel Code: Section IV, and selected to suit system in which installed, with operating pressure and capacity factory set and field adjustable

D. Automatic Air Vents:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Sarco.
   b. Hoffman.
   c. Approved equal.

2. Body: Bronze or cast iron.
3. Internal Parts: Nonferrous.
4. Operator: Noncorrosive metal float.
5. Inlet Connection: NPS 1/2.
6. Discharge Connection: NPS 1/4.
7. CWP Rating: 150 psig.
8. Maximum Operating Temperature: 240 deg F.
9. Install air vent at each unit and at various additional high points in system piping. Contractor shall install a minimum of six air vents on system piping. Each air vent shall be provided with an isolated valve

E. Y-Pattern Strainers:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
   b. Approved equal.

2. Body: ASTM A 126, Class B, cast iron with bolted cover and bottom drain connection.
3. End Connections: Threaded ends for NPS 2 and smaller; flanged ends for NPS 2-1/2 and larger.
4. Strainer Screen: 60-mesh startup strainer and perforated stainless-steel basket with 50 percent free area.
5. CWP Rating: 125 psig.
6. Contractors shall install strainers at supply piping to unit heaters and on the discharge side of new hot water circulator pumps.

1.9 PIPING APPLICATIONS

A. Hot-water heating piping, aboveground or installed within pipe chase, NPS 4 and smaller shall be:

1. Type L, drawn-temper copper tubing, wrought-copper fittings, and soldered joints.

B. Condensate Drain-rooftop, NPS 1" and smaller shall be:

1. Copper Type DWV, or Type M.

1.10 VALVE APPLICATIONS

A. Install shutoff-duty valves at each branch connection to supply mains, and at supply connection to each piece of equipment, and at outlet of steam traps.

B. Install circuit setter, balancing valves at each branch connection to return main.

1.11 PIPING INSTALLATIONS

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Install piping as indicated unless deviations to layout are approved on Coordination Drawings or requested to meet field conditions. Contractor may field route sections of piping, with review and approval of engineer.

B. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.

C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

E. Install piping to permit valve servicing.

F. Install piping at indicated slopes.

G. Install piping free of sags and bends.

H. Install fittings for changes in direction and branch connections.

I. Install piping to allow application of insulation.

J. Select system components with pressure rating equal to or greater than system operating pressure.

K. Install groups of pipes parallel to each other, spaced to permit applying insulation and servicing of valves.

L. Install drains, consisting of a tee fitting, NPS 3/4 full port ball valve, and short NPS 3/4 threaded nipple with cap, at low points in piping system mains and elsewhere as required for system drainage.

M. Install piping at a uniform grade of 0.2 percent upward in direction of flow.

N. Reduce pipe sizes using eccentric reducer fitting installed with level side up.

O. Install unions in piping, NPS 3 and smaller, adjacent to valves, at final connections of equipment, and elsewhere as indicated. Contractor shall install unions to facilitate installation and service of pipe equipment and valves.

P. Install strainers on supply side of control valves, traps, and elsewhere as indicated. Install NPS 3/4 nipple and ball valve in blow-down connection of strainers NPS 2 and larger. Match size of strainer blow-off connection for strainers smaller than NPS 2.

1.12 HANGERS AND SUPPORTS

A. Hanger, support, and anchor devices are specified in Section 230529 – "Hangers and Supports for Hvac Piping and Equipment" Comply with the following requirements for maximum spacing of supports.

B. Install the following pipe attachments:

1. Adjustable steel clevis hangers for individual horizontal piping less than 20 feet long.
2. Spring hangers to support vertical runs.
3. Provide copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.

C. Install hangers for steel piping with the following maximum spacing and minimum rod sizes:

1. NPS 1-1/2: Maximum span, 9 feet; minimum rod size, 3/8 inch.
2. NPS 2: Maximum span, 10 feet; minimum rod size, 3/8 inch.

D. Install hangers for drawn-temper copper piping with the following maximum spacing and minimum rod sizes:

1. NPS 3/4: Maximum span, 5 feet; minimum rod size, 1/4 inch.
2. NPS 1: Maximum span, 6 feet; minimum rod size, 1/4 inch.
3. NPS 1-1/2: Maximum span, 8 feet; minimum rod size, 3/8 inch.
4. NPS 2: Maximum span, 8 feet; minimum rod size, 3/8 inch.

E. Support vertical runs at roof, at each floor, and at 10-foot intervals between floors.

1.13 PIPE JOINT CONSTRUCTION

A. Join pipe and fittings according to the following requirements and Division 23 Sections specifying piping systems.

B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.

E. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

F. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

G. Braze Joints: Follow braze manufacturer's guidelines and refrigerant equipment requirements.

1.14 HYDRONIC SPECIALTIES INSTALLATION

A. Install automatic air vents at high points of system piping in mechanical equipment rooms only. Manual vents at heat-transfer coils and elsewhere as required for air venting.

1.15 FIELD QUALITY CONTROL

A. Prepare hydronic piping according to ASME B31.9 and as follows:

1. Leave joints, including welds, uninsulated and exposed for examination during test.
2. Flush hydronic piping systems with clean water; then remove and clean or replace strainer screens.
3. Isolate equipment from piping. If a valve is used to isolate equipment, its closure shall be capable of sealing against test pressure without damage to valve. Install blinds in flanged joints to isolate equipment.
4. Install safety valve, set at a pressure no more than one-third higher than test pressure, to protect against damage by expanding liquid or other source of overpressure during test.

B. Perform the following tests on hydronic piping:

1. Use ambient temperature water as a testing medium unless there is risk of damage due to freezing. Another liquid that is safe for workers and compatible with piping may be used.
2. While filling system, use vents installed at high points of system to release air. Use drains installed at low points for complete draining of test liquid.
3. Isolate expansion tanks and determine that hydronic system is full of water.
4. Subject piping system to hydrostatic test pressure that is not less than 1.5 times the system's working pressure. Test pressure shall not exceed maximum pressure for any vessel, pump, valve, or other component in system under test.
5. After hydrostatic test pressure has been applied for at least 30 minutes, examine piping, joints, and connections for leakage. Eliminate leaks by tightening, repairing, or replacing components and repeat hydrostatic test until there are no leaks.
6. Prepare written report of testing.

C. Perform the following before operating the system:

1. Open manual valves fully.
2. Inspect air vents at high points of system and determine if all are installed and operating freely (automatic type), or bleed air completely (manual type).
3. Set temperature controls so all coils are calling for full flow.
4. Inspect and set operating temperatures of hydronic equipment to specified values.
5. Verify lubrication of motors and bearings.

--- END OF SECTION 232113 ---

SECTION 233113 - METAL DUCTS

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Clauses apply to this Section

1.2 SUMMARY

A. This Section includes rectangular metal ducts for heating, ventilating and air conditioning systems in pressure classes from minus 2 to plus 3-inch wg.

B. Duct Cleaning for Existing Duct Systems to be modified under this contract.

1.3 SYSTEM DESCRIPTION

A. Duct system design, as indicated, has been used to select and size air-moving and –distribution equipment and other components of air system. Changes to layout or configuration of duct system must be specifically approved in writing by Engineer. Accompany requests for layout modifications with calculations showeing that proposed layout will provide original design results without increasing system total pressure. Modifications and final detail of duct routing shall be on contractor's shop drawing.

1.4 SUBMITTALS

A. Shop Drawings: Show details of the following:
   1. Fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work.
   2. Duct layout indicating pressure classifications and sizes on plans.
   3. Indicate all offsets to obstructions.
   4. Fittings.
   5. Reinforcement and spacing.
   6. Seam and joint construction, indicating compliance with latest SMACNA standards.
   7. Penetrations through fire-rated and other partitions.
   8. Hangers and supports, including methods for building attachment, vibration isolation, restraints, and duct attachment.
   9. Detail/Coordinate duct routing around existing equipment and work of other trades.
   10. Submit sheet metal shop construction standards meeting specified requirements and SMACNA standards.

B. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

C. Record Drawings: Indicate actual routing, fitting details, reinforcement, support, and installed accessories and devices.

1.5 QUALITY ASSURANCE

A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," unless otherwise indicated.

B. Comply with NFPA 90B, “Installation of Warm Air Heating and Air Conditioning Systems,” unless otherwise indicated.

C. Comply with most up to date SMACNA duct construction standards including SMACNA addendums.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver sealant and fire stopping materials to site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multi-component materials

B. Store and handle sealant and firestopping materials according to manufacturer's written recommendations

1.7 SHEET METAL MATERIALS

A. Galvanized, Sheet Steel: Lock-forming quality; ASTM A 653/A653M, G90 coating designation. Thickness shall be
1. For ducts up to 18” maximum dimension, No. 24 Gauge
2. For ducts between 19” and 54” maximum dimension, No. 22 Gauge
3. For Ducts between 55” and 72” maximum dimension, No. 20 Gauge
4. For Ducts over 73” maximum dimension, No. 18 Gauge

B. Aluminum Sheets: Comply with ASTM B 209 Alloy 3003, H14 temper; with mill finish for concealed ducts, and standard, one-side bright finish for duct surfaces exposed to view. Aluminum ductwork for all Fresh Air Intakes.

C. Factory- or Shop-Applied Antimicrobial Coating:

1. Apply to the surface of sheet metal that will form the interior surface of the duct. An untreated clear coating shall be applied to the exterior surface.
2. Antimicrobial compound shall be tested for efficacy by an NRTL and registered by the EPA for use in HVAC systems.
3. Coating containing the antimicrobial compound shall have a hardness of 2H, minimum, when tested according to ASTM D 3363.
4. Surface-Burning Characteristics: Maximum flame-spread index of 25 and maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
5. Shop-Applied Coating Color: [Black] [White].
6. Antimicrobial coating on sheet metal is not required for duct containing liner treated with antimicrobial coating.

D. Reinforcement Shapes and Plates: Galvanized steel reinforcement where installed on galvanized, sheet metal ducts

E. Tie Rods: Galvanized steel, 3/8-inch minimum diameter for lengths longer than 36 inches

1.8 DUCT LINER

A. Flexible Elastomeric Duct Liner: Preformed, cellular, closed-cell, sheet materials complying with ASTM C 534, Type II, Grade 1; and with NFPA 90A or NFPA 90B.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Aeroflex USA Inc.
b. Armacell LLC.
c. Rubatex International, LLC

2. Surface-Burning Characteristics: Maximum flame-spread index of 25 and maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
3. Liner Adhesive: As recommended by insulation manufacturer and complying with NFPA 90A or NFPA 90B.

a. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
b. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. Natural-Fiber Duct Liner: 85 percent cotton, 10 percent borate, and 5 percent polybinding fibers, treated with a microbial growth inhibitor and complying with NFPA 90A or NFPA 90B.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Bonded Logic, Inc.
b. Reflectix Inc.

2. Maximum Thermal Conductivity: 0.24 Btu x in./h x sq. ft. x deg F at 75 deg F mean temperature when tested according to ASTM C 518.
3. Surface-Burning Characteristics: Maximum flame-spread index of 25 and maximum smoke-developed index of 50 when tested according to ASTM E 84; certified by an NRTL.
4. Liner Adhesive: As recommended by insulation manufacturer and complying with NFPA 90A or NFPA 90B.

a. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
b. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile

Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Insulation Pins and Washers:

1. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.106-inch diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch galvanized carbon-steel washer.
2. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick galvanized steel or aluminum; with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.

D. Shop Application of Duct Liner: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 7-11, "Flexible Duct Liner Installation."

1. Adhere a single layer of indicated thickness of duct liner with at least 90 percent adhesive coverage at liner contact surface area. Attaining indicated thickness with multiple layers of duct liner is prohibited.
2. Apply adhesive to transverse edges of liner facing upstream that do not receive metal nosing.
3. Butt transverse joints without gaps, and coat joint with adhesive.
4. Fold and compress liner in corners of rectangular ducts or cut and fit to ensure butted-edge overlapping.
5. Do not apply liner in rectangular ducts with longitudinal joints, except at corners of ducts, unless duct size and dimensions of standard liner make longitudinal joints necessary.
6. Apply adhesive coating on longitudinal seams in ducts with air velocity of 2500 fpm.
7. Secure liner with mechanical fasteners 4 inches from corners and at intervals not exceeding 12 inches transversely; at 3 inches from transverse joints and at intervals not exceeding 18 inches longitudinally.
8. Secure transversely oriented liner edges facing the airstream with metal nosings that have either channel or "Z" profiles or are integrally formed from duct wall. Fabricate edge facings at the following locations:

    a. Fan discharges.
    b. Intervals of lined duct preceding unlined duct.
    c. Upstream edges of transverse joints in ducts where air velocities are higher than 2500 fpm or where indicated.

9. Secure insulation between perforated sheet metal inner duct of same thickness as specified for outer shell. Use mechanical fasteners that maintain inner duct at uniform distance from outer shell without compressing insulation.

    a. Sheet Metal Inner Duct Perforations: 3/32-inch diameter, with an overall open area of 23 percent.

10. Terminate inner ducts with buildouts attached to fire-damper sleeves, dampers, turning vane assemblies, or other devices. Fabricated buildouts (metal hat sections) or other buildout means are optional; when used, secure buildouts to duct walls with bolts, screws, rivets, or welds.

1.9 SEALANT MATERIALS

A. Joint and Seam Sealants, General: The term “sealant” is not limited to materials adhesive or mastic nature but includes tapes and combinations of open-weave fabric strips and mastics.
   1. Joint and Seam Sealant: One-part, nonsag, solvent-release-curing, polymerized butyl sealant, formulated with a minimum of 75 percent solids. Sealant similar to Ductmate Inc., or 3M-Co. Type EC-800 sealing compound.
   2. Ducts shall be sealed to SMACNA Seal class A as a minimum for all transverse and longitudinal joints

1.10 HANGERS AND SUPPORTS

A. Building Attachments: Concrete inserts or structural-steel fasteners appropriate for building materials.

B. Hanger Materials: Galvanized, sheet steel or round, threaded steel rod.

   1. Straps and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for sheet steel width and thickness and for steel rod diameters.

C. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

D. Trapeze and Riser Supports: Steel shapes complying with ASTM A36/A36M.

   1. Supports for Galvanized-Steel Ducts: Galvanized steel shapes and plates.
   2. Supports for Aluminum riser Duct: Aluminum shapes and plates or galvanized material material isolated from alumin surface contact.

1.11 RECTANGULAR DUCT FABRICATION

A. General: Fabricate ducts, elbows, transitions, offsets, branch connections, and other construction with galvanized, sheet steel, according to most recent SMACNA's "HVAC Duct Construction Standards--Metal and Flexible." Comply with requirements for metal thickness, reinforcing types and intervals, tie-rod applications, and joint types and intervals.
   1. Lengths: Fabricate rectangular ducts in lengths appropriate to reinforcement and rigidity class required for pressure classification.
   2. Materials: Free from visual imperfections such as pitting, seam marks, roller marks, stains, and discolorations

B. Static-Pressure Classifications: Unless otherwise indicated, construct ducts to the following:
   1. Supply Ducts: 3-inch wg.
   2. Return Ducts: 2-inch wg, negative-pressure.
   3. Exhaust Ducts: 3-inch wg, negative pressure.

C. Cross Breaking or Cross Beading: Cross break or cross bead duct sides 19 inches and larger and 0.0359 inch thick or less, with more than 10 sq. ft. of unbraced panel area, unless ducts are lined.

D. Longitudinal seams shall be Pittsburgh seam with sealant.

E. Transverse duct connections shall follow SMACNA duct construction standards.

F. Prefabricated joining system similar to Ductmete Industries Inc., Series 35, or approved equal, may be used in areas with sufficient clearances.

1.12 ROUND AND FLAT-OVAL DUCT AND FITTINGS (if applicable to project)

A. Diameter as applied to flat-oval ducts is the diameter of a round duct with a circumference equal to the perimeter of a given size flat-oval duct.

B. Round, Longitudinal seam ducts: fabricate ducts of galvanized steel according to SMACNA "HVAC Duct Construction Standards-Metal and Flexible."

C. Duct Joints:

D. Ducts upto 20 inches in diameter: interior, center beaded slip coupling, sealed before and after fastening, attached with sheet metal screws.

E. Ducts 21 to 72 Inches Diamter: 3 piece gasketed flanged Joint with two internal flanges and sealant and external closure band.

F. Pre-fabricated connection system: Duct may be joined using pre-fabricated duct joining system incorporating an EPDM rubber gasket. Similar to Ductmate, or approved equal.

G. EXPOSED DUCTWORK AND FITTINGS IN INTERACTIVE TRAINING AREA: shall be Uni-Seal Type Single Wall Round Duct and Fittings with Spiral Lockseam by McGill Airflow Corporation or equal. Entire duct shall come with Acousti-line Duct liner (See duct Liner Section below)

1.13 DUCT CLEANING AGENTS:

A. In general any cleaning agents including but not limited to: Soaps and Detergents, Degreasers, Deodorizers, Coil Cleaning Compounds, Resurfacing Materials, Sealants, Antimicrobial Pesticides or any other chemical products, intended to be used as part of the duct cleaning processes, must first be approved by Engineer. All work will be coordinated by Project Manager. Project Manager shall be given 1 Week notice prior to start of work. Work may be required to be conducted during unoccupied building hours if the agents deemed necessary for cleaning pose an environmental hazard to any part of the building. All traces of agent must be evacuated from building completely before occupants enter. Contractor shall provide all means of access required for every section of building duct on the premises to be cleaned.

B. All agents to be used shall be an alkaline or neutral based (PH7 or above) to prevent damage to metal ductwork and shall be USDA approved for food service use.

C. No coatings are to be sprayed onto the clean ductwork after cleaning (No Fire protection powder or lime powder)

D. Clean Existing Ductwork.

1.14 DUCT INSTALLATION, GENERAL

A. Drawings indicate general arrangement of ducts, fittings, and accessories.

B. Construct and install each duct system for the specific duct pressure classification indicated.

C. Install ducts with fewest possible joints.

D. Install fabricated fittings for changes in directions, changes in size and shape, and connections.

E. Install couplings tight to duct wall surface with a minimum of projections into duct.

F. Install ducts, unless otherwise indicated, vertically and horizontally, parallel and perpendicular to building lines; avoid diagonal runs.

G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

H. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.

I. Conceal ducts from view in finished spaces. Do not encase horizontal runs in solid partitions, unless specifically indicated.

J. Coordinate layout with suspended ceiling, fire- and smoke-control dampers, lighting layouts, and similar finished work.

1.15 SEAM AND JOINT SEALING

A. General: Seal duct seams and joints according to the duct pressure class indicated and as described in SMACNA's "HVAC Duct Construction Standards--Metal and Flexible."

B. All longitudinal and transverse joints shall be sealed.

C. Seal externally insulated ducts before insulation installation.

1.16 HANGING AND SUPPORTING

A. Install rigid rectangular metal duct with support systems indicated in SMACNA's "HVAC Duct Construction Standards--Metal and Flexible."

B. Support horizontal ducts within 24 inches of each elbow and within 48 inches of each branch intersection.

C. Support vertical ducts at a maximum interval of 16 feet and at each floor. Provide intermediate support for vertical duct riser. Duct shall be supported at all slab penetrations.

D. Install upper attachments to structures with an allowable load not exceeding one-fourth of failure (proof-test) load.

1.17 CONNECTIONS

A. Connect to vibrating rotary equipment with flexible connectors.

B. For branch, outlet and inlet, and terminal unit connections, comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible."

C. For rooftop equipment verify fans are independently isolated within the unit cabinet and that RTU isolation not required.

1.18 FIELD QUALITY CONTROL

A. Disassemble, reassemble, and seal segments of systems as required to accommodate leakage testing and as required for compliance with test requirements

B. Conduct tests, in presence of Architect, at static pressures equal to maximum design pressure of system or section being tested. If pressure classifications are not indicated, test entire system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure. Give seven days' advance notice for testing

C. Determine leakage from entire system or section of system by relating leakage to surface area of test section

D. Maximum Allowable Leakage: Comply with requirements for Leakage Classification 12 for rectangular ducts in pressure classifications less than and equal to 2-inch wg (both positive and negative pressures), and Leakage Classification 6 for pressure classifications from 2- to 10-inch wg.

E. Remake leaking joints and retest until leakage is less than maximum allowable

F. Leakage Test: Perform tests according to SMACNA's "HVAC Air Duct Leakage Test Manual."

1.19 ADJUSTING

A. Adjust volume-control dampers in ducts, outlets, and inlets to achieve design airflow.

B. Refer to Division 23 Section "Testing, Adjusting, and balancing" for detailed procedures.

1.20 CLEANING

A. After completing system installation, including outlet fittings and devices, inspect the system in the presence of the Engineer.

B. The Contractor is responsible for cleaning all new and existing ductwork as well as roof mounted Kitchen Exhaust Fan. Contractor shall utilize NADCA(National Air Duct Cleaners Association) approved source removal techniques.

C. The Contractor shall protect all ductwork during the course of construction. Contractor shall submit a plan to the Engineer, for approval, prior to construction. Contractor shall incorporate all protective measures to prevent contamination of the duct system during construction. Air pollutants as described in "SMACNA-IAQ Guideleines for Occcupied Buildings Under Construction" Tables 2-2 and 2-3 shall be prevented from entering the duct system and air distribution system. Preventative measures including, but not limited to:
   1. Stored ductwork shall be kept dry and clean.
   2. Sealing of all ductwork, louvers, etc.during construction, prior to finish cleaning of building and at any time where dust or debris may enter system.
   3. Utilize temporary filters, if equipment runs during construction. Perform two complete air filter changes on air handling units when placing air handling units into service after completion of construction.
   4. Seal off fans, coils and air handling units.
   5. Above noted SMACNA Manual guidelines for HVAC protection, source control, pathway interruption, house-keeping.

D. All ducts that have been cleaned should be visibly clean. Contractor shall provide access to ductwork for visual inspection and acceptance by the Engineer

E. To provide visual and mechanical access, the Contractor will be responsible for installing permanent, reusable access doors at approximately 20-30 ft intervals

F. The Contractor shall complete this project in accordance with all OSHA regulations as they may pertain to the project, including confined space, drop fall, respirator fit, and pulmonary function test

--- END OF SECTION 233113 ---

SECTION 233300 - DUCT ACCESSORIES

1.1 SUMMARY

A. This Section includes the following:
1. Sheet Metal Materials
2. Manual Volume Dampers
3. Fire Dampers.
4. Turning vanes.
5. Duct-mounted access doors and panels.
6. Flexible ducts.
7. Flexible Connectors
8. Duct accessory hardware.

1.2 SUBMITTALS

A. Product Data: For the following:
1. Manual volume dampers.
2. Fires Dampers.
3. Turning Vanes
4. Duct-mounted access doors and panels.
5. Flexible ducts.

1.3 QUALITY ASSURANCE

A. NFPA Compliance: Comply with the following NFPA standards:

1. NFPA 90A, "Installation of Air Conditioning and Ventilating Systems."
2. NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."

1.4 SHEET METAL MATERIALS

A. Galvanized, Sheet Steel: Lock-forming quality; ASTM A 653/A 653M, G90 coating designation; mill-phosphatized finish for surfaces of ducts exposed to view.

B. Reinforcement Shapes and Plates: Galvanized steel reinforcement where installed on galvanized, sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.

C. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for 36-inch length or less; 3/8-inch minimum diameter for lengths longer than 36 inches. Construction standards shall meet requirements for SMACNA metal-flexible. Refer to section 15815 “Metal Ducts”.

1.5 MANUAL VOLUME DAMPERS

A. Manufacturers:
1. Air Balance, Inc.

2. Greenheck
3. Nailor Industries, Inc.

B. General Description: AMCA-rated, opposed blade design; minimum of 0.1084-inch-thick, galvanized-steel frames with holes for duct mounting; minimum of 0.0635-inch-thick, galvanized-steel damper blades with maximum blade width of 8 inches.

1. Secure blades to ½ inch diameter, zinc-plated axles using zinc-plated hardware, with nylon blade bearings, blade-linkage hardware of zinc-plated steel and brass, ends sealed against spring-stainless steel blade bearings, and thrust bearings at each end of every blade.
2. Operating Temperature Range: From minus 40 to plus 200 deg F.
3. Provide opposed-blade with inflatable seal blade edging, or replaceable rubber seals, rated for leakage at less than 10cfm per sq. ft. of damper area, at differential pressure of 4 inch wg when damper is being held by torque of 50 in x lbf; when tested according to AMCA 500D.

1.6 FIRE DAMPERS

A. Fire Dampers shall be Ruskin model DIBD2 style B, or approved equal.
1. Dampers shall be 1 ½ hour rated
2. Shall meet the requirements of UL 555. Damper assembly shall be provided with type S or drive mate breakaway connection.
3. Dampers shall be configured for installed position.

B. Frame: Curtain type with blades outside or airstream; fabricated with roll-formed, 0.034-inch thick galvanized steel; with mitered and interlocking corners.

C. Mounting Sleeve: Factory- or field-installed, galvanized sheet steel.

1. Minimum Thickness: 0.052 or 0.138-inch-thick as indicated and of length to suit application.
2. Exceptions: Omit sleeve where damper frame width permits direct attachment of perimeter mounting angles on each side of wall or floor, and thickness of damper frame complies with sleeve requirements.

D. Blades: Roll-formed, interlocking, 0.034-inch thick, galvanized sheet steel. In place of interlocking blades, use full-length, 0.034-inch thick, galvanized-steel blade connectors.

E. Horizontal Dampers: Include blade lock and stainless-steel closure spring.

F. Fusible Links: Replaceable, 165 deg F rated.

1.7 TURNING VANES

A. Fabricate to comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible."

B. Manufactured Turning Vanes: Fabricate of 1-1/2-inch- wide, curved blades set 3/4 inch o.c.; support with bars perpendicular to blades set 2 inches o.c.; and set into side strips suitable for mounting in ducts.

1.8 DUCT-MOUNTED ACCESS DOORS AND PANELS

A. General: Fabricate doors and panels airtight and suitable for duct pressure class.

B. Frame: Galvanized, sheet steel, with bend-over tabs and foam gaskets.

C. Door: Double-wall, galvanized, sheet metal construction with insulation fill and thickness, and number of hinges and locks as indicated for duct pressure class. Include vision panel where indicated. Include 1-by-1-inch butt or piano hinge and cam latches.

D. Seal around frame attachment to duct and door to frame with neoprene or foam rubber.

E. Insulation: 1-inch- thick, fibrous-glass or polystyrene-foam board.

1.9 FLEXIBLE DUCTS

A. General: Comply with UL 181, Class 1.

B. Flexible Ducts: Insulated corrugated aluminum.

C. Flexible ducts shall be Thermaflex G-KM, as manufactured by Flexible Technologies Inc., Abbeville SC, or approved equal.

D. Pressure Rating: 6-inch wg positive, 1/2-inch wg negative.

1.10 FLEXIBLE CONNECTORS

A. Provide Ventflex, heavy woven fabric duct connector with a double coating of polymer by Ventfabrics Inc. or approved equal.

B. Materials: Shall be air-tight, water-tight and flame-retardant or noncombustible fabrics. Material shall be resistant to abrasion and damage from flexing.

C. Connector shall be accepted by the National Fire Protection Association for vibration isolation connectors in duct systems in accordance with ANSI/NFPA 701.

D. Coatings and Adhesives: Comply with UL 181, Class 1.

E. Metal-Edged Connectors: Factory fabricated with a fabric strip **3-1/2 inches** wide attached to two strips of 2-3/4-inch-wide, 0.028-inch-thick, galvanized sheet steel or 0.032-inch- thick aluminum sheets. Provide metal compatible with connected ducts.

F. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.

1. Minimum Weight: 22 oz. /sq. yd.

2. Tensile Strength: 260 lbf/inch in the warp and 300 lbf/inch in the filling.
3. Service Temperature: -40 to 180 deg F.

G. Thrust Limits: Combination coil spring and elastomeric insert with spring and insert in compression, and with a load stop. Include rod and angle-iron brackets for attaching to fan discharge and duct.

1. Frame: Steel, fabricated for connection to threaded rods and to allow for a maximum of 30 degrees of angular rod misalignment without binding or reducing isolation efficiency.
2. Outdoor Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
6. Elastomeric Element: Molded, oil-resistant rubber or neoprene.
7. Coil Spring: Factory set and field adjustable for a maximum of 1/4-inch movement at start and stop.

1.11 ACCESSORY HARDWARE

A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments, and length to suit duct insulation thickness. Test hole connections shall be installed on the new ducting at locations required for airflow measurements on all main ducts and branch takeoffs.

B. Flexible Duct Clamps: Stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action, in sizes 3 to 18 inches to suit duct size.

C. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

1.12 INSTALLATION

A. Install duct accessories according to applicable details shown in SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for metal ducts and NAIMA's "Fibrous Glass Duct Construction Standards" for fibrous-glass ducts.

B. Install duct access panels downstream from volume dampers, turning vanes, and equipment.

1. Install duct access panels to allow access to interior of ducts for cleaning, inspecting, adjusting, and maintaining accessories and terminal units.
2. Install access panels on side of duct where adequate clearance is available.

C. Label access doors according to Division 23 Section "Mechanical Identification."

D. This contractor shall responsible for all cutting and patching required for installing duct, fire dampers, and mounting sleeves, except locations specifically indicated on contract drawings with cutting “By Others”.

1.13 ADJUSTING

A. Adjust duct accessories for proper settings.

B. Final positioning of manual-volume dampers is specified in Division 23 Section "Testing, Adjusting, and Balancing."

--- END OF SECTION 233300 ---

SECTION 233416 - CENTRIFUGAL HVAC FANS

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes: For each product.
   1. Roof Mounted Exhaust Fan

1.3 ACTION SUBMITTALS

A. Product Data:

   1. Include rated capacities, furnished specialties, and accessories for each fan.
   2. Certified fan performance curves with system operating conditions indicated.
   3. Certified fan sound-power ratings.
   4. Motor ratings and electrical characteristics, plus motor and electrical accessories.
   5. Material thickness and finishes, including color charts.
   6. Dampers, including housings, linkages, and operators.

B. Shop Drawings:

   1. Include plans, elevations, sections, and attachment details.
   2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
   3. Include diagrams for power, signal, and control wiring.
   4. Design Calculations: Calculate requirements for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
   5. Vibration Isolation Base Details: Detail fabrication, including anchorages and attachments to structure and to supported equipment. Include auxiliary motor slides and rails, and base weights.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Show fan room layout and relationships between components and adjacent structural and mechanical elements. Show support locations, type of support, and weight on each support. Indicate and certify field measurements.

B. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For centrifugal fans to include in emergency, operation, and maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Belts: **Two** set(s) for each belt-driven unit.

1.7 ROOF MOUNTED EXHAUST FANS

A. **EFT-64** - Contractor shall furnish and install new Loren Cook Model ACE-D VF or approved equal. [Phone # Ralph Schlenker – (718)714-4242, Ext. 103]
   1. Down blast Centrifugal Exhaust Ventilator Roof Mounted, Direct-Drive Electronically-Commutated Variflow Motor
      a. 18”x18”x16-13/16” high (66lbs)
   2. Standard Construction Features
      a. All aluminum housing - Backward inclined all aluminum wheel - Two-piece top cap with stainless steel quick release latches (sizes 120 - 300) – Welded curb cap corners - Bird screen - Permanently lubricated ball bearing motors - Corrosion resistant fasteners - Transit tested packaging.
   3. Performance
      a. 150 CFM, .2 SP; 923 Fan RPM; .011 HP; EC Speed Control
      b. 1/8 HP Motor, 1725 RPM; 115 V / 1ph / 60Hz; 1.9 Rated Load Amps.
   4. Speed Control - internal speed Control Electronically Commutated (EC) Motor Type N
      a. Standard Construction: Integral Potentiometer with slotted screw for speed adjustment.
   5. Backdraft Damper – (11-3/4” x 11-3/4” x 5-3/16”)
      a. Standard Construction –
         1) .020 Aluminum blades - .060 aluminum frame - Aluminum hinge pins - Nylon bushings.
         2) Max. operating temperature 200 Deg F (95 Deg C).
         3) Max. discharge velocity 2000 fpm.
   6. Roof Curb – Loren Cook Model RCG or approved equal. (13-1/2” x 13-1/2” roof opening)
      a. STANDARD CONSTRUCTION FEATURES:
         1) 18 gauge galvanized steel - 1-1/2", 3 lbs. density thermal and acoustical insulation - Continuously welded corners - Wood nailer.
      b. Options:
         1) No wood nailer (deduct 1-1/2" for actual height)
         2) Damper tray.
         3) Liner.
         4) Gasket on wood nailer.
         5) Lorenized coating.
         6) Enamel coating.
         7) Burglar bars.
   7. Accessories
      a. FAN MOUNTED SPEED CONTROL
      b. DISCONNECT NEMA 1 PRE-WIRED

c. BD-12 DAMPER
d. ROOF CURB RCG 16 13.5H +C+T+N
e. GASKET W/NAILER-CURB
f. ALUMINUM BIRDSCREEN

B. **EFT-65** - Contractor shall furnish and install new Loren Cook Model ACE-D VF or approved equal. [Phone # Ralph Schlenker – (718)714-4242, Ext. 103]
1. Down blast Centrifugal Exhaust Ventilator Roof Mounted, Direct-Drive Electronically-Commutated Variflow Motor
   a. 18”x18”x16-13/16” high (66lbs)
2. Standard Construction Features
   a. All aluminum housing - Backward inclined all aluminum wheel - Two-piece top cap with stainless steel quick release latches (sizes 120 - 300) – Welded curb cap corners - Bird screen - Permanently lubricated ball bearing motors - Corrosion resistant fasteners - Transit tested packaging.
3. Performance
   a. 250 CFM; .2” W.C. SP; 1003 Fan RPM; .021 HP; EC Speed Control
   b. 1/6 HP Motor, 1725 RPM; 208 V / 1ph / 60Hz; 1.5 Rated Load Amps.
4. Speed Control - internal speed Control Electronically Commutated (EC) Motor Type N
   a. Standard Construction: Integral Potentiometer with slotted screw for speed adjustment.
5. Backdraft Damper – (11-3/4” x 11-3/4” x 5-3/16”)
   a. Standard Construction –
      1) .020 Aluminum blades - .060 aluminum frame - Aluminum hinge pins - Nylon bushings.
      2) Max. operating temperature 200 Deg F (95 Deg C).
      3) Max. discharge velocity 2000 fpm.
6. Roof Curb – Loren Cook Model RCG or approved equal. (13-1/2” x 13-1/2” roof opening)
   a. STANDARD CONSTRUCTION FEATURES:
      1) 18 gauge galvanized steel - 1-1/2", 3 lbs. density thermal and acoustical insulation - Continuously welded corners - Wood nailer.
   b. Options:
      1) No wood nailer (deduct 1-1/2" for actual height)
      2) Damper tray.
      3) Liner.
      4) Gasket on wood nailer.
      5) Lorenized coating.
      6) Enamel coating.
      7) Burglar bars.
7. Accessories
   a. FAN MOUNTED SPEED CONTROL
   b. DISCONNECT NEMA 1 PRE-WIRED
   c. BD-12 DAMPER
   d. ROOF CURB RCG 16 13.5H +C+T+N
   e. GASKET W/NAILER-CURB
   f. ALUMINUM BIRDSCREEN

1.8 CONTROL

A. All fans shall be controlled via BMS according to Controls Spec Sections: 230993 – "SEQUENCE OF OPERATIONS FOR HVAC CONTROLS" and SECTION 230900 – "INSTRUMENTATION AND CONTROL FOR HVAC".

1.9 INSTALLATION

A. Install centrifugal fans level and plumb.

B. Disassemble and reassemble units, as required for moving to the final location, according to manufacturer's written instructions.

C. Lift and support units with manufacturer's designated lifting or supporting points.

D. Equipment Mounting: Install continuous-thread hanger rods and **Neoprene rubber in shear isolators** of size required to support weight of units.
   1. Comply with requirements for hangers and supports specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."

E. Install units with clearances for service and maintenance.

F. Label fans according to requirements specified in Section 230553 "Identification for HVAC Piping and Equipment."

G. Furnish Backdraft Dampers on all inline fans as shown on drawings according to Spec Section 233300 "AIR DUCT ACCESSORIES".

1.10 CONNECTIONS

A. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors. Flexible connectors are specified in Section 233300 "Air Duct Accessories."

B. Install ducts adjacent to fans to allow service and maintenance.

C. Install piping from scroll drain connection, with trap with seal equal to 1.5 times specified static pressure, to nearest floor drain with pipe sizes matching the drain connection.

D. Install inline fans to ductwork with flex connectors.

1.11 FIELD QUALITY CONTROL

A. Testing Agency: **Engage** a qualified TAB Contractor to balance all fans for this section according to Section 230593 "TESTING, ADJUSTING AND BALANCING".

B. Perform the following tests and inspections **with the assistance of a County Authorized representative**:

1. Verify that shipping, blocking, and bracing are removed.
2. Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.
3. Verify that cleaning and adjusting are complete.
4. Disconnect fan drive from motor, verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operation. Reconnect fan drive system, align and adjust belts, and install belt guards.
5. Adjust belt tension.
6. Adjust damper linkages for proper damper operation.
7. Verify lubrication for bearings and other moving parts.
8. Verify that manual and automatic volume control and fire and smoke dampers in connected ductwork systems are in fully open position.
9. See Section 230593 "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing procedures.
10. Remove and replace malfunctioning units and retest as specified above.

C. Test and adjust controls and safeties. Controls and equipment will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports.

--- END OF SECTION 233416 ---

SECTION 233600 - AIR TERMINAL UNITS

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Single-duct variable air volume terminal units (VAV units)

2. Single-duct variable air volume terminal units (VAV units) w/ Electric Reheat

1.3 SUBMITTALS

A. Product Data: For each type of the following products, including rated capacities, furnished specialties, sound-power ratings, and accessories.

1. Air terminal units.
2. Liners and adhesives.
3. Sealants and gaskets.

B. Operation and Maintenance Data: For air terminal units to include in emergency, operation, and maintenance manuals.

1. Instructions for resetting minimum and maximum air volumes.
2. Instructions for adjusting software set points.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. NFPA Compliance: Comply with NFPA 90 & NFPA 90A

C. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1-2004, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-Up."

1.5 SINGLE-DUCT AIR TERMINAL UNITS

A. The following are unit based specifications See Drawing Schedule for Unit Designations.
1. All VAV Terminal Units (3 total) shall be Greenheck Model XG-TH500-003 or approved equal.

B. General:
   1. 1/2" Dual Density, Coated Fiberglass
   2. All Insulations Meet NFPA 90A and UL 181
   3. All Fiberglass Insulations Have Coated Edges to Prevent Fiber Migration
   4. Units Are Constructed with 22 Gauge Casing & Inlet Duct
   5. 18 Gauge Equivalent Damper Assembly with Integral Blade Seal
   6. Control Panel with Dust Cover
   7. Slip & Drive Discharge Connection
   8. Inlet Airflow Sensor

1.6 CONTROLS FOR VARIABLE VOLUME TERMINAL BOXES

A. Direct Digital Controls (DDC) shall be provided for each VAV zone control unit. Controls shall be provided as detailed in specification Division 23 Section "Instrumentation and Controls" and "Sequence of Operation"

B. Contractor shall coordinate all work with the HVAC controls provider to ensure a complete fully functional installation.

1.7 HANGERS AND SUPPORTS

A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.

B. Hanger Rods for Corrosive Environments: Electro-galvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.

C. Air Terminal Unit Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

D. Trapeze and Riser Supports: Steel shapes and plates for units with steel casings; aluminum for units with aluminum casings.

1.8 RESTRAINT DEVICES

A. General Requirements for Restraint Components: Rated strengths, features, and applications per manufacturer requirements.

   1. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four times the maximum seismic forces to which they will be subjected.

B. Channel Support System: Shop- or field-fabricated support assembly made of slotted steel channels rated in tension, compression, and torsion forces and with accessories for attachment to braced component at one end and to building structure at the other end. Include matching components and corrosion-resistant coating.

C. Restraint Cables: ASTM A 492, stainless-steel cables with end connections made of cadmium-plated steel assemblies with brackets, swivel, and bolts designed for restraining cable service; with an automatic-locking and clamping device or double-cable clips.

D. Hanger Rod Stiffener: Reinforcing steel angle clamped to hanger rod.

E. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

1.9 SOURCE QUALITY CONTROL

A. Factory Tests: Test assembled air terminal units according to ARI 880.

1. Label each air terminal unit with plan number, nominal airflow, maximum and minimum factory-set airflows, and ARI certification seal.

1.10 INSTALLATION

A. Install air terminal units according to NFPA 90A, "Standard for the Installation of Air Conditioning and Ventilating Systems."

B. Install air terminal units level and plumb. Maintain sufficient clearance for normal service and maintenance.

C. Install wall-mounted thermostats/temperature sensors according to Controls Sections.

1.11 HANGER AND SUPPORT INSTALLATION

A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Hangers and Supports."

B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.

1. Where practical, install concrete inserts before placing concrete.
2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes and for slabs more than 4 inches thick.
4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes and for slabs less than 4 inches thick.
5. Do not use powder-actuated concrete fasteners for seismic restraints.

C. Hangers Exposed to View: Threaded rod and angle or channel supports.

D. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

1.12 RESTRAINT-DEVICE INSTALLATION

A. Install hangers and braces designed to support the air terminal units and to restrain against forces required by applicable building codes. Comply with SMACNA's "Seismic Restraint Manual: Guidelines for Mechanical Systems."

B. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction.

C. Attachment to Structure: If specific attachment is not indicated, anchor bracing and restraints to structure, to flanges of beams, to upper truss chords of bar joists, or to concrete members.

D. Drilling for and Setting Anchors:

1. Identify position of reinforcing steel and other embedded items before drilling holes for anchors. Do not damage existing reinforcement or embedded items during drilling. Notify the Architect if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
3. Wedge Anchors: Protect threads from damage during anchor installation. Install heavy-duty sleeve anchors with sleeve fully engaged in the structural element to which anchor is to be fastened.
4. Set anchors to manufacturer's recommended torque, using a torque wrench.
5. Install zinc-coated steel anchors for interior applications and stainless-steel anchors for applications exposed to weather.

1.13 CONNECTIONS

A. Make connections to air terminal units with flexible connectors complying with requirements in Division 23 Section "Duct Accessories."

1.14 IDENTIFICATION

A. Label each air terminal unit with plan number, nominal airflow, and maximum and minimum factory-set airflows.

1.15 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

C. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

D. Tests and Inspections:

1. After installing air terminal units and after electrical circuitry has been energized, test for compliance with requirements.
2. Leak Test: After installation, fill water coils and test for leaks. Repair leaks and retest until no leaks exist.
3. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

E. Air terminal unit will be considered defective if it does not pass tests and inspections.

--- END OF SECTION 233600 ---

SECTION 233713 - DIFFUSERS, REGISTERS, AND GRILLES

1.1 RELATED DOCUMENTS

A. Drawings and general clauses, information for bidders, General and Special Clauses, apply to this Section.

B. Related work specifications.

1.2 SUMMARY

A. This Section includes the following:

1. Registers/Diffusers
2. Supply/Return/Exhaust Grilles

B. Related Sections include the following:

1. Division 23 Section "Duct Accessories" for fire dampers and volume-control dampers not integral to diffusers, registers, and grilles.

1.3 SUBMITTALS

A. Product Data: For each product indicated, include the following:

1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
2. Diffuser, Register, and Grille Schedule: Indicate Drawing designation, room location, quantity, model number, size, and accessories furnished.

B. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:

1. Ceiling suspension assembly members.
2. Method of attaching hangers to building structure.
3. Size and location of initial access modules for acoustical tile.
4. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
5. Duct access panels.

1.4 REGISTERS/DIFFUSERS

A. Supply Registers (Provide that which is shown on Dwg Schedules or the following):

1. Manufacturers:

a. Titus Model 300FS Aluminum or approved equal.
1) All registers shall be equipped with an opposed blade volume damper.

2) Supply registers shall have frames and borders suitable for the construction in which they shall be installed.
3) Register blow pattern shall be as indicated on the plans.

B. Ceiling Diffusers (Provide that which is shown on Dwg Schedules or the following):

1. Manufacturers:

a. Nailor Model 6400-OA, or approved equal.

2. Material: Heavy Gauge steel back pan, Aluminum face
3. Finish: Baked enamel, white.
4. Mounting: Concealed, Lay in, flush face.
5. Damper Type: Adjustable opposed-blade assembly constructed of heavy gauge steel
6. Supply air diffusers shall be provided with a 24”x24” module size, supply connection shall be round neck and provided with an opposed blade damper for balancing purposes. Round neck transition if needed. Module size shall be coordinated with finished ceiling layout.
7. The diffuser shall be tested in accordance with ANSI/ASHRAE Standard 70-1991.

1.5 RETURN/EXHAUST GRILLES

A. Return/Exhaust Grilles (Provide that which is shown on Dwg Schedules or the following):

1. Manufacturers:

a. Nailor Model 5155H-OA, or approved equal.

2. Material: Extruded Aluminum with 1¼” border on all sides.
3. Finish: Baked enamel, white or mill finish as approved by engineer.
4. Blades shall be firmly held in place by mullions from behind the grille and fixed to the grille by welding in place. Blade spacing shall be ½” and deflection 45˚. Screw holes shall be counter sunk for neat appearance. Module size shall be coordinated with the engineer.
5. Shall have opposed blade volume damper constructed of heavy gauge aluminum.
6. The diffuser shall be tested in accordance with ANSI/ASHRAE Standard 70-2006

B. Return Registers (Provide that which is shown on Dwg Schedules or the following):

1. Manufacturers:

a. Titus Model 350FS Aluminum or approved equal.
1) Return registers shall have frames and borders suitable for the construction in which they shall be installed.

1.6 DOOR GRILLE

A. Air inlets shall be series XG-DGLP manufactured by Greenheck. Units shall be exhaust grilles designed to transfer air through doors or walls. Units shall be of extruded aluminum

construction and with an extruded aluminum border and a two sets of 1" inverted "v" louvers. The units shall be the size and quantity as outlined in the plans and specifications.

B. Inlets shall have a single 1-1/4" border with screw holes for surface mounting. Units to provide a finished appearance on one side of the door. Louvers shall be on .666" centers set at 70° and overlapped to provide a minimum light transmission.

C. Deflector blades shall be fixed. Units shall be designed to integrate into a wall or door application.

D. The manufacturer shall provide published performance data. Data shall be tested in accordance to ANSI/ASHRAE standard 70- 2006.

1.7 EXAMINATION

A. Examine areas where diffusers, registers, and grilles are to be installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

1.8 INSTALLATION

A. Install diffusers, registers, and grilles level and plumb.

B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practicable. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.

C. Install diffusers, registers, and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

1.9 ADJUSTING

A. After installation, adjust diffusers, registers, and grilles to air patterns indicated, or as directed, before starting air balancing.

--- END OF SECTION 233713 ---

SECTION 237433 - DEDICATED OUTDOOR-AIR UNITS

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes factory-packaged units capable of supplying up to 100 percent outdoor air and providing cooling and heating.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include rated capacities, operating characteristics, and furnished specialties and accessories.

B. Shop Drawings:

1. Include plans, elevations, sections, and attachment details.
2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Prepare the following by or under the supervision of a qualified professional engineer:

    a. Mounting Details: For securing and flashing roof curb to roof structure. Indicate coordinating requirements with roof membrane system.
    b. Include diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Roof-curb mounting details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Size and location of unit-mounted rails and anchor points and methods for anchoring units to roof curb.
2. Required roof penetrations for ducts, pipes, and electrical raceways, including size and location of each penetration.

B. Startup service reports.

C. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For units to include in emergency, operation, and maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Fan Belts: **Two sets for each belt-driven fan**.
2. Filters: **Two sets for each unit**.

1.7 WARRANTY

A. Special Warranty: Manufacturer agrees to replace components of units that fail in materials or workmanship within specified warranty period.

1. Warranty Period for Compressors: 5 years from date of Substantial Completion.
2. Warranty Period for Heat Exchangers: 5 years from date of Substantial Completion.

1.8 AC-2B - Trane Model OABE036 E3-C1B401LE-A1A00AF0004000B1C1A0 –Horizon – Air Source Heat Pump (B/G)

A. Electrical
1. Unit Voltage: 208-3-60
2. Electrical Options: Non-Fused Disconnect Switch "Circuit Breaker" w/ 115v Outlet (B/G)

B. Configuration
1. Airflow Configuration: Vertical Discharge/No Return
2. Installation: Roof Mounted Outdoor ASHP
3. Compressor: Digital Scroll Primary Circuit
4. Condenser: Air Cooled Variable Speed Head Pressure Low Ambient Control
5. Indoor Blower Motor: Direct Drive w/VFD
6. Cooling
   a. Evaporator Coil: DX 4 Row Interlaced
   b. Hot Gas Reheat: Modulating
7. Heating
   a. Heat Type: Indirect Fired (IF)
   b. Fuel Type: Natural Gas - 80% Eff.
   c. 439 Stainless Steel Furnace: 50 Mbtu/h, (5:1 Turndown NG)

C. Unit Controls: Trane UC600 - Discharge Air Control w/BACNET w/Display all tie in to Existing BMS shall be done via BACnet MS/TP (See other Spec Sections and Dwgs)

D. Accessories
1. Damper Options: 2-Position Outdoor Air Damper

2. Filters: MERV-8
3. Smoke Detectors: Supply
4. Air Flow Monitoring: IFM Fan Piezo Ring/Tap
5. Supply Discharge Air Sensor (FLD)
6. Condenser Hail guard
7. Curb Selection: Standard Knockdown Curb

E. Warranty
1. 1-Year Parts Only (manufacturer warranty)
2. 5-Year Digital/Variable Speed Scroll Compressor

F. Construction
1. Stainless Steel Drip Pan
2. 2-inch Double Wall Construction

G. Manufacturer Start-up – 2 days Straight Time

H. Contractor shall provide
1. External vibration isolation
2. BMS tie-in
3. smoke detectors
4. convenience outlet
5. airflow sensors
6. piping specialties
7. spare parts / filters
8. rigging / receiving
9. all installation, extended parts warranty, training, performance testing, field testing

1.9 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for piping, ducts, and electrical systems to verify actual locations of connections before equipment installation.

C. Examine roof curbs and equipment supports for suitable conditions where units will be installed.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

1.10 INSTALLATION

A. Comply with manufacturer's rigging and installation instructions for unloading units and moving to final locations.

B. Restrained Curb Support: Install restrained vibration isolation roof-curb rails on roof structure according to "The NRCA Roofing Manual."

1. Restrained isolation roof-curb rails are specified in Section 230548 "Vibration and Seismic Controls for HVAC Piping and Equipment."
2. Install and secure units on curbs and coordinate roof penetrations and flashing with roof construction.
3. Install factory vibration isolators.
4. Install flexible duct connectors. Comply with requirements in Section 233300 "Air Duct Accessories" for flexible duct connectors.
5. Coordinate size, location, and installation of unit manufacturer's roof curbs and equipment supports with roof Installer.

C. Install wall- and duct-mounted sensors furnished by manufacturer for field installation. Install control wiring and make final connections to control devices and unit control panel.

D. Comply with requirements for gas-fired furnace installation in NFPA 54, "National Fuel Gas Code."

E. Install separate devices furnished by manufacturer and not factory installed.

F. Install new filters at completion of equipment installation and before testing, adjusting, and balancing.

G. Install drain pipes from unit drain pans to sanitary drain.

1. Drain Piping: Drawn-temper **copper water tubing** complying with ASTM B 88, Type L, with soldered joints.
   a. Adhesive primer shall have a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2. Pipe Size: Same size as condensate drain pan connection.

1.11 CONNECTIONS

A. Where installing piping adjacent to units, allow space for service and maintenance.

B. Gas Piping Connections:

1. Comply with requirements in **Section 231123 "Facility Natural-Gas Piping."**
2. Connect gas piping to furnace, full size of gas train inlet, and connect with union, pressure regulator, and shutoff valve with sufficient clearance for burner removal and service.
3. Install AGA-approved flexible connectors.

C. Hydronic Piping Connections:

1. Comply with requirements in Section 232113 "Hydronic Piping."
2. Install shutoff valve and union or flange on each supply connection and install balancing valve and union or flange on each return connection.

D. Steam Piping Connections:

1. Comply with requirements in Section 232213 "Steam and Condensate Heating Piping."
2. Install shutoff valve and union or flange on each supply connection.
3. Install, starting from the coil connection, union or flange, strainer, union, float and thermostatic trap, union, and shutoff valve.

E. Duct Connections:

1. Comply with requirements in Section 233113 "Metal Ducts."
2. Drawings indicate the general arrangement of ducts.
3. Connect ducts to units with flexible duct connectors. Comply with requirements for flexible duct connectors in Section 233300 "Air Duct Accessories."

F. Electrical Connections: Comply with requirements for power wiring, switches, and motor controls in electrical Sections.

1. Install electrical devices furnished by unit manufacturer but not factory mounted.

1.12 STARTUP SERVICE

A. **Engage a factory-authorized service representative to perform** startup service.

1. Complete installation and startup checks according to manufacturer's written instructions.
2. Inspect units for visible damage to furnace combustion chamber.
3. Perform the following operations for both minimum and maximum firing and adjust burner for peak efficiency:

    a. Measure gas pressure at manifold.
    b. Measure combustion-air temperature at inlet to combustion chamber.
    c. Measure flue-gas temperature at furnace discharge.
    d. Perform flue-gas analysis. Measure and record flue-gas carbon dioxide and oxygen concentration.
    e. Measure supply-air temperature and volume when burner is at maximum firing rate and when burner is off. Calculate useful heat to supply air.

4. Verify operation of remote panel including pilot-light operation and failure modes. Inspect the following:

    a. High-limit heat exchanger.
    b. Alarms.

5. Inspect units for visible damage to refrigerant compressor, condenser and evaporator coils, and fans.
6. Start refrigeration system when outdoor-air temperature is within normal operating limits and measure and record the following:

    a. Cooling coil leaving-air, dry- and wet-bulb temperatures.
    b. Cooling coil entering-air, dry- and wet-bulb temperatures.
    c. Condenser coil entering-air dry-bulb temperature.
    d. Condenser coil leaving-air dry-bulb temperature.

7. Simulate maximum cooling demand and inspect the following:

    a. Compressor refrigerant suction and hot-gas pressures.
    b. Short-circuiting of air through outside coil or from outside coil to outdoor-air intake.

8. Inspect casing insulation for integrity, moisture content, and adhesion.
9. Verify that clearances have been provided for servicing.
10. Verify that controls are connected and operable.
11. Verify that filters are installed.
12. Clean coils and inspect for construction debris.
13. Clean furnace flue and inspect for construction debris.
14. Inspect operation of power vents.
15. Purge gas line.
16. Inspect and adjust vibration isolators and seismic restraints.
17. Verify bearing lubrication.
18. Clean fans and inspect fan-wheel rotation for movement in correct direction without vibration and binding.
19. Adjust fan belts to proper alignment and tension.
20. Start unit.
21. Inspect and record performance of interlocks and protective devices including response to smoke detectors by fan controls and fire alarm.
22. Operate unit for run-in period.
23. Calibrate controls.
24. Adjust and inspect high-temperature limits.
25. Inspect outdoor-air dampers for proper stroke.
26. Verify operational sequence of controls.
27. Measure and record the following airflows. Plot fan volumes on fan curve.

    a. Supply-air volume.
    b. Return-air flow.
    c. Outdoor-air flow.

B. After startup, change filters, verify bearing lubrication, and adjust belt tension.

C. Remove and replace components that do not properly operate and repeat startup procedures as specified above.

1.13 ADJUSTING

A. Adjust initial temperature and humidity set points.

B. Set field-adjustable switches and circuit-breaker trip ranges as indicated.

C. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to 2 visits to Project during other-than-normal occupancy hours for this purpose.

--- END OF SECTION 237433 ---

SECTION 238113 - PACKAGED TERMINAL AIR-CONDITIONERS

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes packaged terminal air conditioners and their accessories and controls, in the following configurations:
   1. Heat-pump units
   2. Heat-pump units with indirect-fired gas heat

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, furnished specialties, electrical characteristics, and accessories.

B. Shop Drawings: For packaged terminal air conditioners. Include plans, elevations, sections, details for wall penetrations and attachments to other work.

   1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
   2. Wiring Diagrams: For power, signal, and control wiring.

C. Color Samples: For unit cabinet, discharge grille, and exterior louver, and for each color and texture specified.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for packaged terminal air conditioners.

B. Field quality-control reports.

C. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For packaged terminal air conditioners to include in emergency, operation, and maintenance manuals.

1.6 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 4 - "Outdoor Air Quality," Section 5 - "Systems and Equipment," Section 6 - "Ventilation Rate Procedures," and Section 7 - "Construction and Startup."

C. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1.

1.7 COORDINATION

A. Coordinate layout and installation of packaged terminal air conditioners and wall construction with other construction that penetrates walls or is supported by them.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of packaged terminal air conditioners that fail in materials or workmanship within specified warranty period.

1. Warranty Period for Sealed Refrigeration System: Manufacturer's standard
2. Warranty Period for Nonsealed System Parts: Manufacturer's standard
3. Warranty Period for Heat Exchangers: Manufacturer's standard

1.9 **RTU-2 - Trane Model 4WCC4024E1000 - Pkgd. Heat Pump Rooftop Unit R-410A** (13WC)

A. R-410A convertible heat pump 14 SEER; 2 Tons, 14 SEER; 208-230/1/60

B. Contractor shall field install
1. 1-2" Filter frame
2. 0 - 100% Mod. economizer w/Bar. relief
3. Economizer relay kit
4. Crankcase heater
5. Low ambient control kit
6. Lifting lug kit

C. Capacities and Characteristics
1. Airflow: 770 CFM
2. Cooling Capacity: 23,800 btu/h
3. SEER2: 13.4
4. Heat Pump Capacity: 23,200 btu/h
5. Electrical Characteristics:
   a. Volts: 208
   b. Phase: Single.
   c. Hertz: 60.
   d. Minimum Circuit Ampacity: 20.6

e. Maximum Overcurrent Protection: 30.

D. Provide spare filters

E. Controls: All tie in to Existing BMS shall be done via BACnet MS/TP (See other Spec Sections and Dwgs)

1.10 AC-6 - Trane Model DHC060H3RHAK601 –Dual Fuel Packaged Heat Pump (W4C)**

1. Dual Fuel, High efficiency, Convertible, 5 Ton, 208-230/60/3, Microprocessor controls
2. High gas heat
3. Low Leak Economizer dry bulb 0-100%/barometric relief
4. Single zone VAV
5. Standard condenser coil w/hail guard 3 ph
6. Contractor Shall provide:
   a. External Vibration Isolation,
   b. Smoke Detectors,
   c. Piping Specialties,
   d. Spare Parts / Filters,
   e. Rigging / Receiving,
   f. Start-Up, All Installation, Extended Parts Warranty
7. Controls BMS Tie-In: All tie in to Existing BMS shall be done via BACnet MS/TP (See other Spec Sections and Dwgs).

1.11 INSTALLATION

A. Install units level and plumb, maintaining manufacturer's recommended clearances and tolerances.

B. Install wall sleeves in finished wall assembly; seal and weatherproof. Joint-sealant materials and applications are specified in Section 079200 "Joint Sealants."

C. Install and anchor wall sleeves to withstand, without damage to equipment and structure, seismic forces required by building code.

1.12 CONNECTIONS

A. Comply with requirements for piping specified in Section 231123 "Facility Natural-Gas Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to machine to allow service and maintenance.

1.13 FIELD QUALITY CONTROL

A. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Tests and Inspections:

1. Inspect for and remove shipping bolts, blocks, and tie-down straps.
2. After installing packaged terminal air conditioners and after electrical circuitry has been energized, test for compliance with requirements.
3. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

C. Packaged terminal air conditioners will be considered defective if they do not pass tests and inspections.

1.14 STARTUP SERVICE

A. **Engage a factory-authorized service representative to perform** startup service.

B. After installation, verify the following:

1. Unit is level on base and is flashed in exterior wall.
2. Unit casing has no visible damage.
3. Compressor, air-cooled condenser coil, and fans have no visible damage.
4. Labels are clearly visible.
5. Controls are connected and operable.
6. Shipping bolts, blocks, and tie-down straps are removed.
7. Filters are installed and clean.
8. Drain pan and drain line are installed correctly.
9. Electrical wiring installation complies with manufacturer's submittal and installation requirements in electrical Sections.
10. Installation. Perform startup checks according to manufacturer's written instructions, including the following:

    a. Lubricate bearings on fan.
    b. Check fan-wheel rotation for correct direction without vibration and binding.

C. After startup service and performance test, change filters.

1.15 ADJUSTING

A. Adjust initial temperature set points.

B. Set field-adjustable switches and circuit-breaker trip ranges as indicated.

--- END OF SECTION 238113 ---

SECTION 238126 - SPLIT-SYSTEM AIR-CONDITIONING UNIT

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes split-system air-conditioning unit consisting of multiple evaporator-fans (air handling unit section) and compressor-condenser components.

B. This section also includes related work and material for a complete system. Electrical work specified in other sections.

1.3 SUBMITTALS

A. Product Data: Include rated capacities, furnished specialties, and accessories for each type of product indicated. Provide manufacture shop drawing submittal. Provide warranty and operations and maintenance manual.

B. Power requirements and electrical characteristics.

C. Energy Star Compliance. Provide equipment meeting energy star efficiency requirements.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Energy-Efficiency Ratio: Equal to or greater than prescribed by ASHRAE 90.1, "Energy Efficient Design of New Buildings except Low-Rise Residential Buildings."

C. Coefficient of Performance: Equal to or greater than prescribed by ASHRAE 90.1, "Energy Efficient Design of New Buildings except Low-Rise Residential Buildings."

D. Units shall be designed to operate with HCFC-free refrigerants.

1.5 COORDINATION

A. Coordinate size and location of concrete base for condensing unit. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork.

B. Coordinate electrical and with other work and location for mounting indoor and outdoor unit.

1.6 WARRANTY

A. Manufacturer's Warranty shall extend 7 years for compressor and 5 years for parts.

1.7 AC-2A CEILING MOUNTED 3-TON DUCTED AIR HANDLER

A. INDOOR UNIT (TRANE MODEL GAM5B0C36M51EA or equal)
1. Unit Configuration: Horizontal Left /Blow through
2. Supply-Air Fan:
a. Qty: **One**.
b. Airflow: 1225 CFM.
c. Minimum Static Pressure: .357 inches W.C.
d. Motor Size: 1/2 HP.
3. Filter: 1-inch-thick, disposable, glass-fiber media
a. 20"x20"
b. MERV: 7.
4. Electrical Characteristics
a. Volts / Phase / Hertz: **208 / Single /** 60
b. FLA / MCA / MOCP: 4.1 / 5 / 15 A
5. Control System: Unit-mounted panel with main fan contactor, compressor contactor, compressor start capacitor, control transformer with circuit breaker, solid-state temperature-control modules **contactor**, time-delay relay, heating contactor, and high-temperature thermostat. Provide solid-state, wall-mounted control panel with start-stop switch and adjustable temperature set point.
a. All tie in to Existing BMS shall be done via BACnet MS/TP (See other Spec Sections and Dwgs)

B. OUTDOOR UNIT (TRANE MODEL 4TTR7036A1000A or equal)
1. Refrigeration System: R410
a. Compressor: Scroll
1) Total Unit Cooling Capacity: 36,000 Btu/hr..
2) Qty. / Stages: 1 / 2
3) RLA / LRA: 17 / 82
4) MCA: 24
5) Max Fuse Size: 35A
b. Outdoor Fan:
1) FLA: .74
2) FAN HP: 1/8 HP
3) FAN DIA.: 27.6"
c. Refrigerant Line Sizes
1) Gas: 3/4"
2) Liquid: 3/8"
d. Dimension: 51" High x 35.1" Wide x 38.7" Deep
e. Weight: 245 lbs.

C. HTCL-1 - Trane Model DT0B06041G0AA080EABA00B – Heating Coil
1. T -5/8" hot water, same end connections; Left hand supply (verify in field);
2. Galvanized steel casing;
3. 1 row; 6" coil height; 41" finned length; Aluminum fins; 80 fins per foot nominal fin spacing

4. .020 (0.508 mm) standard copper tubes; No turbulators;
5. Prima-flo H (Hi efficient); AHRI ACHC certified;
6. Contractor shall provide Hangers, stainless steel casings, all controls, piping specialties / valves, all installation, extended parts warranty;

1.8 AC-25: One (1) Ton Heat Pump Mini-split

A. PERFORMANCE
1. Rated capacity: 12,000 Btu/hr
2. Minimum capacity: 6,000 Btu/hr
3. SEER: 15.2
4. Total input: 1,190W
5. Electrical requirements
   a. Power supply: 208 / 230V, 1 PH, 60Hz
   b. Breaker size: 15A
   c. Indoor-outdoor s1-s2: AC 208/230V
   d. Indoor outdoors2-s3: DC24
   e. Indoor – remote controller: DC-24
6. Performance
   a. MAX Temperatures
      1) Indoor Intake Air Temp: 95ºF DB, 71ºF WB
      2) Outdoor Intake Air Temp: 115ºF DB
   b. MIN
      1) Indoor Intake Air Temp: 67ºF DB, 57ºF WB
      2) Outdoor Intake Air Temp: 0ºF DB

B. INDOOR UNIT FEATURES (Trane Model **PKA-A12HA)**
1. Wall mounted indoor unit for residential and commercial applications
2. Quiet operation
3. Wired remote controller
4. Self-check function integrated diagnostic
5. Limited warranty five years on parts and defects; 7 years on compressors
6. Indoor Unit Remote Temp Sensor (PAC-SE41TS—E)
7. MCA: 1A
8. Fan Motor: .3 FLA
9. Fan Motor Output: 30 W
10. Airflow (Lo – Mid – Hi): 320-370-425 DRY CFM
11. Air Filter: POLYPROPYLENE HONEYCOMB
12. Sound Pressure: 36-40-43 dB(A)
13. Dimensions: 35-3/8Wx9-13/16Dx11-5/8H
14. Weight: 29 Lbs.
15. External Finish: Munsell No. 1.0y 9.2 / 0.2
16. Field Drain Pipie Size: 5/8”
17. Wall Mounted Remote Controller: PAR-21MAA

C. OUTDOOR UNIT Outdoor Unit (Trane Model **PUY-A12NHA3**)
1. M-NET Adapter (PAC-SF81MA-E)
2. Air Outlet Guide (PAC-SG58SG-E)
3. Wind Baffle (WB-PA1)

4. Compressor: DC Inverter Driven Twin Rotary
5. MCA: 13A
6. Fan Motor: .35 F.L.A.
7. Sound Pressure Level
   a. Cooling: 46dB(A)
8. Dimensions: 31-1/2Wx13-7/8Dx23-5/8H
9. Weight: 90LBS.
10. External Finish: Munsell No. 3Y 7.8 / 1.1
11. Refrigerant Type: R410
12. Refrigerant Pipe Size O.D.:
    a. Gas Side: 1/2”
    b. Liquid Side: 1/4”
13. Max Refrigerant Pipe Length: 100’
14. Max Refrigerant Pipe Height Diff: 100’
15. Connection Method: Flared

1.9 AC-5A & AC-5B FLOOR-MOUNTED 5-TON DUCTED AIR HANDLERS

A. INDOOR UNIT AC-5A & AC-5B (TRANE MODEL GAM5B0C60M51EA or equal)
1. Unit Configuration: Up flow /Blow through
2. Supply-Air Fan:
   a. Airflow: 1700 CFM.
   b. Minimum Static Pressure: .5 inches W.C.
   c. Motor Size: 1 HP.
3. Filter: 1-inch-thick, disposable, glass-fiber media
   a. 20”x20”
   b. MERV: 7.
4. Electrical Characteristics
   a. Volts / Phase / Hertz: **208 / Single /** 60
   b. FLA / MCA / MOCP: 7.6 / 10 / 15 A
5. Control System: Unit-mounted panel with main fan contactor, compressor contactor, compressor start capacitor, control transformer with circuit breaker, solid-state temperature-control modules **contactor**, time-delay relay, heating contactor, and high-temperature thermostat. Provide solid-state, wall-mounted control panel with start-stop switch and adjustable temperature set point

B. OUTDOOR UNIT ACC-5A & ACC-5B (TRANE MODEL 4TTR7060A1000A or equal)
1. Refrigeration System: R410
   a. Compressor: Scroll
      1) Total Unit Cooling Capacity: 60,000 Btu/hr.
      2) RLA / LRA: 32.1 / 152.6
      3) MCA: 41
      4) Max Fuse Size: 60A
   b. Outdoor Fan:
      1) FLA: 1.3
      2) FAN HP: ¼ HP
      3) FAN DIA.: 27.6”
   c. Refrigerant Line Sizes
      1) Gas: 1-1/8”
      2) Liquid: 3/8”

d. Dimension: 51” High x 35.1” Wide x 38.7” Deep
e. Weight: 275 lbs.

1.10 REFRIGERANT PIPING

A. Refrigerant Piping: Factory soft annealed line set or copper tube ASTM B280 Type ACR, fitting ASTM b16.22. Fitting shall be brazed ASTM B32, Antimony or silver brazing.

B. Joining Materials: Refrigerant Piping shall be joined by flared or Brazed Connections. Brazing with silver braze material.

C. Solder Fittings, 95-5 leadless solder. Refrigerant piping shall be silver brazed.

1.11 INSTALLATION

A. Install units’ level and plumb.

B. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.

C. Install ground-mounting, compressor-condenser components on 4-inch- thick, reinforced concrete base; 4 inches larger on each side than unit. Coordinate anchor installation with concrete base.

D. Install compressor-condenser components on restrained, spring isolators with a minimum static deflection of 1 inch.

E. Install and connect pre-charged refrigerant tubing, if used, to component's quick-connect fittings. Install tubing to allow access to unit.

F. Refrigerant piping in accordance with ASHRAE 15.

G. Braze Joints: Follow braze manufacturer’s guidelines and refrigerant equipment requirements.

1.12 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to unit to allow service and maintenance.

C. Ground equipment according to Division 16 Section "Grounding and Bonding."

D. Electrical Connections: Comply with requirements in Division 16 Sections for power wiring, switches, and motor controls.

E. Indoor units shall be powered from outdoor units; Contractor to furnish.

F. Field wiring shall run directly from the indoor unit to the wired controller with no splices. The control voltage from the wired controller to the indoor unit shall be 12/24 volts, DC. Up to two wired controllers shall be able to be used to control one unit.

1.13 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:
   1. Before charging system with Refrigerant, vacuum test refrigerant piping according to Manufacturer’s recommendations.

   2. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
   3. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
   4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

B. Remove and replace malfunctioning units and retest as specified above.

1.14 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service, complete installation and startup checks according to manufacturer's written instructions. Demonstrate operation use care and maintenance to owner’s representative.

--- END OF SECTION 238126 ---

SECTION 238413 - HUMIDIFIERS

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following humidifiers:
   1. Steam injection.

1.3 DEFINITION

A. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control, signaling power-limited circuits.

1.4 ACTION SUBMITTALS

A. Product Data: Include rated capacities, operating characteristics, furnished specialties, and accessories.

B. Shop Drawings: Detail fabrication and installation of humidifiers. Include piping details, plans, elevations, sections, details of components, manifolds, and attachments to other work.

   1. Wiring Diagrams: Power, signal, and control wiring.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Detail humidifiers and adjacent equipment. Show support locations, type of support, weight on each support, required clearances, and other details, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:

   1. Structural members to which humidifiers will be attached.
   2. Size and location of initial access modules for acoustical tile.

B. Field quality-control test reports.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For humidifiers to include in operation and maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

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. Supply two (2) replacement electrode cylinder with each self-contained humidifier.

1.8 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with ARI 640, "Commercial and Industrial Humidifiers."

1.9 COORDINATION

A. Coordinate location and installation of humidifiers with manifolds in ducts and air-handling units or occupied space. Revise locations and elevations to suit field conditions and to ensure proper humidifier operation.

1.10 STEAM-INJECTION HUMIDIFIERS

A. Subject to compliance with requirements, provide the Aprilaire Steam Humidifier Model 800 or approved equal
1. Capacity - 30 gallons per day.
2. Electrode Type Humidifier - Generates steam by energizing two electrodes that extend into the steam canister. Current flowing between the electrodes causes the water to boil creating steam.
3. Electrical Data - Unit operates at 208V / 16.0 Amps.
4. Internal Control Board - Manages the operation of the humidifier. Fills and drains to provide full capacity at 16 Amps, and notifies when canister needs replacement.
5. Display Panel - Provides power switch for on/off operation, illuminates LEDs to show fill, drain, steam operations, and diagnostics.
6. Water Level sensor - Manages the water level in the steam canister to prevent over filling.
7. Back Flow protection - Air gap in the fill cap to prevent pressure built up.
8. Automatic Drain and Fill Cycle - Unit flushes and fills periodically to maintain the proper conductivity.
9. Drain Water Tempering - Unit uses cold inlet water to temper the canister water reducing the drain water temperature below 140°F to protect PVC piping and condensation pumps.
10. End-of-Season Drain - After a 72-hour period with no call for humidity the humidifier will drain the water from the canister. Unit will remain in stand-by until next call for humidification.
11. Operating Time Monitor - Accumulates actual humidifier run time to activate periodic drain and fill cycles, end-of-season drain function and monitors the life of canister.
12. Easy to Maintain - No cleaning or scrubbing, simply remove canister and replace.

13. Control - Model 62 Automatic Digital Humidifier Control with outdoor sensor included. Control features blower activation to provide humidity without a call for heating.
14. Operating Conditions:
    a. Water Hardness – 3 to 36 grain per gallon, water filtration not necessary
    b. Water Conductivity – 125-1250 micro Siemens per centimeter (µS/cm)
    c. Supply water pressure must be between 25 psi and 120 psi
    d. Drain water flushed and tempered with cold fresh inlet water
    e. Canister replacement (Model 80) once per humidifier season under normal conditions. Canister life will depend on water quality and run time. Unit will automatically notify when canister must be replaced.
    f. Operating Weight - up to 27 lbs.

B. Accessories:

1. Wall-mounting humidistat.
2. Duct-mounting, high-limit humidistat.
3. In-line strainer.
4. Airflow switch for preventing humidifier operation without airflow.

C. Spare Parts
1. Provide 2 Replacement Steam Cannisters by manufacturer.

1.11 EXAMINATION

A. Examine ducts, air-handling units, and conditions for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Examine roughing-in for piping systems to verify actual locations of piping connections before humidifier installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

1.12 INSTALLATION

A. Install humidifiers with required clearance for service and maintenance. **Maintain path, downstream from humidifiers, clear of obstructions as required by ASHRAE 62.1.**

B. Seal humidifier manifold duct or plenum penetrations with flange.

C. Install humidifier manifolds in metal ducts and casings constructed according to SMACNA's "HVAC Duct Construction Standards, Metal and Flexible."

D. Install **stainless-steel** drain pan under each manifold mounted in duct.

1. Construct drain pans with connection for drain; insulated **and complying with ASHRAE 62.1**.
2. Connect to condensate trap and drainage piping.
3. Extend drain pan upstream and downstream from manifold a minimum distance recommended by manufacturer but not less than required by ASHRAE 62.1.

1.13 CONNECTIONS

A. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

1. Install piping adjacent to humidifiers to allow service and maintenance.
2. Install shutoff valve, strainer, backflow preventer, and union in humidifier makeup line.

B. Install electrical devices and piping specialties furnished by manufacturer but not factory mounted.

C. Install piping from safety relief valves to nearest floor drain.

D. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

E. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

1.14 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.

B. Tests and Inspections:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

C. Remove and replace malfunctioning units and retest as specified above.

--- END OF SECTION 238413 ---

CONTRACT NO. 22-524

DIVISION 26 - TECHNICAL ELECTRICAL SPECIFICATIONS

260000 – GENERAL PROVISIONS

1.1. SCOPE OF WORK

A. The work under this Division shall include furnishing and installing all labor, material, and equipment necessary to complete the electrical installations and interconnections as shown on the contract drawings for the HVAC Systems Replacement, Central Maintenance Facility, 475 Saw Mill River Road, Yonkers, New York.

1.2. WORK INCLUDED

A. The following is a list of general work to be performed under this contract. The work shall not be limited by these descriptions

1. Contractor shall disconnect and remove existing HVAC equipment and all associated equipment and branch circuitry back to its origin shown on contract drawings to be removed unless otherwise noted. All construction debris shall be properly disposed of in the proper manner.

2. Contractor shall disconnect and remove the existing duct detectors from AC-2 unit and install new duct detectors and control relays that are of the same manufacturer of the existing fire alarm system on the new AC-2 unit. Contractor shall be responsible for the testing and programming of the existing fire alarm system after the duct detectors and control relays are installed for the AC-2 unit.

3. The contractor shall coordinate all fire alarm work with the county wide fire alarm service contractor (ADT, Nick Delfico at 914-418-9445. The contractor shall include all costs in his bid.

4. Contractor shall disconnect and remove the existing circuit breakers feeding the existing HVAC units and replace with the circuit breaker size shown on the contract drawings unless otherwise noted.

5. Contractor shall furnish and install new branch feeders, branch circuitry, circuit breakers, MC Cable, conduit, disconnects, GFIC receptacles, junction boxes, panelboards all associated hardware, material, and labor to install his work.

6. Contractor shall perform all wire and cable terminations, cutting, drilling, and patching.

7. All work shall comply with 2020 NEC and NFPA codes.

8. See mechanical drawings for all phasing and work hours of project.

1.3. CODES AND STANDARDS

A. All materials furnished and all work installed shall comply, where applicable, with the requirements of the current New York State Building Code, Local Codes, and the 2020 National

Electrical Code. Whenever reference is made of “National Electrical Code, or "NEC", it shall mean the 2020 National Electrical Code, NFPA No. 70-2020.

B. Material and work shall comply with other Codes and Standards as may be specified or referenced.

C. Where applicable or specified herein, all material and devices furnished shall meet requirements of Underwriters Laboratories, Inc., shall be U.L. listed, and where further applicable, shall bear the U.L. listing mark.

1.4. ELECTRICAL SYMBOLS

A. Unless otherwise indicated, electrical symbols used in this Contract plans conform to ANSI Y32.9 "Graphic Symbols for Electrical Wiring and Layout Diagrams used in Architectural and Building Construction; and ANSI Y32.2 "Graphic Symbols for Electrical and Electronic Diagram."

1.5. GENERAL AND SPECIAL CLAUSES

A. The Contractor shall take notice that, in addition to the requirements under Division 26, he shall be governed by the General Clauses and Special Clauses which are indicated as covering the contract(s) comprising the work for this project, and which make reference to specific responsibilities of the Contractor(s)

1.6. POWER SHUTDOWN

A. Any work performed which includes the cutting off of any power shall be fully coordinated with Nestor Martinez of Liberty Lines Transit, County Construction Coordinator and Engineer. If special precautions are required, they will be enumerated under Item 26.1.10, Execution of Work.

1.7. GROUND FAULT PROTECTION

A. The Contractor shall provide Ground Fault Protection for Personnel at the construction site in accordance with Article 215.9 of the 2020 NEC.

1.8. FINAL TEST AND INSPECTION

A. The Contractor shall be required to demonstrate to the satisfaction of the County Construction Coordinator and Engineer that all the electrical systems, equipment and devices operate as specified.

1.9. RECORD DRAWINGS

A. The Contractor shall submit AS-BUILT drawings as described in the Special Clauses.

1.10. EXECUTION OF WORK

A. All work shall be performed in a phased and orderly manner and completely coordinated with the County Construction Coordinator, Nestor Martinez Jr Executive Vice President, 475 Saw Mill River Road Yonkers, New York, 10701 Office # 914-376-6344 Cell # 914-760-5644, and the Engineer.

1.11. INTENT

A. Drawings are diagrammatic. All systems and portions thereof shall be installed in strict accordance with the manufacturer's recommendations and specifications, complete in all details, utilizing the best quality components, and workmanship assuring adequate design and trouble free operation. Before submitting his proposal, each bidder shall visit the site, examine existing conditions and ascertain the full extent of the work to be performed. He shall examine the plans for all trades where applicable and note all conditions of work by others and their relation to his own work and shall become fully informed as to the extent and character of the work to be performed under this contract. No consideration will be granted for alleged misunderstanding of materials to be furnished, work to be done, or conditions to be dealt with during the course of the job.

END OF SECTION 260000

CONTRACT NO. 22-524

DIVISION 26 - TECHNICAL ELECTRICAL SPECIFICATIONS

SECTION 260500 - COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Electrical equipment coordination and installation.

2. Common electrical installation requirements.

3. Cutting and Patching for Electrical Construction.

4. Field Quality Control.

5. Cleaning.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Shall be UL listed and labeled as defined in NFPA 70, Article 100, and marked for intended use.

B. All work to comply with NFPA 70 2020 standards.

1.4 SUBMITTALS

A. Product Data: For circuit breakers, wire, conduit, disconnects, and junction boxes.

1.5 COORDINATION

A. Coordinate arrangement, mounting, and support of electrical conduit:

1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.

2. To provide for ease of disconnecting the equipment with minimum interference to other installations.

3. So connecting raceways will be clear of obstructions and of the working and access space of other equipment.

B. Coordinate installation of required supporting devices, conduits, circuit breakers, wire, junction boxes, fire alarm devices/cabling, fiber optic cable, and cutting and patching with mechanical contractor and facilities manager prior to performing any work.

C. Coordinate application of firestopping specified in Division 26 Section “Through-Penetration Firestop Systems.

PART 2 - EXECUTION

2.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

A. Comply with NEC 2020.

B. All work shall be performed in a phased and orderly manner and be coordinated with the County Construction coordinator, Mechanical Contractor, and with the Engineer.

C. All conduits and junction boxes shall be properly supported and mounted to comply with NEC 2020 code.

2.2 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

D. Cut sleeves to length for mounting flush with both surfaces of walls.

E. Size pipe sleeves to provide annular clear space between sleeve and raceway as recommend by seal manufacture, unless indicated otherwise.

F. Seal space outside of sleeves with grout for penetrations of concrete and masonry

1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.

G. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint.

H. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with firestop materials. Comply with requirements in Division 26 Section "Through Penetration Firestop Systems."

2.3 FIRESTOPPING

A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 26 Section "Through Penetration Firestop Systems."

2.4 CUTTING AND PATCHING

A. The electrical contractor shall perform all cutting and patching for the installation of material and equipment as required to complete the work.

B. The electrical contractor shall repair and refinish all disturbed areas and surfaces to match existing conditions and install new fireproofing where it has been disturbed.

2.6 FIELD QUALITY CONTROL

A. Inspect installed components for damage and faulty work, including the following:

1. Raceways.

2. Building wire and connectors.

3. Supports for electrical components

4. Electrical identification.

5. Electrical demolition.

6. Cutting and patching for electrical installations.

2.5 CLEANING

A. On completion of work electrical contractor shall be responsible to remove all construction debris created by him.

END OF SECTION 260500

DIVISION 26 – TECHNICAL ELECTRICAL SPECIFICATIONS

SECTION 260512 – THROUGH - PENETRATION FIRESTOP SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Clauses apply to this Section.

1.2 SUMMARY

A. This Section includes through-penetration Firestop systems for penetrations through fire-resistance-rated constructions, including both empty openings and openings containing penetrating items.

1. Floors, walls, ceilings, and partitions.

1.3 PERFORMANCE REQUIREMENTS

A. General: For the following constructions, provide through-penetration Firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated.

1. Fire-resistance-rated walls including partitions with fire protection rated openings.

2. Fire-resistance-rated floors.

B. Rated Systems: Provide through-penetration Firestop systems with the following ratings determined per ASTM E 814 or UL 1479:

1. F-Rated Systems: Provide through-penetration Firestop systems with F-ratings indicated, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.

2. T-Rated Systems: For the following conditions, provide through-penetration Firestop systems with T-ratings indicated, as well as F-ratings, where systems protect penetrating items exposed to potential contact with adjacent materials in occupied floor areas:

a. Penetrations located outside wall cavities.

b. Penetrations located outside fire-resistance-rated shaft enclosures.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For each through-penetration Firestop system, show each type of construction condition penetrated, relationships to adjoining construction and type of penetrating item.

Include Firestop design designation of qualified testing and inspecting agency that evidences 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 system configuration for construction and penetrating items.

C. Qualification Data: Must provide proof that that installer has completed other projects using Firestopping materials.

D. Product Certificates: For through-penetration Firestop system products, signed by product manufacturer that products furnished comply with requirements.

E. Product Test Reports: From a qualified testing agency indicating through-penetration firestop system complies with requirements, based on comprehensive testing of current products.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: The installer must be an experienced installer who has completed other projects using the same or similar material and products to perform through – penetration Firestop systems.

B. Source Limitations: Obtain through-penetration Firestop systems, for each kind of penetration and construction condition indicated, through one source from a single manufacturer.

C. Fire-Test-Response Characteristics: Provide through-penetration Firestop systems that comply with the following requirements and those specified in Part 1 "Performance Requirements" Article:

1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL listed**.**
2. Through-penetration Firestop systems are identical to those tested per ASTM E 814.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver through-penetration Firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, lot number, shelf life if applicable, qualified testing and inspecting agency's classification marking applicable to Project, curing time, and mixing instructions for multicomponent materials.

B. Store and handle materials for through-penetration Firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

B. Ventilate through-penetration Firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

1.8 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that through-penetration Firestop systems are installed according to specified requirements.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration Firestop systems.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the through-penetration Firestop systems indicated for each application in the Through-Penetration Firestop System Schedule at the end of Part 3 that are produced by one of the following manufacturers:

1. A/D Fire Protection Systems Inc.
2. Grace, W. R. & Co. - Conn.
3. Hilti, Inc.
4. Johns Manville.
5. Nelson Firestop Products.
6. NUCO Inc.
7. RectorSeal Corporation (The).
8. Specified Technologies Inc.
9. 3M; Fire Protection Products Division.
10. Tremco; Sealant/Weatherproofing Division.
11. USG Corporation.
12. DAP Inc.

2.2 FIRESTOPPING, GENERAL

A. Compatibility: Provide through-penetration Firestop systems that are compatible with one another; with the substrates forming openings; and with the items, if any, penetrating through-penetration Firestop systems, under conditions of service and application, as demonstrated by through-penetration Firestop system manufacturer based on testing and field experience.

B. Accessories: Provide components for each through-penetration Firestop system that are needed to install fill materials and to comply with Part 1 "Performance Requirements" Article. Use only components specified by through-penetration Firestop system manufacturer and approved by qualified testing and inspecting agency for Firestop systems indicated. Accessories include, but are not limited to, the following items:

1. Permanent forming/damming/backing materials, including the following:

a. Slag-/rock-wool-fiber insulation.
b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.

c. Fire-rated form board.
d. Fillers for sealants.

2. Temporary forming materials.
3. Substrate primers.
4. Collars.
5. Steel sleeves.

2.3 FILL MATERIALS

A. General: Provide through-penetration Firestop systems containing the types of fill materials indicated in the Through-Penetration Firestop System Schedule at the end of Part 3 by referencing the types of materials described in this Article. Fill materials are those referred to in directories of referenced testing and inspecting agencies as "fill," "void," or "cavity" materials.

B. Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.

C. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

D. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized steel sheet.

E. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.

F. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.

G. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.

H. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives.

I. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

J. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:

1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and nonsag formulation for openings in vertical and other surfaces requiring a nonslumping, gunnable sealant, unless indicated firestop system limits use to nonsag grade for both opening conditions.
2. Grade for Horizontal Surfaces: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces.

3. Grade for Vertical Surfaces: Nonsag formulation for openings in vertical and other surfaces.

2.4 MIXING

A. For those products requiring mixing before application, comply with through-penetration Firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of work.

B. Proceed with installation only after unsatisfactory conditions have been corrected

3.2 PREPARATION

A. Surface Cleaning: Clean out openings immediately before installing through-penetration Firestop systems to comply with Firestop system manufacturer's written instructions and with the following requirements:

1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration Firestop systems.
2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration Firestop systems. Remove loose particles remaining from cleaning operation.
3. Remove laitance and form-release agents from concrete.

B. Priming: Prime substrates where recommended in writing by through-penetration Firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

C. Masking Tape: Use masking tape to prevent through-penetration Firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from Firestop system materials. Remove tape as soon as possible without disturbing Firestop system's seal with substrates.

3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

A. General: Install through-penetration Firestop systems to comply with Part 1 "Performance Requirements" Article and with Firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.

B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of Firestop systems.

C. Install fill materials for Firestop systems by proven techniques to produce the following results:

1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

A. Identify through-penetration Firestop systems with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of edge of the Firestop systems so that labels will be visible to anyone seeking to remove penetrating items or Firestop systems. Use mechanical fasteners for metal labels. For plastic labels, use self-adhering type with adhesives capable of permanently bonding labels to surfaces on which labels are placed and, in combination with label material, will result in partial destruction of label if removal is attempted. Include the following information on labels:

1. The words "Warning - Through-Penetration Firestop System - Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Through-penetration firestop system designation of applicable testing and inspecting agency.
4. Date of installation.
5. Through-penetration firestop system manufacturer's name.
6. Installer's name.

3.5 CLEANING AND PROTECTING

A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.

B. Provide final protection and maintain conditions during and after installation that ensure that through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce systems complying with specified requirements.

END OF SECTION 260512

CONTRACT NO. 22-524

DIVISION 26-TECHNICAL ELECTRICAL SPECIFICATIONS

SECTION 260519 - CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Clauses, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Building wires and cables rated 600 V and less.
2. Connectors, splices, and terminations rated 600 V and less.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: UL Listed and labeled as defined in NFPA 70, Article 100, and marked for intended use.

B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. The Okonite Company.
2. Alcan Products Corporation; Alcan Cable Division.
3. American Insulated Wire Corp.; a Leviton Company.
4. General Cable Corporation.
5. Senator Wire & Cable Company.
6. Southwire Company.

2.2 600 VOLT WIRE

A. Wire shall be type XHHW unless otherwise specified and shall have 600 volt rated, cross-linked polyethylene insulation. THWN or THHN may be substituted for conductor sizes #10 and smaller. Use a **solid** conductor for No. 10 AWG and smaller, stranded for No. 8 AWG and larger.

B. Wire shall have a copper conductor, sized as shown on the plans, if not shown it shall be sized as required by 2020 NEC.

C. All wire furnished shall bear U.L. labeling indicating type, voltage rating and conductor size.

D. Each wire shall be color coded and constant phase line or circuit color coding shall be maintained. Insulation shall be provided in colors indicated in the following paragraph:

Color Coding for 208/120v circuits shall be as follows:

Phase A - Black Neutral – White.

Phase B – Red Ground – Green or Bare.

Phase C – Blue.

Color Coding for 480/277v circuits shall be as follows:

Phase A – Brown Neutral – Grey.

Phase B – Orange Ground – Green or Bare.

Phase C – Yellow

As shown, if not shown, as required by NEC.

E. There shall be no splices in raceways.

F. Wire splices shall have an insulation at least equal to that of the original wire. Splices shall be made with crimp connectors and subject to the approval of the engineer.

G. Wiring may be grouped in a raceway at the option of the contractor providing complete compliance with the 2020 NEC is maintained including limitations on the number of conductors and providing conductor size is modified to meet derating criteria.

2.3 METAL CLAD CABLE (TYPE MC)

A. Type MC Cable shall be continuously welded and corrugated impervious aluminum metal sheath, and shall be U.L. labeled.

B. Type MC Cable shall meet all requirements of 2020 NEC Article 330 for Metal Clad Cable and shall comply with Article 300-22(b) for Wiring in Ducts or Plenums used for Environmental Air.

C. Cable shall consist of the number of solid copper conductors as shown on the drawing minimum size 12 AWG and one number 12 green ground conductor with separation tape and fillers

D. Conductors shall be type THHN rated at 600 volts and shall be color coded, as described in Section 260519, PART 2.2, 600 Volt Wire.

PART 3 - EXECUTION

3.1 CONDUCTORS

A. Wire splices shall be as described in Section 260519, PART 2.2, 600 Volt Wire.

B. Required couplings and fittings shall be suitable for the purpose and designed for use with this type of cable.

C. Contractor shall submit shop drawings and sample of the type MC cable he intends to furnish.

D. When branch circuits are exposed, Type XHHW, single conductors in a raceway are to be used.

3.2 INSTALLATION OF CONDUCTORS

A. Use pulling means; including fish tape, cable, rope, and basket-weave wire/cable grips that will not damage cables.

B. Support MC Cable according to NEC article 330.30.

3.3 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

3.4 FIELD QUALITY CONTROL

A. After installing conductors and before the electric circuit is energized physically inspect all work that it meets 2020 NEC codes.

END OF SECTION 260519

CONTRACT NO. 22-524

DIVISION 26 – TECHNICAL ELECTRICAL SPECIFICATIONS

SECTION 260526 - GROUNDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Clauses, apply to this Section.

1.2 SUMMARY

A. This Section includes grounding of electrical systems and equipment. Grounding requirements specified in this Section may be supplemented by special requirements of systems described in other Sections.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: UL listed and labeled as defined in NFPA 70, Article 100, and marked for intended use.

1. Comply with UL 467.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Grounding Conductors, Cables, and Connectors:

a. Apache Grounding/Erico Inc.
b. Chance/Hubbell.
c. Copperweld Corp.
d. Erico Inc.; Electrical Products Group.
e. Framatome Connectors/Burndy Electrical.
f. Ideal Industries, Inc.
g. ILSCO.
h. Kearney/Cooper Power Systems.
i. O-Z/Gedney Co.; a business of the EGS Electrical Group.
j. Raco, Inc.; Division of Hubbell.
k. Thomas & Betts, Electrical.

2.2 GROUNDING CONDUCTORS

A. Material: Copper.

B. Equipment Grounding Conductors: Insulated with green-colored insulation.

2.3 CONNECTOR PRODUCTS

A. Comply with IEEE 837 and UL 467; listed for use for specific types, sizes, and combinations of conductors and connected items.

B. Bolted Connectors: Bolted-pressure-type connectors, or compression type.

PART 3 - EXECUTION

3.1 APPLICATION

A. In raceways, use insulated equipment grounding conductors.

B. Equipment Grounding Conductor Terminations: Use bolted pressure clamps.

C. The Contractor shall provide a grounding system electrically continuous throughout with necessary ground straps, ground wire, and ground bushing required to provide a complete interconnected system ground throughout the work as recommended by the N.E.C. Article 250.

3.2 EQUIPMENT GROUNDING CONDUCTORS

A. Comply with NFPA 70, Article 250, for types, sizes, and quantities of equipment grounding conductors, unless specific types, larger sizes, or more conductors than required by NFPA 70 are indicated.

B. Install equipment grounding conductors in all feeders and circuits.

C. Install insulated equipment grounding conductor with circuit conductors for the following items, in addition to those required by NEC:

1. Feeders and Branch circuits.
2. Receptacle circuits
3. Single-phase motors branch circuits.
4. Three-phase motors branch circuits.
5. Flexible raceway runs.

3.3 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

3.4 CONNECTIONS

A. General: Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.

1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to order of galvanic series.
2. Make connections with clean, bare metal at points of contact.
3. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

B. Equipment Grounding Conductor Terminations: For No. 12 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.

C. Noncontact Metal Raceway Terminations: If metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically noncontinuous conduits at entrances and exits with grounding bushings and bare grounding conductors, unless otherwise indicated.

D. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A.

E. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.

END OF SECTION 260526

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawing and general provisions of the Contract, including General and Special Clauses, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Hangers and supports for electrical equipment and systems.

1.3 DEFINITIONS

A. EMT: Electrical Metal Conduit

1.4 PERFORMANCE REQUIREMENTS

A. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.

B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

C. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads imposed for this Project, with a minimum structural safety factor of four times the applied force.

1.5 QUALITY ASSURANCE

A. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

B. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

C. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

D. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened Portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
   a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

      1) Hilti Inc.
      2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
      3) MKT Fastening, LLC.
      4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.

2. Mechanical-Expansion Anchors: Insert-wedge-type, stainless steel, for use in hardened Portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
   a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

      1) Cooper B-Line, Inc.; a division of Cooper Industries.
      2) Empire Tool and Manufacturing Co., Inc.
      3) Hilti Inc.
      4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
      5) MKT Fastening, LLC.

3. Concrete Inserts: Steel slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for IMC as scheduled in NECA 1, where its Table 1 lists maximum spacings less than stated in NFPA 70. Minimum rod size shall be 1/4 inch (12.7 mm) in diameter.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits.

Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).

C. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
2. To Existing Concrete: Expansion anchor fasteners.
3. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69.
4. To Light Steel: Sheet metal screws.

D. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 260529

SECTION 260533 - RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Clauses apply to this Section.

1.2 SUMMARY

A. This Section includes raceways, fittings, boxes, enclosures, for electrical wiring.

B. Related Sections include the following:

1. Division 26 Section "Through – Penetration Firestop Systems" for firestopping materials and installation at penetrations through walls, ceilings and other fire-rated elements.

2. Division 26 Section "Electrical Identification." For Identification Products.

1.3 DEFINITIONS

A. EMT: Electrical Metallic Tubing.

B. MC: Metal Clad Cable.

C. RGS: Rigid Galvanized Steel Conduit.

1.4 SUBMITTALS

A. Product Data: For surface raceways, wireways, fittings, and boxes.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: UL Listed and labeled as defined in NFPA 70, Article 100, and marked for intended use.

B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AFC Cable Systems, Inc.
2. Alflex Inc.
3. Allied Tube & Conduit; a Tyco International Ltd. Co.
4. Anamet Electrical, Inc.; Anaconda Metal Hose.

5. Electri-Flex Co.
6. Manhattan/CDT/Cole-Flex.
7. Maverick Tube Corporation.
8. O-Z Gedney; a unit of General Signal.
9. Wheatland Tube Company.

B. EMT: Shall be UL labeled, galvanized steel, and ¾" trade size minimum.

C. EMT: ANSI C80.3.

D. MC: ANSI/UL 1569.

E. RGS: ANSI C80.1

F. Fittings and connections for all EMT conduit shall be **Steel compression type**.

G. Joint Compound for Rigid Steel Conduit: Listed for use in cable connector assemblies, and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

H. Couplings, conduit bodies, fittings and conduit support components shall be galvanized.

I. Rigid steel conduit shall be threaded, hot dipped galvanized inside and out and shall be UL labeled. Conduit shall be gasketed and watertight in hazardous, wet, and corrosive locations.

J. All RGS fittings shall be screwed threaded type, drawn tight, with a minimum of 5 threads engaged.

K. Insulated bushings shall be provided at all terminal boxes or panels.

L. All fittings for conduit and cable shall follow NEMA FB 1 standards.

2.2 PULL BOXES AND JUNCTION BOXES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
2. EGS/Appleton Electric.
3. Erickson Electrical Equipment Company.
4. Hoffman.
5. Hubbell Incorporated; Killark Electric Manufacturing Co. Division.
6. O-Z/Gedney; a unit of General Signal.
7. RACO; a Hubbell Company.
8. Robroy Industries, Inc.; Enclosure Division.
9. Scott Fetzer Co.; Adalet Division.
10. Spring City Electrical Manufacturing Company.
11. Thomas & Betts Corporation.
12. Walker Systems, Inc.; Wiremold Company (The).

13. Woodhead, Daniel Company; Woodhead Industries, Inc. Subsidiary.

B. Each junction box shall be a UL listed junction box (or pull box) fabricated of code gauge sheet steel with a screw fastened removable cover unless some other construction or material is shown.

C. Junction boxes shall be provided as required for pulling wire and change in direction.

D. All provisions of N.E.C Article 314 shall apply except as specified herein or shown on the plans.

E. Each weatherproof junction box shall be UL listed.

F. Each shall be feraloy cast body and cover with neoprene gasket and stainless steel cover screws.

G. Each shall be supplied with hot dip galvanized finish.

H. All provision of N.E.C. Article 314 shall apply except as specified herein or shown on plans.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Outdoors: Apply raceway products as specified below, unless otherwise indicated:

1. Exposed Conduit: Rigid Galvanized Steel Conduit.

B. Indoors:
1. Exposed, Not Subject to Physical Damage or Concealed Conduit: Electrical Metallic Tubing shall be galvanized steel or MC Cable.
2. Exposed and subject to Physical Damage: Rigid Galvanized Steel Conduit. All unfinished areas shall use conduit appropriate for environmental conditions.

C. Minimum Raceway Size: **3/4-inch** trade size.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. EMT Conduit: All connections and fittings shall be **steel compression** type, unless otherwise indicated. Set screw fittings are not acceptable.

3.2 INSTALLATION

A. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

B. Contractor shall supply necessary couplings, fittings, elbows, and boxes to make a complete, workable, and continuous system.

C. EMT shall be continuous and serve as a ground.

D. All joints shall be secure and tight.

E. Complete raceway installation before starting conductor installation.

F. Support conduits as specified in 2020 N.E.C Articles 330.30, 344.30, and 358.30.

G. Arrange stub-ups so curved portions of bends are not visible above the finished slab.

H. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.

I. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.

J. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire.

K. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:

L. Where otherwise required by NFPA 70.

3.3 PROTECTION

A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.

END OF SECTION 260533

CONTRACT NO. 22-524

DIVISION 26 – TECHNICAL ELECTRICAL SPECIFICATIONS

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Clauses apply to this Section.

1.2 SUMMARY

A. This section includes electrical identification materials and devices required to comply with ANSI C2, NFPA 70, OSHA standards, and authorities having jurisdiction.

1.3 SUBMITTALS

A. Product Data: For each electrical identification product indicated.

B. Identification Schedule: An index of nomenclature of electrical equipment and system components used in identification signs and labels.

1.4 QUALITY ASSURANCE

A. Comply with ANSI A13.

B. Comply with NFPA 70.

C. Comply with ANSI Z535.4 for safety signs and labels.

D. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

PART 2 - PRODUCTS

2.1 RACEWAY AND CABLE IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway size.

B. Colors for Raceways Carrying Circuits at 600 V or Less:

1. Black letters on an orange field.
2. Legend: Indicate voltage and service.

C. Snap-Around Labels for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

D. Snap-Around, Color-Coding Bands for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches (50 mm) long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

E. Brass or aluminum tags 2 by 2 by 0.05 inch (50 by 50 by 1.3 mm), with stamped legend, punched for use with self-locking cable tie fastener.

2.2 WARNING LABELS AND SIGNS

A. Comply with NFPA 70 and 29 CFR 1910.145.

B. Self-Adhesive Warning Labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.

C. Baked-Enamel Warning Signs:

1. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.
2. 1/4-inch (6.4-mm) grommets in corners for mounting.
3. Nominal size, 7 by 10 inches (180 by 250 mm).

D. Metal-Backed, Butyrate Warning Signs:

1. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch (1-mm) galvanized-steel backing; and with colors, legend, and size required for application.
2. 1/4-inch (6.4-mm) grommets in corners for mounting.
3. Nominal size, 10 by 14 inches (250 by 360 mm).

PART 3 - EXECUTION

3.1 INSTALLATION

A. Verify identity of each item before installing identification products.

B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

C. Apply identification devices to surfaces that require finish after completing finish work.

D. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.

E. Power-Circuit Identification, 600 V or Less: Metal tags or aluminum, wraparound marker bands for cables, feeders switchboards, pull and junction boxes.

1. Color-Coding of Secondary Conductors, 600 V or Less: Use colors listed below for service, feeder, and branch circuit conductors.

a. Color shall be factory applied the entire length of conductors.
b. Colors for 208/120-V Circuits:

1) Phase A: Black.

2) Phase B: Red.
3) Phase C: Blue.
4) Neutral: White.
5) Ground: Green

c. Colors for 480/277-V Circuits:

1) Phase A: Brown.
2) Phase B: Orange.
3) Phase C: Yellow.
4) Neutral: grey.
5) Ground: Green

F. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power and control, unless equipment is provided with its own identification.

a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be self-adhesive, engraved, laminated acrylic or melamine label.
b. Enclosures and electrical cabinets.
c. Access doors and panels for concealed electrical items.
d. Enclosed switches.
e. Enclosed circuit breakers.

END OF SECTION 260553

SECTION 262200 - LOW-VOLTAGE TRANSFORMERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

A. This Section includes the following types of dry-type transformers rated 600 V and less, with capacities up to 1000 kVA:

1. Distribution transformers.

1.3 SUBMITTALS

A. Product Data: Include rated nameplate data, capacities, weights, dimensions, minimum clearances, installed devices and features, and performance for each type and size of transformer indicated.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

1. Wiring Diagrams: Power, signal, and control wiring.

2. Product Certificates: Signed by manufactures of transformer certifying that the transformer furnished comply with requirements.

3. Qualification data: For firms and persons specified in Quality Assurance Article.

4. Factory Test Reports: Certified copies of manufactures' routine factory tested required by reference standards.

5. Sound Level Test Reports: Certified copies of manufactures' sound level tests applicable to equipment for this project.

6. Field Tests Reports: Indicate and interpret test results for tests specified in Part 3.

7. Maintenance Data: Include transformer maintenance manual.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Cover transformer ventilating openings to keep dust out. Store in a warm dry location with uniform temperature or apply temporary heat according to manufactures recommendations within the enclosure of transformer.

B. Handle transformer using only lifting eyes and brackets provided for that purpose. Protect unit against entrance of rain, sleet, or snow if handled in inclement weather.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with IEEE C57.12.91, "Test Code for Dry-Type Distribution and Power Transformers."

1.6 COORDINATION

A. Coordinate size and location of concrete bases with actual transformer provided. Cast Concrete, reinforcement, and formwork requirements are specified with concrete.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Available Manufacturer: Subject to compliance with requirements, manufacturer offering products that may be incorporated into the Work include, but are limited to, the following:

B. Manufacturer: Subject to compliance with requirements, provide product the following:

1. Eaton Electrical Inc.; Cutler-Hammer Products.
   a. Model #V48M28T3016CUS6 (480-208Y/120V, 30KVA)
2. Or approved equal

2.2 VPI DRY-TYPE TRANSFORMER

A. The transformer shall be compartment type, self-cooled, in tamper-proof enclosure.

B. The transformer shall comply with the latest applicable standards.

C. Comply with NEMA ST 20 and list and label as complying with UL 1561.

D. Transformer coils shall be of the continuous wound construction and impregnated utilizing the VPI process. The coils shall be preheated and subjected to a dry vacuum of no less than 29.7 inches of mercury. Precatalyzed resin shall be introduced into coil with vacuum maintained during the process. The coils shall then be subjected to a pressure of 75 psi for a suitable length of time to provide complete impregnation of the coils with no voids or air pockets which can create hot spots or cause corona formation. The coils shall then be cured in ovens forming non-hydroscopic coils with a minimum 2-mils coating over Nomex insulated conductors. The coils shall be wound with **copper conductors**.

E. The transformer shall have a maximum temperature rise of 150 degrees C above a 40 degrees C maximum ambient.

F. Primary taps shall be full capacity, with a minimum of two 2-1/2% above and below rated voltage. Six taps, 2 above and 4 below.

G. KVA size, voltage, and taps shall be as shown on the drawings.

H. All coils shall be constructed of high grade, grain oriented, non-aging silicon steel with high magnetic permeability and low hysteresis, and eddy current losses. Magnetic flux densities are to be kept well below the saturation point. Core laminations shall be miter cut at the core corners to reduce hot spots, core loss, excitation current, and sound level. The laminations shall be clamped together utilizing insulated bolts through the core laminations to provide proper pressure throughout the length of the core.

I. Provision shall be made to completely isolate the core and coil from the enclosure. There shall be no metal to metal contact. Rubber vibration isolation pads shall be installed by the manufacturer between the core and coil and the enclosure base. The core shall be visibly grounded to the ground bus or ground pad by means of a flexible grounding conductor sized in accordance with applicable NEC standards.

J. The enclosure is to be rated for the proposed installation location. Finish shall be ANSI 61 Grey and Comply with ANSI C57.12.28.

K. The secondary termination shall contain spade type terminals with standard NEMA type bole hole patterns.

L. The manufacturer shall adjust the enclosure to suit the conduit entrances on both the primary and secondary compartments.

M. The transformers are to manufactured and tested in accordance with IEEE standards C57.1201, 57,C57.1291, C57.1250, and C57.1251, and shall include, as a minimum, the following tests: Ratio, Polarity, Phase Rotation, No load Loss, Excitation Current, impedance Voltage, Load loss, Applied Potential, Induced Potential, and QA Impulse Test.

N. Factory Test: Insulation resistance: Perform megohmmeter tests of primary and secondary winding and winding to ground.

2.3 IDENTIFICATION DEVICES

A. Nameplates: Engraved, laminated-plastic or metal nameplate for each transformer, mounted with corrosion-resistant screws. Nameplates and label products are specified in Section 260553 "Identification for Electrical Systems."

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with safety requirement IEEE C2.

B. Anchor transformer according to manufacturer's written instructions.

C. Identify transformer and install warning signs according to Division 26 Electrical identification.

D. Tighten electrical connectors and terminals according to manufactures published torque tightening values. If manufactures torque values are not indicated, use those specified in UL 486A and UL 486B.

3.2 FIELD QUALITY CONTROL

A. Test transformer to ensure it is operational within industry and manufactures tolerances, installed according to contract drawings, and is suitable to be energized.

B. On satisfactory completion of test on transformer attach a dated and signed Satisfactory Test label on transformer.

C. Submit a written report of test and any defects found with transformer to County Construction Coordinator.

D. Coordinate startup of transformer with County Construction Coordinator prior to testing and startup.

3.3 ADJUSTING

A. After install of transformer is complete touchup all scratches and mars on finish to match original finish.

END OF SECTION 262200

DIVISION 26 – TECHNICAL ELECTRICAL SPECIFICATIONS

SECTION 262816 – PANELBOARDS AND PANELBOARD CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special clauses apply to this Section.

1.2 SUMMARY

A. This Section includes Branch Circuit Panelboards and Circuit Breakers.

1.3 GENERAL REQUIREMENTS FOR PANELBOARDS.

A. Each panelboard shall be a complete assembly consisting of a box, inside cover, outside cover with lock and schedule window, bus bars, circuit breakers, neutral bus connecting lugs insulation and bracing as required.

B. Each shall conform to NEC. recommendations, be UL listed and bear UL label and be manufactured in accordance with NEMA standards. The main circuit breaker, if shown, and the panelboard without branch circuit breakers shall be UL listed at 65,000 rms. symmetrical amperes interrupting capacity minimum. **Panelboards shall be fully rated.**

C. The main bus and main lugs shall be tinned copper and have current ratings as shown in the panelboard schedule. Current density shall be in accordance with UL requirements.

D. Bus mounting of circuit breakers shall be bolt-on connection. Three-phase panelboard bus bar arrangement shall be phase sequenced. Wiring lugs shall accommodate copper wire, size shown on the plan, not less than NEC. recommendations.

E. Branch circuit breakers shall be as specified and as shown in the panelboard schedule.

F. The enclosure shall be code gauge steel. Trim and inside covers shall be code gauge steel with primer and gray enamel finish. Cover and door shall be equipped with trim clamps, lock and concealed hinge.

G. Bus bars shall be provided for all spaces, and circuit breakers provided as shown on the schedule.

H. Each shall be dead front construction

I. Each lock shall be a cabinet latch-lock or County approved equal, with master keying to be designated after award.

J. Each panelboard assembly including circuit breakers, bus bars, back box, cover, neutral bus, and connecting lugs shall be of one manufacturer.

K. The contractor shall submit shop drawings of the panelboard he intends to furnish.

1.4 GENERAL REQUIREMENTS FOR CIRCUIT BREAKERS.

A. Each circuit breaker shall be bolt on type, molded case, ampere rated as shown on the plan.

B. Each shall be rated for use in the panelboard shown.

C. Each circuit breaker shall be UL listed and conform to NEMA standards.

D. Each circuit breaker shall provide overcurrent protection in each pole by means of a thermal element and magnetic element.

E. Each branch circuit breaker shall be UL listed at 65,000 rms symmetrical amperes interrupting capacity minimum unless otherwise noted. If the existing circuit breakers in the Panelboard have a higher aic rating, the new circuit breakers shall match their aic rating.

F. Ratings shall be clearly visible on the face of each circuit breaker.

G. Multiple circuit breakers shall be of the common trip type with a single handle.

H. Each circuit breakers shall be installed in the panelboard indicated on the panels and if so indicated shall be installed in the pole spaces indicated.

I. The contractor shall submit shop drawings of the circuit breakers he intends to furnish.

1.5 PANELBOARDS AND CIRCUIT BREAKERS

A. Manufacturers: Subject to compliance with requirements, provide products by the following manufacturer:
1. Square D; a brand of Schneider Electric.
2. Eaton: Cutler Hammer

1.6 SUBMITTALS

A. Product Data: For each type of panelboard and circuit breaker include and manufacturers' technical data on features, performance, and electrical characteristics.

1. Current and voltage ratings.
2. Short-circuit current ratings (interrupting and withstand, as appropriate).

1.7 QUALITY ASSURANCE

A. Comply with NEMA PB1 Panelboards.

B. Circuit Breakers: Listed and labeled as defined in NFPA 70 and marked for intended location and application.

C. Comply with National Electrical Code (NEC) and NFPA 70 for components and installation.

1.6 INSTALLATION

A. Install panelboard as shown on the drawings and according to manufactures instructions. Contractor shall ground panelboard to ground ring as shown on drawing.

B. At flush panelboard Install (2) 1 inch conduits to junction boxes in accessible space above drop ceiling for future use.

C. Install circuit breakers with tops at uniform height unless otherwise indicated. Comply with NECA.

D. Contractor shall Load balance panelboard.

END OF SECTION 262816

SECTION 262817 – DISCONNECT SWITCHES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Conditions and other Division 26 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Fusible switches.
2. Nonfusible switches.
3. Enclosures.

1.3 DEFINITIONS

A. NC: Normally closed.
B. NO: Normally open.
C. SPDT: Single pole, double throw.

1.4 SUBMITTALS

A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.

1. Enclosure types and details for types other than NEMA 250, Type 1.
2. Current and voltage ratings.
3. Short-circuit current ratings (interrupting and withstand, as appropriate).
4. Include evidence of UL listing for series rating of installed devices.
5. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.
6. Include time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device. Submit on translucent log-log graph paper.

B. Shop Drawings: For enclosed switches. Include plans, elevations, sections, details, and attachments to other work.

1. Wiring Diagrams: For power, signal, and control wiring.

C. Qualification Data: For qualified testing agency.

D. Field quality-control reports.

1. Test procedures used.
2. Test results that comply with requirements.
3. Results of failed tests and corrective action taken to achieve test results that comply withrequirements.

E. Manufacturer's field service report.

F. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:

1. Manufacturer's written instructions for testing and adjusting enclosed switches and circuitbreakers.
2. Time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device. Submit on translucent log-log graph paper.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Member company of NETA or an NRTL, such as UL.

1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.

B. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single source from single manufacturer.

C. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

E. Comply with NFPA 70.

F. All devices shall be U.L. listed.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:

1. Ambient Temperature: Not less than minus 22 deg F and not exceeding 104 deg F.
2. Altitude: Not exceeding 6600 feet.

B. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only

after arranging to provide temporary electric service according to requirements indicated:

1. Notify Architect, Construction Manager and Owner no fewer than seven days in advance of proposed interruption of electric service.
2. Indicate method of providing temporary electric service.
3. Do not proceed with interruption of electric service without Architect's, Construction Manager's and Owner's written permission.
4. Comply with NFPA 70E.

1.7 COORDINATION

A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

B. Coordinate sizing of switches, breakers and fuses with mechanical contractor and other tradesman equipment shop drawings prior to ordering equipment.

1.8 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than three (3) of each size and type.
2. Fuse Pullers: Two for each size and type.
3. All exterior disconnect switches shall be provided with a weatherproof padlock, all with matching tumblers/keys. Provide a minimum of six (6) keys to the Owner.

1.9 WARRANTY

A. Provide two years warranty on all parts and labor.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
3. Siemens Energy & Automation, Inc.
4. Square D; a brand of Schneider Electric.

2.2 FUSIBLE SWITCHES

A. Not used

2.3 NONFUSIBLE SWITCHES

A. Type HD, Heavy Duty, Quick Make-Quick Break, Single Throw, 240-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position, with load interrupter enclosed visible blade knife switch.

B. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum groundconductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded;labeled for copper and aluminum neutral conductors.
3. Auxiliary Contact Kit: One NO/NC (Form "C") auxiliary contact(s), arranged to activatebefore switch blades open.
4. Hookstick Handle: Allows use of a hookstick to operate the handle.
5. Lugs: Mechanical type, suitable for number, size, and conductor material.

2.4 ENCLOSURES

A. Enclosed Switches: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.

1. Indoor, Dry and Clean Locations: NEMA 250, Type 12.
2. Outdoor Locations: NEMA 250, Type 4X Stainless Steel,
3. Other Wet or Damp, Indoor Locations: NEMA 250, Type 4X Stainless Steel.

2.5 FUSES

A. Not used

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliancewith installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install individual wall-mounted switches with tops at uniform height unless otherwise indicated. Provide concrete bases where required and anchor all equipment.

B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.

C. Install fuses in fusible devices.

D. Comply with NECA 1, NEMA PB 1.1 and PB 2.1.

3.3 IDENTIFICATION

A. Comply with requirements in Division 26 Section "Identification for Electrical Systems."

1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
2. Label each enclosure with engraved metal or laminated-plastic nameplate.

B. Install arc flash warning labels and identify level of PPE protection required.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

B. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

C. Acceptance Testing Preparation:

1. Test insulation resistance for each enclosed switch and circuit breaker, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

D. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

E. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.

F. Prepare test and inspection reports, including a certified report that identifies enclosed switches and circuit breakers and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 ADJUSTING

A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

3.6 CLEANING

A. On completion of installation, vacuum dirt and debris from interiors; do not use compressed air to assist in cleaning.

B. Inspect exposed surfaces and repair damaged finishes.

END OF SECTION 262817

APPENDIX A

ROOF WARRANTY

Yonkers Bus Garage

FIRESTONE PLATINUM-PHW
ROOFING SYSTEM LIMITED WARRANTY

Warranty No: PN001026 **FBPCO #AB1310** **Square Footage: 241000 s.f.**
Building Owner: COUNTY OF WESCHESTER
Building Identification: CENTRAL MAINTENANCE FACILITY
Building Address: 475 SAW MILL RIVER RD., YONKERS, NY, 10701
Warranty Period Of: THIRTY (30) Years Beginning on: 08/24/04
Roofing Contractor: USA GENERAL CONTRACTORS CORP. (06938)

For the warranty period indicated above, Firestone Building Products Company ("Firestone"), a division of BFS Diversified Products, LLC, a Delaware limited liability company, warrants to the Building Owner ("Owner") above that Firestone will, subject to the Terms, Conditions and Limitations set forth below, repair any leak in the Firestone PLATINUM Roofing System ("System").

TERMS, CONDITIONS AND LIMITATIONS

1. The Firestone PLATINUM Roofing System is composed of all Firestone materials. Any materials not manufactured or supplied by Firestone are not covered under this warranty and are listed herein:
2. In the event any leak should occur in the System: (a) The Owner must give written notice to Firestone within thirty (30) days of any occurrence of a leak. By so notifying Firestone, the Owner authorizes Firestone or its designee to investigate the cause of the leak. (b) If upon investigation, Firestone determines that the leak is not excluded under the Terms, Conditions, Limitations and Definitions set forth in this limited warranty, the Owner's sole and exclusive remedy and Firestone's liability will be limited to the repair of the leak. (c) Should the investigation reveal that the leak is excluded under the Terms, Conditions and Limitations, the Owner is responsible for payment of the investigation costs. Failure by Owner to pay for these costs shall render this Firestone PLATINUM PHW Roof System Limited Warranty ("Limited Warranty") null and void. Firestone will advise the Owner of the type and/or extent of repairs required to be made at the Owner's expense that will permit this Limited Warranty to remain in effect for the unexpired portion of its term. Failure by the Owner to properly make these repairs in a reasonable manner using a Firestone licensed applicator and within a reasonable time shall render this Limited Warranty null and void. (d) Any dispute, controversy or claim between the Owner and Firestone concerning this Limited Warranty shall be settled by mediation. In the event that the Owner and Firestone do not resolve the dispute, controversy or claim in mediation, the Owner and Firestone agree that neither party will commence or prosecute any suit, proceeding, or claim other than in the courts of Hamilton County in the state of Indiana or the United States District Court, Southern District of Indiana, Indianapolis Division. Each party irrevocably consents to the jurisdiction and venue of the above-identified courts.
3. Firestone shall have no obligation under this Limited Warranty unless and until Firestone and the licensed applicator have been paid in full for all materials, supplies, services, warranty costs and other costs which are included in, or incidental to, the System.
4. As a special term of this warranty, Firestone will repair any leaks caused by unintentional and occasional damage to the membrane as a result of normal rooftop inspection, maintenance or service.
5. Firestone shall have no obligation under this Limited Warranty, or any other liability, now or in the future if a leak or damage is caused by: (a) Natural forces, disasters, or acts of God including, but not limited to, winds in excess of 100 MPH, hurricanes, tornadoes, hail in excess of 2" in diameter, lightning, earthquakes, atomic radiation, insects, or animals; (b) Any act(s), conduct or omission(s) by any person, or act(s) of war, which damages the System or which impairs the System's ability to resist leaks; (c) Failure by the Owner to use reasonable care in maintaining the building, said maintenance to include, but not limited to those items listed on the reverse side of this Limited Warranty titled "Building Envelope Care and Maintenance Guide" (d) Deterioration or failure of building components, including, but not limited to, the roof substrate, walls, mortar, HVAC units, etc.; (e) Condensation or infiltration of moisture in, through, or around the walls, copings, rooftop hardware or equipment, building structure or underlying or surrounding materials. Firestone specifically excludes any damage to the Firestone insulation or roof system that may come from moisture within the roof deck or existing roof system. (f) Any acid, oil, harmful chemical, chemical or physical reaction and the like which comes in contact with the System, which damages the System, or which impairs the System's ability to resist leaks; (g) Alterations or repairs to the System not approved in writing by Firestone; (h) The architecture, engineering, construction or design of the roof, roofing system, or building. Firestone does not undertake any analysis of the architecture or engineering required to evaluate what type of roof system is appropriate; (i) A change in building use or purpose; (j) Failure to give proper notice as set forth in paragraph 2(a) above.
6. This Limited Warranty shall be transferable subject to Firestone inspection, written approval, and payment of the current transfer fee.
7. During the term of this Limited Warranty, Firestone, its designated representative or employees shall have free access to the roof during regular business hours. In the event that roof access is limited due to security or other restrictions, Owner shall reimburse Firestone for all reasonable costs incurred during inspection and/or repair of the System that are due to delays associated with said restrictions. Owner shall be responsible for the removal and replacement of any overburdens, superstrata or overlays, either permanent or temporary, excluding accepted stone ballast or pavers, as necessary to expose the system for inspection and/or repair.
8. Firestone's failure to enforce any of the terms or conditions stated herein shall not be construed as a waiver of such provision or of any other terms and conditions of this Limited Warranty.
9. This Limited Warranty shall be governed and construed in accordance with the laws of the State of Indiana without regard to conflict of laws.

FIRESTONE DOES NOT WARRANT PRODUCTS INCORPORATED OR UTILIZED IN THIS INSTALLATION WHICH IT HAS NOT FURNISHED. FIRESTONE SPECIFICALLY DISCLAIMS LIABILITY, UNDER ANY THEORY OF LAW, ARISING OUT OF THE INSTALLATION OR PERFORMANCE OF, OR DAMAGES SUSTAINED BY OR CAUSED BY, PRODUCTS NOT FURNISHED BY FIRESTONE. THIS LIMITED WARRANTY SUPERSEDES AND IS IN LIEU OF ALL OTHER WARRANTIES OR GUARANTEES WHETHER WRITTEN OR ORAL, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THIS LIMITED WARRANTY SHALL BE THE OWNER'S SOLE AND EXCLUSIVE REMEDY AGAINST FIRESTONE, AND FIRESTONE SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL, SPECIAL, INCIDENTAL OR OTHER DAMAGES INCLUDING, BUT NOT LIMITED TO, LOSS OF PROFITS OR DAMAGE TO THE BUILDING OR ITS CONTENTS OR THE ROOF DECK. THIS LIMITED WARRANTY CANNOT BE AMENDED, ALTERED OR MODIFIED IN ANY WAY EXCEPT IN WRITING SIGNED BY AN AUTHORIZED OFFICER OF FIRESTONE. NO OTHER PERSON HAS ANY AUTHORITY TO BIND FIRESTONE WITH ANY REPRESENTATION OR WARRANTY WHETHER ORAL OR WRITTEN.

FIRESTONE BUILDING PRODUCTS COMPANY
By: **George Furman**

Authorized Signature: George Furman
Title: **Manager, Contractor Services**

BUILDING ENVELOPE CARE AND MAINTENANCE GUIDE
(Recommendations for Buildings with PLATINUM Warranted Roofing Systems)

Congratulations on your purchase of a Firestone Platinum Roofing System for your building! Your building is a valuable asset and as such should be properly maintained. **All building envelope components require periodic attention to perform as designed and to protect your investment.**

1. The building envelope, including the roof, should be inspected at least twice yearly (in the Spring and Fall), and after any severe storms. Record maintenance procedures as they occur. Log all access times and parties working on the roof.
2. Although Firestone roofing membranes are designed to accommodate moderate levels of standing water, the weight of standing water, ice or snow on a roof may exceed building structural design loads. As a consequence, good roofing practice suggests that water not be allowed to remain on the roof for more than 48 hours after a rainfall. Roofs should have slope to drain and all drain areas should remain clean. Bag and remove all debris from the roof since such debris can be quickly swept into drains by rain. This will allow for proper water run-off and avoid overloading the roof with standing water.
3. The Firestone Platinum Roofing System should not be exposed to acids, solvents, greases, oil, fats, chemicals and the like. If the Firestone Platinum Roofing System is subject to contact with any such materials, contact Firestone immediately.
4. The Firestone Platinum Roofing System is designed to be a waterproofing component -- not a traffic-bearing component -- of the building envelope. If there is to be roof traffic for any reason, contact Firestone or your Firestone Licensed Applicator for the installation of acceptable protective walkways. Coverage for repair to membrane damage in item 4 on the face of this warranty does not absolve the owner of the duty to protect the membrane from damage during rooftop activities.
5. Although periodic inspection is recommended to assure that building components have not been subjected to unusual forces or conditions, the Firestone Platinum Roofing System components do not require maintenance under normal service in order to perform as designed or to keep this Limited Warranty in effect. Surfacings, such as coatings, are sometimes applied to roof membranes for a number of reasons. These surfacings are not covered under the terms of this limited warranty, although they may be covered under a separate agreement.
   a) EPDM and other single-ply roofing membranes do not normally require surface maintenance other than periodic inspection for contaminants (See Item 3.) or damage. Occasionally, approved liquid roof coatings, such as Firestone AcryliTop, are applied to the surface of EPDM membranes in order to provide a lighter surface color. Such coatings do not need to be maintained to assure the performance of the underlying EPDM roof membrane, but some maintenance and re-coating may be necessary in order to maintain a uniform surface appearance.
6. All counterflashing, metal work, drains, skylights, equipment curb and supports, and any other rooftop accessories functioning in conjunction with the Firestone Platinum Roofing System must be properly maintained at all times.
7. If any additional equipment is to be installed on your roof (e.g. HVAC units, TV antennas, etc.), contact Firestone, in writing, for approval before proceeding.
8. Should there be an addition to the building, requiring tie-in to the existing Firestone Platinum Roofing System, contact Firestone before proceeding to ensure the tie-in is in accordance with Firestone specifications.
9. Should you have a problem:
   a) Check for the obvious: clogged roof drains, loose counterflashings, broken skylights, open grills or vents, broken water pipes.
   b) Note conditions resulting in leakage. Heavy or light rain, wind direction, temperature and time of day that the leak occurs are all-important clues to tracing roof leaks. Note whether the leak stops shortly after each rain or continues to drip until the roof is dry. If you are prepared with the facts, the diagnosis and repair of the leak can proceed more rapidly.
   c) Contact Firestone Warranty Claims at 1-800-830-5612 **immediately**...but please don't call until you are reasonably sure that the Firestone Platinum Roofing System is the cause of the leak.

Firestone feels that the preceding recommendations will assist you, the building owner, in maintaining a watertight Platinum roof for many years. Remember, your building is an investment. To maximize your return on this investment, appropriate care is essential.

Firestone
BUILDING PRODUCTS
NOBODY COVERS YOU BETTER.®
525 Congressional Blvd. Carmel, IN 46032
1-800-428-4442 * 1-317-575-7000 * FAX 1-317-575-7100
www.firestonebp.com

Post Warranty Alteration Form

Date: _____

Project #: _____ **or** Warranty #: _____ Exp. Date: _____

Building Identification: _____

Building Address: _____

Owner: _____

Type of Post Warranty Alteration:

☐ General Roof Alterations ☐ Garden Roof System ☐ Photovoltaic (PV) Installation

General Alterations or Garden Roof projects only:

Thank you for your notice of alterations to the warranted Firestone roof system on the above referenced building. All attempts should be made to involve the original installing contractor to make the necessary repairs. Only currently licensed Firestone contractors are permitted to perform alterations and repairs to a warranted roof system.

Firestone reserves the right to require a Post Warranty Alteration (PWA) inspection upon review of the submitted documents. The purpose of the PWA Inspection is to verify new membrane flashings or other membrane-related alterations comply with Firestone's written repair recommendations. The charge for a required inspection is $750.00, payable to Firestone Building Products. **No payments will be accepted prior to the issuance of a Firestone invoice.** The invoice will be directed to the owner listed on the warranty unless a third party is responsible for payment and separate billing information has been provided.

Firestone requires the following information in order to update the existing warranted project, and for the existing warranty to remain in full force:

Firestone Contractor's Name: _____

Firestone Contractor's License #: _____

I certify the following is attached to this document: (all boxes must be checked)

☐ Firestone license number and name of contractor performing repairs
☐ Before and After photos clearly showing scope of work performed
☐ Submit description of work performed including all flashing and/or other details used
☐ Roof Drawing indicating location of Alterations or Additions

Alterations over $10,000.00 ☐ YES ☐ NO

Photovoltaic (PV) projects only:

This form and all requested information should be submitted **after** the PV installation has been completed. An inspection by a Firestone Representative **may** be required upon review of the submitted documents and completion photos. The purpose of the PWA Inspection is to verify new membrane flashings or other membrane-related alterations comply with Firestone's written repair recommendations. **Firestone does not perform pre-installation inspections of PV projects.**

I certify the following information is attached to this document: (all boxes must be checked)

☐ Name of PV Manufacturer
☐ Drawing to include proposed PV layout and Roof Plan
☐ Overburden waiver completed and signed by the Building Owner ONLY
☐ PV rack manufacturer's detail drawing for the installed PV system.
☐ PV Install completion date
☐ Proposed protection/slip sheet materials

_____ _____
Name of Submitter Date

_____ _____
Representative of (Company) E-mail

Upon successful review of the completed work and receipt of the content of this form, the existing warranty will remain in full force. Failure to follow the procedures outlined in this document, including failing to notify