PROJECT MANUAL AND SPECIFICATIONS FOR:

ARCHITECTURAL AND ENGINEERING SERVICE

ODESSA-MONTOUR CENTRAL SCHOOL DISTRICT
300 COLLEGE AVENUE
ODESSA, NY 14869

SED NO. 55-01-01-04-0-001-022 – Odessa Elementary and High School

VOLUME 1 of 1

Arcadis
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Document Set No.



Exp. 02/28/2027

DATE: July 7, 2025
SED APPROVAL DATE: September 29, 2025

ARCADIS PROJECT NO. 143500

PROJECT MANUAL AND SPECIFICATIONS FOR:

Architectural And Engineering Service

Odessa-Montour Central School District
300 College Avenue
Odessa, NY 14869

SED No. 55-01-01-04-0-001-022 – Odessa Elementary and High School

THE DESIGN OF THIS PROJECT CONFORMS TO ALL APPLICABLE PROVISIONS OF THE NEW YORK STATE UNIFORM FIRE PREVENTION AND BUILDING CODE, THE NEW YORK STATE ENERGY CONSERVATION CODE, AND THE BUILDING STANDARDS OF THE NEW YORK STATE EDUCATION DEPARTMENT.

ARCHITECT/ENGINEER
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Website: www.arcadis.com



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Date: July 7, 2025
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Arcadis Project No. 143500

SPECIFICATIONS

FOR

ASBESTOS ABATEMENT

OWNER

SED NO. 55-01-01-04-0-001-022 – Odessa Elementary and High School

I, Ronald J. Yates an EPA Certified Project Designer, do hereby certify that, to the best of my knowledge, information and belief, the plans and specifications are in accordance with the applicable requirements of the New York State Uniform Fire Prevention and Building Code, the state Energy Conservation Construction Code, Construction Standards of the Education Department, United States Environmental Protection Agency 40 CFR Part 763, and the New York State 6 NYCRR Part 56, Title 12.

Ronal J. Yates, III; PE, LEED AP, CAPD

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ARCHITECT: ARCADIS
59-61 COURT STREET, SUITE 300
BINGHAMTON, NY 13901

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DIVISION 00 - BIDDING AND CONTRACT REQUIREMENTS

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INVITATION TO BID

A. PROJECT

1. The Odessa-Montour Central School District invites sealed bids to be received for the 2023 Capital Improvements Phase 2 project.
   Prospective bidders are invited to submit their stipulated sum bids, including applicable Alternates and unit prices, for work described in general as follows:

   A. CONTRACT NO. 1 – GENERAL CONSTRUCTION
   B. CONTRACT NO. 2 – MECHANICAL CONSTRUCTION
   C. CONTRACT NO. 3 – ELECTRICAL CONSTRUCTION
   D. CONTRACT NO. 4 – PLUMBING CONSTRUCTION
   E. CONTRACT NO. 5 – FOOD SERVICE CONSTRUCTION

2. The project shall be substantially complete in accordance with Document 00 21 13 and Section 01 10 00 for all work as indicated on the Contract Documents.

3. The Owner will receive sealed stipulated sum bids from qualified bidders at Odessa-Montour Central School District Office, 300 College Avenue, Odessa, NY 14869 until 2:00 PM Local Time, on October 30, 2025 at which time the bids will be opened and publicly read aloud.

4. Information and Bidding Documents for the Project can be viewed and obtained under public projects at the following designated website: http://www.arcadisplanroom.com/.
   Bidding Documents may be viewed and bid packages may be obtained from the designated website by prospective bidders via the ordering instructions on the "details" tab within the portal. Please read these instructions before ordering a bid package, as they will outline the checkout process for electronic deposits. Bid packages must be obtained from the designated website in order to be considered a "responsible bidder".
   Bidders who register as a plan holder may acquire the bidding and contract documents through the website using the following options:

   - Documents are available to view for free.
   - Hard copy sets can be obtained by electronically depositing the sum of one hundred dollars ($100) for each printed set of documents via the designated website. Shipping and handling is to be paid directly to Dataflow and is non-refundable. Digital sets will be available for download for a non-refundable fee to be paid directly to Dataflow. All official notifications, addenda, and other bidding documents will be offered only through the designated website with notifications to registered bidders. Neither Owner, CM nor Architect/Engineer will be responsible for bidding

documents, including addenda, if any, obtained from sources other than the designated website.

- All prospective bidders using the deposit method, upon returning the first complete set of plans and specifications in good condition within thirty (30) calendar days after the date of award of contracts or rejection of bids, will be refunded the full amount of their deposit for the first set of plans and specifications. For the return of any additional sets of plans and specifications within thirty (30) calendar days after the date of award of contracts or rejection of bids, they will be refunded the full amount of their deposit for one (1) set of plans and specifications less the actual cost of reproduction of the plans and specifications.
- The Owner requires that all bids shall comply with the bidding requirements specified in the INSTRUCTION TO BIDDERS. The Owner may, at their discretion, waive informalities in bids, but is not obligated to do so, nor does this represent that he will do so. The Owner also reserves the right to reject any and all bids. Under no circumstances will the Owner waive any informality which, by such waiver, would give one bidder a substantial advantage or benefit not enjoyed by all other Bidders. No bidder may withdraw his Bid before forty-five (45) days after the actual date of the opening thereof, unless a mistake due to error is claimed by the bidder in accordance with INSTRUCTIONS TO BIDDERS.

For printed portions of the documents or download, the fee is dependent on the size of the documents.

5. Copies of the Contract Documents may be examined at the following offices:

b. Arcadis
59-61 Court Street
Binghamton, New York 13901

c. Builders Exchange of the Southern Tier-East
15 Belden Street
Binghamton, New York 13903-2159

d. Syracuse Builders Exchange
6563 Ridings Road
Syracuse, New York 13206

f. Mohawk Valley Builders Exchange, Inc.
10 Main Street
Suite 202
Whitesboro, NY 13492

i. Construction Contractors Assoc.
330 Meadow Avenue
Newburgh, New York 12550

6. Each bidder must deposit a bid security in the form of a Bid Bond, Certified Check, or Cashier's Check payable to the Owner in the amount of not less than five percent (5%) of the Base Bid amount.

7. The Owner reserves the right to award the contract within forty-five (45) calendar days after the actual date of the receipt of the bids. No bidder may modify or withdraw their bid within forty-five (45) calendar days after the time and date specified for the receipt of bids.

8. The Owner reserves the right to waive any irregularities or informalities in the bid forms or during bidding procedures, and the right to reject any or all bids.

9. Special attention is called to prospective bidders that a Pre-Bid Conference will be held at ODM District Conference Room at 1:00 PM, October 13th, 2025. Project sites will be available for bidders to inspect proposed work areas from 9:00 AM to 3:00 PM on weekdays by appointment with Andrew Knowles, Cell# 607-346-3980.

Signed: Jennifer Stevenson
District Clerk

Dated: September 29, 2025

END OF DOCUMENT

DOCUMENT 00 21 13

INSTRUCTIONS TO BIDDERS

1 PART 1 GENERAL

1.1 DEFINITIONS

A. Bidding Documents include the Project Manual and the proposed Contract Documents. The Project Manual consists of the Invitation to Bid, Instructions to Bidders, Information Available to Bidders, the Bid Form, Wage Rates, and other sample bidding and contract forms. The proposed Contract Documents consist of the Form of Agreement between the Owner and Contractor, Conditions of the Contract, including Supplementary Conditions, Drawings, Specifications, and all Addenda issued prior to execution of the Contract.

B. Definitions set forth in the General Conditions of the Contract for Construction, AIA Document A232, 2019 Edition, are applicable to the Bidding Documents.

C. Addenda are written or graphic instruments issued by the Architect/Engineer prior to the execution of the Contract which modify or interpret the Bidding Documents by additions, deletions, clarifications, or corrections.

D. A Bid is a complete and properly signed proposal to do the work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

E. The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which the Work may be added or from which Work may be deleted for sums stated in Alternates.

F. An Alternate is an amount stated in the Bid to be added to or deducted from the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.

G. A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment or services or a portion of the Work as described in the Bidding Documents.

H. A Bidder is a person or entity who submits a Bid.

2 PART 2 BIDDER'S OBLIGATIONS

2.1 EXAMINATION OF BIDDING DOCUMENTS AND LOCATION OF WORK

A. The Bidder has read and understands the Bidding Documents and the Bid is made in accordance with the stated requirements.

B. The Bidder has read and understands the Bidding Documents or proposed Contract Documents, to the extent that such documentation relates to the Work for which the Bid is submitted, for other portions of the Project, if any, being bid concurrently or presently under construction.

C. Before submitting a Bid, each Bidder shall carefully examine and visit the site of the work. Each Bidder shall fully inform himself prior to bidding as to all existing conditions and limitations under which the work shall be performed, and they shall include in their bid a sum to cover all costs of all items necessary to perform the work as set forth in the Bidding Documents. No allowance will be made to any bidder because of lack of such examination or knowledge. The submission of a bid will be construed as conclusive evidence that the bidder has made such examination.

2.2 CONDITIONS OF THE WORK

A. Each Bidder shall inform himself of all conditions relating to the construction and labor under which the work shall be performed. Failure to do so will not relieve a successful bidder of their 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 their bid.

B. Each Bidder, in carrying out of their work, must employ such methods or means as will not cause any interference with the work of any other Contractor, Owner's occupancy requirements, and safety of persons and property.

C. Each Bidder shall schedule the work in cooperation with the Owner so that efficient and coordinated progress of all work occurs.

D. Refer to Paragraph 2.3 of this Document for project start and completion dates. Each Prime Contractor shall prepare their bid to reflect completion within the dates indicated.

2.3 START OF WORK AND TIME OF COMPLETION

A. Time is of the essence. Work of this Contract, specifically ordering of materials, shall be started within ten (10) working days after receipt by the successful contractor of a "Notice to Proceed" from the Owner.

B. All Bidders are advised that work is required to be coordinated to allow for Owner’s continued use of all facilities.

C. On or before August 27, 2027, all work as indicated in the Contract Documents shall be substantially complete. At that time, and upon the work of this Contract being substantially complete, the Architect will issue a Certificate of Substantial Completion which will establish the date of substantial completion. Within fifteen (15) working days from the date of substantial completion, the Contractor shall have fully completed the work of the Contract, as specified.

D. Contractor and bonding companies shall be held strictly accountable for the completion of the Contractor's work per the specified schedule as a condition to satisfactory contract performance.

2.4 PRE-BID CONFERENCE

A. Special attention is called to prospective bidders that a Pre-Bid Conference will be held at the School District's Conference Room, at 1:00pm October 13, 2025. Representatives of the Owner, Architect/ Engineer, and Construction Manager will be present to review the project scope and to provide those present with interpretations and/or directions.

B. All proposed work shall be inspected only at the above time by all prospective bidders. Any questions or interpretations resulting from on-site inspection of proposed work shall be addressed to the Architect in writing.

2.5 PROOF OF COMPETENCY OF BIDDERS

A. Bidders must be skilled and regularly engaged in the class of work bid for and, if required by the Architect, must submit satisfactory evidence of mechanical facilities and financial ability to do the work within the agreed time and in accordance with all requirements of the Contract.

B. The Owner reserves the right to reject any bid if the evidence by the Bidder is not submitted as above indicated or if the evidence submitted by or investigation of any such bidder fails to satisfy the Owner that any such bidder is responsible or is able or qualified to carry out the obligations of the Contract or to complete the work as contemplated therein.

C. The successful bidder or bidders will be required to keep the entire work of the Contract, or their respective Contracts, at all times under their control.

D. Bidders are hereby notified that only those submitting Bonds rated A X, or better, as per the Best Rating Guide, will be considered for award of contract. Bonding of lesser rating will be considered an irregularity in the submitted Bid, and as defined elsewhere in those documents will be reason for rejection of the Bid by the Owner.

3 PART 3 BIDDING DOCUMENTS

3.1 AVAILABILITY

A. Each Prime Contractor or Sub-Contractor bidding the work may view, purchase downloaded documents, or purchase printed documents off a secure website. There is no cost to view the documents but there is a fee to download or print them. A complete printed set may be obtained for a deposit fee of $50.00, refer to Document 00 11 13. For printed portions of the documents or download, the fee is dependent on the size of the documents. Bidding Documents may be obtained by contacting the office of the Architect/Engineer:

Arcadis
59-61 Court Street, Suite 300
Binghamton, New York 13901
607-772-0007 or visiting http://www.arcadis.com

B. No bid deposit is required to view the bidding document.

C. No refunds will be given for downloading documents.

3.2 INTERPRETATION OR CORRECTIONS OF THE BIDDING DOCUMENTS

A. The Bidder shall carefully study and compare the Bidding Documents with each other, and with other work being bid concurrently to the extent that it relates to the Work for which the Bid is submitted, and shall at once report to the Architect errors, inconsistencies or ambiguities discovered.

B. Interpretations, corrections, and changes of the Bidding Documents will be made by Addendum. Interpretations, corrections, and changes of the Bidding Documents made in any other manner will not be binding, and Bidders shall not rely on them.

3.3 EQUIVALENTS

A. Equivalent: A product or system, proposed for inclusion in the base bid, prior to the award of contract, whose components or characteristics are identical to, or exceed, the specified criteria for that product or system. If accepted, an equivalent results in no change to the contract amount. The Architect/Engineer's decision is the final authority regarding whether a product is equivalent or not.

B. Substitution: A product or system proposed for substitution, after the award of contract, whose components or characteristics differ from the specified criteria for that product or system. If accepted, a substitution may result in a change to the contract amount. Substitutions will only be accepted in the event that products or systems are discontinued.

C. Prospective bidders are advised that whenever specific brands, manufacturers, materials, or equipment are referenced in the Specifications, they are regarded as the required standard of quality and are presumed to be equal. The bidder may select one of the specified items or, if the bidder desires, they may use an equivalent type, brand, manufacturer, material, or equipment other than those named in the specification. When selecting to use an equivalent product or material not specified, the bidder shall submit, prior to the award of contract, the kind, type, brand and/or manufacturer included in the base bid. The bidder is further required to provide information, describing in specific detail, how the bid material differs from the quality and performance required by the base specifications, and other pertinent information as may be required by the Architect/Engineer or the Owner.

D. The successful bidder shall submit within ten (10) calendar days after opening of bids, and prior to award of contract, the kind, type, brand, manufacturer, or equipment included in the base bid. Equivalent products must be highlighted on this list. When requested, the successful bidder shall also submit information, describing in specific detail, how the equivalent bid material differs from the appearance, quality and performance required by the base specification.

E. The risk of whether bid equivalents will be accepted is borne by the Bidder.

F. No substitutions will be considered after the Contract award unless specifically provided in the Contract Documents. Refer to Section 01 60 00 for further information.

3.4 ADDENDA

A. No interpretation of the meaning of the Bidding Documents will be made to any bidder orally. Every request for such interpretation should be made in writing addressed to the Architect/Engineer:

Arcadis
59-61 Court Street, Suite 300
Binghamton, New York 13901

B. Bidders requiring clarification or interpretation of the Bidding Documents shall make a written request which shall reach the Construction Manager at least five (5) business days prior to the date for receipt of Bids. Questions received less than five (5) business days before the date for receipt of bids will not be answered.

C. Addenda will be mailed or delivered to all that are known by the Construction Manager to have received a complete set of Bidding Documents.

D. Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.

E. No Addenda will be issued later than three business days prior to the date for receipt of Bids except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

F. Each Bidder shall ascertain prior to submitting a Bid that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt in the Bid.

G. Failure of any bidder to receive any such addendum shall not relieve any bidder from any obligation under their bid as submitted. All addenda so issued shall become a part of the Contract Documents.

4 PART 4 BIDDING PROCEDURES

4.1 PREPARATION OF BIDS

A. Bids must be submitted on forms identical to the form included with the Bidding Documents. All blank spaces must be filled in, in ink or typewritten, in both words and figures where so indicated. In the case of discrepancy between the two, the amount written in words shall govern.

B. Bidders are required to bid on all alternates that are indicated within the bidding documents. Bidders shall set forth in the space provided the amount to be added to or deducted from the BASE BID. If the Bidder does not desire to make a change from the Base Bid, they shall so indicate by using the words "NO CHANGE".

C. Alternate proposals will not be considered except as indicated on the Bid Form.

D. Erasures or other changes in the bid form must be explained or noted over the signature of the Bidder.

E. Each copy of the Bid shall include the legal name of the Bidder and shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further give the state of incorporation and have the corporate seal affixed. A Bid submitted by an agent shall have a current power of attorney attached certifying the agent's authority to bind the Bidder.

4.2 BID SECURITY

A. Each bid must be accompanied by Bid Bond using AIA Document A310, Certified Check, or Cashier's Check payable to the Owner in the amount of five percent (5%) percent of the base bid proposal.

B. Such Bid Bond, Certified Check, or Cashier's Check will be returned to all except the two lowest formal Bidders within seven (7) calendar days after the formal opening of the Bids. The remaining security will be returned to the two lowest Bidders within forty-eight (48) hours after the Owner and the accepted bidder have executed the Contract or, if no contract has been so executed, within forty-five (45) calendar days after formal bid opening, so long as bidder has not been notified of the acceptance of their proposal.

4.3 SUBMISSION OF BIDS

A. One (1) copy of the Bid Form shall be submitted with each bid. Second copy of Bid Form normally furnished should be retained for Bidder's own records.

B. All copies of the Bid, the bid security, and other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall be addressed to the party receiving the Bids and shall be identified with the Project name, the Bidder's name and address and, if applicable, the designated portion of the Work for which the Bid is submitted. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face thereof.

C. Bids shall be deposited at the designated location prior to the time and date for receipt of Bids. Bids received after the time and date for receipt of Bids will be returned.

D. The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

4.4 MODIFICATION OR WITHDRAWAL OF BID

A. Prior to the time and date designated for receipt of Bids, a Bid submitted may be modified or withdrawn by notice to the party receiving Bids at the place designated for receipt of Bids. Such notice shall be in writing over the signature of the Bidder or by telegram; if by telegram, written confirmation over the signature of the Bidder shall be mailed and postmarked on or before the date and time set for receipt of Bids. A change shall be so worded as not to reveal the amount of the original Bid.

B. Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids provided that they are then fully in conformance with the bidding requirements.

5 PART 5 CONSIDERATION OF BIDS

5.1 OPENING OF BIDS

A. Bids will be opened at the time and place set forth in the Invitation to Bid. Every bid received before that time, or authorized postponement thereof, will be opened and publicly read aloud.

5.2 REJECTION OF BIDS

A. The Owner shall have the right to reject any or all Bids, reject a Bid not accompanied by a required bid security or by other data required by the Bidding Documents, or reject a Bid, which is in any way incomplete or irregular.

B. No bidder may withdraw a bid within forty-five (45) calendar days after the time and date set forth for receipt of bids.

5.3 ACCEPTANCE OF BID (AWARD)

A. It is the intent of the Owner to award a Contract to the lowest responsible Bidder, provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available. The Owner shall have the right to waive informalities or irregularities in a Bid received and to accept the Bid which, in the Owner's judgment, is in the Owner's own best interests.

B. The Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Bidding Documents, and to determine the low Bidder on the basis of the sum of the Base Bid and Alternates accepted.

6 PART 6 POST BID INFORMATION

6.1 DRAWINGS AND SPECIFICATIONS FURNISHED

A. Copies for Construction: Each Contractor will be furnished without charge up to two (2) sets of Contract Drawings and Project Manuals for use during construction for their own use and the use of their subcontractors. Additional sets will be provided at the cost of printing, postage, and handling. Partial sets will NOT be provided.

6.2 CONTRACTOR'S QUALIFICATION STATEMENT

A. Bidders to whom award of a Contract is under consideration shall submit, if required, to the Architect/Engineer and/or Construction Manager, upon request, a properly executed AIA Document A305, Contractor's Qualification Statement.

6.3 SUBMITTALS

A. The Bidder shall, within ten (10) calendar days after notification of selection for the award of a Contract, furnish to the Owner through the Construction Manager in writing:

1. A designation of the Work to be performed with the Bidder's own forces.

2. Names of the manufacturers, products, and the suppliers of principal items or systems of materials and equipment proposed for the work.

3. Names of persons or entities (including those who are to furnish material or equipment fabricated to a special design) proposed for their portions of the Work.

B. The Bidder will be required to establish to the satisfaction of the Construction Manager and Owner the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Bidding Documents.

C. Prior to the award of the Contract, the Construction Manager will notify the Bidder in writing if either the Owner or Construction Manager, after due investigation, has reasonable objection to a person or entity proposed by the Bidder. If the Owner or Construction Manager has reasonable objection to a proposed person or entity, the Bidder may, at the Bidder's option, (1) withdraw the Bid, or (2) submit an acceptable substitute person or entity with an adjustment in the Base Bid or Alternate Bid to cover the difference in cost occasioned by such substitution. The Owner may accept the adjusted bid price or disqualify the Bidder. In the event of either withdrawal or disqualification, bid security will not be forfeited.

D. Persons and entities proposed by the Bidder and to whom the Owner and Construction Manager have made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and Construction Manager.

7 PART 7 PERFORMANCE BOND AND PAYMENT BOND

7.1 BOND REQUIREMENTS

A. As a condition precedent to the execution of the contract, the Contractor shall furnish a bond in a sum of one hundred percent (100%) of the contract sum as security for the faithful performance of this contract (Performance Bond) and a bond in a sum of one hundred percent (100%) of the contract sum as security for the payment of all persons performing labor on the project and furnishing materials in connection with this project (Payment Bond).

B. Only Bonds that carry an AX, or better rating, as determined by the Best Rating Guide, will be acceptable on the project.

C. Bond shall be executed on AIA Document No. A312, "Performance Bond" and "Payment Bond", 2010 Edition, with amounts shown on each part. Surety shall be a company licensed to do business in the State of New York.

D. Attorneys in fact who sign bid bonds or contract bonds must file with each bond a certified copy of their power of attorney to sign said bonds.

E. The bidder shall be held strictly accountable for the completion of this work on the specified schedule as a condition to satisfactory contract performance.

7.2 FAILURE TO ENTER INTO CONTRACT

A. The successful bidder, upon its failure or refusal to execute and deliver the contract, bond, and other bidding requirements required within fourteen (14) calendar days after the bidder has received notice of acceptance of its bid, shall forfeit to the Owner, the security deposited with its proposal or the difference between its bid and the next lowest responsible bid, whichever sum is greater.

8 PART 8 COMPLIANCE WITH GOVERNING AGENCIES

8.1 PERMITS, TAXES, AND ASSESSMENTS

A. The Contractor, in submitting a bid for this Contract, shall include in their Base Bid all costs and liabilities for permits. The Owner shall provide building permit. They shall also include within their Base Bid taxes and assessments upon the wages and salaries paid to employees of the Contractor and their subcontractors under the Contract, or any other taxes which may be assessed by the Federal, State or Local governments except as noted herein.

B. The Owner is exempt from payment of sales and compensating use taxes of the State of New York and of all cities and counties, and the Contractor shall notify all Subcontractors and material suppliers to this effect so the Bid, the Contract Sum, and subsequent requisitions for payment will not include any amount for sales or use taxes. All Contractors are referred to the General Conditions of the Contract for Construction and the Supplementary General Conditions of the Contract.

8.2 LAWS AND REGULATIONS

A. The bidder's attention is directed to the fact that all applicable Federal, State, or other Laws, orders, Rules and Regulations of all Authorities having jurisdiction over construction work in the locality of the project shall apply to the Contract throughout, and they will be deemed to be included in the Contract the same as though herein written out in full.

B. These construction documents, and the joint and several phases of construction hereby contemplated are to be governed, at all times, by applicable provisions of the Federal and New York State law(s), including but not limited to the latest amendments of the following:

Williams-Steiger Occupational Safety & Health Act of 1970, Public Law 910596.

Part 1910 - Occupational Safety and Health Standards, Chapter XVII of Title 29, Code of Federal Regulations

Page 1518 - Safety and Health Regulations for Construction Chapter XIII of Title 29, Code of Federal Regulations.

NY CLS Labor § 220-h (2008), Labor Law, Article 8. Public Work, where the total cost of all work to be performed under the contract is at least two hundred fifty thousand dollars, all laborers, workers, and mechanics employed in the performance of the contract on the public work site, either by the contractor, sub-contractor or other person doing or contracting to do the whole or a part of the work contemplated by the contract, shall be certified prior to performing any work on the project as having successfully completed a course in construction safety and health approved by the United States department of labor's occupational safety and health administration that is at least ten hours in duration.

8.3 NON-COLLUSIVE BIDDING CERTIFICATION

A. Pursuant to the requirements of Section 103-d of the General Municipal Law, each proposal submitted shall be accompanied by a fully executed Non-Collusive Bidding Certification, a copy of which is attached to the Bid Form.

8.4 NON-SEGREGATED FACILITIES CERTIFICATION

A. Notice of Requirement for Certification of Non-Segregated Facilities - Bidders are cautioned as follows: By signing this bid, the bidder will be deemed to have agreed to the provisions of the "Certification of Non-Segregated Facilities", a copy of which is enclosed hereafter. The Certification provides that the bidder does not maintain or provide for their employee’s facilities which are segregated on a basis of race, creed, color, or national origin, whether such facilities are segregated by directive or on a de facto basis. The Certification also provides that they will not maintain such segregated facilities. Failure of a bidder to agree to the Certification of Non-Segregated Facilities will render their bid non-responsive to the terms of solicitation involving awards of contracts

exceeding $10,000.00, which are not exempt from the provisions of the Equal Opportunity Clause.

8.5 ASSIGNMENT OF CONTRACT

A. The successful bidder is prohibited from assigning, transferring, conveying, subletting, or otherwise disposing of the same, or their right, title, or interest therein, or of their power to execute such contract to any other person or corporation without the previous consent in writing of the Owner. If such assignment, transfer conveyance, subletting, or otherwise, is made without the required consent of the Owner, the Contract herein shall be revoked, and annulled in accordance with Section 109 of the General Municipal Law, which is incorporated herein.

8.6 GENERAL COVERAGE CLAUSE

A. Each and every provision of law and clause required by law to be inserted in this contract shall be deemed to have been inserted herein, and if through mistake or otherwise, such provision is not inserted, then upon the application of either party, this Contract shall be physically amended forthwith to make such insertion.

8.7 NON-WAIVER

A. No waiver of any breach of any condition in this agreement shall be binding unless the same shall be in writing and signed by the party waiving the said breach. No such waiver shall in any way affect any other term or condition of this agreement or constitute a cause or excuse for the repetition of such or any other breach unless the waiver shall include the same.

8.8 MODIFICATIONS OF AGREEMENT

A. This agreement constitutes the complete understanding of the parties, no modification or any provision thereof shall be valid unless in writing and signed by both parties.

9 PART 9 SPECIAL INSTRUCTIONS

9.1 CONTRACT BREAKDOWN

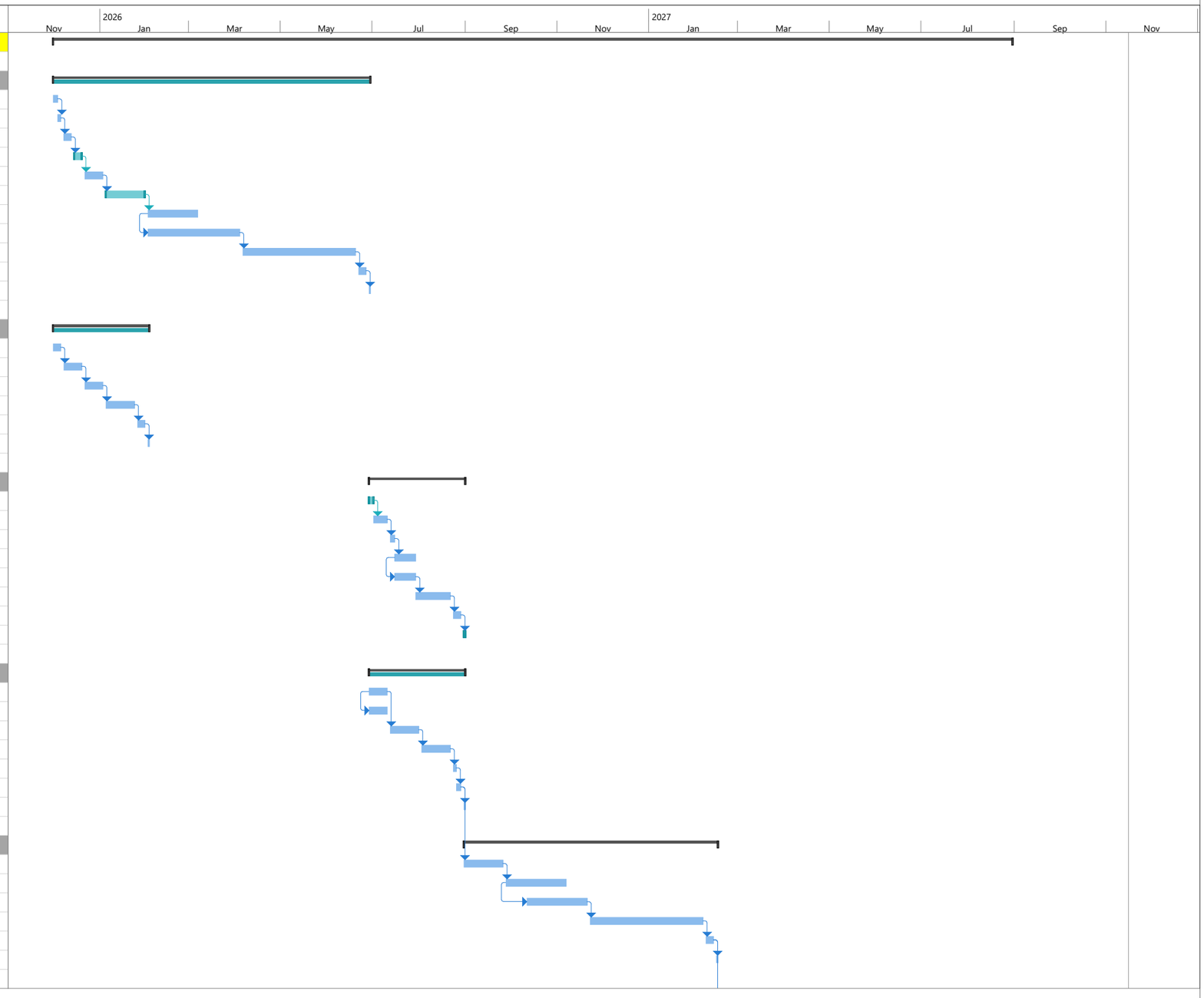
A. Each bidder shall furnish a breakdown of costs as indicated on Bid Form.

B. Successful bidders for each contract shall be required to submit a Schedule of Values indicating contract amount broken down by materials and labor and submit monthly requisitions in this format.

END OF DOCUMENT

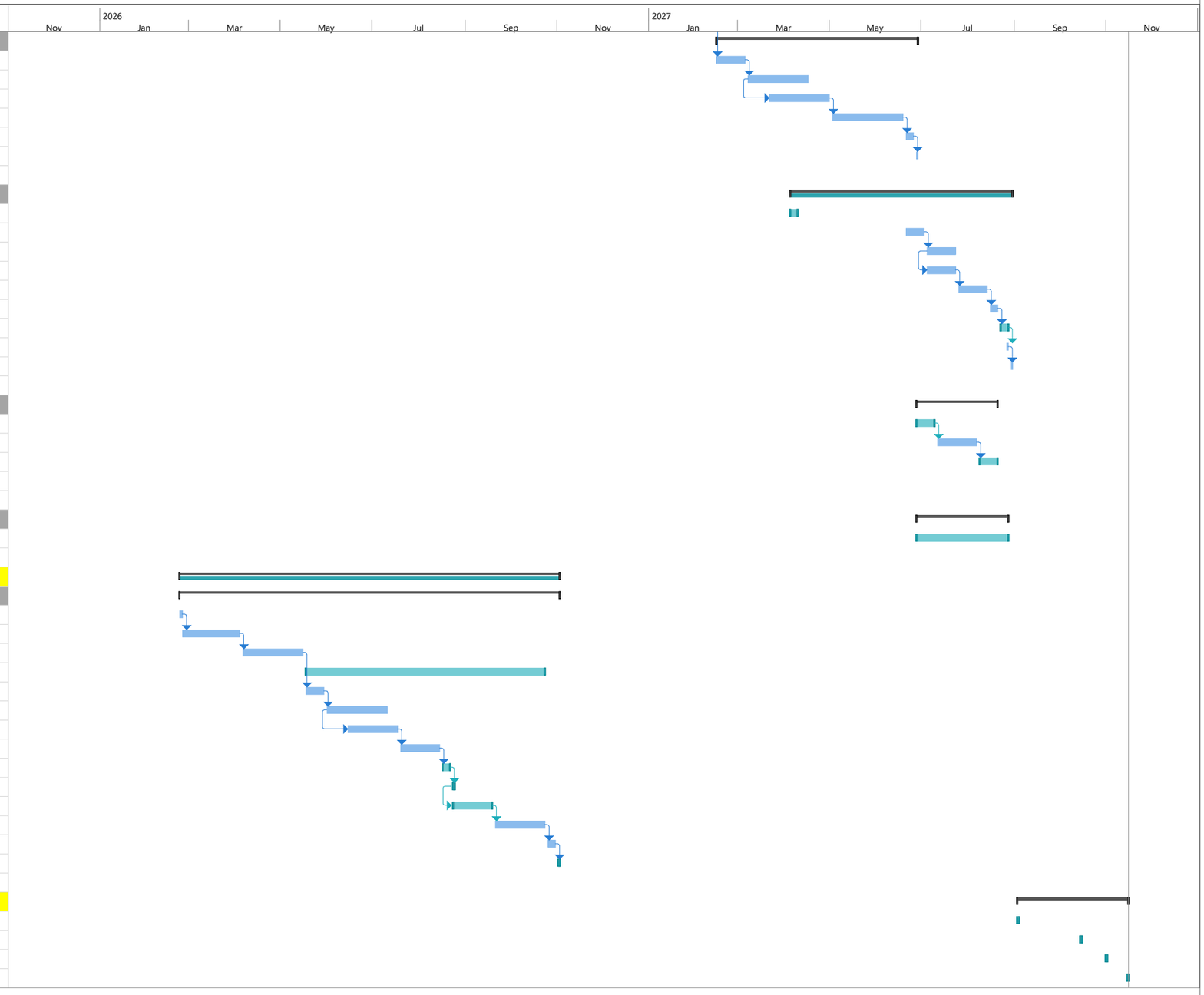
ODESSA-MONTOUR CSD
CAPITAL IMPROVEMENT PROJECT
PHASE II & III MILESTONE SCHEDULE

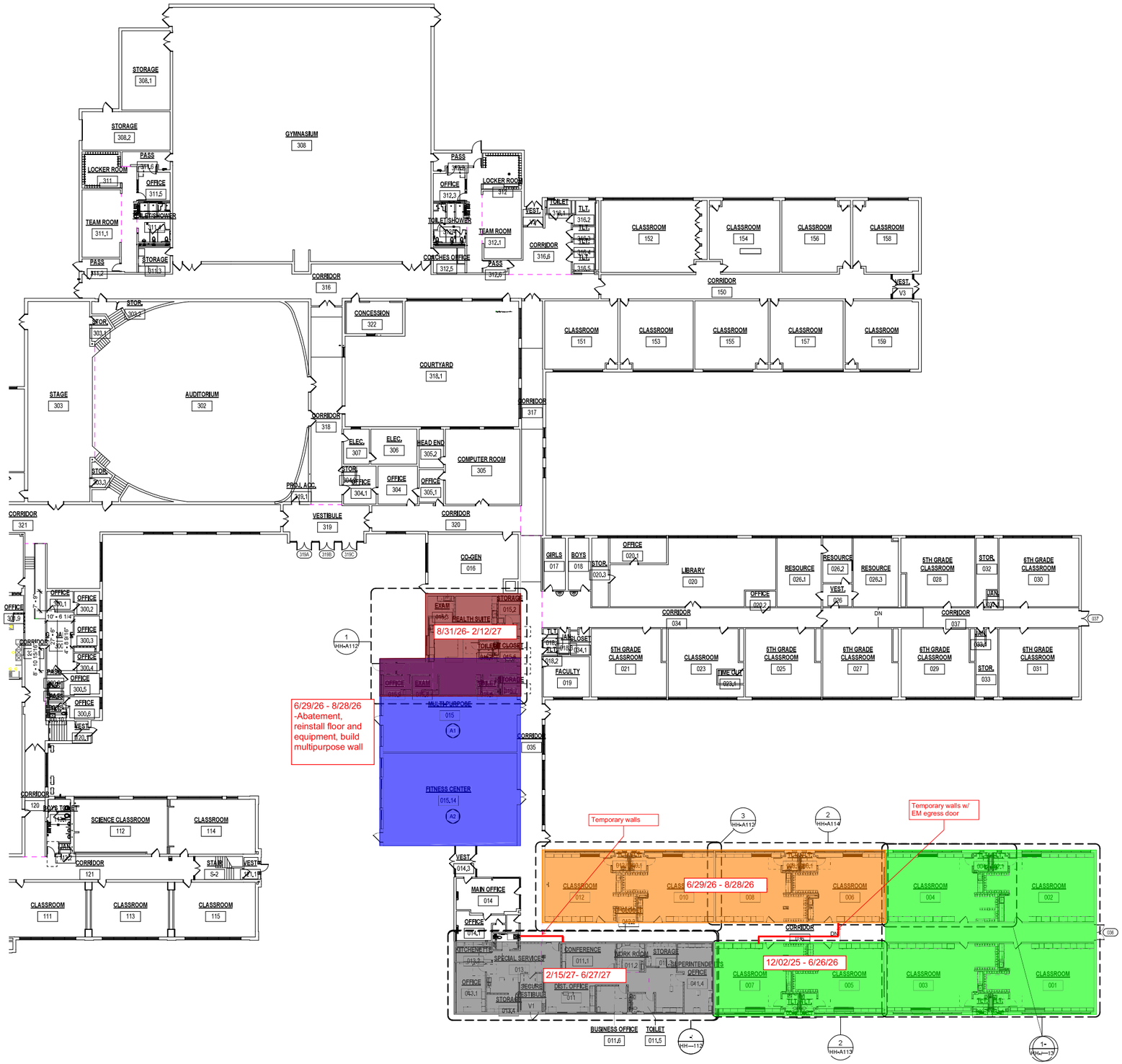
ID	Task Name	Duration	Start	Finish
1	**HS/HANLON ELEMENTARY**	**456 days**	**Mon 12/1/25**	**Mon 8/30/27**
2				
3	**Classroom Renovations (RM 001-004, 005, 007)**	**151 days**	**Mon 12/1/25**	**Mon 6/29/26**
4	Mobilize/Install Site Fence	3 days	Mon 12/1/25	Wed 12/3/25
5	Install Construction Partition (Second Shift)	2 days	Thu 12/4/25	Fri 12/5/25
6	Light Demo Prior to Asbestos Abatement	5 days	Mon 12/8/25	Fri 12/12/25
7	Classroom Asbestos Abatement Prep/Containments	5 days	Mon 12/15/25	Fri 12/19/25
8	Classroom Asbestos Abatement Removals (Winter Break)	10 days	Mon 12/22/25	Fri 1/2/26
9	Remaining Demolition	20 days	Mon 1/5/26	Fri 1/30/26
10	Masonry Partitions	25 days	Mon 2/2/26	Fri 3/6/26
11	MEP Rough-Ins	45 days	Mon 2/2/26	Fri 4/3/26
12	Interior Finishes	55 days	Mon 4/6/26	Fri 6/19/26
13	Punchlist/Final Clean	5 days	Mon 6/22/26	Fri 6/26/26
14	Owner Occupy	1 day	Mon 6/29/26	Mon 6/29/26
15				
16	**Hanlon Crawlspace Abatement & Encapsulate**	**46 days**	**Mon 12/1/25**	**Mon 2/2/26**
17	Exterior Wall Opening	5 days	Mon 12/1/25	Fri 12/5/25
18	Prep/Build Containments	10 days	Mon 12/8/25	Fri 12/19/25
19	Asbestos Removals (Winter Break)	10 days	Mon 12/22/25	Fri 1/2/26
20	Install EPDM Membrane	15 days	Mon 1/5/26	Fri 1/23/26
21	Punchlist/Final Inspection	5 days	Mon 1/26/26	Fri 1/30/26
22	Owner Occupy	1 day	Mon 2/2/26	Mon 2/2/26
23				
24	**Classroom Renovations (RM 006, 008, 010 & 012)**	**46 days**	**Mon 6/29/26**	**Mon 8/31/26**
25	Light Demo Prior to Asbestos Abatement	3 days	Mon 6/29/26	Wed 7/1/26
26	Asbestos Abatement	7 days	Thu 7/2/26	Fri 7/10/26
27	Remaining Demolition	3 days	Mon 7/13/26	Wed 7/15/26
28	Masonry Partitions	10 days	Thu 7/16/26	Wed 7/29/26
29	MEP Rough-Ins	10 days	Thu 7/16/26	Wed 7/29/26
30	Interior Finishes	17 days	Thu 7/30/26	Fri 8/21/26
31	Punchlist/Final Clean	5 days	Mon 8/24/26	Fri 8/28/26
32	Owner Occupy	1 day	Mon 8/31/26	Mon 8/31/26
33				
34	**Fitness Center/Multipurpose RM**	**46 days**	**Mon 6/29/26**	**Mon 8/31/26**
35	Remove/Salvage Rubber Floor	10 days	Mon 6/29/26	Fri 7/10/26
36	Demo Folding Partition	10 days	Mon 6/29/26	Fri 7/10/26
37	Asbestos Abatement (Poured Floor over 9x9)	15 days	Mon 7/13/26	Fri 7/31/26
38	Install Masonry Wall between MPR and Health Office Suit	15 days	Mon 8/3/26	Fri 8/21/26
39	Reinstall Fitness Center Rubber Floor (Rolls)	2 days	Mon 8/24/26	Tue 8/25/26
40	Punchlist/Final Clean	3 days	Wed 8/26/26	Fri 8/28/26
41	Owner Occupy	1 day	Mon 8/31/26	Mon 8/31/26
42				
43	**Health Office Suite Renovation**	**121 days**	**Mon 8/31/26**	**Mon 2/15/27**
44	Demolition	20 days	Mon 8/31/26	Fri 9/25/26
45	MEP Rough-Ins	30 days	Mon 9/28/26	Fri 11/6/26
46	Masonry Partitions	30 days	Mon 10/12/26	Fri 11/20/26
47	Interior Finishes	55 days	Mon 11/23/26	Fri 2/5/27
48	Punchlist/Final Clean	5 days	Mon 2/8/27	Fri 2/12/27
49	Owner Occupy	1 day	Mon 2/15/27	Mon 2/15/27
50				



ODESSA-MONTOUR CSD
CAPITAL IMPROVEMENT PROJECT
PHASE II & III MILESTONE SCHEDULE

ID	Task Name	Duration	Start	Finish
51	**District Office Renovation**	**96 days**	**Mon 2/15/27**	**Mon 6/28/27**
52	Demolition	15 days	Mon 2/15/27	Fri 3/5/27
53	MEP Rough-Ins	30 days	Mon 3/8/27	Fri 4/16/27
54	Masonry Partitions	30 days	Mon 3/22/27	Fri 4/30/27
55	Interior Finishes	35 days	Mon 5/3/27	Fri 6/18/27
56	Punchlist/Final Clean	5 days	Mon 6/21/27	Fri 6/25/27
57	Owner Occupy	1 day	Mon 6/28/27	Mon 6/28/27
58				
59	**Kitchen Renovation**	**106 days**	**Mon 4/5/27**	**Mon 8/30/27**
60	Cafeteria Soffit Abatement (Spring Break)	5 days	Mon 4/5/27	Fri 4/9/27
61	Demolition	10 days	Mon 6/21/27	Fri 7/2/27
62	MEP Rough-Ins	15 days	Mon 7/5/27	Fri 7/23/27
63	Masonry Partitions	15 days	Mon 7/5/27	Fri 7/23/27
64	Interior Finishes	15 days	Mon 7/26/27	Fri 8/13/27
65	Install Equipment	5 days	Mon 8/16/27	Fri 8/20/27
66	Punchlist/Final Clean	5 days	Mon 8/23/27	Fri 8/27/27
67	DOH Inspection	1 day	Fri 8/27/27	Fri 8/27/27
68	Owner Occupy	1 day	Mon 8/30/27	Mon 8/30/27
69				
70	**Guidance Office HVAC (ALT)**	**40 days**	**Mon 6/28/27**	**Fri 8/20/27**
71	Demolition	10 days	Mon 6/28/27	Fri 7/9/27
72	MEP Rough-Ins	20 days	Mon 7/12/27	Fri 8/6/27
73	Interior Finishes	10 days	Mon 8/9/27	Fri 8/20/27
74				
75				
76	**Main Entrance Sitework**	**45 days**	**Mon 6/28/27**	**Fri 8/27/27**
77	Sitework	45 days	Mon 6/28/27	Fri 8/27/27
78				
79	**BUS GARAGE**	**181 days**	**Mon 2/23/26**	**Mon 11/2/26**
80	**Bus Garage**	**181 days**	**Mon 2/23/26**	**Mon 11/2/26**
81	Mobilize/Install Site Fence	2 days	Mon 2/23/26	Tue 2/24/26
82	Demolition	28 days	Wed 2/25/26	Fri 4/3/26
83	Structural Reinforcement/Roof Steel	30 days	Mon 4/6/26	Fri 5/15/26
84	Sitework	115 days	Mon 5/18/26	Fri 10/23/26
85	Roofing/Envelope Dry-In	10 days	Mon 5/18/26	Fri 5/29/26
86	MEP Rough-Ins	30 days	Mon 6/1/26	Fri 7/10/26
87	Masonry Partitions	25 days	Mon 6/15/26	Fri 7/17/26
88	Interior/Exterior Finishes	20 days	Mon 7/20/26	Fri 8/14/26
89	Training RM, Toilet RMs, Office Punchlist/Final Clean	5 days	Mon 8/17/26	Fri 8/21/26
90	Training RM, Toilet RMs, Office Owner Occupy	1 day	Mon 8/24/26	Mon 8/24/26
91	Bus Lift Installation (Structural Concrete 28-Day Min)	20 days	Mon 8/24/26	Fri 9/18/26
92	Remaining Interior Finishes	25 days	Mon 9/21/26	Fri 10/23/26
93	Punchlist/Final Clean	5 days	Mon 10/26/26	Fri 10/30/26
94	Owner Occupy	1 day	Mon 11/2/26	Mon 11/2/26
95	~~<New Task>~~			
96	**CLOSEOUT**	**52 days**	**Fri 9/3/27**	**Mon 11/15/27**
97	Substantial Completion	1 day	Fri 9/3/27	Fri 9/3/27
98	Punchlist Completion	1 day	Fri 10/15/27	Fri 10/15/27
99	O&M/As-Built Completion	1 day	Mon 11/1/27	Mon 11/1/27
100	Final Pay Applications/Final Close	1 day	Mon 11/15/27	Mon 11/15/27





1 HH-A111 FIRST FLOOR RENOVATION PLAN - AREA B
Scale: 1/16" = 1'-0"

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CLIENT
ODESSA-MONTOUR CENTRAL SCHOOL DISTRICT
300 COLLEGE AVENUE,
ODESSA NEW YORK
14869

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ISSUES

ISSUE	ISSUANCE	DATE

KEYPLAN

CONSULTANTS

SEAL
REGISTERED ARCHITECT STEVEN MICHAEL TRIPP 026 STATE OF NEW YORK
EXPIRATION DATE: 02-28-2027

PRIME CONSULTANT
ARCADIS ARCHITECTS, ENGINEERS AND LANDSCAPE ARCHITECTS
ARCADIS
6-41 Court Street, Suite 300,
Binghamton, NY 13901-1956, USA
tel:607 772 0007 fax 607 723 4121
arcadis.com

PROJECT
2023 CAPITAL IMPROVEMENTS - PHASE 2
ODESSA ELEMENTARY & HIGH SCHOOL
300 COLLEGE AVENUE, ODESSA, NEW YORK 13869

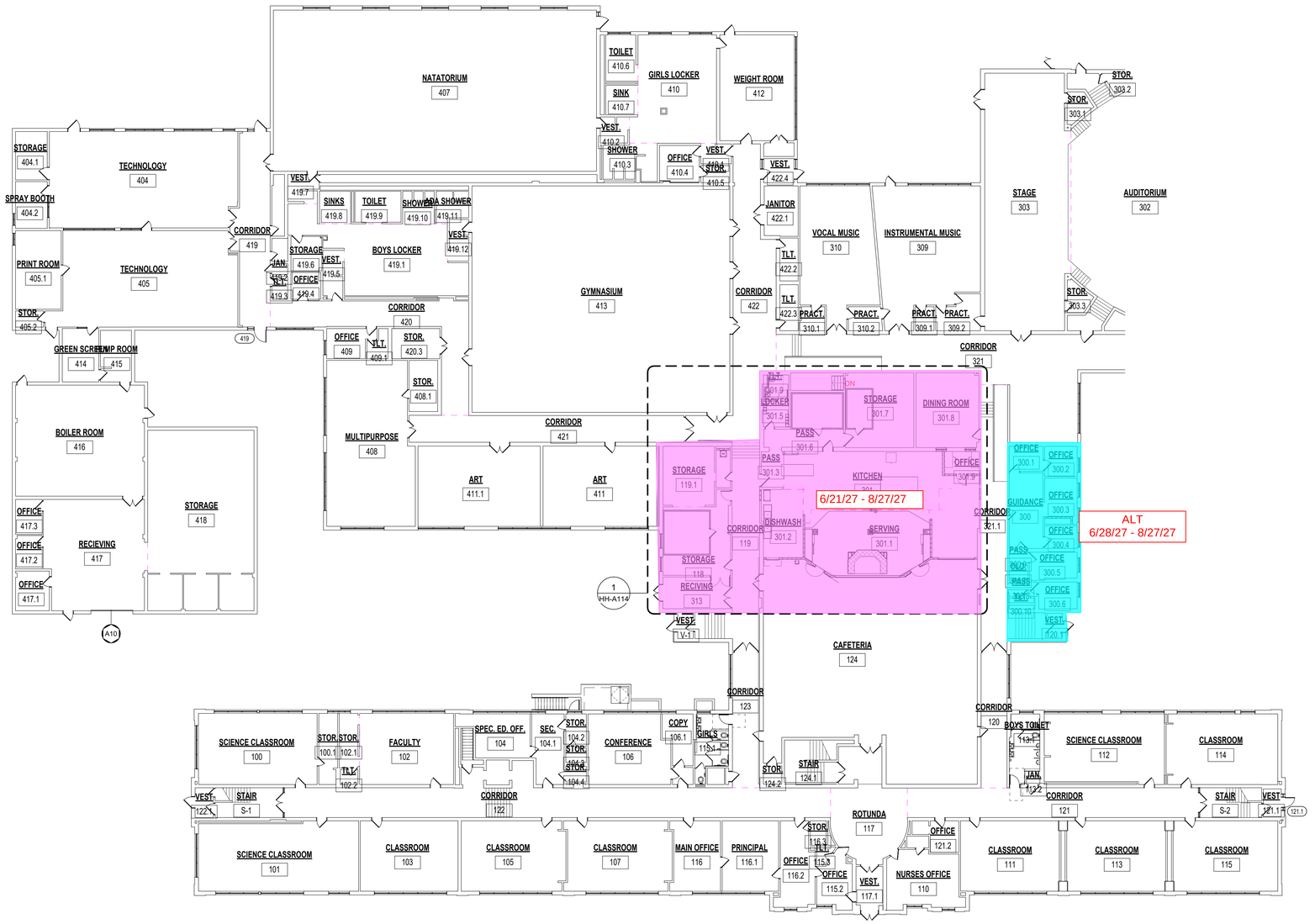
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DRAWN BY: DG	CHECKED BY: DG
PROJECT MGR: SMT	APPROVED BY: SMT
SCALE: As indicated	DATE: 2025-02-28

SHEET TITLE
OVERALL FIRST FLOOR RENOVATION PLAN - AREA B

SHEET NUMBER
HH-A111

ISSUE

Autodesk Docs://143500-Odessa/Arch/r_23CI 143500-ODMCSD_2023_C.rvt



1 HH-A110 FIRST FLOOR RENOVATION PLAN - AREA A
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ARCADIS ARCHITECTS, ENGINEERS, & LANDSCAPE ARCHITECTS
is a member of the Arcadis Group of companies

ISSUES

ISSUE	ISSUANCE	DATE

KEYPLAN

CONSULTANTS

SEAL
REGISTERED ARCHITECT RYDEN MICHAEL FRIEDEL 035 STATE OF NEW YORK

EXPIRATION DATE: 02-28-2027

PRIME CONSULTANT
ARCADIS ARCHITECTS, ENGINEERS AND LANDSCAPE ARCHITECTS
A NEW YORK GENERAL PARTNERSHIP
ARCADIS 59-61 Court Street, Suite 300, Binghamton, NY 13901-1956, USA
tel 607 772 0007 fax 607 723 4121
arcadis.com

PROJECT
2023 CAPITAL IMPROVEMENTS - PHASE 2
ODESSA ELEMENTARY & HIGH SCHOOL
300 COLLEGE AVENUE, ODESSA, NEW YORK 13869

PROJECT NO:	CLIENT PROJECT NO:
143500	55-01-01-04-0-001-022
DRAWN BY: DG	CHECKED BY: DG
PROJECT MGR: SMT	APPROVED BY: SMT
SCALE: As indicated	DATE: 2025-02-28

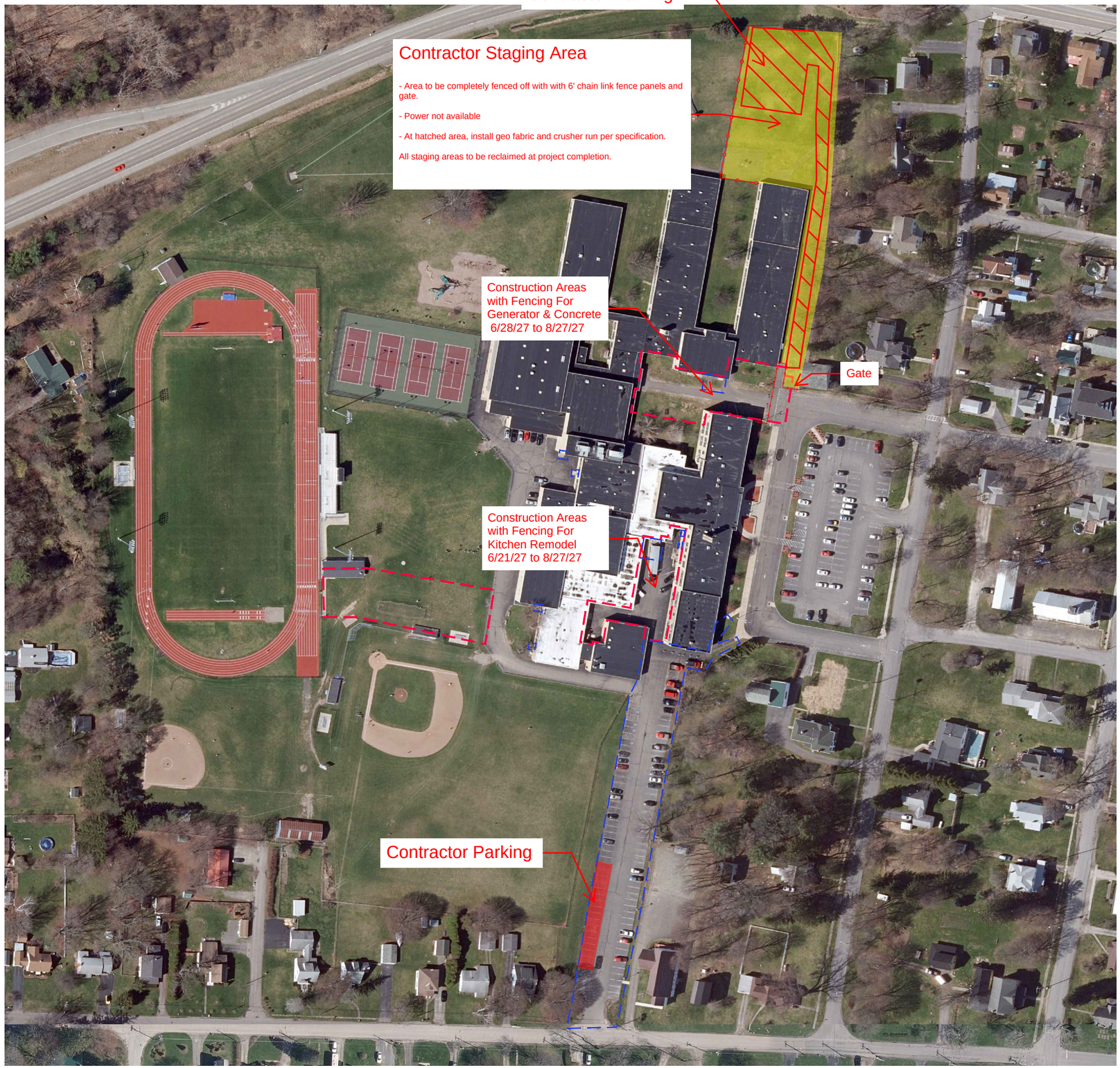
SHEET TITLE
OVERALL FIRST FLOOR RENOVATION PLAN - PART A

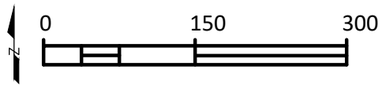
SHEET NUMBER
HH-A110

ISSUE

SCALE CHECK 10mm 1 in.

Autodesk Docs://AUS-001/143500-OMCSD_2023_CapImpPh2/HS_HE-A-VIZ.rvt


Contractor Parking
Contractor Staging Area
- Area to be completely fenced off with with 6' chain link fence panels and gate.
- Power not available
- At hatched area, install geo fabric and crusher run per specification.
All staging areas to be reclaimed at project completion.
Construction Areas with Fencing For Generator & Concrete 6/28/27 to 8/27/27
Gate
Construction Areas with Fencing For Kitchen Remodel 6/21/27 to 8/27/27
Contractor Parking


0
150
300
N

ARCADIS


10'x40'Temporary Office Trailer w/ toilet for Bus Garage Personnel, provided and maintained by GC. 2/23/26 - 6/26/26
Contractor Staging Area
-Area to be completely fenced off with gate.
- Power not available
2/23/26 - 10/30/26
United States • NY • Schuyler Co. • Odessa
State Route 228
228
State Route 224
224
State Route 224
Feedback
50 ft
20 m
© 2025 TomTom, © OpenStreetMap, © Vexcel Imaging

DOCUMENT 00 31 00

INFORMATION AVAILABLE TO BIDDERS

1.1 SUMMARY

A. Document Includes:

1. Lead survey report.

2. Asbestos test report.

3. Crystalline Silica OSHA information

1.2 LEAD SURVEY

A. The presence of lead has been detected in identified work areas. A Summary Analysis Report, including confirmed positives (greater than or equal to 1.0 mg/cm2) is available for viewing upon request to the Owner.

B. Lead Based Paint Hazard: All structural steel, unless specifically stated otherwise, is assumed to be painted with lead-based paint or primer. Whenever cutting, torching, welding, grinding or heating structural steel is specified the contractor is responsible for compliance related to lead-based paint in accordance with OSHA standards. OSHA 1926.62 Lead applies. OSHA Instruction TED 01-00-015 [TED 1-0.1A] (Section V: Chapter 3) provides technical guidance for Controlling Lead Exposures in the Construction Industry: Engineering and Work-Place Controls. OSHA also provides instruction by Directive Number STD-03-08-001 titled Welding, Cutting or Heating of Metals Coated with Lead-Bearing Paint.

1.3 ASBESTOS TEST REPORT

A. The presence of asbestos has been detected in identified work areas. A Summary Analysis Report, including confirmed positives (>1.0%) is available for viewing upon request to the Owner.

1.4 PCB TEST REPORT

A. The presence of PCB's has not been detected in identified work areas. The Summary Analysis Report including confirmed positives is attached to this document.

1.5 CRYSTALLINE SILICA OSHA INFORMATION

A. Assume all concrete, brick, mortar, and masonry materials contain crystalline silica.

B. U.S. Department of Labor Occupational Safety and Health Administration (OSHA) standard 29 CFR 1926.1153 requires employers to limit worker exposures to respirable silica.

C. OSHA provides compliance guidance for worker protection from silica dust hazards for Small Entities at: https://www.osha.gov/Publications/OSHA3902.pdf.

D. Information of OSHA's Respirable Crystalline Silica Standard for Construction is available at: https://www.osha.gov/Publications/OSHA3681.pdf

E. The OSHA Standard and guidelines indicate the use of engineering controls, work practices and procedures to limit the exposure to silica dust including but not limited to wet methods, HEPA filtration for tools and equipment (saws, blades, drills, jack hammers, chipping, grinding, cutting, etc.)

F. The OSHA standard also requires medical monitoring, a respiratory protection program, a written exposure plan, a designated competent person, worker training and record keeping for workers silica exposure.

END OF DOCUMENT

BID FORM - CONTRACT NO. 1
GENERAL CONSTRUCTION

DOCUMENT 00 41 00

BID FORM – GENERAL CONSTRUCTION

TO: Odessa-Montour CSD

PROJECT: 2023 Capital Improvements Project Phase 2

In accordance with Documents 00 21 13 - Instructions to Bidders and 00 31 00 - Information Available to Bidders, and in compliance with the proposed Contract Documents for the construction of the referenced project, please be advised that:

The Undersigned _____
(Name of Contractor)

_____
(Address)

having examined the Bidding Documents as prepared by Arcadis, having visited the site, and having familiarized themselves with the local conditions and any other conditions affecting the work of this Project, including the availability of materials and labor, hereby agrees to execute a contract to furnish all labor, materials, equipment, transportation, and services necessary to perform and complete the construction of the Project in accordance with the Contract Documents within the time limit, for the sums given as follows:

BASE BID – CONTRACT NO. 1 - GENERAL CONSTRUCTION

The construction and completion of all labor, material, equipment, services and related items incidental to and necessary to complete satisfactorily the work as shown on the Bidding Documents for the total lump sum of *(which includes the Allowance(s) noted in Specification Section 01 21 00 – Price and Payment Procedures)*:

_____(Dollars)_____(Figures)

ADDENDA

Receipt of the following addenda are hereby acknowledged and the work of the same are hereby included in the sum of the Base Bid and/or Alternate:

Addendum No. _____Date_____
Addendum No. _____Date_____
Addendum No. _____Date_____
Addendum No. _____Date_____
Addendum No. _____Date_____
Addendum No. _____Date_____

BID BOND

Enclosed is a Bid Bond, Certified Check, Cashier's Check in the amount of _____ Dollars ($_____), made payable to the Owner, and the Undersigned agrees that in case of failure to execute the necessary Contract and furnish the required Performance Bond and Payment Bond within the time limit set forth, the Bid Bond, Certified Check, or Cashier's Check, shall become and remain the property of the Owner as liquidated damages for the delay and additional expense caused the Owner thereby.

GENERAL AGREEMENTS

The sum given within this Bid is based upon the following general agreements:

1. The sum given in the Base Bid represents the entire cost of the Project. The sum given shall include any and all cost for insurance, including all insurance required by the Agreement, any and all fees for licenses and permits. The Undersigned agrees that no claim will be made for any additional costs regardless of any increases in costs such as higher wage scales or material prices. No amount is included in the Base Bid for sales or use taxes on materials and supplies to be incorporated in the work, except as specified.

2. The Undersigned has carefully checked all the figures used in compiling the sum given in the Base Bid and understands that the Owner will not be responsible for any errors or omissions incurred by the Undersigned in making up of this bid. The Undersigned further understands that no modification or withdrawal of this proposal will be permitted after the time specified for the receipt of bids.

3. The Undersigned agrees that this Bid shall be good and may not be withdrawn for a period of forty-five (45) consecutive calendar days after the time specified for the receipt of bids.

4. The Undersigned agrees to furnish the performance bond and payment bond as specified prior to the execution of the Contract.

5. The Undersigned hereby agrees to commence work under this Contract within ten (10) working days of receipt of "Notice to Proceed".

6. The Undersigned hereby agrees that on or before the date indicated in the Instructions to Bidders, they shall have substantially completed all the work of the Contract Documents as specified and that within Fifteen (15) working days from the date of substantial completion, they shall have fully completed the work of the total Contract as specified.

7. The undersigned agrees to provide the Owner with a breakdown of project costs for informational purposes only, prior to award of contract.

Dated: _____, 2025 Signed _____

For _____
(Name of Company)

Street _____

City _____

State _____

Zip _____

Telephone _____

NON-COLLUSIVE BIDDING CERTIFICATION

TO: Odessa-Montour CSD

HEREINAFTER REFERRED TO AS THE OWNER, IN ACCORDANCE WITH SEALED BIDS FOR:

2023 Capital Improvements Project Phase 2

SUBMITTED UNDER DATE OF:_____

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 hereto certifies as to its own organization, under penalty of perjury, that to the best of 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.

COMPANY:_____

BY:_____

CERTIFICATION OF NON-SEGREGATED FACILITIES

By the submission of this bid, the bidder, offeror, or subcontractor certifies that they do not maintain or provide for their employees any segregated facilities at any of their establishments, and that they do not permit their employees to perform their services at any location, under their control, where segregated facilities are maintained. They certify further that they will not maintain or provide for their employees any segregated facilities at any of their establishments, and that they will not permit their employees to perform their services at any location, under their control, where segregated facilities are maintained. The bidder, offeror, applicant or subcontractor agrees that a breach of this certification is a violation of the Equal Opportunity Clause in this contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, rest rooms, restaurants, and other eating area, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation and housing facilities provided for employees which are segregated by explicit directive or are, in fact, segregated on the basis of race, creed, color, or national origin, because of habit, local custom, or otherwise. They further agree that (except where they have obtained identical certifications from proposed subcontractors for specific time periods) they will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding $10,000.00; that they will retain such certifications in their files; and that they will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods):

NOTE: The penalty for making false statement in offers is prescribed in 18 U.S.C. 1001.

_____
Name and Title of Signer
(Please Type)

_____
(Signature)

_____
(Date)

CERTIFICATION

I, _____, the _____ of _____
(Name) (Title) (Name of Company)

hereby swear or affirm that the following is true:

1. The company, its principles or entities related to the company named above, is not now, nor ever has been, debarred from contracting with the United States Government or any State government.

2. The company is not now under investigation by any agency of the Federal Government or the government of any State for any actions by the company, its principles or any related entity, for any alleged malfeasance or misfeasance of any kind or nature which could lead to a debarment from governmental contracting or criminal prosecution, as well as render any contracts signed in reliance on this certification voidable by the party relying on this certification.

3. I have full legal authority under my company's organizational documents or bylaws to make this certification on the company's behalf.

4. I understand that submission of a false statement on this document will subject me to criminal prosecution.

Dated: _____ _____
Signature

IRAN DIVESTMENT ACT CERTIFICATION

As a result of the Iran Divestment Act of 2012 (Act), Chapter 1 of the 2012 Laws of New York, a new provision has been added to the State Finance Law (SFL), § 165-a, effective April 12, 2012. Under the Act, the Commissioner of the Office of General Services (OGS) will be developing a list (prohibited entities list) of "persons" who are engaged in "investment activities in Iran" (both are defined terms in the law). Pursuant to SFL § 165-a(3)(b), the initial list is expected to be issued no later than 120 days after the Act's effective date, at which time it will be posted on the OGS website.

By submitting a bid in response to this solicitation or by assuming the responsibility of a Contract awarded hereunder, Bidder/Contractor (or any assignee) certifies that once the prohibited entities list is posted on the OGS website, it will not utilize on such Contract any subcontractor that is identified on the prohibited entities list.

Additionally, Bidder/Contractor is advised that once the list is posted on the OGS website, any Contractor seeking to renew or extend a Contract or assume the responsibility of a Contract awarded in response to the solicitation, must certify at the time the Contract is renewed, extended or assigned that it is not included on the prohibited entities list.

During the term of the Contract, should the New York State Education Department (AGENCY) receive information that a person is in violation of the above-referenced certification, AGENCY will offer the person an opportunity to respond. If the person fails to demonstrate that it has ceased its engagement in the investment which is in violation of the Act within 90 days after the determination of such violation, then AGENCY shall take such action as may be appropriate including, but not limited to, imposing sanctions, seeking compliance, recovering damages, or declaring the Contractor in default.

AGENCY reserves the right to reject any bid or request for assignment for an entity that appears on the prohibited entities list prior to the award of a contract, and to pursue a responsibility review with respect to any entity that is awarded a contract and appears on the prohibited entities list after contract award.

Signature:_____

Print Name:_____

Title:_____

Company Name:_____

Date: :_____

Attach to each copy of the Bid Form a Bid Bond using AIA Document A310, a certified check, or a cashier's check payable to the Owner. Any Bid Bond on other forms may be considered an irregularity in bidding. AIA forms as required by these Contract Documents are available from the American Institute of Architects, 1735 New York Avenue, NW, Washington, DC 20006, or from the Architect's office at cost.

BID FORM - CONTRACT NO. 2
MECHANICAL CONSTRUCTION

DOCUMENT 00 41 00

BID FORM – MECHANICAL CONSTRUCTION

TO: Odessa-Montour CSD

PROJECT: 2023 Capital Improvements Project Phase 2

In accordance with Documents 00 21 13 - Instructions to Bidders and 00 31 00 - Information Available to Bidders, and in compliance with the proposed Contract Documents for the construction of the referenced project, please be advised that:

The Undersigned _____
(Name of Contractor)

_____
(Address)

having examined the Bidding Documents as prepared by Arcadis, having visited the site, and having familiarized themselves with the local conditions and any other conditions affecting the work of this Project, including the availability of materials and labor, hereby agrees to execute a contract to furnish all labor, materials, equipment, transportation, and services necessary to perform and complete the construction of the Project in accordance with the Contract Documents within the time limit, for the sums given as follows:

BASE BID – CONTRACT NO. 2 - MECHANICAL CONSTRUCTION

The construction and completion of all labor, material, equipment, services and related items incidental to and necessary to complete satisfactorily the work as shown on the Bidding Documents for the total lump sum of *(which includes the Allowance(s) noted in Specification Section 01 21 00 – Price and Payment Procedures)*:

_____(Dollars)_____(Figures)

ADDENDA

Receipt of the following addenda are hereby acknowledged and the work of the same are hereby included in the sum of the Base Bid and/or Alternate:

Addendum No. _____Date_____
Addendum No. _____Date_____
Addendum No. _____Date_____
Addendum No. _____Date_____
Addendum No. _____Date_____
Addendum No. _____Date_____

BID BOND

Enclosed is a Bid Bond, Certified Check, Cashier's Check in the amount of

_____

Dollars ($_____), made payable to the Owner, and the Undersigned agrees that in case of failure to execute the necessary Contract and furnish the required Performance Bond and Payment Bond within the time limit set forth, the Bid Bond, Certified Check, or Cashier's Check, shall become and remain the property of the Owner as liquidated damages for the delay and additional expense caused the Owner thereby.

GENERAL AGREEMENTS

The sum given within this Bid is based upon the following general agreements:

1. The sum given in the Base Bid represents the entire cost of the Project. The sum given shall include any and all cost for insurance, including all insurance required by the Agreement, any and all fees for licenses and permits. The Undersigned agrees that no claim will be made for any additional costs regardless of any increases in costs such as higher wage scales or material prices. No amount is included in the Base Bid for sales or use taxes on materials and supplies to be incorporated in the work, except as specified.

2. The Undersigned has carefully checked all the figures used in compiling the sum given in the Base Bid and understands that the Owner will not be responsible for any errors or omissions incurred by the Undersigned in making up of this bid. The Undersigned further understands that no modification or withdrawal of this proposal will be permitted after the time specified for the receipt of bids.

3. The Undersigned agrees that this Bid shall be good and may not be withdrawn for a period of forty-five (45) consecutive calendar days after the time specified for the receipt of bids.

4. The Undersigned agrees to furnish the performance bond and payment bond as specified prior to the execution of the Contract.

5. The Undersigned hereby agrees to commence work under this Contract within ten (10) working days of receipt of "Notice to Proceed".

6. The Undersigned hereby agrees that on or before the date indicated in the Instructions to Bidders, they shall have substantially completed all the work of the Contract Documents as specified and that within Fifteen (15) working days from the date of substantial completion, they shall have fully completed the work of the total Contract as specified.

7. The undersigned agrees to provide the Owner with a breakdown of project costs for informational purposes only, prior to award of contract.

Dated: _____, 2025 Signed _____

For _____
(Name of Company)

Street _____

City _____

State _____

Zip _____

Telephone _____

NON-COLLUSIVE BIDDING CERTIFICATION

TO: Odessa-Montour CSD

HEREINAFTER REFERRED TO AS THE OWNER, IN ACCORDANCE WITH SEALED BIDS FOR:

2023 Capital Improvements Project Phase 2

SUBMITTED UNDER DATE OF:_____

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 hereto certifies as to its own organization, under penalty of perjury, that to the best of 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.

COMPANY:_____

BY:_____

CERTIFICATION OF NON-SEGREGATED FACILITIES

By the submission of this bid, the bidder, offeror, or subcontractor certifies that they do not maintain or provide for their employees any segregated facilities at any of their establishments, and that they do not permit their employees to perform their services at any location, under their control, where segregated facilities are maintained. They certify further that they will not maintain or provide for their employees any segregated facilities at any of their establishments, and that they will not permit their employees to perform their services at any location, under their control, where segregated facilities are maintained. The bidder, offeror, applicant or subcontractor agrees that a breach of this certification is a violation of the Equal Opportunity Clause in this contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, rest rooms, restaurants, and other eating area, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation and housing facilities provided for employees which are segregated by explicit directive or are, in fact, segregated on the basis of race, creed, color, or national origin, because of habit, local custom, or otherwise. They further agree that (except where they have obtained identical certifications from proposed subcontractors for specific time periods) they will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding $10,000.00; that they will retain such certifications in their files; and that they will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods):

NOTE: The penalty for making false statement in offers is prescribed in 18 U.S.C. 1001.

_____
Name and Title of Signer
(Please Type)

_____
(Signature)

_____
(Date)

CERTIFICATION

I, _____, the _____ of _____
(Name) (Title) (Name of Company)

hereby swear or affirm that the following is true:

1. The company, its principles or entities related to the company named above, is not now, nor ever has been, debarred from contracting with the United States Government or any State government.

2. The company is not now under investigation by any agency of the Federal Government or the government of any State for any actions by the company, its principles or any related entity, for any alleged malfeasance or misfeasance of any kind or nature which could lead to a debarment from governmental contracting or criminal prosecution, as well as render any contracts signed in reliance on this certification voidable by the party relying on this certification.

3. I have full legal authority under my company's organizational documents or bylaws to make this certification on the company's behalf.

4. I understand that submission of a false statement on this document will subject me to criminal prosecution.

Dated: _____ _____
Signature

IRAN DIVESTMENT ACT CERTIFICATION

As a result of the Iran Divestment Act of 2012 (Act), Chapter 1 of the 2012 Laws of New York, a new provision has been added to the State Finance Law (SFL), § 165-a, effective April 12, 2012. Under the Act, the Commissioner of the Office of General Services (OGS) will be developing a list (prohibited entities list) of "persons" who are engaged in "investment activities in Iran" (both are defined terms in the law). Pursuant to SFL § 165-a(3)(b), the initial list is expected to be issued no later than 120 days after the Act's effective date, at which time it will be posted on the OGS website.

By submitting a bid in response to this solicitation or by assuming the responsibility of a Contract awarded hereunder, Bidder/Contractor (or any assignee) certifies that once the prohibited entities list is posted on the OGS website, it will not utilize on such Contract any subcontractor that is identified on the prohibited entities list.

Additionally, Bidder/Contractor is advised that once the list is posted on the OGS website, any Contractor seeking to renew or extend a Contract or assume the responsibility of a Contract awarded in response to the solicitation, must certify at the time the Contract is renewed, extended or assigned that it is not included on the prohibited entities list.

During the term of the Contract, should the New York State Education Department (AGENCY) receive information that a person is in violation of the above-referenced certification, AGENCY will offer the person an opportunity to respond. If the person fails to demonstrate that it has ceased its engagement in the investment which is in violation of the Act within 90 days after the determination of such violation, then AGENCY shall take such action as may be appropriate including, but not limited to, imposing sanctions, seeking compliance, recovering damages, or declaring the Contractor in default.

AGENCY reserves the right to reject any bid or request for assignment for an entity that appears on the prohibited entities list prior to the award of a contract, and to pursue a responsibility review with respect to any entity that is awarded a contract and appears on the prohibited entities list after contract award.

Signature:_____

Print Name:_____

Title:_____

Company Name:_____

Date: :_____

Attach to each copy of the Bid Form a Bid Bond using AIA Document A310, a certified check, or a cashier's check payable to the Owner. Any Bid Bond on other forms may be considered an irregularity in bidding. AIA forms as required by these Contract Documents are available from the American Institute of Architects, 1735 New York Avenue, NW, Washington, DC 20006, or from the Architect's office at cost.

BID FORM - CONTRACT NO. 3
ELECTRICAL CONSTRUCTION

DOCUMENT 00 41 00

BID FORM – ELECTRICAL CONSTRUCTION

TO: Odessa-Montour CSD

PROJECT: 2023 Capital Improvements Project Phase 2

In accordance with Documents 00 21 13 - Instructions to Bidders and 00 31 00 - Information Available to Bidders, and in compliance with the proposed Contract Documents for the construction of the referenced project, please be advised that:

The Undersigned _____
(Name of Contractor)

_____
(Address)

having examined the Bidding Documents as prepared by Arcadis, having visited the site, and having familiarized themselves with the local conditions and any other conditions affecting the work of this Project, including the availability of materials and labor, hereby agrees to execute a contract to furnish all labor, materials, equipment, transportation, and services necessary to perform and complete the construction of the Project in accordance with the Contract Documents within the time limit, for the sums given as follows:

BASE BID – CONTRACT NO. 3 - ELECTRICAL CONSTRUCTION

The construction and completion of all labor, material, equipment, services and related items incidental to and necessary to complete satisfactorily the work as shown on the Bidding Documents for the total lump sum of *(which includes the Allowance(s) noted in Specification Section 01 21 00 – Price and Payment Procedures)*:

_____(Dollars)_____(Figures)

ADDENDA

Receipt of the following addenda are hereby acknowledged and the work of the same are hereby included in the sum of the Base Bid and/or Alternate:

Addendum No. _____Date_____
Addendum No. _____Date_____
Addendum No. _____Date_____
Addendum No. _____Date_____
Addendum No. _____Date_____
Addendum No. _____Date_____

BID BOND

Enclosed is a Bid Bond, Certified Check, Cashier's Check in the amount of

_____

Dollars ($_____), made payable to the Owner, and the Undersigned agrees that in case of failure to execute the necessary Contract and furnish the required Performance Bond and Payment Bond within the time limit set forth, the Bid Bond, Certified Check, or Cashier's Check, shall become and remain the property of the Owner as liquidated damages for the delay and additional expense caused the Owner thereby.

GENERAL AGREEMENTS

The sum given within this Bid is based upon the following general agreements:

1. The sum given in the Base Bid represents the entire cost of the Project. The sum given shall include any and all cost for insurance, including all insurance required by the Agreement, any and all fees for licenses and permits. The Undersigned agrees that no claim will be made for any additional costs regardless of any increases in costs such as higher wage scales or material prices. No amount is included in the Base Bid for sales or use taxes on materials and supplies to be incorporated in the work, except as specified.

2. The Undersigned has carefully checked all the figures used in compiling the sum given in the Base Bid and understands that the Owner will not be responsible for any errors or omissions incurred by the Undersigned in making up of this bid. The Undersigned further understands that no modification or withdrawal of this proposal will be permitted after the time specified for the receipt of bids.

3. The Undersigned agrees that this Bid shall be good and may not be withdrawn for a period of forty-five (45) consecutive calendar days after the time specified for the receipt of bids.

4. The Undersigned agrees to furnish the performance bond and payment bond as specified prior to the execution of the Contract.

5. The Undersigned hereby agrees to commence work under this Contract within ten (10) working days of receipt of "Notice to Proceed".

6. The Undersigned hereby agrees that on or before the date indicated in the Instructions to Bidders, they shall have substantially completed all the work of the Contract Documents as specified and that within Fifteen (15) working days from the date of substantial completion, they shall have fully completed the work of the total Contract as specified.

7. The undersigned agrees to provide the Owner with a breakdown of project costs for informational purposes only, prior to award of contract.

Dated: _____, 2025 Signed _____

For _____
(Name of Company)

Street _____

City _____

State _____

Zip _____

Telephone _____

NON-COLLUSIVE BIDDING CERTIFICATION

TO: Odessa-Montour CSD

HEREINAFTER REFERRED TO AS THE OWNER, IN ACCORDANCE WITH SEALED BIDS FOR:

2023 Capital Improvements Project Phase 2

SUBMITTED UNDER DATE OF:_____

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 hereto certifies as to its own organization, under penalty of perjury, that to the best of 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.

COMPANY:_____

BY:_____

CERTIFICATION OF NON-SEGREGATED FACILITIES

By the submission of this bid, the bidder, offeror, or subcontractor certifies that they do not maintain or provide for their employees any segregated facilities at any of their establishments, and that they do not permit their employees to perform their services at any location, under their control, where segregated facilities are maintained. They certify further that they will not maintain or provide for their employees any segregated facilities at any of their establishments, and that they will not permit their employees to perform their services at any location, under their control, where segregated facilities are maintained. The bidder, offeror, applicant or subcontractor agrees that a breach of this certification is a violation of the Equal Opportunity Clause in this contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, rest rooms, restaurants, and other eating area, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation and housing facilities provided for employees which are segregated by explicit directive or are, in fact, segregated on the basis of race, creed, color, or national origin, because of habit, local custom, or otherwise. They further agree that (except where they have obtained identical certifications from proposed subcontractors for specific time periods) they will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding $10,000.00; that they will retain such certifications in their files; and that they will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods):

NOTE: The penalty for making false statement in offers is prescribed in 18 U.S.C. 1001.

_____
Name and Title of Signer
(Please Type)

_____
(Signature)

_____
(Date)

CERTIFICATION

I, _____, the _____ of _____
(Name) (Title) (Name of Company)

hereby swear or affirm that the following is true:

1. The company, its principles or entities related to the company named above, is not now, nor ever has been, debarred from contracting with the United States Government or any State government.

2. The company is not now under investigation by any agency of the Federal Government or the government of any State for any actions by the company, its principles or any related entity, for any alleged malfeasance or misfeasance of any kind or nature which could lead to a debarment from governmental contracting or criminal prosecution, as well as render any contracts signed in reliance on this certification voidable by the party relying on this certification.

3. I have full legal authority under my company's organizational documents or bylaws to make this certification on the company's behalf.

4. I understand that submission of a false statement on this document will subject me to criminal prosecution.

Dated: _____ _____
Signature

IRAN DIVESTMENT ACT CERTIFICATION

As a result of the Iran Divestment Act of 2012 (Act), Chapter 1 of the 2012 Laws of New York, a new provision has been added to the State Finance Law (SFL), § 165-a, effective April 12, 2012. Under the Act, the Commissioner of the Office of General Services (OGS) will be developing a list (prohibited entities list) of "persons" who are engaged in "investment activities in Iran" (both are defined terms in the law). Pursuant to SFL § 165-a(3)(b), the initial list is expected to be issued no later than 120 days after the Act's effective date, at which time it will be posted on the OGS website.

By submitting a bid in response to this solicitation or by assuming the responsibility of a Contract awarded hereunder, Bidder/Contractor (or any assignee) certifies that once the prohibited entities list is posted on the OGS website, it will not utilize on such Contract any subcontractor that is identified on the prohibited entities list.

Additionally, Bidder/Contractor is advised that once the list is posted on the OGS website, any Contractor seeking to renew or extend a Contract or assume the responsibility of a Contract awarded in response to the solicitation, must certify at the time the Contract is renewed, extended or assigned that it is not included on the prohibited entities list.

During the term of the Contract, should the New York State Education Department (AGENCY) receive information that a person is in violation of the above-referenced certification, AGENCY will offer the person an opportunity to respond. If the person fails to demonstrate that it has ceased its engagement in the investment which is in violation of the Act within 90 days after the determination of such violation, then AGENCY shall take such action as may be appropriate including, but not limited to, imposing sanctions, seeking compliance, recovering damages, or declaring the Contractor in default.

AGENCY reserves the right to reject any bid or request for assignment for an entity that appears on the prohibited entities list prior to the award of a contract, and to pursue a responsibility review with respect to any entity that is awarded a contract and appears on the prohibited entities list after contract award.

Signature:_____

Print Name:_____

Title:_____

Company Name:_____

Date: :_____

Attach to each copy of the Bid Form a Bid Bond using AIA Document A310, a certified check, or a cashier's check payable to the Owner. Any Bid Bond on other forms may be considered an irregularity in bidding. AIA forms as required by these Contract Documents are available from the American Institute of Architects, 1735 New York Avenue, NW, Washington, DC 20006, or from the Architect's office at cost.

BID FORM - CONTRACT NO. 4
PLUMBING CONSTRUCTION

DOCUMENT 00 41 00

BID FORM – PLUMBING CONSTRUCTION

TO: Odessa-Montour CSD

PROJECT: 2023 Capital Improvements Project Phase 2

In accordance with Documents 00 21 13 - Instructions to Bidders and 00 31 00 - Information Available to Bidders, and in compliance with the proposed Contract Documents for the construction of the referenced project, please be advised that:

The Undersigned _____
(Name of Contractor)

_____
(Address)

having examined the Bidding Documents as prepared by Arcadis, having visited the site, and having familiarized themselves with the local conditions and any other conditions affecting the work of this Project, including the availability of materials and labor, hereby agrees to execute a contract to furnish all labor, materials, equipment, transportation, and services necessary to perform and complete the construction of the Project in accordance with the Contract Documents within the time limit, for the sums given as follows:

BASE BID – CONTRACT NO. 4 - PLUMBING CONSTRUCTION

The construction and completion of all labor, material, equipment, services and related items incidental to and necessary to complete satisfactorily the work as shown on the Bidding Documents for the total lump sum of *(which includes the Allowance(s) noted in Specification Section 01 21 00 – Price and Payment Procedures)*:

_____(Dollars)_____(Figures)

ADDENDA

Receipt of the following addenda are hereby acknowledged and the work of the same are hereby included in the sum of the Base Bid and/or Alternate:

Addendum No. _____Date_____
Addendum No. _____Date_____
Addendum No. _____Date_____
Addendum No. _____Date_____
Addendum No. _____Date_____
Addendum No. _____Date_____

BID BOND

Enclosed is a Bid Bond, Certified Check, Cashier's Check in the amount of

_____

Dollars ($_____), made payable to the Owner, and the Undersigned agrees that in case of failure to execute the necessary Contract and furnish the required Performance Bond and Payment Bond within the time limit set forth, the Bid Bond, Certified Check, or Cashier's Check, shall become and remain the property of the Owner as liquidated damages for the delay and additional expense caused the Owner thereby.

GENERAL AGREEMENTS

The sum given within this Bid is based upon the following general agreements:

1. The sum given in the Base Bid represents the entire cost of the Project. The sum given shall include any and all cost for insurance, including all insurance required by the Agreement, any and all fees for licenses and permits. The Undersigned agrees that no claim will be made for any additional costs regardless of any increases in costs such as higher wage scales or material prices. No amount is included in the Base Bid for sales or use taxes on materials and supplies to be incorporated in the work, except as specified.

2. The Undersigned has carefully checked all the figures used in compiling the sum given in the Base Bid and understands that the Owner will not be responsible for any errors or omissions incurred by the Undersigned in making up of this bid. The Undersigned further understands that no modification or withdrawal of this proposal will be permitted after the time specified for the receipt of bids.

3. The Undersigned agrees that this Bid shall be good and may not be withdrawn for a period of forty-five (45) consecutive calendar days after the time specified for the receipt of bids.

4. The Undersigned agrees to furnish the performance bond and payment bond as specified prior to the execution of the Contract.

5. The Undersigned hereby agrees to commence work under this Contract within ten (10) working days of receipt of "Notice to Proceed".

6. The Undersigned hereby agrees that on or before the date indicated in the Instructions to Bidders, they shall have substantially completed all the work of the Contract Documents as specified and that within Fifteen (15) working days from the date of substantial completion, they shall have fully completed the work of the total Contract as specified.

7. The undersigned agrees to provide the Owner with a breakdown of project costs for informational purposes only, prior to award of contract.

Dated: _____, 2025 Signed _____

For _____
(Name of Company)

Street _____

City _____

State _____

Zip _____

Telephone _____

NON-COLLUSIVE BIDDING CERTIFICATION

TO: Odessa-Montour CSD

HEREINAFTER REFERRED TO AS THE OWNER, IN ACCORDANCE WITH SEALED BIDS FOR:

2023 Capital Improvements Project Phase 2

SUBMITTED UNDER DATE OF:_____

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 hereto certifies as to its own organization, under penalty of perjury, that to the best of 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.

COMPANY:_____

BY:_____

CERTIFICATION OF NON-SEGREGATED FACILITIES

By the submission of this bid, the bidder, offeror, or subcontractor certifies that they do not maintain or provide for their employees any segregated facilities at any of their establishments, and that they do not permit their employees to perform their services at any location, under their control, where segregated facilities are maintained. They certify further that they will not maintain or provide for their employees any segregated facilities at any of their establishments, and that they will not permit their employees to perform their services at any location, under their control, where segregated facilities are maintained. The bidder, offeror, applicant or subcontractor agrees that a breach of this certification is a violation of the Equal Opportunity Clause in this contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, rest rooms, restaurants, and other eating area, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation and housing facilities provided for employees which are segregated by explicit directive or are, in fact, segregated on the basis of race, creed, color, or national origin, because of habit, local custom, or otherwise. They further agree that (except where they have obtained identical certifications from proposed subcontractors for specific time periods) they will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding $10,000.00; that they will retain such certifications in their files; and that they will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods):

NOTE: The penalty for making false statement in offers is prescribed in 18 U.S.C. 1001.

_____
Name and Title of Signer
(Please Type)

_____
(Signature)

_____
(Date)

CERTIFICATION

I, _____, the _____ of _____
(Name) (Title) (Name of Company)

hereby swear or affirm that the following is true:

1. The company, its principles or entities related to the company named above, is not now, nor ever has been, debarred from contracting with the United States Government or any State government.

2. The company is not now under investigation by any agency of the Federal Government or the government of any State for any actions by the company, its principles or any related entity, for any alleged malfeasance or misfeasance of any kind or nature which could lead to a debarment from governmental contracting or criminal prosecution, as well as render any contracts signed in reliance on this certification voidable by the party relying on this certification.

3. I have full legal authority under my company's organizational documents or bylaws to make this certification on the company's behalf.

4. I understand that submission of a false statement on this document will subject me to criminal prosecution.

Dated: _____ _____
Signature

IRAN DIVESTMENT ACT CERTIFICATION

As a result of the Iran Divestment Act of 2012 (Act), Chapter 1 of the 2012 Laws of New York, a new provision has been added to the State Finance Law (SFL), § 165-a, effective April 12, 2012. Under the Act, the Commissioner of the Office of General Services (OGS) will be developing a list (prohibited entities list) of "persons" who are engaged in "investment activities in Iran" (both are defined terms in the law). Pursuant to SFL § 165-a(3)(b), the initial list is expected to be issued no later than 120 days after the Act's effective date, at which time it will be posted on the OGS website.

By submitting a bid in response to this solicitation or by assuming the responsibility of a Contract awarded hereunder, Bidder/Contractor (or any assignee) certifies that once the prohibited entities list is posted on the OGS website, it will not utilize on such Contract any subcontractor that is identified on the prohibited entities list.

Additionally, Bidder/Contractor is advised that once the list is posted on the OGS website, any Contractor seeking to renew or extend a Contract or assume the responsibility of a Contract awarded in response to the solicitation, must certify at the time the Contract is renewed, extended or assigned that it is not included on the prohibited entities list.

During the term of the Contract, should the New York State Education Department (AGENCY) receive information that a person is in violation of the above-referenced certification, AGENCY will offer the person an opportunity to respond. If the person fails to demonstrate that it has ceased its engagement in the investment which is in violation of the Act within 90 days after the determination of such violation, then AGENCY shall take such action as may be appropriate including, but not limited to, imposing sanctions, seeking compliance, recovering damages, or declaring the Contractor in default.

AGENCY reserves the right to reject any bid or request for assignment for an entity that appears on the prohibited entities list prior to the award of a contract, and to pursue a responsibility review with respect to any entity that is awarded a contract and appears on the prohibited entities list after contract award.

Signature:_____

Print Name:_____

Title:_____

Company Name:_____

Date: :_____

Attach to each copy of the Bid Form a Bid Bond using AIA Document A310, a certified check, or a cashier's check payable to the Owner. Any Bid Bond on other forms may be considered an irregularity in bidding. AIA forms as required by these Contract Documents are available from the American Institute of Architects, 1735 New York Avenue, NW, Washington, DC 20006, or from the Architect's office at cost.

BID FORM - CONTRACT NO. 5
FOOD SERVICE CONSTRUCTION

DOCUMENT 00 41 00

BID FORM – FOOD SERVICE CONSTRUCTION

TO: Odessa-Montour CSD

PROJECT: 2023 Capital Improvements Project Phase 2

In accordance with Documents 00 21 13 - Instructions to Bidders and 00 31 00 - Information Available to Bidders, and in compliance with the proposed Contract Documents for the construction of the referenced project, please be advised that:

The Undersigned _____
(Name of Contractor)

_____
(Address)

having examined the Bidding Documents as prepared by Arcadis, having visited the site, and having familiarized themselves with the local conditions and any other conditions affecting the work of this Project, including the availability of materials and labor, hereby agrees to execute a contract to furnish all labor, materials, equipment, transportation, and services necessary to perform and complete the construction of the Project in accordance with the Contract Documents within the time limit, for the sums given as follows:

BASE BID – CONTRACT NO. 5 – FOOD SERVICE CONSTRUCTION

The construction and completion of all labor, material, equipment, services and related items incidental to and necessary to complete satisfactorily the work as shown on the Bidding Documents for the total lump sum of *(which includes the Allowance(s) noted in Specification Section 01 21 00 – Price and Payment Procedures)*:

_____(Dollars)_____(Figures)

ADDENDA

Receipt of the following addenda are hereby acknowledged and the work of the same are hereby included in the sum of the Base Bid and/or Alternate:

Addendum No. _____Date_____
Addendum No. _____Date_____
Addendum No. _____Date_____
Addendum No. _____Date_____
Addendum No. _____Date_____
Addendum No. _____Date_____

BID BOND

Enclosed is a Bid Bond, Certified Check, Cashier's Check in the amount of

_____

Dollars ($_____), made payable to the Owner, and the Undersigned agrees that in case of failure to execute the necessary Contract and furnish the required Performance Bond and Payment Bond within the time limit set forth, the Bid Bond, Certified Check, or Cashier's Check, shall become and remain the property of the Owner as liquidated damages for the delay and additional expense caused the Owner thereby.

GENERAL AGREEMENTS

The sum given within this Bid is based upon the following general agreements:

1. The sum given in the Base Bid represents the entire cost of the Project. The sum given shall include any and all cost for insurance, including all insurance required by the Agreement, any and all fees for licenses and permits. The Undersigned agrees that no claim will be made for any additional costs regardless of any increases in costs such as higher wage scales or material prices. No amount is included in the Base Bid for sales or use taxes on materials and supplies to be incorporated in the work, except as specified.

2. The Undersigned has carefully checked all the figures used in compiling the sum given in the Base Bid and understands that the Owner will not be responsible for any errors or omissions incurred by the Undersigned in making up of this bid. The Undersigned further understands that no modification or withdrawal of this proposal will be permitted after the time specified for the receipt of bids.

3. The Undersigned agrees that this Bid shall be good and may not be withdrawn for a period of forty-five (45) consecutive calendar days after the time specified for the receipt of bids.

4. The Undersigned agrees to furnish the performance bond and payment bond as specified prior to the execution of the Contract.

5. The Undersigned hereby agrees to commence work under this Contract within ten (10) working days of receipt of "Notice to Proceed".

6. The Undersigned hereby agrees that on or before the date indicated in the Instructions to Bidders, they shall have substantially completed all the work of the Contract Documents as specified and that within Fifteen (15) working days from the date of substantial completion, they shall have fully completed the work of the total Contract as specified.

7. The undersigned agrees to provide the Owner with a breakdown of project costs for informational purposes only, prior to award of contract.

Dated: _____, 2025 Signed _____

For _____
(Name of Company)

Street _____

City _____

State _____

Zip _____

Telephone _____

NON-COLLUSIVE BIDDING CERTIFICATION

TO: Odessa-Montour CSD

HEREINAFTER REFERRED TO AS THE OWNER, IN ACCORDANCE WITH SEALED BIDS FOR:

2023 Capital Improvements Project Phase 2

SUBMITTED UNDER DATE OF:_____

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 hereto certifies as to its own organization, under penalty of perjury, that to the best of 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.

COMPANY:_____

BY:_____

CERTIFICATION OF NON-SEGREGATED FACILITIES

By the submission of this bid, the bidder, offeror, or subcontractor certifies that they do not maintain or provide for their employees any segregated facilities at any of their establishments, and that they do not permit their employees to perform their services at any location, under their control, where segregated facilities are maintained. They certify further that they will not maintain or provide for their employees any segregated facilities at any of their establishments, and that they will not permit their employees to perform their services at any location, under their control, where segregated facilities are maintained. The bidder, offeror, applicant or subcontractor agrees that a breach of this certification is a violation of the Equal Opportunity Clause in this contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, rest rooms, restaurants, and other eating area, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation and housing facilities provided for employees which are segregated by explicit directive or are, in fact, segregated on the basis of race, creed, color, or national origin, because of habit, local custom, or otherwise. They further agree that (except where they have obtained identical certifications from proposed subcontractors for specific time periods) they will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding $10,000.00; that they will retain such certifications in their files; and that they will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods):

NOTE: The penalty for making false statement in offers is prescribed in 18 U.S.C. 1001.

_____
Name and Title of Signer
(Please Type)

_____
(Signature)

_____
(Date)

CERTIFICATION

I, _____, the _____ of _____
(Name) (Title) (Name of Company)

hereby swear or affirm that the following is true:

1. The company, its principles or entities related to the company named above, is not now, nor ever has been, debarred from contracting with the United States Government or any State government.

2. The company is not now under investigation by any agency of the Federal Government or the government of any State for any actions by the company, its principles or any related entity, for any alleged malfeasance or misfeasance of any kind or nature which could lead to a debarment from governmental contracting or criminal prosecution, as well as render any contracts signed in reliance on this certification voidable by the party relying on this certification.

3. I have full legal authority under my company's organizational documents or bylaws to make this certification on the company's behalf.

4. I understand that submission of a false statement on this document will subject me to criminal prosecution.

Dated: _____ _____
Signature

IRAN DIVESTMENT ACT CERTIFICATION

As a result of the Iran Divestment Act of 2012 (Act), Chapter 1 of the 2012 Laws of New York, a new provision has been added to the State Finance Law (SFL), § 165-a, effective April 12, 2012. Under the Act, the Commissioner of the Office of General Services (OGS) will be developing a list (prohibited entities list) of "persons" who are engaged in "investment activities in Iran" (both are defined terms in the law). Pursuant to SFL § 165-a(3)(b), the initial list is expected to be issued no later than 120 days after the Act's effective date, at which time it will be posted on the OGS website.

By submitting a bid in response to this solicitation or by assuming the responsibility of a Contract awarded hereunder, Bidder/Contractor (or any assignee) certifies that once the prohibited entities list is posted on the OGS website, it will not utilize on such Contract any subcontractor that is identified on the prohibited entities list.

Additionally, Bidder/Contractor is advised that once the list is posted on the OGS website, any Contractor seeking to renew or extend a Contract or assume the responsibility of a Contract awarded in response to the solicitation, must certify at the time the Contract is renewed, extended or assigned that it is not included on the prohibited entities list.

During the term of the Contract, should the New York State Education Department (AGENCY) receive information that a person is in violation of the above-referenced certification, AGENCY will offer the person an opportunity to respond. If the person fails to demonstrate that it has ceased its engagement in the investment which is in violation of the Act within 90 days after the determination of such violation, then AGENCY shall take such action as may be appropriate including, but not limited to, imposing sanctions, seeking compliance, recovering damages, or declaring the Contractor in default.

AGENCY reserves the right to reject any bid or request for assignment for an entity that appears on the prohibited entities list prior to the award of a contract, and to pursue a responsibility review with respect to any entity that is awarded a contract and appears on the prohibited entities list after contract award.

Signature:_____

Print Name:_____

Title:_____

Company Name:_____

Date: :_____

Attach to each copy of the Bid Form a Bid Bond using AIA Document A310, a certified check, or a cashier's check payable to the Owner. Any Bid Bond on other forms may be considered an irregularity in bidding. AIA forms as required by these Contract Documents are available from the American Institute of Architects, 1735 New York Avenue, NW, Washington, DC 20006, or from the Architect's office at cost.

DOCUMENT 00 50 00

AGREEMENT FORMS

PART 1 NOTICE TO PROCEED

A. A "Notice to Proceed" will be sent in triplicate by the Owner to the successful bidder for signature. The date of this notice shall serve as the Contract Date for this project.

B. A copy of the Notice to Proceed is included in this section for informational purposes only.

PART 4 OWNER-CONTRACTOR AGREEMENT

A. The Form of Agreement to be entered into by the Owner and the Contractor for this project shall be the Standard Form of Agreement Between Owner and Contractor, Document A132 of the American Institute of Architects, 2019 Edition.

B. A copy of the Form of Agreement is included in this section for informational purposes only. Upon award of the contract to the respective qualified low Bidder, the actual Form of Agreement will be processed and forwarded to the Owner and Contractor for execution.

NOTICE TO PROCEED

Date:

Project: 2023 Capital Improvements Project Phase 2

Contract:

State Education Number(s): 55-01-01-04-0-001-022 – Odessa Elementary & High School
55-01-01-04-5-003-012 – Bus Garage

Architect's Project No.: 143500

To: [Contractor Name and Address]

Attn:

The above Contractor is hereby authorized to proceed with the _____ Contract, as outlined in the Bidding Documents, dated _____, and amended by Addendum (Addenda) No(s). [insert number], dated [insert date], for the Base Bid amount of $_____, [Contract amount of $_____, including the Base Bid amount of $_____, and accepted [Add/Deduct] Alternate No(s). [insert number] in the amount of $_____.].

The date of this notice shall serve as the CONTRACT DATE for this project. You are required under the terms of the bidding documents to start work within TEN WORKING DAYS, which includes the submission of your Certificates of Insurance ***to the Architect***. Work shall commence at the site upon receipt of Certificate of Insurance.

The following information must be submitted ***to the Architect*** within TEN WORKING DAYS from the receipt of this notice:

Performance Bond
Labor and Material Payment Bond
List of Subcontractors and Material Suppliers
Schedule of Values

Failure to comply with these requirements shall be cause to forfeit the Bid Security per Document 00 21 13, Paragraph 7.2, of the Specifications.

Please return one executed copy to the Owner, one ***to the Architect***, and retain the other for your records.

ISSUED BY: _____ DATE: _____
(OWNER NAME)

ACCEPTED BY: _____ DATE: _____
(CONTRACTOR NAME)

END OF DOCUMENT

DRAFT

AIA® Document A132™ – 2019

Standard Form of Agreement Between Owner and Contractor,
Construction Manager as Adviser Edition

AGREEMENT made as of the « » day of « » in the year « Two Thousand Twenty-Five »
(In words, indicate day, month, and year.)

BETWEEN the Owner:
(Name, legal status, address, and other information)

«Odessa-Montour Central School District »« »
«300 College Avenue »
«Odessa, NY 14869 »

and the Contractor:
(Name, legal status, address, and other information)

« »« »
« »
« »
« »

for the following Project:
(Name, location, and detailed description)

«SED Nos. 55-01-01-04-0-001-022 – Odessa Elementary and High School
55-01-01-04-5-003-012 – Bus Garage »
«
Contract. No.
2023 Capital Improvements Project – Phase 2&3
Odessa-Montour Central School District
300 College Avenue
Odessa, NY 14869 »

The Construction Manager:
(Name, legal status, address, and other information)

«LeChase Construction Service, LLC »« »
«11849 East Corning Road »
«Corning, NY 14830 »

The Architect:
(Name, legal status, address, and other information)

«Arcadis »« »
«59-61 Court Street, Suite 300 »
«Binghamton, NY 13901 »

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This document is intended to be used in conjunction with AIA Documents A232™–2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition; B132™–2019, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™–2019, Standard Form of Agreement Between Owner and Construction Manager as Adviser. AIA Document A232™–2019 is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

ELECTRONIC COPYING of any portion of this AIA® Document to another electronic file is prohibited and constitutes a violation of copyright laws as set forth in the footer of this document.

AIA Document A132™ – 2019. Copyright © 1975, 1980, 1992, 2009, and 2019 by The American Institute of Architects. All rights reserved. The "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are registered trademarks and may not be used without permission. This draft was produced by AIA software at 11:06:51 ET on 03/17/2021 under Order No.4578421089 which expires on 02/04/2022, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail copyright@aia.org.
User Notes: (2020689991)

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EXHIBIT B DETERMINATION OF THE COST OF THE WORK

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than Modifications, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND DATES OF SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be:
(Check one of the following boxes.)

[« X »] The date of this Agreement.

If a date of commencement of the Work is not selected, then the date of commencement shall be the date of this Agreement.

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

§ 3.3 Substantial Completion of the Project or Portions Thereof

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the date of Substantial Completion of the Work of all of the Contractors for the Project will be:
(Insert the date of Substantial Completion of the Work of all Contractors for the Project.)

«August 27, 2027 »

§ 3.4 When the Work of this Contract, or any Portion Thereof, is Substantially Complete

§ 3.4.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall substantially complete the entire Work of this Contract:
(Check one of the following boxes and complete the necessary information.)

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[« X »] By the following date: « August 27, 2027 »

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be one of the following:
(Check the appropriate box.)

[« X »] Stipulated Sum, in accordance with Section 4.2 below
(Based on the selection above, complete Section 4.2, 4.3 or 4.4 below.)

§ 4.2 Stipulated Sum

§ 4.2.1 The Contract Sum shall be « » ($ « »), subject to additions and deductions as provided in the Contract Documents.

§ 4.2.2 Alternates

§ 4.2.2.1 Alternates, if any, included in the Contract Sum:

Item	Price

§ 4.2.3 Allowances, if any, included in the Contract Sum:
(Identify each allowance.)

Item	Price

§ 4.2.4 Unit prices, if any:
(Identify the item and state the unit price, and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit ($0.00)

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Construction Manager by the Contractor, and Certificates for Payment issued by the Construction Manager and Architect, the Owner shall make progress payments on account of the Contract Sum, to the Contractor, as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

«Refer to Document 00 73 00 – Supplementary General Conditions of the Contract. »

§ 5.1.3 Provided that an Application for Payment is received by the Construction Manager not later than the « twenty-fifth » day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the « thirtieth » day of the « following » month. If an Application for Payment is received by the Construction Manager after the application date fixed above, payment of the amount certified shall be made by the Owner not later than « forty-five » (« 45 ») days after the Construction Manager receives the Application for Payment.
(Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 Progress Payments Where the Contract Sum is Based on a Stipulated Sum

§ 5.1.4.1 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Construction Manager and Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

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§ 5.1.4.2 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.4.3 In accordance with AIA Document A232™–2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.4.3.1 The amount of each progress payment shall first include:

.1 That portion of the Contract Sum properly allocable to completed Work;

.2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and

.3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

§ 5.1.4.3.2 The amount of each progress payment shall then be reduced by:

.1 The aggregate of any amounts previously paid by the Owner;

.2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A232–2019;

.3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;

.4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A232–2019; and

.5 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to when the Work of this Contract is substantially complete, the Owner may withhold the following amount, as retainage, from the payment otherwise due:
(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)

«Five percent (5%) »

§ 5.1.7.2 Except as set forth in this Section 5.1.7.2, when the Work of this Contract is substantially complete, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7.

§ 5.2 Final Payment

§ 5.2.1 Final Payment Where the Contract Sum is Based on a Stipulated Sum

§ 5.2.1.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

.1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A232–2019, and to satisfy other requirements, if any, which extend beyond final payment; and

.2 a final Certificate for Payment or Project Certificate for Payment has been issued by the Architect.

§ 5.2.1.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the final Certificate for Payment or Project Certificate for Payment.

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as Initial Decision Maker pursuant to Article 15 of AIA Document A232–2019, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker.

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§ 6.2 Binding Dispute Resolution
For any Claim subject to, but not resolved by, mediation pursuant to Article 15 of AIA Document A232–2019, the method of binding dispute resolution shall be as follows:

[« X »] Litigation in a court of competent jurisdiction.

If the Owner and Contractor do not select a method of binding dispute resolution, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 Where the Contract Sum is a Stipulated Sum

§ 7.1.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A232–2019.

§ 7.1.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A232–2019.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A232–2019 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner's representative:
(Name, address, email address, and other information)

«Jim Nolan »
«Odessa-Montour Central School District »
«300 College Avenue »
«Odessa, NY 14869 »

§ 8.3 The Contractor's representative:
(Name, address, email address, and other information)

« »
« »
« »
« »
« »
« »

§ 8.4 Neither the Owner's nor the Contractor's representative shall be changed without ten days' prior notice to the other party.

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A132™–2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A132™–2019, Exhibit A, and elsewhere in the Contract Documents.

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

.1 AIA Document A132™–2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition

.2 AIA Document A132™–2019, Exhibit A, Insurance and Bonds Exhibit

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.3 AIA Document A232™–2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition

.4 Drawings

Number	Title	Date
See Table of Contents		

.5 Specifications

Section	Title	Date	Pages
See Table of Contents			

.6 Addenda, if any:

Number	Date	Pages

Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are also enumerated in this Article 9.

.7 Other Exhibits:
(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

[« X »] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
See Table of Contents			

.]'[; Other documents, if any, listed below:
(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A232–2019 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)

«1. Advertisement to Bid, dated October 1, 2025, shall become part of the Contract Documents.
2. Instructions to Bidders, dated September 29, 2025, shall become part of the Contract Documents.
3. Bid Form from _____, dated _____, shall become part of the Contract Documents. »

This Agreement is entered into as of the day and year first written above.

OWNER *(Signature)*	**CONTRACTOR** *(Signature)*
« »« »	« »« »
(Printed name and title)	*(Printed name and title)*

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DOCUMENT 00 60 00

BONDS AND CERTIFICATES

PART 1 PERFORMANCE BOND AND PAYMENT BOND

A. As described in Document 00 21 13 - Information to Bidders, Part 7 Performance Bond and Payment Bond, each bidder shall submit a Performance Bond and Payment Bond in the amount of one hundred percent (100%) of the Contract Sum.

B. The bonds submitted shall be executed on AIA Document A312 "Performance Bond" and "Payment Bond", 2010 Edition.

C. Copies of these documents are included for informational purposes only. Prospective bidders may acquire copies of said documents from the office of the Architect for the actual cost of the documents as determined by the American Institute of Architects.

PART 2 CERTIFICATE OF INSURANCE

A. The acceptable Certificate of Insurance for this contract will be the ACORD Certificate of Insurance Form 25-S as enclosed in this section.

B. The contractor shall, upon execution of the Form of Agreement with the Owner, submit the Certificate of Insurance prior to commencement of work as described in Article 11 of the General Conditions.

C. The limits and types of liability, naming the Owner and project as insured are as shown on the attached forms.

PART 3 CONTRACTOR'S QUALIFICATION STATEMENT

A. After the receipt and opening of bids, and prior to the issuance of a notice to proceed and execution of a formal Owner/Contractor Agreement, the low bidder may be required to submit a completed Contractor's Qualification Statement on AIA Document A305.

B. A copy of the Qualification Statement to be used on this project is included for informational purposes only and may be purchased at the Architect's office. Upon award of the Contract to the respective qualified low Bidder(s) the actual Contractor's Qualification Statement(s) will be processed and forwarded to the respective parties for execution.

PART 4 ASBESTOS ABATEMENT LIABILITY INSURANCE (CONTRACT NO. 1)

A. Liability insurance shall include all major divisions of coverage and be a comprehensive basis including:
   1. Owner's and Contractor's Protective.

2. Products and Completed Operations.

3. Contractual - Including specified provisions for the Contractor's obligations.

4. Owned, Non-owned and Hired Motor Vehicles.

6. Broad Form Property Damage Including Completed Operations.

B. Minimum Insurance Limits:

1. Workers Compensation:
   a. State: Statutory.
   b. Applicable Federal (e.g. Longshoreman, harbor work, work at or outside U. S. Boundaries): Statutory.
   c. Maritime: NA.
   d. Employer's Liability: $100,000.
   e. Benefits Required by Union as Labor Contracts: Applicable.

2. The Contractor shall possess a valid Occurrence Based Asbestos Liability Insurance for this project.

3. Comprehensive General Asbestos Liability (Including Premises-Operations; Independent Contractor's Protective; Product and Completed Operations; Broad Form Property Damage):
   a. Bodily Injury:
      $1,000,000 Each Occurrence
      $1,000,000 Aggregate, Products and Completed Operations
   b. Property Damage:
      $1,000,000 Each Occurrence
      $5,000,000 Aggregate
   c. Products and Completed Operations Insurance shall be maintained for a minimum of, at the discretion of the Owner, one year after the final payment. Said Contractor shall continue to provide to the Owner on an annual basis WRITTEN EVIDENCE of this aforementioned insurance for the duration of the policy.
   d. Contractual Liability (Hold Harmless Coverage);
      1) Bodily Injury:
         $500,000 Each Occurrence
      2) Property Damage:
         $500,000 Each Occurrence
         $1,000,000 Aggregate
   e. Personal Injury, with Employment Exclusion deleted:
      $1,000,000 Aggregate

4. Comprehensive Automobile Liability (Owned, Non-owned, Hired):
   a. Bodily Injury:
      $500,000 Each Person
      $1,000,000 Each Accident

b. Property Damage:
$1,000,000 Each Occurrence

C. Before starting work on site, furnish one copy of each Certificate(s) of Insurance for each copy of Agreement, setting forth evidence of all coverage required.

The form of each Certificate of Insurance shall be ACORD Form 25-S (7/97) (non-simplified version). Furnish to the Owner copies of the endorsements that are subsequently issued amending coverage limits.

END OF DOCUMENT

AIA® Document A312® – 2010

Performance Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)

CONSTRUCTION CONTRACT
Date:
Amount: $
Description:
(Name and location)

BOND
Date:
(Not earlier than Construction Contract Date)

Amount: $
Modifications to this Bond: ☐ None ☐ See Section 16

CONTRACTOR AS PRINCIPAL	**SURETY**
Company: *(Corporate Seal)*	Company: *(Corporate Seal)*
Signature: _____	Signature: _____
Name and Title:	Name and Title:

(Any additional signatures appear on the last page of this Performance Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or **BROKER:**

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

Init.
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§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

§ 2 If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Section 3.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after

.1 the Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

.2 the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

.3 the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

§ 4 Failure on the part of the Owner to comply with the notice requirement in Section 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

§ 5 When the Owner has satisfied the conditions of Section 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

§ 5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

§ 5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

§ 5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Section 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

§ 5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

§ 6 If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

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§ 7 If the Surety elects to act under Section 5.1, 5.2 or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for

.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

.2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and

.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

§ 8 If the Surety elects to act under Section 5.1, 5.3 or 5.4, the Surety's liability is limited to the amount of this Bond.

§ 9 The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors and assigns.

§ 10 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 11 Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

§ 13 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 14 Definitions

§ 14.1 Balance of the Contract Price. The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

§ 14.2 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

§ 14.3 Contractor Default. Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

§ 14.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 14.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

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§ 15 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 16 Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	
Address:		Address:	

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AIA® Document A312® – 2010

Payment Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)

CONSTRUCTION CONTRACT
Date:
Amount: $
Description:
(Name and location)

BOND
Date:
(Not earlier than Construction Contract Date)

Amount: $
Modifications to this Bond: ☐ None ☐ See Section 18

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	

(Any additional signatures appear on the last page of this Payment Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or **BROKER:**

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

Init.
/

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§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

§ 2 If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Section 13) of claims, demands, liens or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety.

§ 4 When the Owner has satisfied the conditions in Section 3, the Surety shall promptly and at the Surety's expense defend, indemnify and hold harmless the Owner against a duly tendered claim, demand, lien or suit.

§ 5 The Surety's obligations to a Claimant under this Bond shall arise after the following:

§ 5.1 Claimants, who do not have a direct contract with the Contractor,

.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and

.2 have sent a Claim to the Surety (at the address described in Section 13).

§ 5.2 Claimants, who are employed by or have a direct contract with the Contractor, have sent a Claim to the Surety (at the address described in Section 13).

§ 6 If a notice of non-payment required by Section 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Section 5.1.1.

§ 7 When a Claimant has satisfied the conditions of Sections 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

§ 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

§ 7.2 Pay or arrange for payment of any undisputed amounts.

§ 7.3 The Surety's failure to discharge its obligations under Section 7.1 or Section 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Section 7.1 or Section 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

§ 8 The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Section 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

§ 9 Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

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§ 10 The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to, or give notice on behalf of, Claimants or otherwise have any obligations to Claimants under this Bond.

§ 11 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 12 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Section 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 13 Notice and Claims to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

§ 14 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 15 Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

§ 16 Definitions

§ 16.1 Claim. A written statement by the Claimant including at a minimum:

- **.1** the name of the Claimant;
- **.2** the name of the person for whom the labor was done, or materials or equipment furnished;
- **.3** a copy of the agreement or purchase order pursuant to which labor, materials or equipment was furnished for use in the performance of the Construction Contract;
- **.4** a brief description of the labor, materials or equipment furnished;
- **.5** the date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
- **.6** the total amount earned by the Claimant for labor, materials or equipment furnished as of the date of the Claim;
- **.7** the total amount of previous payments received by the Claimant; and
- **.8** the total amount due and unpaid to the Claimant for labor, materials or equipment furnished as of the date of the Claim.

§ 16.2 Claimant. An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

§ 16.3 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

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§ 16.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 16.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

§ 17 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 18 Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:	_____	Signature:	_____
Name and Title:		Name and Title:	
Address:		Address:	

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CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

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

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

PRODUCER	CONTACT NAME:	
	PHONE (A/C, No, Ext):	FAX (A/C, No):
	E-MAIL ADDRESS:	
	INSURER(S) AFFORDING COVERAGE	NAIC #
INSURED	INSURER A :	
	INSURER B :	
	INSURER C :	
	INSURER D :	
	INSURER E :	
	INSURER F :	

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
	COMMERCIAL GENERAL LIABILITY						EACH OCCURRENCE	$
	☐ CLAIMS-MADE ☐ OCCUR						DAMAGE TO RENTED PREMISES (Ea occurrence)	$
							MED EXP (Any one person)	$
							PERSONAL & ADV INJURY	$
	GEN'L AGGREGATE LIMIT APPLIES PER:						GENERAL AGGREGATE	$
	☐ POLICY ☐ PRO-JECT ☐ LOC						PRODUCTS - COMP/OP AGG	$
	☐ OTHER:							$
	AUTOMOBILE LIABILITY						COMBINED SINGLE LIMIT (Ea accident)	$
	☐ ANY AUTO						BODILY INJURY (Per person)	$
	☐ OWNED AUTOS ONLY ☐ SCHEDULED AUTOS						BODILY INJURY (Per accident)	$
	☐ HIRED AUTOS ONLY ☐ NON-OWNED AUTOS ONLY						PROPERTY DAMAGE (Per accident)	$
								$
	☐ **UMBRELLA LIAB** ☐ OCCUR						EACH OCCURRENCE	$
	☐ **EXCESS LIAB** ☐ CLAIMS-MADE						AGGREGATE	$
	☐ DED ☐ RETENTION $							$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y / N						☐ PER STATUTE ☐ OTH-ER	
	ANYPROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? ☐ **(Mandatory in NH)**	N / A					E.L. EACH ACCIDENT	$
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	$
							E.L. DISEASE - POLICY LIMIT	$

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

CERTIFICATE HOLDER

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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AIA® Document A305® – 2020

Contractor's Qualification Statement

THE PARTIES SHOULD EXECUTE A SEPARATE CONFIDENTIALITY AGREEMENT IF THEY INTEND FOR ANY OF THE INFORMATION IN THIS A305-2020 TO BE HELD CONFIDENTIAL.

SUBMITTED BY:
(Organization name and address.)

SUBMITTED TO:
(Organization name and address.)

TYPE OF WORK TYPICALLY PERFORMED
(Indicate the type of work your organization typically performs, such as general contracting, construction manager as constructor services, HVAC contracting, electrical contracting, plumbing contracting, or other.)

THIS CONTRACTOR'S QUALIFICATION STATEMENT INCLUDES THE FOLLOWING:
(Check all that apply.)

[ ] Exhibit A – General Information
[ ] Exhibit B – Financial and Performance Information
[ ] Exhibit C – Project-Specific Information
[ ] Exhibit D – Past Project Experience
[ ] Exhibit E – Past Project Experience (Continued)

CONTRACTOR CERTIFICATION
The undersigned certifies under oath that the information provided in this Contractor's Qualification Statement is true and sufficiently complete so as not to be misleading.

Organization's Authorized Representative Signature

Date

Printed Name and Title

NOTARY
State of:
County of:
Signed and sworn to before me this day of

Notary Signature

My commission expires:

ADDITIONS AND DELETIONS:
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AIA® Document A305® – 2020 Exhibit A

General Information

This Exhibit is part of the Contractor's Qualification Statement, submitted by and dated the day of in the year
(In words, indicate day, month and year.)

§ A.1 ORGANIZATION
§ A.1.1 Name and Location
§ A.1.1.1 Identify the full legal name of your organization.

§ A.1.1.2 List all other names under which your organization currently does business and, for each name, identify jurisdictions in which it is registered to do business under that trade name.

§ A.1.1.3 List all prior names under which your organization has operated and, for each name, indicate the date range and jurisdiction in which it was used.

§ A.1.1.4 Identify the address of your organization's principal place of business and list all office locations out of which your organization conducts business. If your organization has multiple offices, you may attach an exhibit or refer to a website.

§ A.1.2 Legal Status
§ A.1.2.1 Identify the legal status under which your organization does business, such as sole proprietorship, partnership, corporation, limited liability corporation, joint venture, or other.

.1 If your organization is a corporation, identify the state in which it is incorporated, the date of incorporation, and its four highest-ranking corporate officers and their titles, as applicable.

.2 If your organization is a partnership, identify its partners and its date of organization.

.3 If your organization is individually owned, identify its owner and date of organization.

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.4 If the form of your organization is other than those listed above, describe it and identify its individual leaders:

§ A.1.2.2 Does your organization own, in whole or in part, any other construction-related businesses? If so, identify and describe those businesses and specify percentage of ownership.

§ A.1.3 Other Information

§ A.1.3.1 How many years has your organization been in business?

§ A.1.3.2 How many full-time employees work for your organization?

§ A.1.3.3 List your North American Industry Classification System (NAICS) codes and titles. Specify which is your primary NAICS code.

§ A.1.3.4 Indicate whether your organization is certified as a governmentally recognized special business class, such as a minority business enterprise, woman business enterprise, service disabled veteran owned small business, woman owned small business, small business in a HUBZone, or a small disadvantaged business in the 8(a) Business Development Program. For each, identify the certifying authority and indicate jurisdictions to which such certification applies.

§ A.2 EXPERIENCE

§ A.2.1 Complete Exhibit D to describe up to four projects, either completed or in progress, that are representative of your organization's experience and capabilities.

§ A.2.2 State your organization's total dollar value of work currently under contract.

§ A.2.3 Of the amount stated in Section A.2.2, state the dollar value of work that remains to be completed:

§ A.2.4 State your organization's average annual dollar value of construction work performed during the last five years.

§ A.3 CAPABILITIES

§ A.3.1 List the categories of work that your organization typically self-performs.

§ A.3.2 Identify qualities, accreditations, services, skills, or personnel that you believe differentiate your organization from others.

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§ A.3.3 Does your organization provide design collaboration or pre-construction services? If so, describe those services.

§ A.3.4 Does your organization use building information modeling (BIM)? If so, describe how your organization uses BIM and identify BIM software that your organization regularly uses.

§ A.3.5 Does your organization use a project management information system? If so, identify that system.

§ A.4 REFERENCES

§ A.4.1 Identify three client references:
(Insert name, organization, and contact information)

§ A.4.2 Identify three architect references:
(Insert name, organization, and contact information)

§ A.4.3 Identify one bank reference:
(Insert name, organization, and contact information)

§ A.4.4 Identify three subcontractor or other trade references:
(Insert name, organization, and contact information)

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AIA® Document A305® – 2020 Exhibit B

Financial and Performance Information

This Exhibit is part of the Contractor's Qualification Statement, submitted by and dated the day of in the year
(In words, indicate day, month and year.)

§ B.1 FINANCIAL

§ B.1.1 Federal tax identification number:

§ B.1.2 Attach financial statements for the last three years prepared in accordance with Generally Accepted Accounting Principles, including your organization's latest balance sheet and income statement. Also, indicate the name and contact information of the firm that prepared each financial statement.

§ B.1.3 Has your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management, been the subject of any bankruptcy proceeding within the last ten years?

§ B.1.4 Identify your organization's preferred credit rating agency and identification information.
(Identify rating agency, such as Dun and Bradstreet or Equifax, and insert your organization's identification number or other method of searching your organization's credit rating with such agency.)

§ B.2 DISPUTES AND DISCIPLINARY ACTIONS

§ B.2.1 Are there any pending or outstanding judgments, arbitration proceedings, bond claims, or lawsuits against your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management, or any of the individuals listed in Exhibit A, Section 1.2, in which the amount in dispute is more than $75,000?
(If the answer is yes, provide an explanation.)

§ B.2.2 In the last five years has your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management:
(If the answer to any of the questions below is yes, provide an explanation.)

.1 failed to complete work awarded to it?

.2 been terminated for any reason except for an owners' convenience?

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User Notes: (1934846794)

.3 had any judgments, settlements, or awards pertaining to a construction project in which your organization was responsible for more than $75,000?

.4 filed any lawsuits or requested arbitration regarding a construction project?

§ B.2.3 In the last five years, has your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management; or any of the individuals listed in Exhibit A Section 1.2:
(If the answer to any of the questions below is yes, provide an explanation.)

.1 been convicted of, or indicted for, a business-related crime?

.2 had any business or professional license subjected to disciplinary action?

.3 been penalized or fined by a state or federal environmental agency?

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AIA® Document A305® – 2020 Exhibit C

Project Specific Information

This Exhibit is part of the Contractor's Qualification Statement, submitted by and dated the day of in the year
(In words, indicate day, month and year.)

PROJECT:
(Name and location or address.)

CONTRACTOR'S PROJECT OFFICE:
(Identify the office out of which the contractor proposes to perform the work for the Project.)

TYPE OF WORK SOUGHT
(Indicate the type of work you are seeking for this Project, such as general contracting, construction manager as constructor, design-build, HVAC subcontracting, electrical subcontracting, plumbing subcontracting, etc.)

CONFLICT OF INTEREST
Describe any conflict of interest your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management, or any of the individuals listed in Exhibit A Section 1.2, may have regarding this Project.

§ C.1 PERFORMANCE OF THE WORK
§ C.1.1 When was the Contractor's Project Office established?

§ C.1.2 How many full-time field and office staff are respectively employed at the Contractor's Project Office?

§ C.1.3 List the business license and contractor license or registration numbers for the Contractor's Project Office that pertain to the Project.

§ C.1.4 Identify key personnel from your organization who will be meaningfully involved with work on this Project and indicate (1) their position on the Project team, (2) their office location, (3) their expertise and experience, and (4) projects similar to the Project on which they have worked.

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User Notes: (1148806451)

§ C.1.5 Identify portions of work that you intend to self-perform on this Project.

§ C.1.6 To the extent known, list the subcontractors you intend to use for major portions of work on the Project.

§ C.2 EXPERIENCE RELATED TO THE PROJECT

§ C.2.1 Complete Exhibit D to describe up to four projects performed by the Contractor's Project Office, either completed or in progress, that are relevant to this Project, such as projects in a similar geographic area or of similar project type. If you have already completed Exhibit D, but want to provide further examples of projects that are relevant to this Project, you may complete Exhibit E.

§ C.2.2 State the total dollar value of work currently under contract at the Contractor's Project Office:

§ C.2.3 Of the amount stated in Section C.2.2, state the dollar value of work that remains to be completed:

§ C.2.4 State the average annual dollar value of construction work performed by the Contractor's Project Office during the last five years.

§ C.2.5 List the total number of projects the Contractor's Project Office has completed in the last five years and state the dollar value of the largest contract the Contractor's Project Office has completed during that time.

§ C.3 SAFETY PROGRAM AND RECORD

§ C.3.1 Does the Contractor's Project Office have a written safety program?

§ C.3.2 List all safety-related citations and penalties the Contractor's Project Office has received in the last three years.

§ C.3.3 Attach the Contractor's Project Office's OSHA 300a Summary of Work-Related Injuries and Illnesses form for the last three years.

§ C.3.4 Attach a copy of your insurance agent's verification letter for your organization's current workers' compensation experience modification rate and rates for the last three years.

§ C.4 INSURANCE

§ C.4.1 Attach current certificates of insurance for your commercial general liability policy, umbrella insurance policy, and professional liability insurance policy, if any. Identify deductibles or self-insured retentions for your commercial general liability policy.

§ C.4.2 If requested, will your organization be able to provide property insurance for the Project written on a builder's risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis?

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§ C.4.3 Does your commercial general liability policy contain any exclusions or restrictions of coverage that are prohibited in AIA Document A101-2017, Exhibit A, Insurance A.3.2.2.2? If so, identify.

§ C.5 SURETY

§ C.5.1 If requested, will your organization be able to provide a performance and payment bond for this Project?

§ C.5.2 Surety company name:

§ C.5.3 Surety agent name and contact information:

§ C.5.4 Total bonding capacity:

§ C.5.5 Available bonding capacity as of the date of this qualification statement:

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AIA® Document A305® – 2020 Exhibit D

Contractor's Past Project Experience

	1	2	3	4
PROJECT NAME				
PROJECT LOCATION				
PROJECT TYPE				
OWNER				
ARCHITECT				
CONTRACTOR'S PROJECT EXECUTIVE				
KEY PERSONNEL (include titles)				
PROJECT DETAILS	Contract Amount Completion Date % Self-Performed Work	Contract Amount Completion Date % Self-Performed Work	Contract Amount Completion Date % Self-Performed Work	Contract Amount Completion Date % Self-Performed Work
PROJECT DELIVERY METHOD	☐ Design-bid-build ☐ Design-build ☐ CM constructor ☐ CM advisor ☐ Other:	☐ Design-bid-build ☐ Design-build ☐ CM constructor ☐ CM advisor ☐ Other:	☐ Design-bid-build ☐ Design-build ☐ CM constructor ☐ CM advisor ☐ Other:	☐ Design-bid-build ☐ Design-build ☐ CM constructor ☐ CM advisor ☐ Other:
SUSTAINABILITY CERTIFICATIONS				

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DOCUMENT 00 72 00

GENERAL CONDITIONS

1 PART 1 GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

A. The provisions of the Standard AIA Document A232, 2019 Edition, General Conditions of the Contract for Construction, shall apply to all work of the project.

B. A copy of the General Conditions of the Contract for Construction is included for informational purposes only and may be purchased from the Architect at cost.

END OF DOCUMENT

AIA® Document A232® – 2019

General Conditions of the Contract for Construction, *Construction Manager as Adviser Edition*

for the following PROJECT:
(Name, and location or address)

2023 Capital Improvements Project – Phase 3
Odessa-Montour Central School District
300 College Avenue
Odessa, NY 14869

THE CONSTRUCTION MANAGER:
(Name, legal status, and address)

LeChase Construction Service, LLC
11849 East Corning Road
Corning, NY 14830

THE OWNER:
(Name, legal status, and address)

Odessa-Montour Central School District
300 College Avenue
Odessa, NY 14869

THE ARCHITECT:
(Name, legal status, and address)

Arcadis
59-61 Court Street, Suite 300
Binghamton, NY 13901

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This document is intended to be used in conjunction with AIA Documents A132™–2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition; B132™–2019, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™–2019, Standard Form of Agreement Between Owner and Construction Manager as Adviser.

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents. The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of addenda relating to bidding or proposal requirements.

§ 1.1.2 The Contract. The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and the Construction Manager or the Construction Manager's consultants, (3) between the Owner and the Architect or the Architect's consultants, (4) between the Contractor and the Construction Manager or the Construction Manager's consultants, (5) between the Owner and a Subcontractor or Sub-subcontractor (6) between the Construction Manager and the Architect, or (7) between any persons or entities other than the Owner and Contractor. The Construction Manager and Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of their duties.

§ 1.1.3 The Work. The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 The Project. The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by other Contractors, and by the Owner's own forces and Separate Contractors.

§ 1.1.5 Contractors. Contractors are persons or entities, other than the Contractor or Separate Contractors, who perform Work under contracts with the Owner that are administered by the Architect and Construction Manager.

§ 1.1.6 Separate Contractors. Separate Contractors are persons or entities who perform construction under separate contracts with the Owner not administered by the Architect and Construction Manager.

§ 1.1.7 The Drawings. The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

§ 1.1.8 The Specifications. The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.9 Instruments of Service. Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.10 Initial Decision Maker. The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.

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§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 1.2.1.1 The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles, or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 Interpretation

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 Ownership and Use of Drawings, Specifications, and Other Instruments of Service

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, sub-subcontractors, and suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

§ 1.6 Notice

§ 1.6.1 Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement.

§ 1.6.2 Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

§ 1.7 Digital Data Use and Transmission

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form. The parties will use AIA Document E203™–2013, Building

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Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document G202™–2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Construction Manager and the Architect do not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor, within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of, or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 Evidence of the Owner's Financial Arrangements

§ 2.2.1 Prior to commencement of the Work, and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 2.2.1, the Contract Time shall be extended appropriately.

§ 2.2.2 Following commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract only if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due; or (3) a change in the Work materially changes the Contract Sum. If the Owner fails to provide such evidence, as required, within fourteen days of the Contractor's request, the Contractor may immediately stop the Work and, in that event, shall notify the Owner that the Work has stopped. However, if the request is made because a change in the Work materially changes the Contract Sum under (3) above, the Contractor may immediately stop only that portion of the Work affected by the change until reasonable evidence is provided. If the Work is stopped under this Section 2.2.2, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided in the Contract Documents.

§ 2.2.3 After the Owner furnishes evidence of financial arrangements under this Section 2.2, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.4 Where the Owner has designated information furnished under this Section 2.2 as "confidential," the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose "confidential" information, after seven (7) days' notice to the Owner, where disclosure is required by law, including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by court or arbitrator(s) order. The Contractor may also disclose "confidential" information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements,

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assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities. Unless otherwise provided under the Contract Documents, the Owner, assisted by the Construction Manager, shall secure and pay for the building permit.

§ 2.3.2 The Owner shall retain an architect lawfully licensed to practice architecture, or an entity lawfully practicing architecture, in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.3 The Owner shall retain a construction manager adviser lawfully practicing construction management in the jurisdiction where the Project is located. That person or entity is identified as the Construction Manager in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.4 If the employment of the Construction Manager or Architect terminates, the Owner shall employ a successor construction manager or architect to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Construction Manager or Architect, respectively.

§ 2.3.5 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.3.6 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.3.7 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.3.8 The Owner shall forward all communications to the Contractor through the Construction Manager. Other communication shall be made as set forth in Section 4.2.6.

§ 2.4 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to review by the Construction Manager and prior approval of the Architect, and the Construction Manager or Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Construction Manager's and Architect's and their respective consultants' additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

ARTICLE 3 CONTRACTOR

§ 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction

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where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of its obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Construction Manager or Architect in their administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.5, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Construction Manager and Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information submitted to the Construction Manager in such form as the Construction Manager and Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Construction Manager and Architect any nonconformity discovered by or made known to the Contractor as a request for information submitted to Construction Manager in such form as the Construction Manager and Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to section 15.1.7, as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely notice to the Owner, the Construction Manager, and the Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. The Construction Manager shall review the proposed alternative for sequencing, constructability, and coordination impacts on the other Contractors. Unless the Architect or the Construction Manager objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.

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§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of the Project already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect, in consultation with the Construction Manager, and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner, Construction Manager, and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Construction Manager or Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.5.2 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4.

§ 3.6 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work or portions thereof provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 Permits, Fees, Notices, and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Owner, assisted by the Construction Manager, shall secure and pay for the building permit. The Contractor shall secure and pay for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions. If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or

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(2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner, Construction Manager, and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect and Construction Manager will promptly investigate such conditions and, if the Architect, in consultation with the Construction Manager, determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect, in consultation with the Construction Manager, determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner, Construction Manager, and Contractor, stating the reasons. If the Owner or Contractor disputes the Architect's determination or recommendation, either party may submit a Claim as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner, Construction Manager, and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 Allowances

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents:

- **.1** allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- **.2** Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- **.3** whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect, through the Construction Manager, of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Construction Manager may notify the Contractor, stating whether the Owner, the Construction Manager, or the Architect (1) has reasonable objection to the proposed superintendent or (2) require additional time for review. Failure of the Construction Manager to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner, Construction Manager, or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

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§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information, and the Construction Manager's use in developing the Project schedule, a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project. The Contractor shall cooperate with the Construction Manager in scheduling and performing the Contractor's Work to avoid conflict with, and as to cause no delay in, the work or activities of other Contractors, or the construction or operations of the Owner's own forces or Separate Contractors.

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Construction Manager's and Architect's approval. The Architect and Construction Manager's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Construction Manager and Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall participate with other Contractors, the Construction Manager, and the Owner in reviewing and coordinating all schedules for incorporation into the Project schedule that is prepared by the Construction Manager. The Contractor shall make revisions to the construction schedule and submittal schedule as deemed necessary by the Construction Manager to conform to the Project schedule.

§ 3.10.4 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner, Construction Manager, and Architect, and incorporated into the approved Project schedule.

§ 3.11 Documents and Samples at the Site

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Construction Manager, Architect, and Owner, and delivered to the Construction Manager for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 Shop Drawings, Product Data, and Samples

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules, and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment, or workmanship, and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect and Construction Manager is subject to the limitations of Sections 4.2.10 through 4.2.12. Informational submittals upon which the Construction Manager and Architect are not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Construction Manager or Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Construction Manager, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract

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Documents, in accordance with the Project submittal schedule approved by the Construction Manager and Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of other Contractors, Separate Contractors, or the Owner's own forces. The Contractor shall cooperate with the Construction Manager in the coordination of the Contractor's Shop Drawings, Product Data, Samples, and similar submittals with related documents submitted by other Contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner, Construction Manager, and Architect, that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been reviewed and approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Construction Manager and Architect of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by the Construction Manager and Architect on previous submittals. In the absence of such notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner, the Architect, and the Construction Manager shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Construction Manager shall review submittals for sequencing, constructability, and coordination impacts on other Contractors.

§ 3.12.10.2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Construction Manager and Architect at the time and in the form specified by the Architect.

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§ 3.13 Use of Site

§ 3.13.1 The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.13.2 The Contractor shall coordinate the Contractor's operations with, and secure the approval of, the Construction Manager before using any portion of the site.

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner, Separate Contractors, or of other Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner, Separate Contractors, or by other Contractors except with written consent of the Construction Manager, Owner, and such other Contractors or Separate Contractors. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Separate Contractors, other Contractors, or the Owner, its consent to cutting or otherwise altering the Work.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner, or Construction Manager with the Owner's approval, may do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

The Contractor shall provide the Owner, Construction Manager, and Architect with access to the Work in preparation and progress wherever located.

§ 3.17 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner, Construction Manager, and Architect harmless from loss on account thereof, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications, or other documents prepared by the Owner, Architect, or Construction Manager. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect through the Construction Manager.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Construction Manager, Architect, Construction Manager's and Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

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§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

ARTICLE 4 ARCHITECT AND CONSTRUCTION MANAGER

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

§ 4.1.2 The Construction Manager is the person or entity retained by the Owner pursuant to Section 2.3.3 and identified as such in the Agreement.

§ 4.1.3 Duties, responsibilities, and limitations of authority of the Construction Manager and Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner, Construction Manager, Architect, and Contractor. Consent shall not be unreasonably withheld.

§ 4.2 Administration of the Contract

§ 4.2.1 The Construction Manager and Architect will provide administration of the Contract as described in the Contract Documents and will be the Owner's representatives during construction until the date the Architect issues the final Certificate for Payment. The Construction Manager and Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. On the basis of the site visits, the Architect will keep the Owner and the Construction Manager reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner and Construction Manager known deviations from the Contract Documents and defects and deficiencies observed in the Work.

§ 4.2.3 The Construction Manager shall provide one or more representatives who shall be in attendance at the Project site whenever the Work is being performed. The Construction Manager will determine in general if the Work observed is being performed in accordance with the Contract Documents, will keep the Owner and Architect reasonably informed of the progress of the Work, and will promptly report to the Owner and Architect known deviations from the Contract Documents and the most recent Project schedule, and defects and deficiencies observed in the Work.

§ 4.2.4 The Construction Manager will schedule and coordinate the activities of the Contractor and other Contractors in accordance with the latest approved Project schedule.

§ 4.2.5 The Construction Manager, except to the extent required by Section 4.2.4, and Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, and neither will be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. Neither the Construction Manager nor the Architect will have control over or charge of, or be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or of any other persons or entities performing portions of the Work.

§ 4.2.6 Communications. The Owner shall communicate with the Contractor and the Construction Manager's consultants through the Construction Manager about matters arising out of or relating to the Contract Documents. The Owner and Construction Manager shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Construction Manager otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with other Contractors shall be

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through the Construction Manager. Communications by and with the Owner's own forces and Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 4.2.7 The Construction Manager and Architect will review and certify all Applications for Payment by the Contractor, in accordance with the provisions of Article 9.

§ 4.2.8 The Architect and Construction Manager have authority to reject Work that does not conform to the Contract Documents, and will notify each other about the rejection. Whenever the Construction Manager considers it necessary or advisable, the Construction Manager will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, upon written authorization of the Owner, whether or not the Work is fabricated, installed or completed. The foregoing authority of the Construction Manager will be subject to the provisions of Sections 4.2.18 through 4.2.20 inclusive, with respect to interpretations and decisions of the Architect. However, neither the Architect's nor the Construction Manager's authority to act under this Section 4.2.8 nor a decision made by either of them in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect or the Construction Manager to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons performing any of the Work.

§ 4.2.9 Utilizing the submittal schedule provided by the Contractor, the Construction Manager shall prepare, and revise as necessary, a Project submittal schedule incorporating information from other Contractors, the Owner, Owner's consultants, Owner's Separate Contractors and vendors, governmental agencies, and participants in the Project under the management of the Construction Manager. The Project submittal schedule and any revisions shall be submitted to the Architect for approval.

§ 4.2.10 The Construction Manager will receive and promptly review for conformance with the submittal requirements of the Contract Documents, all submittals from the Contractor such as Shop Drawings, Product Data, and Samples. Where there are other Contractors, the Construction Manager will also check and coordinate the information contained within each submittal received from the Contractor and other Contractors, and transmit to the Architect those recommended for approval. By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Construction Manager represents to the Owner and Architect that the Construction Manager has reviewed and recommended them for approval. The Construction Manager's actions will be taken in accordance with the Project submittal schedule approved by the Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness while allowing sufficient time to permit adequate review by the Architect.

§ 4.2.11 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Upon the Architect's completed review, the Architect shall transmit its submittal review to the Construction Manager.

§ 4.2.12 Review of the Contractor's submittals by the Construction Manager and Architect is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Construction Manager and Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Construction Manager and Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.13 The Construction Manager will prepare Change Orders and Construction Change Directives.

§ 4.2.14 The Construction Manager and the Architect will take appropriate action on Change Orders or Construction Change Directives in accordance with Article 7, and the Architect will have authority to order minor changes in the Work as provided in Section 7.4. The Architect, in consultation with the Construction Manager, will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

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§ 4.2.15 Utilizing the documents provided by the Contractor, the Construction Manager will maintain at the site for the Owner one copy of all Contract Documents, approved Shop Drawings, Product Data, Samples, and similar required submittals, in good order and marked currently to record all changes and selections made during construction. These will be available to the Architect and the Contractor, and will be delivered to the Owner upon completion of the Project.

§ 4.2.16 The Construction Manager will assist the Architect in conducting inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion in conjunction with the Architect pursuant to Section 9.8; and receive and forward to the Owner written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10. The Construction Manager will forward to the Architect a final Application and Certificate for Payment or final Project Application and Project Certificate for Payment upon the Contractor's compliance with the requirements of the Contract Documents.

§ 4.2.17 If the Owner and Architect agree, the Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The Owner shall notify the Construction Manager of any change in the duties, responsibilities and limitations of authority of the Project representatives.

§ 4.2.18 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of the Construction Manager, Owner, or Contractor through the Construction Manager. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.19 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either, and will not be liable for results of interpretations or decisions so rendered in good faith.

§ 4.2.20 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.21 The Construction Manager will receive and review requests for information from the Contractor, and forward each request for information to the Architect, with the Construction Manager's recommendation. The Architect will review and respond in writing, through the Construction Manager, to requests for information about the Contract Documents. The Construction Manager's recommendation and the Architect's response to each request will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include other Contractors or Separate Contractors or the subcontractors of other Contractors or Separate Contractors.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Construction Manager, for review by the Owner, Construction Manager and Architect, of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Construction Manager may notify the Contractor whether the Owner, the Construction Manager or the Architect (1) has reasonable objection to any such proposed person or entity or, (2) requires additional time for review. Failure of the Construction Manager to provide notice within the 14-day period shall constitute notice of no reasonable objection.

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§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner, Construction Manager or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner, Construction Manager or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner, Construction Manager or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner, Construction Manager or Architect makes reasonable objection to such substitution.

§ 5.3 Subcontractual Relations

By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, that the Contractor, by these Contract Documents, assumes toward the Owner, Construction Manager and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner, Construction Manager and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- **.1** assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and
- **.2** assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor Contractor or other entity. If the Owner assigns the subcontract to a successor Contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor Contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction with Own Forces and to Award Other Contracts

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

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§ 6.1.2 When the Owner performs construction or operations with the Owner's own forces or Separate Contractors, the Owner shall provide for coordination of such forces and Separate Contractors with the Work of the Contractor, who shall cooperate with them.

§ 6.1.3 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.

§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner's own forces, Separate Contractors, Construction Manager and other Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner's own forces, Separate Contractors or other Contractors, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Construction Manager and Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor or other Contractors that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Construction Manager and the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's or other Contractors' completed or partially completed construction is fit and proper to receive the Contractor's Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractors or other Contractors that are not apparent.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs, including costs that are payable to a Separate Contractors or to other Contractors, because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of delays, improperly timed activities, damage to the Work or defective construction by the Owner's own forces, Separate Contractors, or other Contractors.

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction, or to property of the Owner, Separate Contractors, or other Contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner, Separate Contractors, and other Contractors shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, Separate Contractors, other Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Construction Manager, with notice to the Architect, will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Construction Manager, Architect and Contractor. A Construction Change Directive requires agreement by the Owner, Construction Manager and Architect and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued by the Architect alone.

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§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

§ 7.2 Change Orders

A Change Order is a written instrument prepared by the Construction Manager and signed by the Owner, Construction Manager, Architect, and Contractor, stating their agreement upon all of the following:

.1 The change in the Work;
.2 The amount of the adjustment, if any, in the Contract Sum; and
.3 The extent of the adjustment, if any, in the Contract Time.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Construction Manager and signed by the Owner, Construction Manager and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

.1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
.2 Unit prices stated in the Contract Documents or subsequently agreed upon;
.3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
.4 As provided in Section 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Construction Manager shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Construction Manager may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

.1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Construction Manager and Architect;
.2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;
.3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
.4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and
.5 Costs of supervision and field office personnel directly attributable to the change.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Construction Manager of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

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§ 7.3.7 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Construction Manager and Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Construction Manager and Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Construction Manager and Architect determine to be reasonably justified. The interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Construction Manager and Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Construction Manager shall prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Construction Manager and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Construction Manager that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner, Architect, Construction Manager, or an employee of any of them, or of the Owner's own forces, Separate Contractors, or other Contractors; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section

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15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts and the Architect, based on the recommendation of the Construction Manager, determines justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

§ 9.1.1 The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Construction Manager, before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Construction Manager and the Architect. This schedule, unless objected to by the Construction Manager or Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. The Construction Manager shall forward to the Architect the Contractor's schedule of values. Any changes to the schedule of values shall be submitted to the Construction Manager and supported by such data to substantiate its accuracy as the Construction Manager and the Architect may require, and unless objected to by the Construction Manager or the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

§ 9.3 Applications for Payment

§ 9.3.1 At least fifteen days before the date established for each progress payment, the Contractor shall submit to the Construction Manager an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner, Construction Manager or Architect require, such as copies of requisitions, and releases of waivers of lien from Subcontractors and suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Construction Manager and Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all

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Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials and equipment relating to the Work.

§ 9.4 Certificates for Payment

§ 9.4.1 Where there is only one Contractor, the Construction Manager will, within seven days after the Construction Manager's receipt of the Contractor's Application for Payment, review the Application, certify the amount the Construction Manager determines is due the Contractor, and forward the Contractor's Application and Certificate for Payment to the Architect. Within seven days after the Architect receives the Contractor's Application for Payment from the Construction Manager, the Architect will either (1) issue to the Owner a Certificate for Payment, in the full amount of the Application for Payment, with a copy to the Construction Manager; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Construction Manager and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Construction Manager and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1. The Construction Manager will promptly forward to the Contractor the Architect's notice of withholding certification.

§ 9.4.2 Where there is more than one Contractor performing portions of the Project, the Construction Manager will, within seven days after the Construction Manager receives all of the Contractors' Applications for Payment: (1) review the Applications and certify the amount the Construction Manager determines is due each of the Contractors; (2) prepare a Summary of Contractors' Applications for Payment by combining information from each Contractor's application with information from similar applications for progress payments from the other Contractors; (3) prepare a Project Application and Certificate for Payment; (4) certify the amount the Construction Manager determines is due all Contractors; and (5) forward the Summary of Contractors' Applications for Payment and Project Application and Certificate for Payment to the Architect.

§ 9.4.2.1 Within seven days after the Architect receives the Project Application and Project Certificate for Payment and the Summary of Contractors' Applications for Payment from the Construction Manager, the Architect will either (1) issue to the Owner a Project Certificate for Payment, with a copy to the Construction Manager; or (2) issue to the Owner a Project Certificate for Payment for such amount as the Architect determines is properly due, and notify the Construction Manager and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Project Application for Payment, and notify the Construction Manager and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1. The Construction Manager will promptly forward the Architect's notice of withholding certification to the Contractors.

§ 9.4.3 The Construction Manager's certification of an Application for Payment or, in the case of more than one Contractor, a Project Application and Certificate for Payment, shall be based upon the Construction Manager's evaluation of the Work and the data in the Application or Applications for Payment. The Construction Manager's certification will constitute a representation that, to the best of the Construction Manager's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is, or Contractors are, entitled to payment in the amount certified.

§ 9.4.4 The Architect's issuance of a Certificate for Payment or, in the case of more than one Contractor, Project Application and Certificate for Payment, shall be based upon the Architect's evaluation of the Work, the recommendation of the Construction Manager, and data in the Application for Payment or Project Application for Payment. The Architect's certification will constitute a representation that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is, or Contractors are, entitled to payment in the amount certified.

§ 9.4.5 The representations made pursuant to Sections 9.4.3 and 9.4.4 are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Construction Manager or Architect.

§ 9.4.6 The issuance of a Certificate for Payment or a Project Certificate for Payment will not be a representation that the Construction Manager or Architect has (1) made exhaustive or continuous on-site inspections to check the quality

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or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Construction Manager or Architect may withhold a Certificate for Payment or Project Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Construction Manager's or Architect's opinion the representations to the Owner required by Section 9.4.3 and 9.4.4 cannot be made. If the Construction Manager or Architect is unable to certify payment in the amount of the Application, the Construction Manager will notify the Contractor and Owner as provided in Section 9.4.1 and 9.4.2. If the Contractor, Construction Manager and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment or a Project Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Construction Manager or Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment or Project Certificate for Payment previously issued, to such extent as may be necessary in the Construction Manager's or Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from the acts and omissions described in Section 3.3.2 because of

- **.1** defective Work not remedied;
- **.2** third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- **.3** failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
- **.4** reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- **.5** damage to the Owner or a Separate Contractor or other Contractor;
- **.6** reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- **.7** repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

§ 9.5.3 When the reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.4 If the Architect or Construction Manager withholds certification for payment under Section 9.5.1, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Construction Manager, and both will reflect such payment on the next Certificate for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment or Project Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Construction Manager and Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Construction Manager will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Owner, Construction Manager and Architect on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor

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fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner, Construction Manager nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors or provided by suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

§ 9.7 Failure of Payment

If the Construction Manager and Architect do not issue a Certificate for Payment or a Project Certificate for Payment, through no fault of the Contractor, within fourteen days after the Construction Manager's receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Construction Manager and Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' notice to the Owner, Construction Manager and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall notify the Construction Manager, and the Contractor and Construction Manager shall jointly prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the list, the Architect, assisted by the Construction Manager, will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect, assisted by the Construction Manager, to determine Substantial Completion.

§ 9.8.4 When the Architect, assisted by the Construction Manager, determines that the Work of all of the Contractors, or designated portion thereof, is substantially complete, the Construction Manager will prepare, and the Construction

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Manager and Architect shall execute, a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor and Construction Manager shall jointly prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect after consultation with the Construction Manager.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Construction Manager, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon completion of the Work, the Contractor shall forward to the Construction Manager a notice that the Work is ready for final inspection and acceptance, and shall also forward to the Construction Manager a final Contractor's Application for Payment. Upon receipt, the Construction Manager shall perform an inspection to confirm the completion of Work of the Contractor. The Construction Manager shall make recommendations to the Architect when the Work of all of the Contractors is ready for final inspection, and shall then forward the Contractors' notices and Application for Payment or Project Application for Payment, to the Architect, who will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Construction Manager and Architect will promptly issue a final Certificate for Payment or Project Certificate for Payment stating that to the best of their knowledge, information and belief, and on the basis of their on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Construction Manager's and Architect's final Certificate for Payment or Project Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect through the Construction Manager (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6), if required by the Owner, other data

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establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Construction Manager and Architect so confirm, the Owner shall, upon application by the Contractor and certification by the Construction Manager and Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect through the Construction Manager prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- **.1** liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;
- **.2** failure of the Work to comply with the requirements of the Contract Documents;
- **.3** terms of special warranties required by the Contract Documents; or
- **.4** audits performed by the Owner, if permitted by the Contract Documents, after final payment.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor, or a supplier, shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract. The Contractor shall submit the Contractor's safety program to the Construction Manager for review and coordination with the safety programs of other Contractors. The Construction Manager's responsibilities for review and coordination of safety programs shall not extend to direct control over or charge of the acts or omissions of the Contractors, Subcontractors, agents or employees of the Contractors or Subcontractors, or any other persons performing portions of the Work and not directly employed by the Construction Manager.

§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to

- **.1** employees on the Work and other persons who may be affected thereby;
- **.2** the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor;
- **.3** other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction; and
- **.4** construction or operations by the Owner, Separate Contractors, or other Contractors.

§ 10.2.2 The Contractor shall comply with, and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, bearing on safety of persons or property or their protection from damage, injury, or loss.

§ 10.2.3 The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards.

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§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner, Construction Manager or Architect or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner, Construction Manager and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 Hazardous Materials

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner, Construction Manager and Architect of the condition.

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor, Construction Manager and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor, the Construction Manager and the Architect will promptly reply to the Owner in writing stating whether or not any of them has reasonable objection to the persons or entities proposed by the Owner. If the Contractor, Construction Manager or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor, the Construction Manager and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Construction Manager, Architect, their consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of

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tangible property (other than the Work itself), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall reimburse the Contractor for all cost and expense thereby incurred.

§ 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Construction Manager and Construction Manager's consultants, and the Architect and Architect's consultants, shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

§ 11.1.2 The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 11.1.3 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance. Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice directly to the Owner, and separately to the Construction Manager, of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.2 Owner's Insurance

§ 11.2.1 The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.

§ 11.2.2 Failure to Purchase Required Property Insurance. If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the

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Contract Documents, the Owner shall inform both the Contractor and the Construction Manager, separately and in writing, prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.

§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance. Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice directly to the Contractor, and separately to the Construction Manager, of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

§ 11.3 Waivers of Subrogation

§ 11.3.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Construction Manager and Construction Manager's consultants; (3) the Architect and Architect's consultants; (4) other Contractors and any of their subcontractors, sub-subcontractors, agents, and employees; and (5) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Construction Manager, Construction Manager's consultants, Architect, Architect's consultants, other Contractors, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this Section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

§ 11.3.2 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance

The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor, Architect, and Construction Manager for loss of use of the Owner's property, due to fire or other hazards however caused.

§ 11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to

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requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Construction Manager, Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Construction Manager, Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

§ 11.5.2 Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Construction Manager's or Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by either, be uncovered for their examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Construction Manager or Architect has not specifically requested to examine prior to its being covered, the Construction Manager or Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Construction Manager or Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion, and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Construction Manager's and Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof, or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner, Construction Manager or Architect, the Owner may correct it in accordance with Section 2.5.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

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§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner, Separate Contractors, or other Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the place where the Project is located excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate the assignment.

§ 13.3 Rights and Remedies

§ 13.3.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

§ 13.3.2 No action or failure to act by the Owner, Construction Manager, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.

§ 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Construction Manager and Architect timely notice of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become

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requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

§ 13.4.2 If the Construction Manager, Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Construction Manager and Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Construction Manager and Architect of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Construction Manager's and Architect's services and expenses, shall be at the Contractor's expense.

§ 13.4.4 Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Construction Manager for transmittal to the Architect.

§ 13.4.5 If the Construction Manager or Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Construction Manager or Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.4.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate the parties agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

- **.1** Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- **.2** An act of government, such as a declaration of national emergency, that requires all Work to be stopped;
- **.3** Because the Construction Manager has not certified or the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- **.4** The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, repeated suspensions, delays, or interruptions of the entire Work by the Owner as described in Section 14.3, constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' notice to the Owner, Construction Manager and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit on Work not executed, and costs incurred by reason of such termination.

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§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees, or any other persons performing portions of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' notice to the Owner, Construction Manager and Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- **.1** repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- **.2** fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;
- **.3** repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- **.4** otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, after consultation with the Construction Manager, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- **.1** Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- **.2** Accept assignment of subcontracts pursuant to Section 5.4; and
- **.3** Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Construction Manager's and Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall, upon application, be certified by the Initial Decision Maker after consultation with the Construction Manager, and this obligation for payment shall survive termination of the Contract.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work, in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and the Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent:

- **.1** that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or
- **.2** that an equitable adjustment is made or denied under another provision of this Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- **.1** cease operations as directed by the Owner in the notice;
- **.2** take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and

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.3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Owner shall pay the Contractor for Work properly executed; costs incurred by reason of the termination, including costs attributable to termination of Subcontracts; and the termination fee, if any, set forth in the Agreement.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition. A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

§ 15.1.2 Time Limits on Claims

The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2.

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Initial Decision Maker with a copy sent to the Construction Manager and Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party under this Section 15.1.3.1 shall be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3.2 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

§ 15.1.4.2 The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

§ 15.1.5 Claims for Additional Cost. If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay only one Claim is necessary.

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§ 15.1.6.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

§ 15.1.7 Waiver of Claims for Consequential Damages. The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

.1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

.2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished, or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties, the Construction Manager, and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation

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within 30 days of receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 Mediation

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract, except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.7, shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.

§ 15.3.4 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 Arbitration

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. The Arbitration shall be conducted in the place where the Project is located, unless another location is mutually agreed upon. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement, shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

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§ 15.4.4 Consolidation or Joinder

§ 15.4.4.1 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as those of the Owner and Contractor under this Agreement.

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SUPPLEMENTARY GENERAL CONDITIONS OF THE CONTRACT

Review Supplementary Conditions with the Owner to insure all the project's basic requirements, and any special requirements, are included in the Contract Conditions.

The following Supplement modifies, deletes from, adds, and replaces the "General Conditions of the Contract for Construction – AIA Document A201, 2017. Where a portion of the General Conditions is modified, the unaltered portions of the General Conditions shall remain in effect. If, and to the extent that, this Supplement is inconsistent with the Owner-Contractor Agreement, the Conditions of the Contract, and General Requirements (Division 01 of the Specifications), this Supplement shall override.

ARTICLE 1 GENERAL PROVISIONS

1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

1.2.2 Add the following sentence to the end of subparagraph 1.2.2:

Such separation of the specifications into divisions, sections, and articles, and arrangements of the drawings shall not operate to make the Architect/Engineer responsible for the scope of the contracts between Contractors and Subcontractors nor for the portion of the work to be performed among the trade groups. Such matters shall be the sole responsibility of the Contractor.

1.5 OWNERSHIP AND USE OF ARCHITECT/ENGINEER'S DRAWINGS, SPECIFICATIONS, AND OTHER INSTRUMENTS OF SERVICE

1.5.1 Add the following sentence to the end of subparagraph 1.5.1:

Subcontractors, sub-subcontractors, material or equipment suppliers and others desiring copies of any drawings or specifications shall obtain them from the Contractor.

ARTICLE 2 OWNER

2.1 GENERAL

2.1.1 Add the following sentence to the end of subparagraph 2.1.1:

Where the term "Owner" or a pronoun in place of it occurs in these Contract Conditions and specifications, it refers to:

Odessa-Montour Central School District

or its duly authorized representative.

2.3 INFORMATION AND SERVICES REQUIRED OF THE OWNER

2.3.6 Delete Section 2.3.6 in its entirety and replace with the following:

Drawings and Specifications Furnished:

.1 Copies for Bidding Purposes: See Invitation for Bids – Advertisement.

.2 Copies for Construction: The Contractors will each be furnished without charge up to two (2) sets of Contract Drawings and Project Manuals for use during construction for their own use and the use for their subcontractors.

.3 Owner shall furnish additional sets upon a Contractor's written request. Such additional sets will be provided at the cost of printing, postage and handling. Partial sets will NOT be provided.

ARTICLE 3 CONTRACTOR

3.4 LABOR AND MATERIALS

3.4.4 Add the following provision as a new subparagraph 3.4.4:

After the Notice to Proceed has been executed by the Contractor and the Owner, the Architect/Engineer will consider a formal request for the substitution of products in place of those specified only under the conditions set forth in the General Requirements (Division 01 of the Specifications).

3.6 TAXES

3.6.1 Delete subparagraph 3.6 and substitute the following*:*

Exemption from Sales and Compensating Use Taxes of the State of New York and of Cities and Counties:

.1 The Owner is exempt from payment of sales and compensating use taxes of the State of New York and of cities and counties on all supplies and materials sold to the Owner pursuant to this Contract. This exemption does not, however, apply to tools, machinery, equipment or other property leased by or to the Contractor or a Subcontractor or to supplies and materials not incorporated into the completed project. The Contractor and their Subcontractors shall be responsible for and pay for any and all applicable taxes, including sales and compensating use taxes, on such leased tools, machinery, equipment or other property or such unincorporated supplies and materials and the provisions set forth below will not be applicable to such tools, machinery, equipment, property, supplies and materials.

.2 The purchase by the Contractors of the supplies and materials sold hereunder will be a purchase or procurement for resale and, therefore, not subject to the New York State sales or compensating use taxes or any such taxes of cities and counties. The sale of such supplies and materials by the Contractor to the Owner, which is a non-profit agency, will not be subject to the aforesaid sales or compensating use taxes. With respect to such supplies and materials sold hereunder, the Contractor, at the request of the Owner, shall furnish to the Owner such bills of sale and other instruments as may be required by it, properly executed, acknowledged and delivered, assuring to it title to such supplies and materials free of encumbrances and the Contractor shall mark or otherwise identify all such supplies and materials as the property of the Owner.

.3 The purchase by Subcontractors of supplies and materials to be sold hereunder will also be a purchase or procurement for resale to the Contractor (either directly or through other Subcontractors) and, therefore, not subject to the aforesaid sales or compensating use taxes, provided that the subcontract agreements provide for the resale of such supplies and materials prior to and separate and apart from the incorporation of such supplies and materials into the permanent construction and that such subcontract agreements are in a form similar to this Contract.

.4 If, as a result of such sale of supplies and materials (1) any claim is made against the Contractor by the State of New York or any city or county for sales or compensating use taxes on the aforesaid mentioned supplies and materials, or (2) any claim is made against the Contractor by a material person or subcontractor by the State of New York or any city or county for sales or compensating use taxes on the aforementioned supplies and materials than, if the Contractor and Subcontractor have complied with the provisions of this Contract relating thereto, the Owner will reimburse the Contractor for an amount equal to the amount of such tax required to be paid in accordance with the requirements of law provided that:

a. The subcontract agreements in conjunction with this Contract provide for the resale of such supplies and materials prior to and separate and apart from the incorporation of such supplies and materials into the permanent construction; such subcontract agreements are in a form similar to this Contract;

b. The Contractor and their subcontractors and material person obtain any and all necessary resale exemption certificates from the Owner and furnish a resale certificate to all persons, firms or corporations from which they purchase supplies and materials for the performance of the work covered by this Contract;

c. The Contractor and all subcontractors maintain and keep, for a period of six (6) years after the date of final payment for the sale or, if a claim for sales or compensating use tax is pending or threatened at the end of such six year period, until such claim is finally settled, records which, in the judgment of the Department of Taxation and Finance, adequately show (1) all materials and supplies purchased by them for resale pursuant to the provisions of this Contract, and (2) all materials and supplies sold to the Owner pursuant to the provisions of this Contract;

d. The Owner is afforded the opportunity, before any payment of tax is made, to contest said claim in the manner and to the extent that the Owner may choose and to settle or satisfy said claims; and

e. The Contractor and the subcontractor give immediate notice to the Owner of any such claim, cooperate with the Owner and its designated attorney in contesting said claim and furnish promptly to the Owner and said attorney all information and documents necessary or convenient for contesting said claim, said information and documents to be preserved for six (6) years after the date of final payment for the sale or, if such claim is pending or threatened at the end of such six years, until such claim is finally settled. If the Owner elects to contest any such claim, it will bear the expense of such contest.

.5 Nothing in this section is intended or shall be construed as relieving the Contractor from their obligations under Article 4 of these Specifications or any other provision of the Contract, and the Contractor shall have the full continuing responsibility to install the materials and supplies purchased in accordance with the provisions of this Contract, to protect the same, to maintain them in proper condition and to forthwith repair, replace and make good any damage thereto without cost to the Owner until such time as the work covered by the Contract is fully accepted by the Owner.

3.8 ALLOWANCES

3.8.2.2 Add the following sentence at the end of subparagraph 3.8.2.2:

Except when installation is specified as part of the allowance in the General Requirements (Division 1 of the Specifications).

3.9 SUPERINTENDENT

3.9.4 Add the following provision as a new subparagraph 3.9.4:

The superintendent shall be satisfactory to the Owner in all respects, and Owner shall have the right to require Contractor to dismiss from the Project any superintendent whose performance is not satisfactory to Owner, and to replace such superintendent with a superintendent satisfactory to Owner. The Contractor shall not replace the superintendent without the consent of the Owner in all respects.

3.13 USE OF SITE

3.13.1 Add the following new subparagraph 3.13.1:

Contractor shall coordinate their use of the site with the Owner's use of the building and safety of persons and property. Any use of the site by the Contractor shall receive prior approval of the Owner and Architect/Engineer.

3.15 CLEANING UP

3.15.1 Add the following sentences as new sentences to subparagraph 3.15.1:

.1 The Contractor shall clean up all accumulated debris and rubbish daily during construction and remove the accumulation from the building and the premises.

.2 On completion of all work, the Contractor shall clean the building and site of all debris and rubbish of all kinds, leaving premises in a neat and clean condition to the satisfaction of the Owner and Architect/Engineer.

ARTICLE 4 ARCHITECT/ENGINEER

4.1 GENERAL

4.1.1 Add the following sentence at the end of subparagraph 4.1.1:

Where the term "Architect/Engineer" or a pronoun in place of it occurs in these specifications or drawings, it refers to:

Arcadis
59-61 Court Street, Suite 300
Binghamton, New York 13901

ARTICLE 5 SUBCONTRACTORS

5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

5.2.1 In the first sentence, delete the words "as soon as practicable" and substitute the following words, "within fourteen (14) calendar days".

ARTICLE 7 CHANGES IN THE WORK

7.1 GENERAL

7.1.4 Add the following provision as a new subparagraph 7.1.4:

Changes, additional work, or deletion of work, involving an addition or subtraction to the Contract sum, shall not be done until the Contractor submits to the Architect/Engineer the cost of the added or deleted work with a complete and detailed listing of all subcontractors, all materials, labor, overhead and profits and the Architect/Engineer has issued an appropriate change order. If requested, the Contractor shall also submit quotes from subcontractors and material suppliers.

7.3 CONSTRUCTION CHANGE DIRECTIVES

7.3.5 Delete Section 7.3.5 in its entirety and replace with the following:

When either the Owner or the Contractor or both do not agree with the determination made by the Architect/Engineer concerning the adjustments in the Contract Sum and Contract Time, such disagreement shall be resolved in the manner prescribed by Article 15.

7.3.11 Add the following provision as a new subparagraph 7.3.11:

In subparagraph 7.3.4 the allowance for overhead and profit shall be as scheduled below. Labor costs shall include items incidental to labor, including applicable payroll taxes, workmen's compensation insurance, fringe and all mandatory costs paid in connection with labor, and other employee costs approved by the Architect/Engineer. Overhead shall include Contractor's supervisory employees, general office expense and small tools.

.1 For the Contractor, for work performed by the contractor's own forces, 15 percent of the cost.

.2 For the Contractor, for work performed by the contractor's subcontractor, ten percent of the amount due the subcontractor.

.3 For each subcontractor, for work performed by subcontractor's own forces, ten percent of the cost

.4 Overhead and profit shall not be added to work performed pursuant to Field Directive Allowance work or Architect/Engineer directed materials allowances.

.5 In order to facilitate checking of quotations for extras or credits, all proposals shall be accompanied by a completed itemization of cost, including labor, materials, and subcontracts. Labor and material shall be itemized in the manner prescribed above. Where cost items are subcontracts, they shall be itemized also. In no case will a change be approved without such itemization.

.6 Contractor's neglect causing expense or delay to Owner, Construction Manager, or Architect/Engineer to be compensated for by the Contractor to the extent of damage caused. Unnecessary supervision or revision of drawings so caused to be billed by the Architect/Engineer to the Contractor at actual cost.

ARTICLE 9 PAYMENTS AND COMPLETION

9.3 APPLICATIONS FOR PAYMENT

9.3.2 Add the following sentence at the end of subparagraph 9.3.2:

If deemed necessary to assure delivery of materials at the times needed, Contractors, with the approval of the Architect/Engineer, may accept delivery at any time and may include the cost of such materials in their next monthly application for payment, provided such materials have actually been delivered to the Contractor and properly stored by them with the approval or under the direction of the Architect/Engineer, either at the job or in an approved storage shed or bonded warehouse. Materials not stored on project site must have a certification of insurance for stored materials submitted to the Architect/Engineer prior to approval of Application for Payment.

9.3.4 Add the following as a new subparagraph 9.3.4:

Method of Payment - On or before the twenty-fifth (25th) day of each month, the Contractor shall submit to the Architect/Engineer a Requisition for Payment, using AIA Documents G702 and G703, for the work, materials, and equipment incorporated in the project, or stored as specified. On or before the twenty-fifth (25th) of that succeeding month, the Architect/Engineer will have reviewed the Contractor's Requisition for Payment, received from the Contractor three (3) copies of the Requisition for Payment in a form satisfactory to the Architect/Engineer. The Owner will pay the Contractor by the thirtieth (30th) of the succeeding month. Monthly requisitions shall include certified payroll documents.

9.4 CERTIFICATES FOR PAYMENT

9.4.3 Add the following provision as a new subparagraph 9.4.3:

The Contractor will be paid monthly 95% prorate value of the work and materials incorporated or materials suitably stored on the site until final completion and acceptance of all work under the Contract.

9.4.4 Add the following provision as a new subparagraph 9.4.4:

Final payment of withheld percentage will be made within thirty (30) days after final inspection and acceptance.

9.5 DECISIONS TO WITHHOLD CERTIFICATION

9.5.5 Add the following provision as a new subparagraph 9.5.5:

No partial payments will be made after the time fixed for the completion of the work or the time to which completion may be extended under the terms of the Contract, until the full and final completion and acceptance of all work herein agreed upon, up to and including two times the value of the uncompleted or unacceptable work as is determined by the Owner and Architect/Engineer.

9.8 SUBSTANTIAL COMPLETION

9.8.6 Add the following provision as a new subparagraph 9.8.6:

The dates of Commencement and of Substantial Completion shall be as specified in the "Instructions to Bidders".

9.8.7 Add the following provision as a new subparagraph 9.8.7:

Substantial completion, for the purpose of determining when the next to final payment to the Contractor is due to be paid, shall be considered the completion of the work of the contract in its entirety with the exception of such items as are of a minor nature and are properly assignable to a Final Completion List and it shall be at the discretion of the Architect/Engineer to determine when "substantial completion" has been accomplished.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

10.5 Add paragraph 10.5, Protection of Work, Property, and Materials:

10.5 PROTECTION OF WORK, PROPERTY, AND MATERIALS:

10.5.1 Contractor shall protect the building and building contents from damage from weather, construction materials, etc., to permit the Owner's continuous use of the building.

10.5.2 Provide and maintain in good working order suitable fire protection equipment throughout the time of the Contract.

10.5.3 Conduct of Work in Freezing Weather - Protection shall be afforded as required to prevent freezing and as may be approved by the Architect/Engineer. If new or old work is injured by freezing, it shall be removed and replaced by the Contractor at their own expense.

10.5.4 Contractor shall be responsible for guarding and protecting their work and materials and work and materials of their subcontractors at all hours, including those hours during which workers are not engaged in construction.

ARTICLE 11 INSURANCE AND BONDS

Delete subparagraph 11.1.1 in its entirety and replace it with the following subparagraphs and clauses:

11.1.1 The Contractor shall purchase from, and maintain in, a company licensed to sell insurance in the State where the project is located, occurrence based insurance as will protect the Contractor from claims set forth in the subparagraphs below, which may arise out of or result from the Contractor’s operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor, by a Subcontractor, by a sub-subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable. The insurance shall be written to name Owner,

Architect/Engineer, their agents and employees, and all other designated entities, as additional insured parties on a primary and non-contributing basis to the fullest extent permitted by law for all claims caused in whole or in part by the contractor's negligent acts or omissions during the contractor's operations which will also include completed operations for period of not less than three (3) years after substantial completion; and this designation shall appear on all Certificates of Insurance.

.1 The insurance company shall be rated at least A-VII by AM Best Company AND must be approved by the owner.

.2 At the sole discretion of the Owner, the Asbestos Abatement Contractor, if any, may purchase such liability insurance from a risk retention group; provided, however, that the liability insurance provided by such risk retention group shall fully protect the Contractor from claims set forth in subparagraph 11.1.2 below, which may arise out of or result from the Contractor's operations under the Contract or from that of a Subcontractor or from anyone directly or indirectly employed by any of them.

.3 The liability insurance required in subparagraph 11.1.1 shall protect the Contractor against the following:

a. claims under workers' or workmen's compensation, disability benefit and other similar employee benefit acts which are applicable to the Work to be performed;
b. claims for damages because of bodily injury, occupation sickness or disease, or death of the Contractor's employees;
c. claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
d. .claims for damages insured by usual personal injury liability coverage which are sustained (1) by a person as a result of an offense directly or indirectly related to employment of such person by the Contractor, or (2) by another person;
e. claims for damages, other than to the Work itself, because of injury, death of a person or property damage arising out of the ownership, maintenance or use of a motor vehicle; and
f. claims involving contractual liability insurance applicable to the Contractor's obligations under Paragraph 3.18.

.4 The insurance required by subparagraph 11.1.1 shall be on a comprehensive basis and may be provided by a Commercial General Liability or a Comprehensive General Liability policy. Endorsements and exclusions of any category of insurance must be noted on the Certificate of Insurance prepared for this Project; provided, however, that the insurance required by subparagraph 11.1.1 shall include all of the following major divisions of coverage:

a. Premises-Operations (including X-C-U);
b. Independent Contractor's Protective;
c. Products and Completed Operations;
d. Personal and Advertising Injury Liability with Employment Exclusion deleted;

e. Contractual -- including specified provision for the Contractor's Obligations under paragraph 3.18;
f. Owned, Non-Owned and Hired Motor Vehicles; and
g. Broad Form Property Damage including Completed Operations.
h. Coverage shall not include any residential exclusion.

.5 The insurance required by subparagraph 11.1.1 shall be provided on an occurrence basis only, with no sunset clauses. The Coverages shall be maintained without interruption from date of commencement of the Work until the date of final payment or later, for those coverages required by the Contract to be maintained after final payment.

.6 The insurance required by subparagraph 11.1.1 shall be written for not less than the following limits, or greater if required by law:

.7 Worker's Compensation and Disability coverage:

i) The Company and/or Project Owner shall provide evidence of insurance
and maintain Workers Compensation/Disability insurance as required by statute.

ii) Accepted Forms:

Workers Compensation Forms DBL (Disability Benefits Law) Forms

CE-200	**Exemption**		**CE-200**	**Exemption**
C-105.2	**Commercial Insurer**		**DB-120.1**	**Insurers**
SI-12	**Self-Insurer**		**DB-155**	**Self-Insured**
GSI-105.2	**Group Self-Insured**			
U-26.3	**New York State Insurance Fund**			

a. State: Statutory (In states where statutory limits are not set provide a minimum of $1,000,000 coverage per accident)

.8 Comprehensive or Commercial General Liability (including asbestos liability; Premises-Operations; Independent Contractor's Protective; Products and Completed Operations; Broad Form Property Damage):

a. Bodily Injury:
$1,000,000 Each Occurrence
$2,000,000 Aggregate

b. Property Damage:
$1,000,000 Each Occurrence
$2,000,000 Aggregate

c. Products and Completed Operation to be maintained for three (3) years after Owner's acceptance at final payment:

Property Damage Liability Insurance shall provide X, C, and U coverage.

Broad Form Property Damage Coverage shall include Completed Operation.

All above mentioned insurance shall be provided with a joint waiver of subrogation.

.9 Contractual Liability:

a. Bodily Injury:
$1,000,000 Each Occurrence
$2,000,000 Aggregate

b Property Damage:
$1,000,000 Each Occurrence
$2,000,000 Aggregate

.10 Personal Injury, with Employment Exclusion deleted:

.11 Business Auto Liability (including owned, non-owned, and hired vehicles): $1,000,000 combined single limit.

.12 If the General Liability coverages are provided by a Commercial Liability policy:

These coverages are to be properly evidenced by checking the appropriate box(es) on the **ACORD 855-NY Construction Certificate of Liability Addendum's** Information Section, Items G, H, I and L. Policy shall have attached **Designated Location(s) General Aggregate Limit CG 25 04** endorsement.

Limits expressed shall be <u>no less than</u>:

General Aggregate	$2,000,000
Products-Completed Operations Aggregate	$2,000,000
Per Occurrence	$1,000,000
Personal & Advertising Injury	$1,000,000
Fire Damage Liability	$ 100,000
Medical Payments (per person)	$ 5,000

Blanket Additional Insured endorsement to include – Owner, Lessees or Contractors - Automatic Status For Other Parties When Required in Written Construction Agreement – Wording should include any other person or organization you are required to add as an additional insured under the contract or agreement (Paragraph 2 of CG 20 38 04 13 or equivalent)
Any scheduled person or organization section of the additional insured endorsement containing wording other than designated names shall not be accepted.

.13 Umbrella/Excess Liability

$5,000,000 over primary insurance.
$10,000 retention for self-insured hazards, each occurrence.

.14 Pollution Liability: Insure the entire project against pollution risks, including all tiers of subcontractors, off site transportation and exposures at non owned locations.

$1,000,000 Each Occurrence
$2,000,000 Aggregate

.15 If the Commercial General Liability policy of the Contractor, or any subcontractor, of any tier, contains a General Aggregate Limit, such General Aggregate shall apply separately to each project and location.
a. A copy of the per project aggregate endorsement shall be provided before any work is started on the project.

.16 The Contractor shall purchase and maintain, from a company licensed to sell insurance in the state where the Project is located, an Owner's Protective Liability Policy in the name of the Owner and covering the interests of the Owner with coverage in the amount of $1,000,000 for each occurrence and $2,000,000.00 aggregate.

.17 Certificates of Insurance, **acceptable to the Owner**, shall be filed with the Architect/Engineer and Owner prior to commencement of the Work.
a. These Certificates and the insurance policies required by paragraph 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least thirty (30) days' prior written notice has been given to the Owner.
b. The Certificates shall be written on an ACORD Form 25 in addition to the completed ACORD 855 and appropriate workers compensation / disability certificates.
c. If any of the foregoing insurance coverages are required to remain in force after final payment and are reasonably available, an additional Certificate evidencing continuation of such coverage shall be submitted with the final Application for Payment as required by subparagraph 9.10.2.

d. Information concerning reduction in coverage shall be furnished by the Contractor with reasonable promptness in accordance with the Contractor's information and belief.

e. **In addition to the Certificate of Insurance**, the Contractor shall provide the Owner with copies of any endorsement subsequently issued amending coverage or limits.

f. The insurance for the additional insured shall be as broad as the coverage provided for the named insured contractor. It shall apply as primary insurance, on a noncontributing basis before any other insurance or self-insurance, including any deductible, maintained or provided to, the additional insured(s).

.18 No Contractor or subcontractor of any tier, shall commence work under this Contract until he has obtained all the insurance required hereunder and until such insurance has been accepted by the Owner.

.19 Subcontractor's insurance: Except as otherwise approved in writing by Owner, Contractor shall cause each of the Subcontractors, of any tier, to procure and to maintain, during the life of its Subcontract, insurance of the types and in the amounts required of Contractor and reasonable to the Owner. The Owner, the Architect/Engineer, their agents and employees, and all other designated entities will be added as additional insureds on a primary and non-contributory basis to the fullest extent permitted by law for all claims caused, in whole, or in part, by the Contractor's negligent acts or omissions during the Contractor's operations which will also include completed operations for a period of not less than three (3) years after substantial completion; and this designation shall appear on all Certificates of Insurance.

11.1.2 Delete Paragraph 11.1.2 and substitute in lieu thereof the following:

11.1.2 Contractor shall deliver to the Owner prior to the execution of the Contract, an executed Performance Bond and Labor and Material Payment Bond each in the amount of one hundred percent (100%) of the Contract Sum. The Bonds shall be written by a company licensed to sell surety insurance in the state where the project is located, Treasury Listed and acceptable to the Owner. Contractor shall use an unaltered AIA Document A312, 2010 Edition. The Attorney-in-Fact who executes these bonds on behalf of the surety is to affix thereto a certified and current copy of the Power of Attorney. No Work shall commence until the Owner has accepted the Bonds. The Owner shall have the right to reject the Contractor for the Contractor's failure to comply and the Contractor shall forfeit any bid security for failure to comply with bonding or insurance requirements.

ARTICLE 14 TERMINATION OF SUSPENSION OF THE CONTRACT

14.2.4.1 Insert the following as a new subparagraph 14.2.4.1:

14.2.4.1 The costs of finishing the Work include, without limitation, all reasonable attorneys' fees, additional title costs, insurance, additional interest because of any delay in completing the Work, and all other direct and indirect and consequential costs incurred by the Owner by reason of the termination of the Contractor as stated herein.

14.3.2.3 Insert the following as a new subparagraph 14.3.2.3:

14.3.2.3 The Owner shall be entitled to collect from the Contractor all direct, indirect, and consequential damages suffered by the Owner on account of the Contractor's default, including, without limitation, additional services and expenses of the Architect/Engineer made necessary thereby and attorneys' fees incurred by the Owner on account of such default.

END OF DOCUMENT

DOCUMENT 00 82 00

PREVAILING WAGE RATES

1 PART 1 PREVAILING WAGE RATES

A. Prospective bidder shall note that the applicable prevailing wage rates, as determined by the New York State Bureau of Public Works Labor Department, are applicable for all phases of the work on this project.

B. The Prevailing Wage Rates attached are hereby made a part of this contract, in accordance with Section 220 of the Labor Law. All prospective bidders shall adhere to this documentation when preparing their bids.

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.

Contractor Registry

Effective December 30, 2024 all contractors and subcontractors submitting bids or performing construction work on public work projects, or private projects covered by Article 8 of the Labor Law, are required to register with the New York State Department of Labor (NYSDOL) under Labor Law Section 220-i. To register, contractors and subcontractors must submit an application through NYSDOL's Contractor Registry portal which is available through the agency's Management System for Protecting Worker Rights (MPWR) https://mpwr-public.labor.ny.gov/en/login.

For additional information, please visit online.

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.

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 to 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.

*Contractor Registry (LL 220-I): Effective December 30th, 2024
Labor Law Section 220-i(6) prohibits contractors from bidding on public work and prohibits both contractors and subcontractors from commencing work
on private and public projects subject to prevailing wage requirements. This section requires contractors to submit their Certificate of Registration with
their bid materials. Each Certificate of Registration will have a unique registration number. Failure to provide proof of registration, as required by Labor
Law Section 220-i, as a minimum qualification will result in the bidder being deemed non-responsive. There is a public database of registered contractors and subcontractors available online at data.ny.gov to confirm registration validity. For additional information on how to register and the
requirements, visit https://dol.ny.gov/public-work-contractor-and-subcontractor-registry-landing

*Electronic Certified Payroll (LL 220-K): Effective December 31st, 2025
Effective December 31, 2025, all contractors and subcontractors who perform public work, or covered private work subject to the prevailing wage, will be
required to submit certified payrolls electronically to the Bureau of Public Work and Prevailing Wage Enforcement. Additional information about the
electronic certified payroll submission system will be made available on the Department's Website at https://dol.ny.gov/Electronic-Payroll

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.

Shift Work

If the timeline of the contract requires shift work be performed to meet deadlines, the BPWE will enforce the shift work rate as the required rate on
the project whether or not shift work is specifically addressed in the contract.

Paid Prenatal Leave

Every employer shall be required to provide to its employees twenty hours of paid prenatal personal leave during any fifty-two week calendar period. Paid prenatal personal leave shall mean leave taken for the health care services received by an employee during their pregnancy or related to such pregnancy, including physical examinations, medical procedures, monitoring and testing, and discussions with a health care
provider related to the pregnancy. Paid prenatal personal leave may be taken in hourly increments. Benefits for paid prenatal personal leave shall
be paid in hourly installments. Employees shall receive compensation at the employee's regular rate of pay, or the applicable minimum wage established by the labor law, whichever is greater, for the use of Paid Prenatal leave.

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

Schuyler County General Construction

Boilermaker — 07/01/2025

JOB DESCRIPTION Boilermaker **DISTRICT** 12

ENTIRE COUNTIES
Allegany, Cattaraugus, Chautauqua, Chemung, Erie, Genesee, Livingston, Monroe, Niagara, Ontario, Orleans, Schuyler, Steuben, Wayne, Wyoming, Yates

WAGES

Per hour:	07/01/2025	01/01/2026 Additional
Boilermaker	$ 39.35	$ 2.50*

The wage rate will be 90% of the above for Maintenance work on boilers less than 100,000 pph.

*To be allocated at a later date.

SUPPLEMENTAL BENEFITS
Per hour: $ 33.52*

*NOTE: $32.03 of this amount is for every Hour "Paid"

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES
1st Term at 12 Months
Terms 3-8 at 6 Months
Per Hour:
1st 65%
3rd 70% 4th 75% 5th 80% 6th 85% 7th 90% 8th 95%

Supplemental Benefits per hour:

All Terms $ 33.52**

**NOTE: $32.03 of this amount is for every Hour "Paid"

12-7

Broadband — 07/01/2025

JOB DESCRIPTION Broadband **DISTRICT** 4

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, Orleans, Oswego, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Suffolk, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Wyoming, Yates

PARTIAL COUNTIES
Orange: Entire County except Village of Greenwood Lake, Village of Highland Falls, Town of Tuxedo, and Town of Patterson

WAGES

Per Hour:	07/01/2025	08/04/2025 Additional
Field Tech Install/Repair	$ 51.27	3% Per Hour

For outside work (excluding installation on building construction/alteration/renovation projects), stopping at first point of attachment (demarcation), installing/maintaining/repairing broadband internet service.

Applies to projects receiving ConnectAll funding that are subject to New York State Labor Law §224-E.

SUPPLEMENTAL BENEFITS
Per Hour:
$ 23.24

OVERTIME PAY
See (B, K, *R) on OVERTIME PAGE
* Two and one half times the hourly rate after the 8th hour

HOLIDAY
Paid: See (5, 6, 7, 11, 12) on HOLIDAY PAGE
Overtime: See (5, 6, 7, 11, 12) on HOLIDAY PAGE

4-CWA-Dist2

Carpenter - Building 07/01/2025

JOB DESCRIPTION Carpenter - Building **DISTRICT** 2

ENTIRE COUNTIES
Chemung, Cortland, Schuyler, Steuben, Tompkins

PARTIAL COUNTIES
Allegany: Only the Township of Alfred.

WAGES

Per hour:	07/01/2025	01/01/2026	07/01/2026 Additional	07/01/2027 Additional
Carpenter	$ 31.59	$ 32.09	$ 3.50*	$ 4.00*
Floor Coverer	31.59	32.09	3.50*	4.00*
Carpet Layer	31.59	32.09	3.50*	4.00*
Dry-Wall	31.59	32.09	3.50*	4.00*
Diver-Wet Day	61.25	61.25	0.00	4.00*
Diver -Dry Day	32.59	33.09	3.50*	4.00*
Diver Tender	32.59	33.09	3.50*	4.00*

*To be allocated at a later date

NOTE ADDITIONAL AMOUNTS PAID FOR THE FOLLOWING WORK LISTED BELOW (per hour worked):
- Pile Drivers/Dock Builders shall receive $0.25 per hour over the journeyworker's rate of pay when performing piledriving/dock building work.
- Certified welders shall receive $1.00 per hour over the journeyworker's rate of pay when the employee is required to be certified and performs DOT or ABS specified welding work (Effective 7/1/2026 premium increases to $3.00/hr and will include premium when AWS certification is required).
- When an employee performs work within a contaminated area on a State and/or Federally designated hazardous waste site, and where relevant State and/or Federal regulations require employees to be furnished and use or wear required forms of personal protection, then the employee shall receive his regular hourly rate plus $1.50 per hour.
- Depth pay for Divers based upon deepest depth on the day of the dive (per diem payment):
  0' to 80' no additional fee
  81'to 100' additional $.50 per foot
  101'to 150' additional $0.75 per foot
  151'and deeper additional $1.25 per foot
- Penetration pay for Divers based upon deepest penetration on the day of the dive (per diem payment):
  0' to 50' no additional fee
  51' to 100' additional $.75 per foot
  101' and deeper additional $1.00 per foot
- Diver rates applies to all hours worked on dive day.

SHIFT WORK
On Agency/Owner mandated shift work, the following rates will be applicable:
1st Shift - Regular Rate
2nd Shift - Premium of 7% of base wage per hour (Effective 7/1/2026 premium increases to 10%)
3rd Shift - Premium of 14% of base wage per hour (Effective 7/1/2026 premium increases to 15%)
Shift work shall be defined as implementing at least two (2) shifts in a twenty-four (24) consecutive hour period. Shift work must be for a minimum of three (3) consecutive days.

SUPPLEMENTAL BENEFITS
Per hour:

	07/01/2025	01/01/2026
Journeyworker	$ 23.39	$ 23.39

OVERTIME PAY
See (B, E, E2, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
Note: Any holiday which occurs on Sunday shall be observed the following Monday. If Christmas falls on a Saturday, it shall be observed on the prior Friday.

REGISTERED APPRENTICES
Wages per hour (1300 hour terms at the following percentage of Journeyworker's base wage):

1st	2nd	3rd	4th
65%	70%	75%	80%

Supplemental Benefits per hour:

$ 12.55	$ 12.55	$ 15.15	$ 15.15

NOTE ADDITIONAL AMOUNTS PAID TO APPRENTICES FOR THE FOLLOWING WORK LISTED BELOW (per hour worked):
- Pile Driving/Dock Builder apprentices shall receive an additional $0.25 per hour worked when performing piledriving/dock building work.
- Certified Welders shall receive $1.00 per hour over the apprentices rate of pay when the apprentice is required to be certified and performs DOT or ABS specified welding work (Effective 7/1/2026 premium increases to $3.00/hr and will include premium when AWS certification is required).
- When an apprentice performs work within a contaminated area on a State and/or Federally designated hazardous waste site, and where relevant State and/or Federal regulations require the apprentice to be furnished and use or wear required forms of personal protection, then the apprentice shall receive his regular hourly rate plus $1.50 per hour.

2-277B-CS

Carpenter - Building / Heavy&Highway — 07/01/2025

JOB DESCRIPTION Carpenter - Building / Heavy&Highway **DISTRICT** 2

ENTIRE COUNTIES
Albany, Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Niagara, Oneida, Onondaga, Ontario, Orleans, Oswego, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Wyoming, Yates

PARTIAL COUNTIES
Orange: The area lying on Northern side of Orange County demarcated by a line drawn from the Bear Mountain Bridge continuing west to the Bear Mountain Circle, continue North on 9W to the town of Cornwall where County Road 107 (also known as Quaker Rd) crosses under 9W, then east on County Road 107 to Route 32, then north on Route 32 to Orrs Mills Rd, then west on Orrs Mills Rd to Route 94, continue west and south on Route 94 to the Town of Chester, to the intersection of Kings Highway, continue south on Kings Highway to Bellvale Rd, west on Bellvale Rd to Bellvale Lakes Rd, then south on Bellvale Lakes Rd to Kain Rd, southeast on Kain Rd to Route 17A, then north and southeast along Route 17A to Route 210, then follow Route 210 to NJ Border.

WAGES

Wages per hour:	07/01/2025	07/01/2026 Additional	07/01/2027 Additional
Carpenter - ONLY for Artificial Turf/Synthetic Sport Surface	$ 37.94	$ 2.25*	$ 2.25*

* To be allocated at a later date.

Note - Does not include the operation of equipment. Please see Operating Engineers rates.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker	$ 27.34

OVERTIME PAY
See (B, E, Q, X) on OVERTIME PAGE

HOLIDAY
Paid: See (5) on HOLIDAY PAGE
Overtime: See (5, 6, 16) on HOLIDAY PAGE
Notes:
When a holiday falls upon a Saturday, it shall be observed on the preceding Friday. Whan a holiday falls upon a Sunday, it shall be observed on the following Monday.
An employee taking an unexcused day off the regularly scheduled day before or after a paid Holiday shall not receive Holiday pay.

REGISTERED APPRENTICES
Wages per hour (1300 hour terms at the following percentage of Journeyworker's wage):

1st	2nd	3rd	4th
65%	70%	75%	80%

Supplemental Benefits per hour:

$19.10	$19.69	$21.83	$22.42

2-42AtSS

Carpenter - Heavy&Highway — 07/01/2025

JOB DESCRIPTION Carpenter - Heavy&Highway **DISTRICT** 2

ENTIRE COUNTIES
Broome, Cayuga, Chemung, Cortland, Delaware, Jefferson, Lewis, Onondaga, Oswego, Schuyler, Seneca, St. Lawrence, Steuben, Tioga, Tompkins, Yates

WAGES

Per hour	07/01/2025	07/01/2026 Additional	07/01/2027 Additional
Carpenter	$ 39.52	$ 2.00*	$ 4.42*
Piledriver	39.52	2.00*	4.42*
Dockbuilder	39.52	2.00*	4.42*
Diver-Wet Day	64.52	2.00*	4.42*
Diver-Dry Day	40.52	2.00*	4.42*
Diver-Tender	40.52	2.00*	4.42*

*To be allocated at a later date.

NOTE ADDITIONAL AMOUNTS PAID FOR THE FOLLOWING WORK LISTED BELOW (per hour worked):
- State or Federal designated hazardous site, requiring protective gear shall be an additional $2.50 per hour.
- Certified welders when required to perform welding work will receive an additional $5.00 per hour.

ADDITIONAL NOTES PERTAINING TO DIVERS/TENDERS:
- Divers and Tenders shall receive one and one half (1 1/2) times their regular diver and tender rate of pay for Effluent and Slurry diving.
- Divers and tenders being paid at the specified rate for Effluent and Slurry diving shall have all overtime rates based on the specified rate plus the appropriate overtime rates (one and one half or two times the specified rate for Slurry and Effluent divers and tenders).
- The pilot of an ADS or submersible will receive one and one-half (1 1/2) times the Diver-Wet Day Rate for time submerged.
- All crew members aboard a submersible shall receive the Diver-Wet Day rate.
- Depth pay for Divers based upon deepest depth on the day of the dive (per diem payment):
  0' to 50' no additional fee
  51' to 100' additional $0.50 per foot
  101' to 150' additional $0.75 per foot
  151' to 200' additional $1.25 per foot
  201' and deeper additional $1.50 per foot
- Penetration pay for Divers based upon deepest penetration on the day of the dive (per diem payment):
  0' to 50' no additional fee
  51' to 100' additional $0.75 per foot
  101' to 200' additional $1.00 per foot
  Over 201' additional $1.25 per foot
- Diver rates applies to all hours worked on dive day.

SHIFT WORK

When project owner mandates a single irregular work shift, the Journeyworkers and Apprentices will receive an additional $4.00 per hour. A single irregular work shift can start any time from 5:00 p.m. to 1:00 a.m.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker	$ 27.31

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

- In the event a Holiday falls on a Saturday, the Friday before will be observed as a Holiday. If a Holiday falls on a Sunday, then Monday will be observed as a Holiday.
- The employee must work their scheduled workday before and their scheduled workday after the holiday to receive holiday pay.

REGISTERED APPRENTICES

CARPENTER/PILEDRIVER/DOCKBUILDER APPRENTICES

Wages per hour (1300 hour terms at the following percentage of journeyworker's base wage):

1st	2nd	3rd	4th
65%	70%	75%	80%

Supplemental Benefits per hour:

$ 19.07	$ 19.66	$ 21.75	$ 22.34

NOTE ADDITIONAL AMOUNTS PAID PER HOUR WORKED TO APPRENTICES FOR SPECIFIC TYPES OF WORK PERFORMED:
- State or Federal designated hazardous site, requiring protective gear shall be an additional $2.50 per hour.
- Certified welders when required to perform welding work will receive an additional $5.00 per hour.

2-277HH-Bro

Electrician — 07/01/2025

JOB DESCRIPTION Electrician **DISTRICT** 6

ENTIRE COUNTIES

PARTIAL COUNTIES
Cayuga: Only the Township of Genoa.
Schuyler: Only the Townships of Cayuta, Catharine, and Hector.
Seneca: Only the Townships of Lodi and Covert.
Tioga: Only the Townships of Spencer and Candor.
Tompkins: Entire county except the Township of Groton.

WAGES

Per hour:	07/01/2025	06/01/2026 Additional	06/01/2027 Additional
Electrician	$ 44.50	$ 4.00*	$ 4.50*

* To be allocated at a later date.

NOTE: Additional amounts, subject to overtime premiums, due for the following work (applicable to all employees):
-Additional $1.00 per hour for work from trusses, scaffolds, frames, spider baskets, ladders, etc. 40 feet or more from ground floor or in underground mines or tunnels. Work done from personal lift equipment that complies with OSHA requirements are excluded.
-Additional $2.00 per hour when required to work under compressed air, on radio towers, on asbestos abatement projects which require the use of a respirator, work of a hazardous nature, work where gas masks are required or work requiring use of protective arc flash suits.

SHIFT WORK
THE FOLLOWING RATES WILL APPLY WHEN SHIFT WORK IS MANDATED EITHER IN THE JOB SPECIFICATION OR BY THE CONTRACTING AGENCY:

1ST SHIFT	8:00 AM to 4:30 PM	Regular wage rate
2ND SHIFT	4:30 PM to 1:00 AM	Regular wage rate plus 17.3%
3RD SHIFT	12:30 AM to 9:00 AM	Regular wage rate plus 31.4%

SUPPLEMENTAL BENEFITS

Per hour:	
Journeyworker	$ 30.55 plus 3% of hourly wage paid*

* NOTE: 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: On Saturday the first 8 hours worked shall be paid at a rate of one and one-half times the applicable rate. All additional hours are payable at double the straight time rate.
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) on HOLIDAY PAGE
NOTE: When a holiday falls on a Saturday, the day preceding shall be celebrated as such, and when falling on a Sunday, Monday will be celebrated as the holiday.

REGISTERED APPRENTICES
WAGES per hour: One year terms at the following percentage of Journeyworker's wage.

1st year	50%
2nd year	55%
3rd year	65%
4th year	75%
5th year	85%

SUPPLEMENTAL BENEFITS per hour:

1st year	$ 14.25*
2nd year	14.25*
3rd year	24.30*
4th year	24.84*
5th year	26.38*

* PLUS 3% OF HOURLY WAGE PAID, STRAIGHT TIME RATE OR PREMIUM RATE.

6-241

Electrician **07/01/2025**

JOB DESCRIPTION Electrician **DISTRICT** 2

ENTIRE COUNTIES

Chemung, Steuben

PARTIAL COUNTIES
Allegany: Only the townships of Allen, Almond, Alfred, Andover, Birdsall, Burns, Granger, Grove, Hume, Independence, Ward, Wellsville, West Almond, Willing, and that portion of Amity, Angelica, Belfast, Caneadea, and Scio that lie east of the Genesee River.
Schuyler: Only the Townships of Dix, Montour, Orange, Reading and Tyrone.
Tioga: Only the Townships of Barton and Nichols.

WAGES

Per hour:	07/01/2025
Electrician (Base wage)	$ 43.40
Audio,Sound,Teledata	43.40

ADDITIONAL AMOUNTS FOR SPECIFIC TYPES OF JOBSITE CONDITIONS (amount subject to any overtime premiums):
Additional $1.00 per hour for high work defined as work being done more than 35' above the floor where electricians are working on Tooth Picks, Structural Steel, Temporary Platforms, Swinging Scaffolds and Boatswain Chairs.
Additional $1.00 per hour for work in shafts 25' deep and in tunnels 50' long under construction.
Additional $2.00 per hour for work inside or on Towers, Smoke Stacks and Wind Turbine Generators over 100' high.
Additional $2.00 per hour for work in hazardous locations requiring supplied air (other than Class A) and any other type of respiratory equipment required for Class B or Class C as defined in OSHA Standards.
Additional $3.00 per hour for work in hazardous locations requiring Class A supplied air as defined in OSHA Standards.

SHIFT WORK
When shift work is mandated in the job specifications or by the contracting agency, the following journeyworker hourly rates apply. The starting hours of a shift may be adjusted up to two (2) hours in order to meet the needs of the contracting agency.

Between the hours of 8:00AM and 4:30PM	$ 43.40
Between the hours of 4:30PM and 1:00AM	48.83
Between the hours of 12:30AM and 9:00AM	54.25

SUPPLEMENTAL BENEFITS
Per hour:
Journeyworker
$ 22.57 plus $ 7.85* plus 3% of hourly wage
*Subject to SAME PREMIUM as overtime work

OVERTIME PAY
See (B, *E, Q) on OVERTIME PAGE
*Work performed on Saturday shall be paid at one and one-half of the hourly rate for the first ten hours, then two times the hourly rate therafter.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 23) on HOLIDAY PAGE
When the holiday falls on Saturday, it shall be recognized and celebrated as such on the Friday before and when the holiday falls on Sunday, it shall be recognized and celebrated as such on the following Monday (December 24th excluded).

REGISTERED APPRENTICES
WAGES: One year terms at the following percent of Journeyworker's wage.

1st	2nd	3rd	4th	5th
50%	55%	65%	75%	85%

ADDITIONAL AMOUNTS FOR SPECIFIC TYPES OF JOBSITE CONDITIONS (amount subject to any overtime premiums):
Additional $1.00 per hour for high work defined as work being done more than 35' above the floor where electricians are working on Tooth Picks, Structural Steel, Temporary Platforms, Swinging Scaffolds and Boatswain Chairs.
Additional $2.00 per hour for work inside or on Towers, Smoke Stacks and Wind Turbine Generators over 100' high.
Additional $1.00 per hour for work in shafts 25' deep and in tunnels 50' long under construction.
Additional $3.00 per hour for work in hazardous locations requiring Class A supplied air as defined in OSHA Standards.
Additional $2.00 per hour for work in hazardous locations requiring supplied air (other than Class A) and any other type of respiratory equipment required for Class B or Class C as defined in OSHA Standards.

SUPPLEMENTAL BENEFITS per hour:
07/01/2025

1st term	$13.42 plus 3% of hourly wage
2nd term	$18.45 plus $4.32* plus 3% of hourly wage
3rd term	$19.37 plus $5.10* plus 3% of hourly wage
4th term	$20.28 plus $5.89* plus 3% of hourly wage
5th term	$21.20 plus $6.67* plus 3% of hourly wage

*Subject to SAME PREMIUM as overtime work

Elevator Constructor — 07/01/2025

JOB DESCRIPTION Elevator Constructor **DISTRICT** 5

ENTIRE COUNTIES
Chemung, Livingston, Monroe, Ontario, Schuyler, Seneca, Steuben, Wayne, Yates

WAGES
Per hour worked: 07/01/2025

Elevator Constructor	$ 61.52
Helper	49.22

SUPPLEMENTAL BENEFITS
Per hour:
$ 40.035
*Add 6% of regular hourly rate for all hours worked.

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

REGISTERED APPRENTICES
850 hours terms at the following percentage of journeyman's wage.

1st	2nd	3rd	4th	5th	6th	7th	8th
50*	55%	65%	65%	70%	70%	80%	80%

*Zero benefits paid for first term.

Supplemental Benefits per hour:
$ 40.035*

*Add 6% of regular hourly rate for all hours worked

5-27

Glazier — 07/01/2025

JOB DESCRIPTION Glazier **DISTRICT** 5

ENTIRE COUNTIES
Broome, Chemung, Chenango, Delaware, Otsego, Schuyler, Steuben, Tioga, Tompkins

WAGES
Per hour: 07/01/2025

Glazier	$ 30.00

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman	$ 33.15

OVERTIME PAY
See (B, E*, E2, Q**) on OVERTIME PAGE.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES
1000 hour terms

Appr. 1st term	$ 20.00
Appr. 2nd term	21.00
Appr. 3rd term	22.00
Appr. 4th term	23.00
Appr. 5th term	24.00
Appr. 6th term	25.00

Appr. 7th term	26.00
Appr. 8th term	27.00

Supplemental Benefits per hour:

Appr. 1st term	$ 13.27
Appr. 2nd term	13.27
Appr. 3rd term	19.27
Appr. 4th term	19.27
Appr. 5th term	20.27
Appr. 6th term	20.27
Appr. 7th term	21.27
Appr. 8th term	21.27

5-677z3

Insulator - Heat & Frost — 07/01/2025

JOB DESCRIPTION Insulator - Heat & Frost **DISTRICT** 7

ENTIRE COUNTIES
Broome, Cayuga, Chemung, Chenango, Cortland, Herkimer, Jefferson, Lewis, Madison, Oneida, Onondaga, Oswego, Otsego, Schuyler, Seneca, St. Lawrence, Tioga, Tompkins

WAGES
Per hour: 07/01/2025

Asbestos Installer	$ 43.25
Insulation Installer	43.25
(On mechanical systems only)	

SHIFT WORK
The following rates will apply on all contracting agency-mandated shifts worked:

1st Shift	$ 43.25
2nd Shift	49.74
3rd Shift	51.90

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker	$ 27.34

OVERTIME PAY
See (*B1, **K, P) on OVERTIME PAGE
*NOTE: First 10 hours on Saturday.
**NOTE: Holidays that fall on Sunday are subject to double time.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (2*,4,6,28) on HOLIDAY PAGE
*Triple time for Labor Day if worked.

REGISTERED APPRENTICES
WAGES per hour: One (1) year terms at the following percentage of Journeyworker's wage.

1st	2nd	3rd	4th
60%	70%	80%	90%

SUPPLEMENTAL BENEFITS per hour:

$ 24.09	$ 24.09	$ 27.34	$ 27.34

7-30-Syracuse

Ironworker — 07/01/2025

JOB DESCRIPTION Ironworker **DISTRICT** 6

ENTIRE COUNTIES
Broome, Cayuga, Cortland, Onondaga, Oswego, Seneca, Tioga, Tompkins

PARTIAL COUNTIES
Chenango: Only the townships of Afton, Bainbridge, Coventry, German, Greene, Guilford, Lincklaen, McDonough, Norwich, Otselic, Oxford, Pharsalia, Pitcher, Preston and Smithville.
Jefferson: Only the townships of Adams, Alexandria, Brownville, Cape Vincent, Clayton, Ellisburg, Henderson, Hounsfield, LeRay, Lorraine, Lyme, Orleans, Pamelia, Rodman, Rutland, Theresa, Watertown and Worth.

Madison: Only the townships of Cazenovia, DeRuyter, Fenner, Georgetown, Lenox, Lincoln, Nelson, Smithfield and Sullivan.
Schuyler: Only the townships of Cayuta, Catharine, Hector and Montour.
Wayne: Only the townships of Butler, Galen, Huron, Rose, Savannah and Wolcott.

WAGES
Structural, Reinforcing, Re-bar, Machinery Mover & Rigger, Ornamental & Curtain Wall, Window Wall, Pre-Glazed Metal Framed Windows Attached to Steel or Masonry Including Caulking, Fence Erector (Chain Link/Security), Sheeter/Bridge Rail, Pre-Cast Erector, Stone Derrickman, Pre-Engineered Building Erector, Welder

Per hour:	07/01/2025	07/01/2026 Additional
Ironworker	$ 37.16	$ 2.76*

* To be allocated at a later date.

SHIFT WORK
Multiple shifts mandated by the project owner. All shifts will be eight (8) hours.

1st Shift	$ 37.16	
2nd Shift	40.88	Starting times between 2PM and 7PM
3rd Shift	42.73	Starting times between 7PM and 12AM

WHEN A SINGLE IRREGULAR SHIFT IS WORKED, WITH START TIMES BASED ON SECOND AND THIRD SHIFTS, ADD 10% TO THE 1ST SHIFT WAGE RATE POSTED ABOVE.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker	$ 31.88

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
NOTE: Any holiday which occurs on Saturday shall be observed on the preceding Friday. Any holiday which occurs on Sunday shall be observed the following Monday.

REGISTERED APPRENTICES
WAGES per hour: One year terms at the following rates.

1st	2nd	3rd	4th
$ 21.50	$ 23.50	$ 25.50	$ 27.50

SUPPLEMENTAL BENEFITS per hour:

1st year	$ 13.03
2nd year	21.36
3rd year	22.55
4th year	23.74

Ironworker **07/01/2025**

JOB DESCRIPTION Ironworker **DISTRICT** 5

ENTIRE COUNTIES
Chemung, Livingston, Monroe, Ontario, Yates

PARTIAL COUNTIES
Allegany: Only the Townships of Birdsall, Burns and Grove.
Genesee: Only the Townships of Batavia, Bergen, Bethany, Byron, Elba, LeRoy, Oakfield, Pavillion, Stafford.
Orleans: Only the Townships of Albion, Barre, Carlton, Clarendon, Gaines, Kendall, Murray, and Village of Holley.
Schuyler: Only the Townships of Dix, Orange, Reading and Tyron.
Steuben: Only the Townships of Addison, Avoca, Bath , Bradford, Cameron, Campbell, Caton, Cohocton, Corning, Dansville, Erwin, Hornby, Lindley, Prattsburg, Pulteney, Rathbone, Thurston, Tuscarora, Urbana, Wayland, Wayne, Wheeler, Woodhull.
Wayne: Only the Townships of Arcadia, Lyons, Macedon, Marion, Ontario, Palmyra, Sodus, Walworth, Willamson and Village of Newark.
Wyoming: Only the Townships of Castile, Covington, Middlebury, Perry.

WAGES

Per hour:	07/01/2025
Structural	$ 35.75
Reinforcing	35.75
Ornamental	35.75

Fence Erector	35.75
Welder	35.75
Sheeter	36.00
Stone Derrick Man	35.75
Mach. Mov./Rigger	35.75
Precast Concrete Erector	35.75
Window/Curtainwall Erector	35.75
Pre-Engineered Building	35.75

SHIFT WORK
When shift work is mandated either in the job specification or by the contracting agency the following premiums apply
10% for second shift work from 2:00PM - 7:00PM
15% for third shift work from 7:00PM - 12:00AM

When a single irregular shift is worked outside the standard workday with the start times based on second and third shifts, a 10% premium on hours worked applies.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman	$ 32.65

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES
One year terms at the following rates.

1st.	2nd.	3rd.	4th.
$21.50	$23.50	$25.50	$27.50

Supplemental Benefits per hour:

Appr. 1st year	$ 13.98
Appr. 2nd year	21.79
Appr. 3rd year	22.90
Appr. 4th year	24.02

5-33.1

Laborer - Building — 07/01/2025

JOB DESCRIPTION Laborer - Building **DISTRICT** 2

ENTIRE COUNTIES
Broome, Chemung, Cortland, Schuyler, Steuben, Tioga, Tompkins

PARTIAL COUNTIES
Chenango: Entire County except the Townships of Sherburne, Columbus and New Berlin.
Delaware: Only the Townships of Sidney, Masonville, Walton, Tompkins, Deposit, Hancock, and Colchester.

WAGES
Per hour:

GROUP #1: Basic Laborer - excavation, concrete vibrator, power-driven buggie, demolition (including acetylene torch work) that is customarily done by a laborer

GROUP #2: Air Tool Operators, Mason Tenders

GROUP #3: Blaster, Rock Drill (compressor driven)

GROUP #4: Asbestos, Hazardous, Toxic Waste, Lead and Mold Remediation

	07/01/2025	07/01/2026 Additional
GROUP #1	$ 30.00	$ 1.25*
GROUP #2	31.00	1.25*
GROUP #3	32.00	1.25*
GROUP #4	32.00	1.25*

*To be allocated at a later date.

IMPORTANT NOTES:
- Laborer tasks on Renewable Energy and Green Energy construction work shall be paid at the appropriate Heavy & Highway rates.
- Wage and supplement rates for the operation of forklift and skid steer may be found under the classification "Operating Engineer".

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker	$ 20.20

OVERTIME PAY
See (B, E, E2, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
When a holiday falls on Sunday, it shall be observed on the following Monday.

REGISTERED APPRENTICES
WAGES: 1000 hour terms at the following percentage of Journeyworker's wage.

1st	2nd	3rd	4th
70%	80%	85%	90%

SUPPLEMENTAL BENEFITS per hour:

1st term	$ 15.85
2nd term	17.10
3rd term	17.98
4th term	18.85

2-785b

Laborer - Heavy&Highway **07/01/2025**

JOB DESCRIPTION Laborer - Heavy&Highway **DISTRICT** 2

ENTIRE COUNTIES
Broome, Chemung, Cortland, Schuyler, Steuben, Tioga, Tompkins

PARTIAL COUNTIES
Chenango: Entire County except the Townships of Sherburne, Columbus, and New Berlin.
Delaware: Only the Townships of Sidney, Masonville, Walton, Tompkins, Deposit, Hancock and Colchester.

WAGES
Per hour:

GROUP A: Drill Helper, Flagman, Outboard and Hand Boats.

GROUP B: Basic Rate, Bull Float (where used for strike off only), Chain Saw, Concrete Aggregate Bin, Concrete Bootmen, Gin Buggy, Hand or Machine Vibrator, Jack Hammer, Mason Tender, Mortar Mixer, Pavement Breaker, Handlers of Steel Mesh, Small Generators for Laborers Tools, Installation of Bridge Drainage Pipe, Pipe Layers, Vibrator Type Rollers, Tamper, Drill Doctor, Water Pump Operators (1-1/2" & Single Diaphragm), Nozzle (Asphalt, Gunite, Seeding, and Sand Blasting), Laborers on Chain Link Fence Erection, Rock Splitter and Power Unit, Pusher Type Concrete Saw and all other Gas, Electric, and Air Tool Operators, Wrecking Laborer.

GROUP C: Drilling equipment - only where a separate air compressor unit supplies power, Acetylene Torch Operators, Asphalt Raker, Powder Man, Tail or Screw Operator on Asphalt Paver.

GROUP D: Blasters, Form Setters (slab steel forms on highways, roads, streets & airport runways), Stone or Granite Curb Setters.

GROUP E: Hazardous Waste defined as when an employee performs hazardous waste removal, lead abatement and removal, asbestos abatement and removal work on State and/or Federally designated waste site and were relevant State and/or Federal regulations require employees to use or wear required forms of personal protection.

	07/01/2025	07/01/2026 Additional	07/01/2027 Additional
GROUP A	$ 38.06	$ 3.40*	$ 4.20*
GROUP B	38.26	3.40*	4.20*
GROUP C	38.46	3.40*	4.20*
GROUP D	38.66	3.40*	4.20*

GROUP E	43.26	3.40*	4.20*

*To be allocated at a later date.

IMPORTANT NOTES:
- Laborer tasks on Renewable Energy and Green Energy construction work shall be paid at the appropriate Heavy & Highway rates.
- Wage and supplement rates for the operation of forklift and skid steer may be found under the classification "Operating Engineer".
- When an employee is required by the employer and/or by the material data safety sheets of a product, during its application, to wear a half or full-face replaceable cartridge respirator for more than (2) hours, then in such case said employee(s) will be paid the Group E rate for the shift.

SHIFT WORK
A single irregular work shift starting any time between 5:00 PM and 1:00 AM on governmental mandated night work shall be paid an additional $5.00 per hour.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker $ 26.35

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
- If Holiday falls on Sunday, it will be celebrated on Monday. If the Holiday falls on Saturday, it will be celebrated on Saturday.
- An Employee must work the scheduled working day before and the scheduled working day after a holiday to receive holiday pay.

REGISTERED APPRENTICES
WAGES: 1000 hour terms at the following percentage of Journeyworker's GROUP B wage:

1st	2nd	3rd	4th
70%	80%	90%	95%

SUPPLEMENTAL BENEFITS per hour:
All terms $ 26.35

2-785h

Laborer - Tunnel — 07/01/2025

JOB DESCRIPTION Laborer - Tunnel **DISTRICT** 2

ENTIRE COUNTIES
Broome, Chemung, Cortland, Schuyler, Steuben, Tioga, Tompkins

PARTIAL COUNTIES
Chenango: Entire County except the Townships of Sherburne, Columbus, and New Berlin.
Delaware: Only the Townships of Sidney, Masonville, Walton, Tompkins, Deposit, Hancock and Colchester.

WAGES
Per hour:

GROUP A: Change House Man

GROUP B: Miners and all Machine Men, Safety Miner, All Shaft work, Caisson work, Drilling, Blow Pipe, all Air Tools, Tugger, Scaling, Nipper, Guniting pot to nozzle, Bit Grinder, Signal Man (top and bottom), Concrete Man, Shield Driven Tunnels, mixed face and soft ground, liner plate tunnels in free air.

GROUP C: Blaster

GROUP D: Hazardous waste removal work on a State and/or Federally designated waste site where relevant State and/or Federal regulations require employees to use or wear required forms of personal protection.

	07/01/2025	07/01/2026 Additional	07/01/2027 Additional
Group A	$ 41.24	$ 3.40*	$ 4.20*
Group B	41.44	3.40*	4.20*
Group C	44.24	3.40*	4.20*
Group D	46.24	3.40*	4.20*

*To be allocated at a later date

IMPORTANT NOTES:
- When an employee is required by the employer and/or by the material data safety sheets of a product, during its application, to wear a half or full face replaceable cartridge respirator for more then (2) hours, then in such case said employee(s) will be paid the Group D rate for the shift.

SHIFT WORK
A single irregular work shift starting any time between 5:00 PM and 1:00 AM on governmental mandated night work shall be paid an additional $5.00 per hour.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker	$ 26.35

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE
- If Holiday falls on Sunday, it will be celebrated on Monday. If the Holiday falls on Saturday, it will be celebrated on Friday.

HOLIDAY

Paid:	See (5, 6) on HOLIDAY PAGE
Overtime:	See (5, 6) on HOLIDAY PAGE

If the holiday falls on Saturday, it will be celebrated on Friday. If the holiday falls on Sunday, it will be celebrated on Monday

REGISTERED APPRENTICES
WAGES: 1000 hour terms at the following percentage of Group B wage

1st	2nd	3rd	4th
70%	80%	90%	95%

SUPPLEMENTAL BENEFITS per hour:

All Terms	$ 26.35

2-785T

Lineman Electrician — 07/01/2025

JOB DESCRIPTION Lineman Electrician **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, Wyoming, Yates

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.

Crane Operators: Operation of any type of crane on line projects.
Crawler Backhoe: Operation of tracked excavator/crawler backhoe with 1/2 yard bucket or larger on line projects.
Digging Machine Operator: All other digging equipment and augering on line projects.

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.

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.

-----Below rates applicable on all overhead and underground distribution and maintenance work, and all overhead and underground transmission line work and the installation of fiber optic cable where no other construction trades are or have been involved. Includes access matting for line work.

Per hour:	07/01/2025	05/04/2026	05/03/2027	05/01/2028
Group A:				
Lineman, Technician	$ 61.56	$ 64.37	$ 66.84	$ 69.47

Crane, Crawler Backhoe	61.56	64.37	66.84	69.47
Welder, Cable Splicer	61.56	64.37	66.84	69.47
Group B:				
Digging Mach. Operator	$ 55.40	$ 57.93	$ 60.16	$ 62.52
Group C:				
Tractor Trailer Driver	$ 52.33	$ 54.71	$ 56.81	$ 59.05
Groundman, Truck Driver	49.25	51.50	53.47	55.58
Equipment Mechanic	49.25	51.50	53.47	55.58
Group D:				
Flagger	$ 33.86	$ 35.40	$ 36.76	$ 38.21

Additional 3% per hour above regular rate for entire crew when a helicopter is used. This will increase to 5% on May 03, 2027.

-----Below rates applicable on all electrical sub-stations, switching structures, fiber optic cable and all other work not defined as "Utility outside electrical work." Includes access matting for line work.

Group A:				
Lineman, Technician	$ 61.56	$ 64.37	$ 66.84	$ 69.47
Crane, Crawler Backhoe	61.56	64.37	66.84	69.47
Cable Splicer	67.72	70.81	73.52	76.42
Certified Welder, Pipe Type Cable	$ 64.64	$ 67.59	$ 70.18	$ 72.94
Group B:				
Digging Mach. Operator	$ 55.40	$ 57.93	$ 60.16	$ 62.52
Group C:				
Tractor Trailer Driver	$ 52.33	$ 54.71	$ 56.81	$ 59.05
Groundman, Truck Driver	49.25	51.50	53.47	55.58
Equipment Mechanic	49.25	51.50	53.47	55.58
Group D:				
Flagger	$ 33.86	$ 35.40	$ 36.76	$ 38.12

Additional 3% per hour above regular rate for entire crew when a helicopter is used. This will increase to 5% on May 03, 2027.

-----Below rates applicable on all switching structures, maintenance projects, railroad catenary install/maintenance third rail installation, bonding of rails and pipe type cable and installation of fiber optic cable. Includes access matting for line work.

Group A:				
Lineman, Tech, Welder	$ 62.94	$ 65.81	$ 68.34	$ 71.03
Crane, Crawler Backhoe	62.94	65.81	68.34	71.03
Cable Splicer	69.23	72.39	75.17	78.13
Certified Welder, Pipe Type Cable	66.09	69.10	71.76	74.58
Group B:				
Digging Mach. Operator	$ 56.65	$ 59.23	$ 61.51	$ 63.93
Group C:				
Tractor Trailer Driver	$ 53.50	$ 55.94	$ 58.09	$ 60.38
Groundman, Truck Driver	50.35	52.65	54.67	56.82
Equipment Mechanic	50.35	52.65	54.67	56.82
Group D:				
Flagger	$ 34.62	$ 36.20	$ 37.59	$ 39.07

Additional 3% per hour above regular rate for entire crew when a helicopter is used. This will increase to 5% on May 03, 2027.

-----Below rates applicable on all overhead and underground transmission line work & fiber optic cable where other construction trades are or have been involved. This applies to transmission line work only, not other construction. Includes access matting for line work.

Group A:				
Lineman, Tech, Welder	$ 64.18	$ 67.10	$ 69.68	$ 72.43

Crane, Crawler Backhoe	64.18	67.10	69.68	72.43
Group B:				
Digging Mach. Operator	$ 57.76	$ 60.39	$ 62.71	$ 65.19
Group C:				
Tractor Trailer Driver	$ 54.55	$ 57.04	$ 59.23	$ 61.57
Groundman, Truck Driver	51.34	53.68	55.74	57.94
Equipment Mechanic	51.34	53.68	55.74	57.94
Group D:				
Flagger	$ 35.30	$ 36.91	$ 38.32	$ 39.84

Additional 3% per hour above regular rate for entire crew when a helicopter is used. This will increase to 5% on May 03, 2027.

SHIFT WORK

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 %

SUPPLEMENTAL BENEFITS

Per hour:

	07/01/2025	05/04/2026	05/03/2027	05/01/2028
Group A	$ 31.90*	$ 32.90*	$ 34.40*	$ 35.90*
Group B	$ 27.90*	$ 28.90*	$ 30.40*	$ 31.90*
Group C	$ 27.70*	$ 28.50*	$ 29.70*	$ 30.90*
Group D	$ 27.65*	$ 28.40*	$ 29.53*	$ 30.66*

*Plus 7 % of the hourly wage paid. The 7% is based on straight time or premium time.

OVERTIME PAY

See (B, E, Q, X) on OVERTIME PAGE. NOTE: Double time for all emergency work designated by the Dept. of Jurisdiction.
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, 15, 25) on HOLIDAY PAGE
Overtime See (5, 6, 8, 15, 25) on HOLIDAY PAGE
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 Journeyworker's Lineman wage.

1st	2nd	3rd	4th	5th	6th	7th
60%	65%	70%	75%	80%	85%	90%

SUPPLEMENTAL BENEFITS per hour:

	07/01/2025	05/04/2026	05/03/2027	05/01/2028
All terms:	$ 27.65*	$ 28.40*	$ 29.53*	$ 30.66*

*Plus 7% of the hourly wage paid. The 7% is based on straight time or premium time.

6-1249a

Lineman Electrician - Teledata — 07/01/2025

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

For outside work, stopping at first point of attachment (demarcation).

Per hour:	07/01/2025
Cable Splicer	$ 40.81
Installer, Repairman	$ 38.73
Teledata Lineman	$ 38.73
Tech., Equip. Operator	$ 38.73
Groundman/Flagger	$ 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.

SHIFT WORK
THE FOLLOWING RATES APPLY WHEN THE CONTRACTING AGENCY MANDATES MULTIPLE SHIFTS OF AT LEAST FIVE (5) DAYS DURATION ARE WORKED. WHEN TWO (2) OR THREE (3) SHIFTS ARE WORKED THE FOLLOWING RATES APPLY:

1ST SHIFT	REGULAR RATE
2ND SHIFT	REGULAR RATE PLUS 10%
3RD SHIFT	REGULAR RATE PLUS 15%

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker	$ 5.77 *plus 3% of the hour 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
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 — 07/01/2025

JOB DESCRIPTION Lineman Electrician - Traffic Signal, Lighting **DISTRICT** 6

ENTIRE COUNTIES
Albany, Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Cortland, Delaware, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Niagara, Oneida, Onondaga, Ontario, Orleans, Oswego, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Sullivan, Tioga, Tompkins, Warren, Washington, Wayne, Wyoming, Yates

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.

Crane Operators: Operation of any type of crane on Traffic Signal/Lighting projects.
Crawler Backhoe: Operation of tracked excavator/crawler backhoe with 1/2 yard bucket or larger on Traffic Signal/Lighting projects.
Digging Machine Operator: All other digging equipment and augering on Traffic Signal/Lighting projects.

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.

A flagger's duties shall consist of traffic control only.

Per hour:	07/01/2025	05/04/2026	05/03/2027	05/01/2028
Group A:				
Lineman, Technician	$ 52.86	$ 55.31	$ 57.40	$ 59.64

Crane, Crawler Backhoe	52.86	55.31	57.40	59.64
Certified Welder	55.50	58.08	60.27	62.62
Group B:				
Digging Machine	$ 47.57	$ 49.78	$ 51.66	$ 53.68
Group C:				
Tractor Trailer Driver	$ 44.93	$ 47.01	$ 48.79	$ 50.69
Groundman, Truck Driver	42.29	44.25	45.92	47.71
Equipment Mechanic	42.29	44.25	45.92	47.71
Group D:				
Flagger	$ 31.72	$ 33.19	$ 34.44	$ 35.78

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.

SHIFT WORK

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%

SUPPLEMENTAL BENEFITS

Per hour worked:

	07/01/2025	05/04/2026	05/03/2027	05/01/2028
Group A	$ 31.90*	$ 32.90*	$ 34.40*	$ 35.90*
Group B	$ 27.90*	$ 28.90*	$ 30.40*	$ 31.90*
Group C	$ 27.70*	$ 28.50*	$ 29.70*	$ 30.90*
Group D	$ 27.65*	$ 28.40*	$ 29.53*	$ 30.66*

* Plus 7% of the hourly wage paid. The 7% is based on straight time or premium time.

OVERTIME PAY

See (B, E, Q, X) on OVERTIME PAGE. NOTE: Double time for all emergency work designated by the Dept. of Jurisdiction.
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, 15, 25) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 15, 25) on HOLIDAY PAGE
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 Journeyworker's Lineman wage.

1st	2nd	3rd	4th	5th	6th	7th
60%	65%	70%	75%	80%	85%	90%

SUPPLEMENTAL BENEFITS per hour:

	07/01/2025	05/04/2026	05/03/2027	05/01/2028
All terms:	$ 27.65*	$ 28.40*	$ 29.53*	$ 30.66*

* Plus 7% of the hourly wage paid. The 7% is based on straight time or premium time.

6-1249a-LT

Lineman Electrician - Tree Trimmer **07/01/2025**

JOB DESCRIPTION Lineman Electrician - Tree Trimmer **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, Wyoming, Yates

WAGES

Applies to line clearance, tree work and right-of-way preparation on all new or existing energized overhead or underground electrical, telephone and CATV lines. This also includes stump removal near underground energized electrical lines including telephone and CATV lines.

Per hour:	07/01/2025	01/04/2026	01/03/2027
Tree Trimmer	$ 33.18	$ 34.67	$ 36.23
Equipment Operator	29.35	30.67	32.05
Equipment Mechanic	29.35	30.67	32.05
Truck Driver	23.85	24.93	26.05
Groundman	19.64	20.53	21.45
Flagger	15.50	16.20	16.93

SUPPLEMENTAL BENEFITS

Per hour:

	07/01/2025	01/04/2026	01/03/2027
Journeyworker	$ 10.98*	$ 11.23*	$ 11.48*

* Plus 4.5% of the hourly wage paid. The 4.5% is based on straight time rate or premium rate.

OVERTIME PAY

See (B, E, Q, X) on OVERTIME PAGE

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, 15, 16, 25) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 15, 16, 25) on HOLIDAY PAGE

NOTE: All paid holidays falling on a Saturday shall be observed on the preceding Friday. All paid holidays falling on a Sunday shall be observed on the following Monday.

6-1249TT

Mason - Building — 07/01/2025

JOB DESCRIPTION Mason - Building **DISTRICT** 5

ENTIRE COUNTIES

Chemung, Schuyler, Steuben

PARTIAL COUNTIES

Allegany: Only the Townships of Alfred, Almond, Andover and Burns.

WAGES

Per Hour:	07/01/2025
Building:	
Bricklayer, Cement	$ 33.26
Mason, Plasterer, Stone	
Mason, Tuck Pointer	

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman	$ 31.66

OVERTIME PAY

See (B,E,E2*,Q) on OVERTIME PAGE

*Note - Or other conditions beyond the employer's control such as fire or natural disaster.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wages per hour:

One year terms at the following wage:

1st	2nd	3rd	4th
$ 20.29	$ 25.28	$ 27.36	$ 29.93

Supplemental benefits per hour:

1st	2nd	3rd	4th
$ 26.92	$27.82	$ 29.69	$ 31.05

5-3b - Co - Z2

Mason - Heavy&Highway 07/01/2025

JOB DESCRIPTION Mason - Heavy&Highway **DISTRICT** 5

ENTIRE COUNTIES
Allegany, Broome, Chautauqua, Chemung, Chenango, Cortland, Delaware, Genesee, Livingston, Monroe, Ontario, Orleans, Otsego, Schuyler, Seneca, Steuben, Tioga, Tompkins, Wayne, Wyoming, Yates

PARTIAL COUNTIES
Cattaraugus: Enitre county except in the Township of Perrysburg and the Village of Gowanda only the Bricklayer classification applies.
Erie: Only the Bricklayer classification applies.
Niagara: Only the Bricklayer classification applies.

WAGES

Per hour:	07/01/2025
Heavy & Highway:	
Cement Mason	$ 38.63
Bricklayer	38.63

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman	$ 26.28

OVERTIME PAY
See (B, E, E2, Q) on OVERTIME PAGE

HOLIDAY

Paid:	See (1) on HOLIDAY PAGE
Overtime:	See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wages per hour:

1500 hour terms at the following percentage of Journeyman's wage:

1st	2nd	3rd	4th
50%	60%	70%	80%

Supplemental benefits per hour:

1st term	$ 15.40
2nd term	$ 24.62
3rd term	$ 25.04
4th term	$ 25.45

5-3h

Mason - Tile Finisher 07/01/2025

JOB DESCRIPTION Mason - Tile Finisher **DISTRICT** 5

ENTIRE COUNTIES
Broome, Chemung, Chenango, Cortland, Delaware, Otsego, Schuyler, Steuben, Tioga, Tompkins

PARTIAL COUNTIES
Albany: Towns of Alfred, Almond, Andover and Burns in Allegany County

WAGES

Wages	
Per hour:	07/01/2025
Building:	
Marble, Slate, Terrazzo and Tile Finisher	$ 32.45

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman $ 23.52

OVERTIME PAY
See (B,E,E2*,Q) on OVERTIME PAGE
*Note - Or other conditions beyond the employer's control such as fire or natural disaster.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wages per hour:

One year terms at the following wage:

1st	2nd	3rd
$ 19.47	$ 22.72	$ 25.96

Supplemental benefits per hour:

1st	2nd	3rd
$ 15.12	$ 15.72	$ 20.37

5-3TF - Z4

Mason - Tile Setter — 07/01/2025

JOB DESCRIPTION Mason - Tile Setter **DISTRICT** 5

ENTIRE COUNTIES
Broome, Chemung, Chenango, Cortland, Delaware, Otsego, Schuyler, Steuben, Tioga, Tompkins

PARTIAL COUNTIES
Allegany: Towns of Alfred, Almond, Andover and Burns.

WAGES
Wages
Per Hour: 07/01/2025
Building:
Marble, Slate, Terrazzo and Tile Setter $ 34.69

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman $ 27.06

OVERTIME PAY
See (B,E,E2*,Q) on OVERTIME PAGE
*Note - Or other conditions beyond the employer's control such as fire or natural disaster.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wages per hour:

One year terms at the following wage:

1st	2nd	3rd	4th
$ 20.81	$ 24.28	$ 27.75	$ 31.22

Supplemental benefits per hour:

1st	2nd	3rd	4th
$ 15.59	$ 16.26	$ 25.70	$ 26.38

5-3TS - Z4

Millwright — 07/01/2025

JOB DESCRIPTION Millwright **DISTRICT** 6

ENTIRE COUNTIES

Albany, Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Niagara, Oneida, Onondaga, Ontario, Orleans, Oswego, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Wyoming, Yates

WAGES

THE FOLLOWING RATE APPLIES TO ANY GAS/STEAM TURBINE AND OR RELATED COMPONENT WORK, INCLUDING NEW INSTALLATIONS OR MAINTENANCE AND ANY/ALL WORK PERFORMED WITHIN THE PROPERTY LIMITS OF A NUCLEAR FACILITY.

Per hour:	07/01/2025
Millwright - Power Generation	$ 47.00

NOTE: ADDITIONAL PREMIUMS PAID FOR THE FOLLOWING WORK LISTED BELOW (amount subject to any overtime premiums):
- Certified Welders shall receive an additional $1.75 per hour provided they are directed to perform Certified Welding.
- If a work site has been declared a hazardous site by the Owner and the use of protective gear (including, as a minimum, air purifying canister-type chemical respirators) is required, then that employee shall receive an additional $1.50 per hour.
- An employee performing the work of a machinist shall receive an additional $2.00 per hour. For the purposes of this premium to apply, a "machinist" is a person who uses a lathe, Bridgeport, milling machine or similar type of tool to make or modify parts.
- When performing work underground at 500 feet and below, the employee shall receive an additional $1.00 per hour.

SUPPLEMENTAL BENEFITS

Per hour paid:

Journeyworker	$ 28.45*

*NOTE: Subject to OT premium

OVERTIME PAY

See (B, E, E2, Q, V) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

NOTE: Any holiday that falls on Sunday shall be observed the following Monday. Any holiday that falls on Saturday shall be observed the preceding Friday.

REGISTERED APPRENTICES

WAGES per hour: One year terms at the following percentage of Journeyworker's wage:

Appr. 1st year	65%*
Appr. 2nd year	75%*
Appr. 3rd year	80%*
Appr. 4th year	90%*

*NOTE: Additional premium for the following work listed below:

Certified Welder	$ 1.75
Hazardous Waste Work	1.50
Machinist	2.00
Underground (500' and below)	1.00

SUPPLEMENTAL BENEFITS per hour:

Appr. 1st year	$ 11.95
Appr. 2nd year	23.50
Appr. 3rd year	25.15
Appr. 4th year	26.80

6-1163Power

Millwright 07/01/2025

JOB DESCRIPTION Millwright **DISTRICT** 6

ENTIRE COUNTIES

Chemung, Cortland, Livingston, Monroe, Ontario, Orleans, Schuyler, Steuben, Tompkins, Wayne, Wyoming

WAGES

Per hour:	07/01/2025
Building	$ 37.89

Heavy & Highway	41.39

NOTE: ADDITIONAL PREMIUMS PAID FOR THE FOLLOWING WORK LISTED BELOW (amount subject to any overtime premiums):
- Certified Welders shall receive an additional $1.75 per hour provided they are directed to perform Certified Welding.
- On Building projects, If a work site has been declared a hazardous site by the Owner and the use of protective gear (including, as a minimum, air purifying canister-type chemical respirators) is required, then that employee shall receive an additional $1.50 per hour.
- H/H work performed on hazardous waste sites where employees are required to wear protective gear shall receive an additional $2.00 per hour over the Millwright H/H rate for all hours worked on the day protective gear was worn.
- An employee performing the work of a machinist shall receive an additional $2.00 per hour. For the purposes of this premium to apply, a "machinist" is a person who uses a lathe, Bridgeport, milling machine or similar type of tool to make or modify parts.
- When performing work underground at 500 feet and below, the employee shall receive an additional $1.00 per hour.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker	$ 27.29

OVERTIME PAY
See (B, E, E2, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
NOTE: Any holiday that falls on Sunday shall be observed the following Monday. Any holiday that falls on Saturday shall be observed the preceding Friday.

REGISTERED APPRENTICES
WAGES per hour: One year terms at the following percentage of Journeyworker's wage:

Appr. 1st year	65%*
Appr. 2nd year	75%*
Appr. 3rd year	80%*
Appr. 4th year	90%*

*NOTE: Additional premium for the following work listed below:

Certified Welder	$ 1.75
Hazardous Waste (Bldg)	1.50
Hazardous Waste (H/H)	2.00
Machinist	2.00
Underground (500' and below)	1.00

SUPPLEMENTAL BENEFITS per hour:

Appr. 1st year	$ 11.95
Appr. 2nd year	22.69
Appr. 3rd year	24.22
Appr. 4th year	25.76

6-1163

Operating Engineer - Building — 07/01/2025

JOB DESCRIPTION Operating Engineer - Building **DISTRICT** 7

ENTIRE COUNTIES
Allegany, Chemung, Livingston, Monroe, Ontario, Schuyler, Steuben, Wayne, Yates

PARTIAL COUNTIES
Genesee: Only that portion of the county that lies east of a line drawn down the center of Route 98, and the entirety of the City of Batavia.

WAGES
---In the event that equipment listed below is operated by robotic control, the classification covering the operation will be the same as if manually operated.
---If a second employee is required by the employer for operation of any covered machine, they shall be an Engineer Class 3.

CLASS A1*: All Cranes (A1 Includes Boom Trucks, Cableway, Cherry Picker, Derrick, Dragline, Dredge, Overhead Crane, Pile Driver, Tower Crane**, Truck Crane, Whirlies).

CLASS 1: Air Tugger; All terrain telescoping material handler; Barber Green and similar type machines; Clamshell; Dragline Shovel and similar machines over three-eighths cu. yd. capacity (Factory rating); Carrier mounted Backhoes that swing 360 degrees; Big Generator Plant Hoist (on steel erection); Bridge Crane (all types); Caisson auger and similar type machine; Dredge; Excavator all purpose hydraulically operated; Forklift (with Factory rating of 15' or more of lift); Hoist (on steel erection); Hydraulic/Krupp Drill; Mucking Machines; Remote controlled Excavator with attachments (Brokk type or similar); Ross Carrier (and similar type); Three-Drum Hoist (when all three drums are in use).

CLASS 2: A-Frame Truck; Backfilling Machine; Backhoe (tractor mounted); Belt Crete (and similar type machines); Bituminous spreading machine (3/8 yd. capacity or less factory rating); Bulldozer; Carry-all type Scraper; Compressors (four (4) not to exceed 2000 CFM combined capacity) or (three (3) or less with more than 1200 CFM but not to exceed 2000 CFM); Concrete Mixer; Concrete Placer; Concrete Pump; Mini Locomotives (all types); Elevating Grader; Elevator; Fine Grade and Finish Rollers; Fine Grade Machines (all kinds); Forklift with factory rating of less than 15' of lift; Front End Loader; Gunite Pumping Machine; High Pressure Boiler; Hoist (1 or 2 drums); Maintenance Engineer (Mechanic); Mechanical Slurry Machine (all kinds); Mega Mixers and similar type machines; Motor Grader; Pavement Grinder; Post Hole Digger; Pumps (regardless of motive power) no more than four (4) in number not to exceed twenty (20) inches in total capacity (not to include single electric pumps up to and including four (4) inches); Shot Crete Pumping Machine; Side Boom; Tractor; Skid Steer Loader (including attachments); Stoner Crusher; Tournadozer and similar types; Tournapull and similar types; Trenching Machines; Welder; Well Drill; Well Point System.

CLASS 3: Compressors - any combination (Not to exceed three (3) pieces of equipment or not to exceed 1200 CFM combined capacity); Fireman; Longitudinal Float; Mechanical Heater; Pumps (regardless of motive power, no more than three (3) in number, not to exceed twelve (12) inches total capacity); Roller (fill and grade); Rubber Tired Tractor; Welding Machine (except gas driven up to 300 amp); Mechanical Conveyor (over 12 ft. in length); Junior Engineers/Oilers.

Per hour:	07/01/2025
CLASS A1*	$ 47.64
CLASS 1	43.14
CLASS 2	42.34
CLASS 3	39.64

Additional $2.50 per hour if work requires Personal Protective Equipment for hazardous waste site activities with a level C or over rating.

(*) TONNAGE PREMIUMS:
All cranes up to 64 tons capacity - A1 rate
All cranes 65 ton to 110 ton capacity - A1 rate plus $ 1.50
All cranes 111 ton to 199 ton capacity - A1 rate plus $ 2.00
All cranes 200 ton to 399 ton capacity - A1 rate plus $ 3.00
All cranes 400 ton to 599 ton capacity - A1 rate plus $ 4.00
All cranes 600 ton to 799 ton capacity - A1 rate plus $ 5.00
All cranes 800 ton to 999 ton capacity - A1 rate plus $ 6.00
All cranes 1000 ton capacity and over - A1 rate plus $ 7.00

(**) Tower Cranes - A1 rate plus $2.50 (no tonnage premiums)

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker	$ 35.61

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid:	See (5, 6) on HOLIDAY PAGE
Overtime:	See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES
WAGES: One year terms at the following percentage of the Journeyworker's wage listed below.

1st year	60% of CLASS 3 rate
2nd year	65% of CLASS 3 rate
3rd year	75% of CLASS 2 rate
4th year	80% of CLASS 1 rate

Additional $2.50 per hour if work requires Personal Protective Equipment for hazardous waste site activities with a level C or over rating.

SUPPLEMENTAL BENEFITS per hour: Same as Journeyworker

7-158-832B

Operating Engineer - Building - Excavating & Paving **07/01/2025**

JOB DESCRIPTION Operating Engineer - Building - Excavating & Paving **DISTRICT** 7

ENTIRE COUNTIES
Allegany, Chemung, Livingston, Monroe, Ontario, Schuyler, Steuben, Wayne, Yates

PARTIAL COUNTIES
Genesee: Only that portion of the county that lies east of a line drawn down the center of Route 98, and the entirety of the City of Batavia.

WAGES
NOTE: The following rates apply to "Site Work" which may include site preparation, grading, underground work, athletic fields, paving, skateboard parks and all other work outside the footprint of any building.

This wage schedule does not cover Hazardous Waste Removal work, See Heavy/Highway schedule (7-158-832H)

CLASS A: All terrain Telescoping Material Handler; Asphalt Paver; Automatic Fine Grader; Backhoe (except tractor mounted-rubber tired); Blacktop Plant (automated); Cableway; Caisson Auger; Central Mix Concrete Plant (automated); Cherry Picker (over 5 ton capacity); Crane; Cranes and Derricks (steel erection); Dragline; Dual Drum Paver; Excavator (all purpose-hydraulically operated); Front End Loader (4 cu. yd. and over); Hoist (two or three drum); Hydro-Axe; Hydraulic/Krupp Drill; Pile Driver; Power Grader (with elevating loader attachment); Quarry Master (or equivalent); Remote controlled Excavator with attachments; Shovel; Slip Form Paver (if a second man is needed, he shall be an Oiler); Tractor Drawn Belt-Type Loader; Truck Crane; Tunnel Shovel.

CLASS B: Articulated off-road Material Hauler; Backhoe (tractor mounted-rubber tired); Bituminous Spreader and Mixer; Blacktop Plant (non-automated); Boring Machine; Cage Hoist; Central Mix Plant (non-automated) and all Concrete Batching Plants; Cherry Picker (5 tons and under); Compressor (4 or less exceeding 2,000 c.f.m. combined capacity); Concrete Paver (over 16'); Concrete Pump; Crusher; Drill Rigs (tractor mounted); Front-end Loader (under 4 cu. yd.); Hi-pressure Boiler (15 lbs. and over); Hoist (one drum); Kolman Plant Loader and similar type loaders (if Employer requires another man to clean the screen or to maintain the equipment, he shall be an Oiler); Maintenance Engineer; Maintenance Grease Man; Mechanical Slurry Machine; Mixer for stabilized base (self-propelled); Monorail Machine; Plant Engineer; Power Broom; Power Grader; Pump Crete, Ready Mix Concrete Plant; Road Widener; Roller (all above sub-grade); Side Boom; Skid Steer Loader (including attachments); Tractor Scraper; Tractor with Dozer and/or Pusher; Trencher; Vacuum Truck; Winch.

CLASS C: Compressors (4 not to exceed 2,000 c.f.m. combined capacity) or (3 or less with more than 1,200 c.f.m. but not to exceed 2,000 c.f.m.); Compressors (any size but subject to other provisions for compressors), Dust Collectors, Generators, Welding Machines (four of any type or combination); Concrete Pavement Spreaders and Finishers; Conveyor; Drill (core); Drill (well); Electric Pump used in conjunction with Well Point Systems; Farm Tractor with accessories; Fine Grade Machine; Fork Lift; Gunite Machine; Hammers (Hydraulic self-propelled); Locomotive; Post Hole Digger and Post Driver; Pumps (regardless of motive power, not more than 4 in number not to exceed 20" in total capacity); Submersible Electric Pumps (when used in lieu of well Points); Tractor with towed accessories; Vibrator Compactor; Vibro Tamp; Well Point.

CLASS D: Compressor (any size, but subject to other provisions for compressors), Dust Collectors, Generator, Welding machines (three or less of any type or combination); Concrete Mixer (16' and under); Concrete Saw (self-propelled); Form Tamper; Mulching Machine; Power Heaterman; Pumps (regardless of motive power no more than 3 in number not to exceed 12" in total capacity); Revinius Widener; Steam Cleaner; Tractor.

CLASS E: Junior Engineer/Oiler

Per hour:	07/01/2025
CLASS A	$ 41.26
CLASS B	40.79
CLASS C	40.10
CLASS D	36.61
CLASS E	35.38

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker	$ 35.26

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

7-158-832BEX

Operating Engineer - Heavy&Highway **07/01/2025**

JOB DESCRIPTION Operating Engineer - Heavy&Highway **DISTRICT** 7

ENTIRE COUNTIES
Allegany, Chemung, Livingston, Monroe, Ontario, Schuyler, Steuben, Wayne, Yates

PARTIAL COUNTIES

Genesee: Only that portion of the county that lies east of a line drawn down the center of Route 98, and the entirety of the City of Batavia.

WAGES

NOTE:
---In the event that equipment listed below is operated by robotic control, the classification covering the operation will be the same as if manually operated.
---If a second employee is required by the employer for operation of any covered machine, they shall be an Engineer Class C.

CLASS A1*: All Cranes that require a NYS Crane License (Boom Truck, Cherry Picker, Derrick, Dragline, Overhead Crane (Gantry or Straddle Type), Pile Driver, Tower Crane (including self erecting)**, Truck Crane).

CLASS A: Asphalt Curb Machine (self-propelled, slipform); Asphalt Paver; Automated Concrete Spreader (CMI type); Automatic Fine Grader; Backhoe (except tractor mounted, rubber tired); Backhoe Excavator, Full Swing (CAT 212 or similar type); Back Filling Machine; Belt Placer (CMI type); Blacktop Plant (automated); Blacktop Roller; Bulldozer (being operated with active GPS); Cableway; Caisson Auger; Central Mix Concrete Plant (automated); Concrete Curb Machine (self-propelled, slipform); Concrete Pump; Cranes - Listed in A1 that do not require a NYS Crane License; Directional Boring/Drilling Machine; Dredge; Dual Drum Paver; Excavator (all purpose-hydraulic, Gradall or similar); Front End Loader (4 cu. yd. & over); Head Tower (Sauerman or equal); Hoist (two or three drum); Holland Loader; Maintenance Engineer; Mine Hoist; Mucking Machine or Mole; Pavement Breaker (SP Wertgen; PB-4 and similar type); Profiler/Milling Machine (over 105 h.p.); Power Grader; Quad 9; Quarry Master (or equivalent); Scraper; Shovel; Side Boom; Slip Form Paver; Tractor Drawn Belt-Type Loader; Truck or Trailer Mounted Chipper (self-feeder); Tug Operator (manned rented equipment excluded); Tunnel Shovel.

CLASS B: Backhoe (tractor mounted, rubber tired); Bituminous Recycler Machine; Bituminous Spreader and Mixer; Blacktop Plant (non-automated); Blast or Rotary Drill (truck or tractor mounted); Boring Machine; Bridge Deck Finishing Machine; Brokk; Cage Hoist; Central Mix Plant (non-automated) and All Concrete Batching Plants; Concrete Paver (over 16'); Crawler Drill (self-contained); Crusher; Diesel Power Unit; Drill Rigs (truck or tractor mounted); Front End Loader (under 4 cu. yd.); Greaseman - Lubrication Engineer; HiPressure Boiler (15 lbs & over); Hoist (one drum); Hydro-Axe; Kolman Plant Loader & similar type loaders; Locomotive; Material Handling Knuckle Boom; Mini-Excavator (under 18,000lbs); Mixer (for stabilized base, self-propelled); Monorail Machine; Profiler/Milling Machine (105 h.p. and under); Plant Engineer; Prentice Loader; Pug Mill; Pump Crete; Ready Mix Concrete Plant; Refrigeration Equipment (for soil stabilization); Road Widener; Roller (all above subgrade); Sea Mule; Self-contained ride-on Rock Drill (excluding Air-Track type drill); Skidder; Tractor with Dozer and/or Pusher; Trencher; Tugger Hoist; Vacuum Machine (mounted or towed); Vermeer Saws (ride-on, any size or type); Welder; Winch and Winch Cat; Work Boat Operator including L.C.M.'s.

CLASS C: "A" Frame Winch Hoist (On Truck); Aggregate Plant; Articulated Heavy Hauler; Asphalt or Concrete Grooving Machine (ride-on); Ballast Regulator (ride-on); Bituminous Heater (self-propelled); Boat (powered); Boiler (used in conjunction with production); Cement & Bin Operator; Compressors***; Concrete Pavement Spreader and Finisher; Concrete Paver or Mixer (16' & under); Concrete Saw (self-propelled); Conveyor; Deck Hand; Directional Boring/Drilling Machine Locator; Drill (Core); Drill (Well); Dust Collectors***; Electric Pump When Used in Conjunction with Well Point System; Farm Tractor with accessories; Fine Grade Machine; Fireman; Fork Lift; Form Tamper; Generators***; Grout Pump; Gunite Machine; Hammers (hydraulic self-propelled); Heaters***; Hydra-Spiker (ride-on); Hydraulic Pump (jacking system); Hydro-Blaster (water); Light Plants***; Mulching Machine; Oiler; Parapet Concrete or Pavement Grinder; Post Hole Digger (excluding hand-held); Post Driver; Power Broom (towed); Power Heaterman; Power Sweeper; Pumps***; Revinius Widener; Roller (subgrade & fill); Scarifier (ride-on); Shell Winder; Skid Steer Loader (Bobcat or similar); Span Saw (ride-on); Steam Cleaner; Tamper (ride-on); Tie Extractor (ride-on); Tie Handlers (ride-on); Tie Inserters (ride-on); Tie Spacers (ride-on); Tire Repair; Track Liner (ride-on); Tractor; Tractor (with towed accessories); Vacuum Machine (self-propelled); Vibratory Compactor; Vibro Tamp; Welding Machines***; Well Point.

***CLASS C NOTE: Considered Hands-Off(unmanned). Includes only operation and maintenance of the equipment.

Per hour:	07/01/2025
CLASS A1*	$ 58.38
CLASS A	55.38
CLASS B	54.68
CLASS C	51.81

(*) TONNAGE PREMIUMS:
All cranes up to 64 ton capacity - A1 rate
All cranes 65 ton to 110 ton capacity - A1 rate plus $ 1.50
All cranes 111 ton to 199 ton capacity - A1 rate plus $ 2.00
All cranes 200 ton to 399 ton capacity - A1 rate plus $ 3.00
All cranes 400 ton to 599 ton capacity - A1 rate plus $ 4.00
All cranes 600 ton to 799 ton capacity - A1 rate plus $ 5.00
All cranes 800 ton to 999 ton capacity - A1 rate plus $ 6.00
All cranes 1000 ton capacity and over - A1 rate plus $ 7.00

(**) Tower Cranes - A1 rate plus $3.00 (no tonnage premiums apply)

- Cranes in Luffer Configuration - A1 rate plus $ 5.00.
- Cranes with external ballast (Tray or Wagon) - A1 rate plus $ 5.00.

Additional $2.50 per hour for hazardous waste removal work on a State and/or Federally designated waste site which requires employees to wear Level C or above forms of personal protection.

SHIFT WORK
Additional $2.50 per hour for all employees who work a single irregular work shift starting from 5:00 PM to 1:00 AM that is mandated by the Contracting Agency.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker	$ 36.03

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
NOTE: If a holiday falls on Sunday, it will be celebrated on Monday.

REGISTERED APPRENTICES
WAGES: (1000) hour terms at the following percentage of Journeyworker's CLASS B wage.

1st term	60%
2nd term	70%
3rd term	80%
4th Term	90%

Additional $2.50 per hour for hazardous waste removal work on a State and/or Federally designated waste site which requires employees to wear Level C or above forms of personal protection.

SUPPLEMENTAL BENEFITS per hour: Same as Journeyworker

7-158-832H

Operating Engineer - Survey Crew — 07/01/2025

JOB DESCRIPTION Operating Engineer - Survey Crew **DISTRICT** 12

ENTIRE COUNTIES
Albany, Allegany, Broome, Cayuga, Chemung, Chenango, Clinton, Columbia, Cortland, Essex, Franklin, Fulton, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Oneida, Onondaga, Ontario, Oswego, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Tioga, Tompkins, Warren, Washington, Wayne, Yates

PARTIAL COUNTIES
Dutchess: The northern portion of the county from the northern boundary line of the City of Poughkeepsie, north.
Genesee: Only the portion of the county that lies east of a line down the center of Route 98 to include all area that lies within the City of Batavia.

WAGES
These rates apply to Building, Tunnel and Heavy Highway.

Per hour:
SURVEY CLASSIFICATIONS:

Party Chief - One who directs a survey party.
Instrument Person - One who operates the surveying instruments.
Rod Person - One who holds the rods and assists the Instrument Person.

	07/01/2025
Party Chief	$ 52.91
Instrument Person	48.67
Rod Person	36.29
Additional $3.00/hr. for Tunnel Work	
Additional $2.50/hr. for Hazardous Work Site	

SUPPLEMENTAL BENEFITS
Per hour worked:

Journeyman	$ 30.10

OVERTIME PAY
See (B, E, P, *X) on OVERTIME PAGE
*Note: $25.10/Hr. Only for "ALL" premium hours paid when worked.

HOLIDAY
Paid: See (5, 6) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES
WAGES: 1000 hour terms based on the Percentage of Rod Persons Wage:

	07/01/2025
0-1000	60%
1001-2000	70%
2001-3000	80%

SUPPLEMENTAL BENEFIT per hour worked:

0-1000	$ 21.88 / PHP $18.03
1001-2000	24.90 / " 20.45
2001-3000	27.93/ " 22.93

NOTE: PHP is premium hours paid when worked.

12-158-545 D.H.H.

Operating Engineer - Survey Crew - Consulting Engineer 07/01/2025

JOB DESCRIPTION Operating Engineer - Survey Crew - Consulting Engineer **DISTRICT** 12

ENTIRE COUNTIES
Albany, Allegany, Broome, Cayuga, Chemung, Chenango, Clinton, Columbia, Cortland, Essex, Franklin, Fulton, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Oneida, Onondaga, Ontario, Oswego, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Tioga, Tompkins, Warren, Washington, Wayne, Yates

PARTIAL COUNTIES
Dutchess: The northern portion of the county from the northern boundary line of the City of Poughkeepsie, north.
Genesee: Only the portion of the county that lies east of a line down the center of Route 98 to include all area that lies within the City of Batavia.

WAGES
These rates apply to feasibility and preliminary design surveying, line and grade surveying for inspection or supervision of construction when performed under a Consulting Engineer Agreement.

Per hour:
SURVEY CLASSIFICATIONS:

Party Chief - One who directs a survey party.
Instrument Person - One who operates the surveying instruments.
Rod Person - One who holds the rods and assists the Instrument Person.

	07/01/2025
Party Chief	$ 52.91
Instrument Person	48.67
Rod Person	36.29

Additional $3.00/hr. for Tunnel Work.
Additional $2.50/hr. for EPA or DEC certified toxic or hazardous waste work.

SUPPLEMENTAL BENEFITS
Per hour worked:

Journeyman	$ 30.10

OVERTIME PAY
See (B, E, Q, *X) on OVERTIME PAGE
*Note: $25.10/Hr. Only for "ALL" premium hours paid when worked.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES
WAGES: 1000 hour terms based on percentage of Rod Persons Wage:

	07/01/2025
0-1000	60%

1001-2000	70%
2001-3000	80%

SUPPLEMENTAL BENEFIT per hour worked:

0-1000	$ 21.88 / PHP $18.03
1001-2000	$ 24.90 / " 20.45
2001-3000	$ 27.93 / " 22.93

NOTE: PHP is premium hours paid when worked.

12-158-545 DCE

Operating Engineer - Tunnel — 07/01/2025

JOB DESCRIPTION Operating Engineer - Tunnel **DISTRICT** 7

ENTIRE COUNTIES
Albany, Allegany, Broome, Cayuga, Chemung, Chenango, Clinton, Columbia, Cortland, Essex, Franklin, Fulton, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Oneida, Onondaga, Ontario, Oswego, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Tioga, Tompkins, Warren, Washington, Wayne, Yates

PARTIAL COUNTIES
Dutchess: Northern part of Dutchess, to the northern boundary line of the City of Poughkeepie, then due east to Route 115 to Bedell Road, then east along Bedell Road to VanWagner Road, then north along VanWagner Road to Bower Road, then east along Bower Road to Rte. 44 east to Rte. 343, then along Rte. 343 east to the northern boundary of the Town of Dover Plains and east along the northern boundary of the Town of Dover Plains, to the borderline of the State of Connecticut.
Genesee: Only that portion of the county that lies east of a line drawn down the center of Route 98 and the entirety of the City of Batavia.

WAGES
CLASS A: Automatic Concrete Spreader (CMI Type); Automatic Fine Grader; Backhoe (except tractor mounted, rubber tired); Belt Placer (CMI Type); Blacktop Plant (automated); Cableway; Caisson Auger; Central Mix Concrete Plant (automated); Concrete Curb Machine (self-propelled slipform); Concrete Pump (8" or over); Dredge; Dual Drum Paver; Excavator; Front End Loader (4 cu. yd & over); Gradall; Head Tower (Sauerman or Equal); Hoist (shaft); Hoist (two or three Drum); Log Chipper/Loader (self-feeder); Maintenance Engineer (shaft and tunnel); any Mechanical Shaft Drill; Mine Hoist; Mining Machine(Mole and similar types); Mucking Machine or Mole; Overhead Crane (Gantry or Straddle Type); Pile Driver; Power Grader; Remote Controlled Mole or Tunnel Machine; Scraper; Shovel; Side Boom; Slip Form Paver (If a second man is needed, they shall be an Oiler); Tripper/Maintenance Engineer (shaft & tunnel); Tractor Drawn Belt-Type Loader; Tug Operator (manned rented equipment excluded); Tunnel Shovel.

CLASS B: Automated Central Mix Concrete Plant; Backhoe (topside); Backhoe (track mounted, rubber tired); Backhoe (topside); Bituminous Spreader and Mixer, Blacktop Plant (non-automated); Blast or Rotary Drill (truck or tractor mounted); Boring Machine; Cage Hoist; Central Mix Plant(non-automated); all Concrete Batching Plants; Compressors (4 or less exceeding 2,000 c.f.m. combined capacity); Concrete Pump; Crusher; Diesel Power Unit; Drill Rigs (tractor mounted); Front End Loader (under 4 cu. yd.); Grayco Epoxy Machine; Hoist (One Drum); Hoist (2 or 3 drum topside); Knuckle Boom material handler; Kolman Plant Loader & similar type Loaders (if employer requires another person to clean the screen or to maintain the equipment, they shall be an Oiler); L.C.M. Work Boat Operator; Locomotive; Maintenance Engineer (topside); Maintenance Grease Man; Mixer (for stabilized base-self-propelled); Monorail Machine; Plant Engineer; Personnel Hoist; Pump Crete; Ready Mix Concrete Plant; Refrigeration Equipment (for soil stabilization); Road Widener; Roller (all above sub-grade); Sea Mule; Shotcrete Machine; Shovel (topside); Tractor with Dozer and/or Pusher; Trencher; Tugger Hoist; Tunnel Locomotive; Vacuum Machine (mounted or towed); Welder; Winch; Winch Cat.

CLASS C: A Frame Truck; All Terrain Telescoping Material Handler; Ballast Regulator (ride-on); Compressors (4 not to exceed 2,000 c.f.m. combined capacity; or 3 or less with more than 1200 c.f.m. but not to exceed 2,000 c.f.m.); Compressors ((any size, but subject to other provisions for compressors), Dust Collectors, Generators, Pumps, Welding Machines, Light Plants (4 or any type combination)); Concrete Pavement Spreaders and Finishers; Conveyor; Drill (core); Drill (well); Electric Pump used in conjunction with Well Point System; Farm Tractor with Accessories; Fine Grade Machine; Fork Lift; Grout Pump (over 5 cu. ft.); Gunite Machine; Hammers (hydraulic-self-propelled); Hydra-Spiker (ride-on); Hydra-Blaster (water); Hydro-Blaster; Motorized Form Carrier; Post Hole Digger and Post Driver; Power Sweeper; Roller grade & fill); Scarifer (ride-on); Span-Saw (ride-on); Submersible Electric Pump (when used in lieu of well points); Tamper (ride-on); Tie-Extractor (ride-on), Tie Handler (ride-on), Tie Inserter (ride-on), Tie Spacer (ride-on); Track Liner (ride-on); Tractor with towed accessories; Vibratory Compactor; Vibro Tamp, Well Point.

CLASS D: Aggregate Plant; Cement & Bin Operator; Compressors (3 or less not to exceed 1,200 c.f.m. combined capacity); Compressors ((any size, but subject to other provisions for compressors), Dust Collectors, Generators, Pumps, Welding Machines, Light Plants (3 or less or any type or combination)); Concrete Saw (self-propelled); Form Tamper; Greaseman; Hydraulic Pump (jacking system); Junior Engineer; Light Plants; Mulching Machine; Oiler; Parapet Concrete or Pavement Grinder; Power Broom (towed); Power Heaterman (when used for production); Revinius Widener; Shell Winder; Steam Cleaner; Tractor.

Per hour:	07/01/2025
CLASS A	$ 58.44
CLASS B	57.22
CLASS C	54.43
CLASS D	51.42

Additional $5.00 per hour for Hazardous Waste Work on a state or federally designated hazardous waste site where the Operating Engineer is in direct contact with hazardous material and when personal protective equipment is required for respiratory, skin and eye protection.

CRANES:
Crane 1: All cranes, including self-erecting.
Crane 2: All Lattice Boom Cranes and all cranes with a manufacturer's rating of fifty (50) ton and over.
Crane 3: All hydraulic cranes and derricks with a manufacturer's rating of forty nine (49) ton and below, including boom trucks.

Crane 1	$ 62.44
Crane 2	61.44
Crane 3	60.44

SUPPLEMENTAL BENEFITS
Per hour:
$ 25.90
+ 10.10*

* This portion of the benefits subject to SAME PREMIUM as shown for overtime wages.

OVERTIME PAY
See (B, B2, E, Q, X) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
NOTE: If a holiday falls on Sunday, it shall be observed on Monday.

REGISTERED APPRENTICES
WAGES:(1000) hours terms at the following percentage of Journeyworker's Class B wage.

1st term	60%
2nd term	65%
3rd term	70%
4th term	75%

SUPPLEMENTAL BENEFITS per hour: Same as Journeyworker

7-158-832TL.

Painter — 07/01/2025

JOB DESCRIPTION Painter **DISTRICT** 3

ENTIRE COUNTIES
Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Cortland, Delaware, Erie, Genesee, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Niagara, Oneida, Onondaga, Ontario, Orleans, Oswego, Otsego, Schuyler, Seneca, St. Lawrence, Steuben, Tioga, Tompkins, Wayne, Wyoming, Yates

WAGES

Per hour:	07/01/2025	05/01/2026 Additional
Bridge	$ 46.19	$ 2.50
Tunnel	46.19	
Tank*	44.19	

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.

*Tank rate applies to indoor and outdoor tanks, tank towers, standpipes, digesters, waste water treatment tanks, chlorinator tanks, etc. Covers all types of tanks including but not limited to steel tanks, concrete tanks, fiberglass tanks, etc.

SHIFT WORK
Note an additional $1.50 per hour is required when the contracting agency or project specification requires any shift to start prior to 6:00am or after 12:00 noon.

SUPPLEMENTAL BENEFITS
Per hour:
$ 31.51

OVERTIME PAY
Exterior work only See (B, E2, E4, F, R) on OVERTIME PAGE.
All other work See (B, F, R) on OVERTIME PAGE.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wages per hour:

750 hour terms at the following wage:

1st	2nd	3rd	4th	5th	6th
$ 24.00	$ 26.00	$ 28.00	$ 30.00	$ 34.00	$ 38.00

Supplemental benefits per hour:

1st	2nd	3rd	4th	5th	6th
$ 6.60	$ 6.95	$ 7.30	$ 7.65	$ 8.00	$ 8.35

3-4-Bridge, Tunnel, Tank

Painter 07/01/2025

JOB DESCRIPTION Painter **DISTRICT** 2

ENTIRE COUNTIES
Chemung, Schuyler

PARTIAL COUNTIES
Steuben: Only the Townships of Addison, Bath, Bradford, Cameron, Campbell, Caton, Corning, Erwin, Hornby, Lindley, Rathbone and Thurston

WAGES
Per hour:

	07/01/2025	05/01/2026 Additional
Painter	$ 26.13	$ 2.25*
Taper, Paperhangers, and Vinyl hangers	27.44	2.31*

*To be allocated at a later date.

ADDITIONAL AMOUNTS FOR SPECIFIC TYPES OF JOBSITE CONDITIONS (amount subject to any overtime premiums):
- Additional $ 1.00 per hour for Spray Work (does not apply to application of water-based coatings to walls)
- Additional $ 1.00 per hour for Swing Chair or Swing Scaffold
- Additional $ 2.00 per hour for Steeplejack
- Additional $ 1.00 per hour for Sand Blasting
- Additional $ 1.00 per hour for Acid or High Pressure Wash
- Additional $ 1.25 per hour for Structural Steel (buildings) defined as new or old construction where ceilings, walls or the steel itself is to be painted from open trusses which require climbing or crawling without the support of solid scaffolding or scaffolding starting at the floor or ground level.
- Additional $ 1.25 per hour for Epoxy-brush or roll (solvent base only)
- Additional $ 2.00 per hour for Drywall Machine Operator

NOTE - SEE BRIDGE PAINTER RATES FOR BRIDGES & TANKS

SUPPLEMENTAL BENEFITS
Per hour:
Journeyworker $ 24.03

OVERTIME PAY
See (B, E2, F, R) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
A Holiday that falls on a Sunday will be celebrated on Monday, a holiday that falls on a Saturday will be celebrated on Friday.

REGISTERED APPRENTICES
WAGES:

Painter: 750 hour terms at the Painter Apprentice wage rate:

1st	2nd	3rd	4th	5th	6th	7th	8th
$ 18.00	$ 18.50	$ 19.00	$ 19.50	$ 20.00	$ 21.00	$ 22.00	$ 23.00

Taper: 750 hour terms at the following Journeyworker Taper Apprentice wage rate:

1st	2nd	3rd	4th	5th	6th
$ 20.00	$ 20.50	$ 21.00	$ 21.50	$ 22.00	$ 23.00

ADDITIONAL AMOUNTS FOR SPECIFIC TYPES OF JOBSITE CONDITIONS (amount subject to any overtime premiums):
- Additional $ 1.00 per hour for Spray Work (does not apply to application of water-based coatings to walls)
- Additional $ 1.00 per hour for Swing Chair or Swing Scaffold
- Additional $ 2.00 per hour for Steeplejack
- Additional $ 1.00 per hour for Sand Blasting
- Additional $ 1.00 per hour for Acid or High Pressure Wash
- Additional $ 1.25 per hour for Structural Steel (buildings) defined as new or old construction where ceilings, walls or the steel itself is to be painted from open trusses which require climbing or crawling without the support of solid scaffolding or scaffolding starting at the floor or ground level.
- Additional $ 1.25 per hour for Epoxy-brush or roll (solvent base only)
- Additional $ 2.00 per hour for Drywall Machine Operator

SUPPLEMENTAL BENEFITS per hour:
Painter/Decorator:

1st	2nd	3rd	4th	5th	6th	7th	8th
$ 6.10	$ 7.10	$ 8.10	$ 9.20	$ 11.00	$ 11.00	$ 13.00	$ 13.64

Taper/Drywall Finisher:

1st	2nd	3rd	4th	5th	6th
$ 6.10	$ 7.10	$ 8.10	$ 10.00	$ 13.00	$ 13.73

2-178 E

Painter - Metal Polisher 07/01/2025

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

	07/01/2025
Metal Polisher	$ 40.33
Metal Polisher*	41.43
Metal Polisher**	44.33

*Note: Applies on New Construction & complete renovation
** Note: Applies when working on scaffolds over 34 feet.

SUPPLEMENTAL BENEFITS
Per Hour: 07/01/2025

Journeyworker:
All classification $ 13.44

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, 11, 15, 16, 25, 26) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wages per hour:
One (1) year term at the following wage rates:

	07/01/2025
1st year	$ 20.17
2nd year	22.18
3rd year	24.20
1st year*	$ 20.56
2nd year*	22.62
3rd year*	24.74
1st year**	$ 22.67
2nd year**	24.68
3rd year**	26.70

*Note: Applies on New Construction & complete renovation
** Note: Applies when working on scaffolds over 34 feet.

Supplemental benefits:
Per hour:

1st year	$ 8.94
2nd year	8.94
3rd year	8.94

8-8A/28A-MP

Plumber 07/01/2025

JOB DESCRIPTION Plumber **DISTRICT** 6

ENTIRE COUNTIES
Chemung, Cortland, Onondaga, Schuyler, Tompkins

PARTIAL COUNTIES
Madison: Only the Townships of Sullivan, Cazenovia and DeRuyter.
Seneca: Only the Townships of Covert and Lodi.
Steuben: Only the Townships of Addison, Bath, Bradford, Campbell, Caton, Corning, Erwin, Hornby, Lindley, Pulteney, Rathbone, Thurston, Tuscarora, Urbana and Wayne.
Tioga: Only the Townships of Barton, Berkshire, Candor, Nichols, Richford, Spencer and Tioga.

WAGES

Per hour:	07/01/2025	05/01/2026 Additional
Plumber, Steamfitter, Pipefitter, Welder, HVAC, Refrigeration.	$ 48.26	$ 4.50*

* To be allocated at a later date.

SHIFT WORK
SINGLE IRREGULAR WORK SHIFT: Additional 15% premium added to the wage rate above for a single irregular work shift starting between 4:30PM and 7:00AM.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker	$ 28.15*

*NOTE: $10.27 of the supplemental benefits are paid at the same premium as shown for overtime work performed at semi-conductor manufacturer and/or fabrication plants.

OVERTIME PAY
Time and one half for the 9th & 10th hours Monday thru Friday and first 10 hours on Saturday. All other overtime hours are double time.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
NOTE: If a holiday falls on Saturday, the holiday will be observed on the preceding Friday. If a holiday falls on Sunday, it will be observed on the following Monday.

REGISTERED APPRENTICES
WAGES per hour: One year terms at the following percentage of the Journeyworker's wage:

1st	2nd	3rd	4th	5th
55%	60%	70%	75%	85%

SUPPLEMENTAL BENEFITS per hour*:

1st	$ 15.87
2nd	24.67
3rd	25.30
4th	25.89
5th	26.90

*NOTE: Below is the portion of supplemental benefits paid at overtime premiums for work performed at semi-conductor manufacturer and/or fabrication plants:

1st	n/a
2nd	$ 8.58

3rd	8.77
4th	9.14
5th	9.71

6-81-SF

Roofer 07/01/2025

JOB DESCRIPTION Roofer **DISTRICT** 2

ENTIRE COUNTIES
Broome, Chemung, Chenango, Delaware, Otsego, Schoharie, Schuyler, Steuben, Tioga, Tompkins

WAGES

Per hour:	07/01/2025
Roofer, Waterproofer	$ 30.33
	+ 1.02*

*This amount is paid for all hours worked, whether regular or premium hours.

NOTE ADDITIONAL PREMIUMS PAID FOR THE FOLLOWING WORK LISTED BELOW (amount not subject to overtime premiums):
- On days where more than one shift is worked on the job, the hours worked after 4:30 PM and before 6:30 AM will be paid an additional $1.90 per hour premium. This premium is not for use in emergency repair situations.
- Premium of $1.25 per hour will be paid for the application, rip-off or handling of pitch products. The premium will be paid for pitch that is showing, covered or buried on the roof.
- Premium of $1.25 per hour will be paid for asbestos abatement requiring a half face respirator.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker	$ 23.99

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid:	See (1) on HOLIDAY PAGE
Overtime:	See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wages:

Hours per term	
0-667 Hrs.	$ 21.24 + 0.71*
668-1335 Hrs.	22.76 + 0.76*
1336-2002 Hrs.	24.27 + 0.81*
2003-2669 Hrs.	25.79 + 0.86*
2670-3336 Hrs.	27.30 + 0.92*
3337-4000 Hrs.	28.82 + 0.97*

*This amount is paid for all hours worked, whether regular or premium hours.

NOTE ADDITIONAL PREMIUMS PAID FOR THE FOLLOWING WORK LISTED BELOW (amount not subject to overtime premiums):
- On days where more than one shift is worked on the job, the hours worked after 4:30 PM and before 6:30 AM will be paid an additional $1.90 per hour premium. This premium is not for use in emergency repair situations.
- Premium of $1.25 per hour will be paid for the application, rip-off or handling of pitch products. The premium will be paid for pitch that is showing, covered or buried on the roof.
- Premium of $1.25 per hour will be paid for asbestos abatement requiring a half face respirator.

Supplemental Benefits:

0-667 Hrs.	$ 19.93
668-1335 Hrs.	20.62
1336-2002 Hrs.	21.29
2003-2669 Hrs.	21.96
2670-3336 Hrs.	22.65
3337-4000 Hrs.	23.32

2-203elmi

Sheetmetal Worker 07/01/2025

JOB DESCRIPTION Sheetmetal Worker **DISTRICT** 2

ENTIRE COUNTIES
Allegany, Broome, Chemung, Delaware, Otsego, Schuyler, Steuben, Tioga, Tompkins

WAGES

Per hour:

	07/01/2025	05/01/2026 Additional	05/01/2027 Additional
Sheetmetal Worker	$ 39.74 + 0.99*	$ 4.00**	$ 4.00**

NOTE: Ten cents ($0.10) per hour additional premium to be paid when working polyresin fiberglass.
*Amount is paid for every hour worked (amount not subject to overtime premium)
**To be allocated at a later date

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker: $ 22.41

OVERTIME PAY
See (*B1, Q) on OVERTIME PAGE
*On Saturday, time and one half of the hourly rate for the first ten (10) hours, then two (2) times the hourly wage rate for all hours after ten (10) hours worked.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
Note: Holidays are observed on the Holiday, not on the day that it is locally observed.

REGISTERED APPRENTICES
WAGES per hour:
Indentured after 05/01/2025 (1-year Terms):

1st	2nd	3rd	4th	5th
$ 23.84 +0.60*	$ 25.83 +0.65*	$ 27.82 +0.70*	$ 31.79 +0.79*	$ 33.78 +0.84*

Indentured prior to 05/01/2025 (Half Year Terms):

1st	2nd	3rd	4th	5th	6th	7th	8th
$ 23.84 +0.60*	$ 23.84 +0.60*	$ 25.83 +0.65*	$ 27.82 +0.70*	$ 29.81 +0.75*	$ 31.79 +0.79*	$ 33.78 +0.84*	$ 35.77 +0.89*

*Amount is paid for every hour worked (amount not subject to overtime premium)

SUPPLEMENTAL BENEFITS per hour:
Indentured after 05/01/2025:

1st	2nd	3rd	4th	5th
$ 2.12	$ 18.64	$ 18.72	$ 18.88	$ 22.17

Indentured prior to 05/01/2025:

1st	2nd	3rd	4th	5th	6th	7th	8th
$ 2.12	$ 2.12	$ 18.64	$ 18.72	$ 18.80	$ 18.88	$ 18.97	$ 19.05

2-112

Sprinkler Fitter — 07/01/2025

JOB DESCRIPTION Sprinkler Fitter **DISTRICT** 1

ENTIRE COUNTIES
Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Niagara, Oneida, Onondaga, Ontario, Orleans, Oswego, Otsego, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Tioga, Tompkins, Washington, Wayne, Wyoming, Yates

WAGES
Per hour 07/01/2025

Sprinkler Fitter $ 45.06

SUPPLEMENTAL BENEFITS
Per hour

Journeyworker $ 29.41

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
$ 23.28	$ 25.98	$ 28.15	$ 30.31	$ 31.94	$ 34.64	$ 36.81	$ 38.97	$ 41.14	$ 43.30

Supplemental Benefits per hour

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
$ 9.57	$ 9.57	$ 21.49	$ 21.49	$ 21.74	$ 21.74	$ 21.74	$ 21.74	$ 21.74	$ 21.74

1-669

Teamster - Building / Heavy&Highway 07/01/2025

JOB DESCRIPTION Teamster - Building / Heavy&Highway **DISTRICT** 7

ENTIRE COUNTIES
Chemung, Livingston, Monroe, Ontario, Schuyler, Wayne

PARTIAL COUNTIES
Genesee: Only in the townships of Oakfield, Elba, Batavia, Byron, Alexander, Bethany, Pavilion, Leroy, Stafford, and Bergen.
Orleans: Only in the townships of Gaines, Carlton, Barre, Kendall, Murray, Clarendon, and Albion.
Steuben: Only the Townships of: Addison, Avoca, Bath, Bradford, Cameron, Campbell, Caton, Corning, Erwin, Hornby, Howard, Lindley, Pulteney, Rathbone, Thurston, Tuscarora, Urbana, Wayland, Wayne, Wheeler, and Woodhull.
Tioga: Only from Nichols/Smithboro towards the City of Elmira (west).
Wyoming: Only in the townships of Attica, Orangeville, Wethersfield, Eagle, Genesee Falls, Castile, Ganesville, Perry, Warsaw, Middlebury, Covington, and Pike.

WAGES
*NOTE - THIS RATE APPLIES ONLY TO MILLING OPERATIONS (ASPHALT or CONCRETE) WHEN MATERIALS ARE TO BE REMOVED FROM THE PROJECT SITE.

Per hour:	07/01/2025	07/01/2026
Teamster - Mill Rate	$ 27.50	$ 28.50

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker	$ 12.96	$ 13.17

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

7-118-Mill

Teamster - Building / Heavy&Highway 07/01/2025

JOB DESCRIPTION Teamster - Building / Heavy&Highway **DISTRICT** 7

ENTIRE COUNTIES
Chemung, Livingston, Monroe, Ontario, Schuyler, Wayne

PARTIAL COUNTIES
Genesee: Only in the townships of Oakfield, Elba, Batavia, Byron, Alexander, Bethany, Pavilion, Leroy, Stafford, and Bergen.
Orleans: Only in the townships of Gaines, Carlton, Barre, Kendall, Murray, Clarendon, and Albion.
Steuben: Only the Townships of: Addison, Avoca, Bath, Bradford, Cameron, Campbell, Caton, Corning, Erwin, Hornby, Howard, Lindley, Pulteney, Rathbone, Thurston, Tuscarora, Urbana, Wayland, Wayne, Wheeler, and Woodhull.
Tioga: Only from Nichols/Smithboro towards the City of Elmira (west).
Wyoming: Only in the townships of Attica, Orangeville, Wethersfield, Eagle, Genesee Falls, Castile, Ganesville, Perry, Warsaw, Middlebury, Covington, and Pike.

WAGES
GROUP #1: Warehousemen*, Yardmen*, Truck helpers, Pickups, Panel trucks, Flatboy material trucks (straight jobs), Single Axle dump trucks, Dumpsters, Material Checkers/Receivers*, Greasers, Tiremen, Mechanics Helpers/Parts Chasers.
GROUP #2: Tandems and Batch Trucks, Mechanics.
GROUP #3: Semi-trailers, Low-Boy trucks, Asphalt distributor trucks, and Agitator, Mixer trucks and Dumpcrete type vehicles, Truck mechanic, Fuel trucks.

GROUP #4: Articulated off-road material hauler, Specialized earth moving equipment, Euclid type, or similar off-highway equipment, where not self-loaded, Straddle (Ross) carrier, and self-contained concrete mobile truck.
GROUP #5: Off-highway Tandem back-dump, Twin engine equipment and double-hitched equipment where not self-loaded.

*NOTE - Applies when a temporary warehouse structure is built/utilized specifically for a public work project.

Per hour:	07/01/2025	07/01/2026
GROUP #1	$ 31.39	$ 33.59
GROUP #2	31.44	33.64
GROUP #3	31.49	33.69
GROUP #4	31.64	33.84
GROUP #5	31.79	33.99

Additional $1.50 per hour for hazardous waste removal work on a City, County, State and/or Federal Designated waste site and regulations require employee to use or wear personal protection.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker	$ 27.77	$ 27.94

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

7-118

Welder 07/01/2025

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 07/01/2025

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
(B3)	Time and one half of the hourly rate after 40 straight 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)	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 - 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 please call 518-457-5589.

NYSDOL Bureau of Public Work Debarment List 07/03/2025

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	*****5784	A.J.M. TRUCKING, INC.		PO BOX 2064 MONROE NY 10950	02/12/2024	02/12/2029
DOL	DOL		AKHLAQ OULAKH		4307 28TH AVE ASTORIA NY 11103	10/11/2024	10/11/2029
DOL	NYC		ALL COUNTY SEWER & DRAIN, INC.		7 GREENFIELD DR WARWICK NY 10990	03/25/2022	03/25/2027
DOL	DOL	*****8387	AMERICAN PAVING & MASONRY, CORP.		8 FOREST AVE GLEN COVE NY 11542	05/24/2024	05/24/2029
DOL	DOL	*****8654	AMERICAN PAVING, INC.		8 FORREST AVE. GLEN COVE NY 11542	05/24/2024	05/24/2029
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 GARCIA		515 WEST AVE UNIT PH 13NORWALK CT 06850	05/12/2021	05/12/2026
DOL	DOL		ANGELO STANCO		8 FOREST AVE. GLEN COVE NY 11542	05/24/2024	05/24/2029
DOL	DOL		ANGELO TONDO		449 WEST MOMBSHA ROAD MONROE NY 10950	06/06/2022	06/06/2027
DOL	DOL	*****4231	ANKER'S ELECTRIC SERVICE, INC.		10 SOUTH 5TH ST LOCUST VALLEY NY 11560	09/26/2022	09/26/2027
DOL	DOL		ANTHONY MONGELLI		PO BOX 2064 MONROE NY 10950	02/12/2024	02/12/2029
DOL	NYC		ARADCO CONSTRUCTION CORP		115-46 132RD ST SOUTH OZONE PARK NY 11420	09/17/2020	09/17/2025
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	DOL		B&L RENOVATION CO.		618 OCEAN PARKWAY APT A6BROOKLYN NY 11230	09/17/2020	09/17/2025
DOL	NYC	*****2113	BHW CONTRACTING, INC.		401 HANOVER AVENUE STATEN ISLAND NY 10304	01/11/2021	01/11/2026
DOL	DA	*****9290	BJA RENOVATION, CORP		33 DOLLARD DR NORTH BABYLON NY 11703	03/19/2025	03/19/2030
DOL	DOL	*****5078	BLACK RIVER TREE REMOVAL, LLC		29807 ANDREWS ROAD BLACK RIVER NY 13032	10/17/2023	10/17/2028
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	*****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	DOL	*****4155	CASA BUILDERS, INC.	FRIEDLANDER CONSTRUCTION	64 N PUTT CONNERS ROAD NEW PALTZ NY 12561	05/10/2023	05/10/2028
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	DOL		CHRISTOPHER GRECO		26 NORTH MYRTLE AVENUE SPRING VALLEY NY 10956	02/18/2021	02/18/2026
DOL	DOL	*****2281	CORRAO TRUCKING, INC.		PO BOX 393 NANUET NY 10954	09/17/2024	09/17/2029
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

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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		DARWIN PEGUESE		6400 BALTIMORE NATIONAL SUITE 602CANTONSVILLE NY 21228	10/24/2024	10/24/2029
DOL	DOL		DAVID FRIEDLANDER		64 NORTH PUTT CORNERS RD NEW PALTZ NY 12561	05/10/2023	05/10/2028
DOL	DOL		DINA TAYLOR		64 N PUTT CONNERS RD NEW PALTZ NY 12561	05/10/2023	05/10/2028
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	DOL		EMIL KISZKO		84 DIAMOND ST BROOKLYN NY 11222	07/18/2024	07/18/2029
DOL	DOL	*****3298	EMJACK CONSTRUCTION CORP.		84 DIAMOND ST BROOKLYN NY 11222	07/18/2024	07/18/2029
DOL	DOL	*****3298	EMJACK CONSTRUCTION LLC		4192 SIR ANDREW CIRCLE DOYLESTOWN PA 18902	07/18/2024	07/18/2029
DOL	DOL		EUGENIUSZ "GINO" KUCHAR		195 KINGSLAND AVE BROOKLYN NY 11222	12/22/2023	12/22/2028
DOL	DA		FREDERICK HUTZLER		2375 RAYNOR STREET RONKONKOMA NY 11779	08/04/2021	08/04/2026
DOL	DOL	*****2998	G.E.M. AMERICAN CONSTRUCTION CORP.		195 KINGSLAND AVE BROOKLYN NY 11222	12/22/2023	12/22/2028
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	DA		GIOVANNA TRAVALJA		3735 9TH ST LONG ISLAND CITY NY 11101	01/05/2023	01/05/2028
DOL	DA		GIOVANNI NAPOLITANO		2501 BAYVIEW AVENUE WANTAGH NY 11793	02/21/2024	02/21/2029
DOL	DA	*****0213	GORILLA CONTRACTING GROUP, LLC		505 MANHATTAN AVE WEST BABYLON NY 11704	10/05/2023	10/05/2028
DOL	DA	*****4760	GTX CONSTRUCTION ASSOCIATES, CORP		2501 BAYVIEW AVE WANTAGH NY 11793	02/21/2024	02/21/2029
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	*****2397	ISLAND BREEZE MARINE, INC.		6400 BALTIMORE NATIONAL CANTONSVILLE MD 21228	10/24/2024	10/24/2029
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	11/07/2023	11/07/2028
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	11/07/2023	11/07/2028
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	11/07/2023	11/07/2028
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	11/07/2023	11/07/2028
DOL	DOL	*****1147	J.R.N. CONSTRUCTION, LLC		531 THIRD ST ALBANY NY 12206	12/22/2022	12/22/2027

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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	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 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		JORGE RAMOS		8970 MIKE GARCIA DR MANASSAS VA 20109	07/16/2021	07/16/2026
DOL	DA		JOSEPH DEMASCO		33 DOLLARD DRIVE NORTH BABYLON NY 11703	03/19/2025	03/19/2030
DOL	DOL		JOSEPH HALL		937 US ROUTE 11 CENTRAL SQUARE NY 13036	10/21/2024	10/21/2029
DOL	DOL	*****2271	JOSEPH HALL COMPANIES LLC		937 US ROUTE 11 CENTRAL SQUARE NY 13036	10/21/2024	10/21/2029
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
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		JRN CONSTRUCTION CO, LLC		1024 BROADWAY ALBANY NY 12204	11/07/2023	11/07/2028
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	*****1147	JRN CONSTRUCTION, LLC		531 THIRD STREET ALBANY NY 12206	11/07/2023	11/07/2028
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		JRN PAVING, LLC		531 THIRD STREET ALBANY NY 12206	11/07/2023	11/07/2028
DOL	DOL		JULIUS AND GITA BEHREND		5 EMES LANE MONSEY NY 10952	11/20/2002	11/20/3002

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DOL	DOL		KATE E. CONNOR		7088 INTERSTATE ISLAND RD SYRACUSE NY 13209	03/31/2021	03/31/2026
DOL	DOL		KEAN INDUSTRIES, LLC		2345 RT. 52 SUITE 2NHOPEWELL JUNCTION NY 12533	12/18/2023	12/18/2028
DOL	DOL	*****2959	KELC DEVELOPMENT, INC		7088 INTERSTATE ISLAND RD SYRACUSE NY 13209	03/31/2021	03/31/2026
DOL	DOL		KEVIN FUNEZ URBINA A/K/A KEVIN FUNEZ		1009 LYNDALE AVE TRENTON NJ 08629	12/16/2024	12/16/2029
DOL	DOL		KIMBERLY F. BAKER		7901 GEE ROAD CANASTOTA NY 13032	08/17/2021	08/17/2026
DOL	DOL	*****8760	KJ&J CONSTRUCTION, LLC		1009 LYNDALE AVE TRENTON NJ 08629	12/16/2024	12/16/2029
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	DOL		KRIN HEINEMANN		2345 ROUTE 52, SUITE 2N HOPEWELL JUNCTION NY 12533	12/18/2023	12/18/2028
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	DOL		LEROY E. NELSON JR		531 THIRD ST ALBANY NY 12206	11/07/2023	11/07/2028
DOL	DOL	*****3716	LIGHTNIN ELECTRIC INC.		3418 NORTHERN BLVD SUITE 5-27LONG ISLAND CITY NY 11101	12/13/2024	12/13/2029
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	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	DOL		MAQSOOD AHMAD		618 OCEAN PKWY BROOKLYN NY 11230	09/17/2020	09/17/2025
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	DOL		MOHAMMAD MIAN		8269 21ST ST BELLEROSE NY 11426	12/22/2022	12/22/2027
DOL	NYC		MUHAMMED A. HASHEM		524 MCDONALD AVENUE BROOKLYN NY 11218	09/17/2020	09/17/2025
DOL	NYC		NASEER CHAUDHRY		2349 BRAGG STREET BROOKLYN NY 11229	04/22/2025	04/22/2030
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	NYC		NAVIT SINGH		402 JERICHO TURNPIKE NEW HYDE PARK NY 11040	08/10/2022	08/10/2027
DOL	DOL		NELCO CONTRACTING, LLC		1024 BROADWAY ALBANY NY 12204	11/07/2023	11/07/2028
DOL	DA		NICHOLAS BARNETT		33 DOLLARD DR BABYLON NY 11703	03/04/2025	03/04/2030
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

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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 CONSTRUCTI ON, INC.	444 SCHANTZ ROAD ALLENTOWN PA 18104	09/17/2020	09/17/2025
DOL	DOL		NIKOLA NTONI		3418 NORTHERN BLVD SUITE 5-27LONG ISLAND CITY NY 11101	12/13/2024	12/13/2029
DOL	NYC	*****6971	NN CONSTRUCTION, INC.		2349 BRAGG STREET BROOKLYN NY 11229	04/22/2025	04/22/2030
DOL	NYC	*****5643	NYC LINE CONTRACTORS, INC.		402 JERICHO TURNPIKE NEW HYDE PARK NY 11040	08/10/2022	08/10/2027
DOL	DOL		PATRICK PENNACCHIO		2345 RT. 52 SUITE 2NHOPEWELL JUNCTION NY 12533	12/18/2023	12/18/2028
DOL	DOL		PATRICK PENNACCHIO		2345 RT. 52 SUITE 2NHOPEWELL JUNCTION NY 12533	12/18/2023	12/18/2028
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	*****4168	PHANTOM CONSTRUCTION CORP.		95-27 116TH STREET QUEENS NY 11419	07/12/2024	07/12/2029
DOL	DOL	*****4168	PHANTOM CONSTRUCTION CORP.		95-27 116TH STREET QUEENS NY 11419	05/28/2024	05/28/2029
DOL	DOL	*****4772	R.W. LOBDELL CONSTRUCTION LLC		635 WEST DRYDEN ROAD FREEVILLE NY 13068	01/31/2025	01/31/2030
DOL	NYC		RASHEL CONSTRUCTION CORP		524 MCDONALD AVENUE BROOKLYN NY 11218	09/17/2020	09/17/2025
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		ROBBYE BISSESAR		89-51 SPRINGFIELD BLVD QUEENS VILLAGE NY 11427	01/11/2003	01/11/3003
DOL	DOL		ROMEO WARREN		161 ROBYN RD MONROE NY 10950	07/11/2022	07/11/2027
DOL	DOL	*****7172	RZ & AL INC.		198 RIDGE AVENUE VALLEY STREAM NY 11581	06/06/2022	06/06/2027
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	DA	*****0476	SAMCO ELECTRIC CORP.		3735 9TH ST LONG ISLAND CITY NY 11101	01/05/2023	01/05/2028
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	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	*****9528	STEEL-IT, LLC.		17613 SANTE FE LINE ROAD WAYNESFIELD OH 45896	07/16/2021	07/16/2026
DOL	DOL	*****3800	SUBURBAN RESTORATION CO. INC.		5-10 BANTA PLACE FAIR LAWN PLACE NJ 07410	03/29/2021	03/29/2026
DOL	DOL	*****9150	SURGE INC.		8269 21ST STREET	12/22/2022	12/22/2027

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DOL	DOL		SYED MUHAMMAD S. JAFRI A/K/A SHARRUKH JAFRI		4307 28TH AVE ASTORIA NY 11103	10/11/2024	10/11/2029
DOL	DOL		SYED RAZA		198 RIDGE AVENUE NY 11581	06/06/2022	06/06/2027
DOL	DOL		TARLOK SINGH		95-27 116TH STREET QUEENS NY 11419	05/28/2024	05/28/2029
DOL	DOL		TARLOK SINGH		95-27 116TH STREET QUEENS NY 11419	07/12/2024	07/12/2029
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	*****5766	THE COKER CORPORATION	COKER CORPORATIO N	2610 SOUTH SALINA ST SUITE 14SYRACUSE NY 13205	09/17/2020	09/17/2025
DOL	DOL	*****2426	THE MATRUKH GROUP, INC.		4307 28TH AVE PO BOX 9082ASTORIA NY 11103	10/11/2024	10/11/2029
DOL	DOL		THOMAS LOBDELL		635 WEST DRYDEN ROAD FREEVILLE NY 13068	01/31/2025	01/31/2030
DOL	DOL		TIMOTHY PERCY		29807 ANDREWS ROAD BLACK RIVER NY 13612	10/17/2023	10/17/2028
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
DOL	NYC		VICKRAM MANGRU		21 DAREWOOD LANE VALLEY STREAM NY 11581	09/17/2020	09/17/2025
DOL	DOL		VINCENT CORRAO		PO BOX 393 NANUET NY 10954	09/17/2024	09/17/2029
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 CONTRACTIN G, INC.	54 PENTAQUIT AVE BAYSHORE NY 11706	01/19/2021	01/19/2026
DOL	DOL		WILLIAM SCRIVENS		4192 SIR ANDREW CIRCLE DOYELSTOWN PA 18902	07/18/2024	07/18/2029
DOL	DOL		XENOFON EFTHIMIADIS		29-10 38TH AVENUE LONG ISLAND CITY NY 11101	10/11/2023	10/11/2028

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01 10 00

SUMMARY

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Project location.

B. Contracts.

C. Administrative and procedural sections applicable to all contracts.

D. Temporary facilities and controls applicable to all contracts.

E. Contract closeout applicable to all contracts.

F. Work sequence.

1.2 PROJECT LOCATION

A. The project consists of work at the following facilities and/or site:

Odessa Elementary and High School
300 College Avenue
Odessa, NY 14869

Odessa-Montour Bus Garage
409 NY-224
Odessa, NY 14869

1.3 CONTRACTS

A. Perform Work of each Prime Contract under a separate stipulated sum contract with the Owner.

B. Work of each separate Contract is identified in the following Articles.

1.4 ADMINISTRATIVE AND PROCEDURAL SECTIONS APPLICABLE TO ALL CONTRACTS

A. Section 01 21 00 – Price and Payment Procedures: Cash allowances, contingency allowances, schedule of values, applications for payment, and change procedures.

B. Section 01 30 00 – Administrative Requirements: Coordination and project conditions, field engineering, pre-construction conference, site mobilization conference, progress meetings, pre-installation conferences, on-site manager, job superintendent, construction mobilization, equipment electrical characteristics and components, cutting and patching, and special procedures.

C. Section 01 33 00 – Submittals: Submittal procedures, construction progress schedules, proposed products list, product data, shop drawings, samples, certificates, and manufacturer's instructions.

D. Section 01 40 00 – Quality Requirements: Contract quality control and control of installation, tolerances, references, field samples, mock-up requirements, manufacturer's field services and reports, and testing and inspection.

E. Section 01 41 00 – Regulatory Requirements: Building codes, and labor laws.

F. Section 01 60 00 – Product Requirements: Products, product delivery requirements, product storage and handling requirements, product options, and product substitution procedures.

1.5 TEMPORARY FACILITIES AND CONTROLS SECTIONS APPLICABLE TO ALL CONTRACTS

A. Section 01 50 00 - Construction Facilities and Controls: Temporary utilities, telephone service, facsimile service, temporary water service, temporary sanitary facilities, water control, exterior enclosures, interior enclosures, protection of installed work, maintenance of traffic, parking, progress cleaning, project identification, field offices and sheds, scaffolds, staging and safety devices, lifting devices and hoisting facilities, and removal of utilities, facilities, and controls.

B. Section 01 50 13 – Safety Standards: Owner occupancy, fencing, barriers, security, fire and hazard protection, progress cleaning, ventilation during construction, materials containing asbestos, and materials containing lead-based paint.

C. Section 01 50 23 – Uniform Safety Standards for School Construction: Building occupancy, general safety and security standards, separation of construction, exiting plan, ventilation plan, construction noise, construction contaminants, asbestos abatement, and presence of lead.

D. Section 01 51 00 – Temporary Utilities: Temporary electricity, temporary lighting for construction purposes, temporary heating and ventilation, and costs.

1.6 CONTRACT CLOSEOUT APPLICABLE TO ALL CONTRACTS

A. Section 01 70 00 – Execution Procedures: Closeout procedures, final cleaning, starting of systems, demonstration and instruction, testing, adjusting and balancing, protecting installed construction, project record documents, operation and maintenance data, manual for materials and finishes, manual for equipment and systems, spare parts and maintenance products, product warranties and product bonds, final inspection, evidence of payment and release of liens, final application for payment, final certification for payment, and asbestos certification.

1.7 CONTRACT NO. 1 - GENERAL CONSTRUCTION

A. Contract includes but is not limited to:

1. All sitework including walks, drives, utilities, etc.

2. Demolition work, including walls, doors, ceilings, floor finish, floors, wall finishes, and casework.

3. Exterior masonry restoration.

4. Interior doors, frames, sidelites, borrowed lites, door hardware, and glazing.

5. Aluminum storefronts, doors, and glazing. FRP doors and associated frames, caulking, and accessories as required to perform work.

6. Resilient flooring and base, carpet, reducer strips and accessories

7. Glazed walll and floor tile, base, and accessories.

8. Interior gypsum board and associated framing, suspended acoustical ceilings, painting, and accessories as required to complete work.

9. Markerboards, tack-boards, toilet compartments and accessories. Interior wall mounted signage, exterior dimensional letter signage, lockers, and accessories as required to complete work.

10. The above includes all work at the Odessa Elementary, High School and Bus garage.

B. Division 01 - General Requirements.

1. Administrative and procedural section listed above.

2. Temporary facilities and controls section listed above.

3. Contract closeout section listed above.

C. Division 02 – Existing Conditions: All sections.

D. Division 03 - Concrete: All sections.

E. Division 04 - Masonry: All sections.

F. Division 05 - Metals:

1. Section 05 50 00 – Metal Fabrications.

2. Section 05 52 13 – Pipe and Tube Railings.

G. Division 06 – Wood, Plastic, and Composites: All sections.

H. Division 07 - Thermal and Moisture Protection:

1. Section 07 62 00 – Sheet Metal Flashing and Trim.

2. Section 07 84 00 – Firestopping.

3. Section 07 92 00 – Joint Sealants.

I. Division 08 - Openings: All sections.

J. Division 09 - Finishes: All sections.

K. Division 10 - Specialties: All sections.

L. Division 11 - Equipment:
1. 11 30 13 – Residential Appliances

M. Division 12 - Furnishings: All sections.

N. Division 14 - Conveying Systems: All sections.

1.8 CONTRACT NO. 2 - MECHANICAL

A. Contract includes but is not limited to:

1. Odessa Elementary and High School and the Bus Garage
   a. Elementary, High School, and Bus Garage heating and ventilation system alterations to accommodate reconfigured areas including replacing existing roof exhaust fans and ceiling-mounted cabinet heaters with new rooftop packaged energy recovery ventilators with electric heat, with associated ductwork, controls and equipment as indicated on mechanical drawings.

B. Division 01 - General Requirements:

1. Administrative and procedural section listed above.

2. Temporary facilities and controls section listed above.

3. Contract closeout section listed above.

C. Division 02 – Existing Conditions:

1. Section 02 42 00 – Demolition.

D. Division 07 – Thermal and Moisture Protection:

1. Section 07 84 00 – Fire Stopping.

2. Section 07 92 00 – Joint Sealants.

E. Division 09 – Finishes:

1. Section 09 90 00 – Painting and Coating.

F. Division 23 – Heating, Ventilating, and Air Conditioning:

1. Section 23 01 00 – Basic Mechanical Requirements.

2. Section 23 05 29 – Hangers and Supports for HVAC Piping and Equipment.

3. Section 23 05 53 – Identification for HVAC Piping and Equipment.

4. Section 23 05 93 – Testing, Adjusting, and Balancing for HVAC.

5. Section 23 07 13 – Duct Insulation.

6. Section 23 07 19 – HVAC Piping Insulation.

7. Section 23 08 00 – Commissioning of HVAC.

8. Section 23 09 23 – Direct-Digital Control System for HVAC.

9. Section 23 21 13 – Hydronic Piping.

10. Section 23 21 23 – Hydronic Pumps.

11. Section 23 73 00 – Indoor Central-Station Air-Handling Units.

12. Section 23 23 00 – Refrigerant Piping.

13. Section 23 31 00 – HVAC Ducts and Casing.

14. Section 23 34 23 – HVAC Power Ventilators.

15. Section 23 52 16 – Condensing Boilers.

16. Section 23 72 00 – Air-to-Air Energy Recovery Equipment.

17. Section 23 81 26 – Split-System Air-Conditioners.

18. Section 23 82 00 – Convection Heating and Cooling Units

1.9 CONTRACT NO. 3 - ELECTRICAL

A. Contract includes but is not limited to the following at the Odessa Elementary and High School and the Bus Garage.:

1. Replacement of lighting and associated controls withing the renovated areas of the buildings

2. Replacement of convenience power and data communications system outlets within the renovated areas of the buildings.

3. Provide Electrical connections to HVAC and Plumbing equipment.

B. Division 01 - General Requirements:

1. Administrative and procedural section listed above.

2. Temporary facilities and controls section listed above.

3. Contract closeout section listed above.

C. Division 02 – Existing Conditions:

1. Section 02 41 00 – Demolition.

D. Divion 07 – Thermal and Moisture Protection:

1. Section 07 84 00 – Fire Stopping.

2. Section 07 92 00 – Joint Sealants.

E. Division 09 – Finishes:

1. Section 09 90 00 – Painting and Coating.

F. Division 26 - Electrical: All Division 26 Sections.

G. Division 28 – Electronic Safety and Security: All Division 28 Sections.

1.10 CONTRACT NO. 4 - PLUMBING

A. Contract includes but is not limited to the following at the Odessa Elementary and High School and the Bus Garage:

1. Replacing all plumbing fixtures and associated domestic water, sanitary and vent piping in areas of renovation.

B. Division 01 - General Requirements:

1. Administrative and procedural section listed above.

2. Temporary facilities and controls section listed above.

3. Contract closeout section listed above.

C. Division 02 – Existing Conditions:

1. Section 02 41 19 – Selective Demolition.

D. Division 03 – Concrete:

1. Section 03 01 00 – Maintenance of Concrete.

E. Division 05 – Metals:

1. Section 05 12 00 – Structural Steel Framing.

F. Division 07 – Thermal and Moisture Protection:

1. Section 07 84 00 – Fire Stopping.

2. Section 07 92 00 – Joint Sealants.

G. Division 22 - Plumbing: All Division 22 Sections.

1.11 CONTRACT NO. 5 – FOOD SERVICE

A. Contract includes but is not limited to:

1. Replacement of food service equipment in the kitchen.

B. Division 01 - General Requirements:

1. Administrative and procedural section listed above.

2. Temporary facilities and controls section listed above.

3. Contract closeout section listed above.

C. Division 02 – Existing Conditions: All sections.

D. Division 11 – Equipment:

1. Section 11 40 00 – Foodservice Equipment

1.12 WORK SEQUENCE

A. Construct Work in phases to accommodate Owner's occupancy requirements during the construction period, coordinate construction schedule and operations with Owner, Architect/Engineer and Construction Manager:

1. All contractors are responsible for jointly developing a schedule to meet or better the above dates.

2. The intent shall be to start work immediately after contract award, with subsequent work to follow in an expedient manner.

3. All Prime Contractors are responsible for all work under their contract no matter what Drawings on which that work appears.

4. All Prime contractors shall be equally responsible to coordinate with each other so that the Work and schedule is not impeded and to insure completion.

5. Local custom and trade union jurisdictional settlements do not control the scope of work included in each prime contract. When a potential jurisdictional dispute or similar interruption of work is first identified or threatened, the affected prime contracts shall promptly negotiate a reasonable settlement to avoid or minimize the pending interruption and delays.

6. All OSHA safety and hazardous materials regulations will be abided by on this project. All Contractors must submit a safety program, a hazardous materials program, (all required data must be maintained at the job site) and attend safety meetings, as required by governmental agencies.

7. All construction shall be completed to support Owner’s occupancy of areas in accordance with the sequence of Work.

8. All contractors shall be responsible to maintain manpower and shifts necessary to insure completion on schedule. Multiple Crews: To maintain the project schedule, each Prime Contractor shall provide multiple crews as may be required. Each crew is to be furnished with its own supervision, cranes, scaffold and other means necessary to maintain the Project Schedule.

9. The Work shall be conducted to provide the least possible interference to the activities of the Owner's personnel. Coordination of any utility and/or power interruption must be done with the Architect/Engineer. Shutdowns must occur during off hours and non-occupied days only.

10. Start dates on segments of the Work may be modified at the Owner's and Architect/Engineer's discretion.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 21 00

PRICE AND PAYMENT PROCEDURES

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Cash allowances.

B. Schedule of allowances.

C. Schedule of values.

D. Hourly rate breakdown.

E. Application for payment.

F. Change procedures.

1.2 ALLOWANCES

A. Costs Included in Allowances: Cost of product to Contractor or Subcontractor, less applicable trade discounts, and delivery to site. Product handling at the site, including unloading, uncrating, and storage; protection of products from elements and from damage, and labor for installation and finishing unless specified otherwise.

B. Costs Not Included in the Allowance: Costs for overhead and profit for items purchased and installed under Allowances. It is the responsibility of the Contractor to include overhead and profit as part of the Base Bid.

C. Architect/Engineer Responsibilities:

1. Consult with Contractor for consideration and selection of products, suppliers, and/or installers.

2. Select products in consultation with Owner and transmit decision to Construction Manager.

D. Contractor Responsibilities:

1. Assist Architect/Engineer in selection of products, suppliers, and installers. Selection shall be coordinated through the Construction Manager.

2. Obtain proposals from suppliers and installers and offer recommendations.

3. On notification of selection by Construction Manager, execute purchase agreement with designated suppliers and installers.

4. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.

5. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.

E. Funds will be drawn from Allowances only by letter with a Change Order processed at Project Completion. Assignment of additional work directed in the field to the Field Allowance is at the discretion of the Owner.

F. Whenever costs are more or less than Allowance, the contract sum shall be adjusted by Change Order.

1.3 SCHEDULE OF ALLOWANCES

A. CONTRACT NO. 1 – GENERAL CONSTRUCTION

1. Field Directive Allowance: The General Contractor shall include in their Base Bid the amount of Seventy Five Thousand Dollars ($75,000) for the purpose of covering the costs of field directive work for unforeseen conditions as directed by the Owner and Construction Manager.

B. CONTRACT NO. 2 – MECHANICAL CONSTRUCTION

1. Field Directive Allowance: The Mechanical Contractor shall include in their Base Bid the amount of Thirty Five Thousand Dollars ($35,000) for the purpose of covering the costs of field directive work for unforeseen conditions as directed by the Owner and Construction Manager.

C. CONTRACT NO. 3 – ELECTRICAL CONSTRUCTION

1. Field Directive Allowance: The Electrical Contractor shall include in their Base Bid the amount of Twenty Thousand Dollars ($20,000) for the purpose of covering the costs of field directive work for unforeseen conditions as directed by the Owner and Construction Manager.

D. CONTRACT NO. 4 – PLUMBING CONSTRUCTION

1. Field Directive Allowance: The Mechanical Contractor shall include in their Base Bid the amount of Twenty Thousand Dollars ($20,000) for the purpose of covering the costs of field directive work for unforeseen conditions as directed by the Owner and Construction Manager.

E. CONTRACT NO. 5 – FOOD SERVICE CONSTRUCTION

1. Field Directive Allowance: The Food Service Contractor shall include in their Base Bid the amount of Five Thousand Dollars ($5,000) for the purpose of covering the costs of field directive work for unforeseen conditions as directed by the Owner and Construction Manager.

1.4 SCHEDULE OF VALUES

A. Submit typed schedule on AIA Form G703 - Continuation Sheet for G732. Contractor's standard form or electronic media printout will be considered.

B. Submit Schedule of Values to Construction Manager in duplicate within ten (10) days after date established in Notice to Proceed.

C. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the major specification Section. Identify site mobilization and bonds and insurance.

D. Allowances shall show as individual line items. It will not be necessary to indicate breakdown of allowances by material and labor.

E. Include within each line item, a directly proportional amount of Contractor's overhead and profit, except cash allowances. Refer to paragraph 1.3, Item B above.

F. Revise schedule to list approved Change Orders, with each Application for Payment.

1.5 HOURLY LABOR RATE BREAKDOWN

A. All Prime contractors and their sub-contractors shall submit a completed Hourly Labor Rate Breakdown form for all trades or classifications of workers in their employ. A sample of the Hourly Labor Rate Breakdown form is included at the end of this Section.

1.6 APPLICATION FOR PAYMENT

A. Prepare payment application on AIA Form G732 - Application and Certificate for Payment, and AIA G703 – Continuation Sheet for G732.

B. Present required information in typewritten form and/or on electronic media printout.

C. Execute certification by signature of authorized officer.

D. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.

E. List each authorized Change Order as an extension on continuation sheet, listing Change Order number and dollar amount as for an original item of Work.

F. Substantiating Data: When Construction Manager requires substantiating information, submit data justifying dollar amounts in question. Include the following with Application for Payment:

1. Affidavits and Insurance Certificates attesting to off site stored products.

2. Construction progress schedules.

3. Partial release from major subcontractors and vendors.

G. Submit four (4) copies of each application for payment to Construction Manager.

1.7 CHANGE PROCEDURES

A. Submittals: Submit name of individual authorized to receive change documents and be responsible for informing others in Contractor's employ or subcontractors of changes to the Work.

B. The Construction Manager will advise of minor changes in the Work not involving an adjustment to Contract Sum or Contract Time as authorized by AIA A232, 2019 Edition, Paragraph 7.4, by issuing a supplemental instruction.

C. The Construction Manager may issue a Proposal Request, which includes a detailed description of a proposed change with supplementary or revised Drawings and specifications.

D. The Contractor may propose a change by submitting request for change to the Construction Manager, describing the proposed change and its full effect on the Work. Include a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation and a statement describing effect on Work by separate or other contractors. Document any requested substitutions in accordance with Section 01 60 00.

E. Stipulated Sum Change Order: Based on Proposal Request and Contractor's fixed price quotation or Contractor's request for a Change Order as approved by Construction Manager.

F. Unit Price Change Order: For pre-determined unit prices and quantities, the Change Order will be executed on a fixed unit price basis. For unit costs or quantities of units of work, which are not pre-determined, execute Work under a Construction Change Directive. Changes in Contract Sum or Contract Time will be computed as specified for Change Order.

G. Construction Change Directive: Construction Manager may issue a directive, signed by the Owner, instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work, and designate method of determining any change in Contract Sum or Contract Time. Promptly execute the change.

H. Change Order: Submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract. Construction Manager will determine the change allowable in Contract Sum and Contract Time as provided in the Contract Documents.

I. Maintain detailed records of work done on Time and Material basis. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work. All work requested by the Construction Manager to be done on a Time and Material basis shall be signed for by the Construction Managers designated representative. It is the responsibility of the respective Contractor to have the daily work signed for. Any Time and Material slips not signed for on a daily basis may not be allowed.

J. Change Order Forms: AIA G701/CMa Change Order, or equal.

K. Execution of Change Orders: Construction Manager will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.

L. Special attention is called to the following relating to start of work and time of completion.

1. It is imperative that all Prime Contractors take into consideration costs associated with expediting contracts, submittals, shop drawings, product approvals, deliveries, shift work, overtime, or any other related issue, to insure opening and operation of buildings in a manner sufficient to satisfy the Owner. This is not necessarily limited to but includes temporary protection, closures and services.

2. All contractors are advised that all costs for overtime and shift work are to be anticipated and carried in the Base Bid. No allowances will be made for overtime or shift work due to the lack of workers or equipment and material deliveries or improper project management by respective contractors.

2 PART 2 PRODUCTS

Not Used

3 PART 3 EXECUTION

Not Used

Hourly Labor Rate Breakdown:

Date:
Arcadis Project No.: 143500
Project: 2023 Capital Improvements Project – Phase 2&3

Prepared By:
Contractor:
Address:

Telephone:
Fax:

Trade Classification:
Local Union :
Effective Date - From:
To:

	% or Rate	Straight Time	Time + One Half Rate	Double Time Rate
3.1 Base Rate				
F.I.C.A.				
Federal Unemployment Tax				
State Unemployment Tax				
Disability Insurance				
Welfare Fund				
Pension Fund				
Defined Contribution				
Annuity Fund				
Association Dues				
Paid Holidays				
Worker's Compensation				
Public Liability				
Property Damage Insurance				
Education				
TOTALS				

END OF SECTION

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Coordination.

B. Preconstruction conference.

C. Progress meetings.

D. Preinstallation conferences.

E. On-site manager.

F. Job superintendent.

G. Construction mobilization.

H. Equipment electrical characteristics and components.

I. Cutting and patching.

J. Special procedures.

1.2 COORDINATION AND PROJECT CONDITIONS

A. Coordinate scheduling, submittals, and work of the various sections of the project manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

1. Openings in new floors, walls, or roofs are to be cut by the contractor furnishing and installing the floor, wall, or roof material.
   a. Location of opening required shall be supplied by the Contractor in need of opening. The locations required shall be marked on a drawing by the contractor requiring the opening and provided to the contractor cutting the opening. Drawing shall indicate the centerline and dimensions of the opening in both directions.
   b. Structural or metal fabrications required to frame and properly support the openings shall be furnished and installed by the Contract No.1 - General Construction Contractor.

2. Openings in existing floors, walls, or roofs are to be cut by the Contractor requiring the opening.
   a. Structural or metal fabrications required to frame and properly support the openings shall be furnished and installed by contractor requiring the opening.

b. Employ a subcontractor certified by the roof manufacturer to perform work on the existing roof areas so that warranties in effect are maintained.

3. Trenches, at the interior of building footprints, whether existing or planned, for the Work of each contract shall be provided by each Contractor for its own Work.
   a. For trenches at existing interior concrete slabs on grade:
      1.) The Contractor requiring the trench shall mark out location of required trench.
      2.) The General Trades contractor shall saw cut and remove the concrete.
      3.) The Contractor requiring the trench shall excavate; install thw work, backfill and compact up to the subbase level.
      4.) The General Trades contractor shall install the base material and replace the concrete slab as detailed on the Drawings.
      5.) The General Trades Contractor shall patch floor finishes to match or as detailed or scheduled on Drawings.
      6.) All Contractors shall refer to Contract Documents for applicable specification sections and details.

4. Curbs shall be furnished and installed by the contractor requiring the opening.
   a. Flashing of the curb units to maintain watertight condition shall be the responsibility of each prime contractor when curbs are installed on existing roof areas.
   b. Flashing of the curb units to maintain watertight condition shall be the responsibility of Contract No. 5 – Roofing Construction Contractor when curbs are installed on new roof areas designated to be replaced as part of the work.
   c. Employ a subcontractor certified by the roof manufacturer to perform work on existing roof areas so that warranties in effect are maintained.

5. For openings required in new unit masonry assemblies, steel lintels shall be furnished and installed by the Contract No. 1 – General Construction Contractor
   a. Location of opening required shall be supplied by the Contractor in need of opening. The locations required shall be marked on a drawing by the contractor requiring the opening and provided to the Contract No. 1 General Construction Contractor. Drawing shall indicate the centerline and dimensions of the opening in both directions.

6. For openings and sleeves required at penetrations through existing concrete and unit masonry assemblies, steel lintels shall be furnished and installed by each prime contractor.

7. Louvers required in new unit masonry assemblies shall be furnished and installed by the contractor requiring the louver.
    a. Location of louver opening required shall be supplied by the Contractor in need of opening unless already specifically indicated on the Contract Documents. The locations required shall be marked on a drawing by the contractor requiring the opening and provided to the Contract No. 1- General Contractor. Drawing shall indicate the centerline and dimensions of the opening in both directions.

8. Louvers required in existing unit masonry assemblies shall be furnished and installed by the contractor requiring the louver. Opening and structural support for the louver shall be provided by the contractor requiring the louver.

9. Sleeves required at penetrations through new concrete and masonry shall be furnished by the contractor in need of the penetration to the Contract No. 1 – General Construction Contractor.
    a. Location of sleeves required shall be supplied by the Contractor in need of sleeve placement. The locations required shall be marked on a drawing by the contractor requiring the opening and provided to the Contract No. 1 - General Construction Contractor. Drawing shall indicate the centerline and dimensions of the opening in both directions.
    b. Location drawings and sleeves shall be delivered by the contractor needing the sleeve placement to the Contract No. 1 - General Construction Contractor a minimum of 96 hours prior to concrete pour.

10. Sleeves required at penetrations through concrete and masonry in areas of existing construction shall be furnished by each prime contractor.

B. Verify utility requirement characteristics of operating equipment are compatible with building utilities. Coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

C. Coordinate space requirements and installation of mechanical and electrical work, which is indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

D. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

E. Coordinate completion and cleanup of Work of separate Sections in preparation for Substantial Completion and for portions of work designated for Owners occupancy.

F. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.3 PRECONSTRUCTION CONFERENCE

A. Construction Manger will schedule a conference after Notice to Proceed.

B. Attendance Required: Owner, Construction Manager, Architect, Engineer, and Contractors.

C. Agenda:

1. Channels and procedures for communications.

2. Organizational arrangement of Contractors' forces and personnel, those of subcontractors, material suppliers, Owner, Construction Manager, and Architect/Engineers.

3. Distribution of Contract Documents.

4. Submission of list of Subcontractors, list of products, Schedule of Values, and progress schedule.

5. Designation of personnel representing the parties in Contract, Construction Manager, and the Architect/Engineer.

6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal requests, Change Orders, and Contract Closeout procedures.

7. Scheduling, including sequence of critical Work.

8. Use of premises by Owner and Contractor.

9. Owner's requirements and occupancy.

10. Construction facilities and controls provided by Contractor.

11. Temporary utilities provided by Contractor.

12. Security and housekeeping procedures.

13. Schedules.

14. Procedures and Scheduling for testing by Geotechnical and Environmental Engineer.

15. Procedures for maintaining record documents.

16. Requirements for start-up of equipment.

17. Inspection and acceptance of equipment put into service during construction period.

1.4 PROGRESS MEETINGS

A. Construction Manager will Schedule and administer meetings throughout progress of the Work at weekly intervals.

B. Construction Manager to make arrangements for meetings, prepare agenda with copies for participants, preside at meetings, record minutes, and distribute copies to Owner, participants, and those affected by decisions made.

C. Attendance Required: Job superintendent, major Subcontractors and suppliers, Owner, Construction Manager, Project Administrator, Architect, Engineer, as appropriate to agenda topics for each meeting.

D. Agenda:

1. Review minutes of previous meetings.

2. Review of Work progress.

3. Field observations, problems, and decisions.

4. Identification of problems impeding planned progress.

5. Review of submittals schedule and status of submittals.

6. Review of off-site fabrication and delivery schedules.

7. Maintenance of progress schedule.

8. Corrective measures to regain projected schedules.

9. Planned progress during succeeding work period.

10. Coordination of projected progress.

11. Maintenance of quality and work standards.

12. Effect of proposed changes on progress schedule and coordination.

13. Other business relating to Work.

1.5 PREINSTALLATION CONFERENCES

A. When required in individual specification sections, convene a preinstallation conference at Project site prior to commencing Work of the specific section.

B. Require attendance of parties directly affecting, or affected by, Work of the specific Section.

C. Notify Construction Manager seven (7) calendar days in advance of conference date.

D. Contractor to prepare agenda, preside at conference, record minutes, and distribute copies within four days after conference to participants, with two copies to Construction Manager.

E. Review conditions of installation, preparation and installation procedures, and coordination with related work.

1.6 ON-SITE MANAGER

A. On-site Manager: Construction Manager's On-site Manager.

1.7 JOB SUPERINTENDENT

A. Each Prime Contractor shall provide a qualified Job Superintendent with experience in supervision of five or more projects similar in size and scope of work.

B. Job Superintendent shall be responsible for full-time field supervision, coordination of contractors' and subcontractors' work forces, and completion of the work, as required in the Contract Documents. **Each Prime Contractor's full-time superintendent is expected to perform supervisory and coordination activities of the contractor's own forces and subcontractors at all times. The General Construction Contractor's superintendent will not be a "working" superintendent, i.e. performing any of the actual installation of the work. Their sole position on the project is to monitor, coordinate and supervise the work of the contractor and the contractor's subcontractors.**

C. Prime Contractor's Superintendent is required to be on site at all times. Subcontractors are working regardless if Prime Contractor's own forces are on site.

D. Each Prime Contractor shall submit Job Superintendent's resume, documenting prior experience, if requested by Owner, Architect, or Construction Manager.

E. Architect, Construction Manager and Owner shall have the right to require Contractor to dismiss from the project any Superintendent whose performance is not satisfactory.

F. Contractor shall not replace the Superintendent without the consent of the Construction Manager, Architect and/or Owner.

1.8 CONSTRUCTION MOBILIZATION

A. Each Contractor shall cooperate with the On-site Manager, Construction Manager and Owner in allocation of mobilization areas of site for sheds, for access, traffic, and parking facilities.

B. During construction, each Contractor shall coordinate use of site and facilities through the On-site Manager, Architect and Owner.

C. Each Contractor shall comply with procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and resolution of ambiguities and conflicts as established at Pre-Construction Meeting.

2 PART 2 PRODUCTS

2.1 EQUIPMENT ELECTRICAL CHARACTERISTICS AND COMPONENTS

A. Motors: Specific motor type is specified in individual specification sections.

B. Wiring Terminations: Furnish terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Include lugs for terminal box.

C. Cord and Plug: Furnish minimum 6- foot (2 m) cord and plug including grounding connector for connection to electric wiring system. Cord of longer length is specified in individual specification sections.

3 PART 3 EXECUTION

3.1 CUTTING AND PATCHING

A. Each Prime Contractor shall employ skilled and experienced installers to perform cutting and patching.

B. Unless otherwise indicated each Prime Contractor shall be responsible to infill openings left in existing floors, walls, and ceilings from removals. Infill shall be made with like materials and finishes to match adjacent conditions.

C. At any location existing finishes are damaged or removed, as a result of work the applicable Prime Contractor shall be responsible to make appropriate repairs to match existing facilities.

D. Submit written request in advance of cutting or altering elements which affects:

1. Structural integrity of element.

2. Integrity of weather-exposed or moisture-resistant elements.

3. Efficiency, maintenance, or safety of element.

4. Visual qualities of sight-exposed elements.

5. Work of Owner or separate contractor.

E. Execute cutting, fitting, and patching, including excavation and fill, to complete Work, and to:

1. Fit the several parts together, to integrate with other Work.

2. Uncover Work to install or correct ill-timed Work.

3. Remove and replace defective and non-conforming Work.

4. Remove samples of installed Work for testing.

5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.

F. Execute work by methods to avoid damage to other Work and provide proper surfaces to receive patching and finishing.

G. Cut masonry and concrete materials using masonry saw or core drill.

H. Restore Work with new products in accordance with requirements of Contract Documents.

I. Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

J. Maintain integrity of wall, ceiling, or floor construction, completely seal voids.

K. At penetrations of fire rated walls, partitions, ceiling or construction, completely seal voids with fire rated or fire-resistant material in accordance with Section 07 84 00, to full thickness of penetrated element.

L. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.

M. Identify any hazardous substance or condition exposed during the Work to the Construction Manager for decision or remedy.

3.2 SPECIAL PROCEDURES

A. Materials: As specified in product Sections; match existing products and work for patching and extending work.

B. Employ skilled and experienced installers to perform work.

C. Close openings in exterior surfaces to protect existing work from weather and extremes of temperature and humidity.

D. Remove, cut, and patch work in a manner to minimize damage and to provide a means of restoring products and finishes to original condition.

E. Refinish visible existing surfaces to remain in renovated rooms and spaces, to specified condition for each material, with a neat transition to adjacent finishes.

F. Where new work abuts or aligns with existing, perform a smooth and even transition. Patched work to match existing adjacent work in texture and appearance.

G. When finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Construction Manager.

H. Where a change of plane of 1/4 inch or more occurs, submit recommendation for providing a smooth transition for Construction Manager review. Request instructions from Construction Manager.

I. Patch or replace portions of existing surfaces that are damaged, lifted, discolored, or showing other imperfections.

J. Finish surfaces as specified in individual product Sections.

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Submittal procedures.

B. Construction progress schedules.

C. Proposed products list.

D. Shop drawings.

E. Product data.

F. Samples.

G. Certificates.

H. Manufacturers' instructions.

I. Manufacturers' field reports.

1.2 SUBMITTAL PROCEDURES

A. Transmit each submittal with standard submittal form, shown at the end of this Section.

B. Sequentially number the transmittal forms. Mark revised submittals with original number and sequential alphabetic suffix.

C. Identify Project, Contractor, Subcontractor, or supplier; pertinent Drawing sheet and detail number(s), and specification Section number, appropriate to submittal.

D. Apply Contractor's stamp, signed or initialed certifying that review, verification of products required, field dimensions, adjacent construction Work, and coordination of information, is in accordance with the requirements of the Work and Contract Documents.

E. Schedule submittals to expedite the Project and deliver to Construction Manager at business address. Coordinate submission of related items.

F. For each submittal review, allow fifteen (15) days excluding delivery time to and from Contractor.

G. Identify variations from Contract Documents and Product or system limitations, which may be detrimental to successful performance of the completed Work.

H. Allow space on submittals for Contractor, Construction Manager and Architect/Engineer review stamps.

I. When revised for resubmission, identify changes made since previous submission.

J. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report inability to comply with requirements.

K. Submittals not requested will not be recognized or processed.

1.3 CONSTRUCTION PROGRESS SCHEDULES

A. Submit initial progress schedule in duplicate within 15 calendar days after date established in Notice to Proceed for Construction Manager review.

B. Revise and resubmit as required.

C. Submit revised schedules as required by Construction Manager with each application for payment identifying changes since previous version.

D. Distribute copies of reviewed schedules to Project site file, subcontractors, suppliers, and other concerned parties.

E. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

F. Submit a horizontal bar chart with separate line for each major section of Work or operation, identifying first workday of each week.

G. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates, and duration.

H. Indicate estimated percentage of completion for each item of Work at each submission.

I. Indicate submittal dates required for shop drawings, product data, samples, and product delivery dates, including those furnished under Allowances. Indicate dates reviewed submittals will be required from Architect/Engineer. Indicate decision dates for selection of finishes.

J. Each Prime Contractor shall be required to submit, within 15 calendar days of award of contract, a schedule showing "duration" of major activities. "Duration" shall not be specific dates but is defined as the amount of time (calendar days, weeks, months) to perform specific tasks. The amount of tasks shall accurately reflect enough activities to collate with other contracts, to determine overlaps and conflicts in scheduling, and accurately describe the scope of work within each contract. Contractors shall indicate earliest start date per task and accurately reflect impact of submittals, product review, material and equipment delivery, and any other issues that may impact start of Work.

K. Each Prime Contractor shall comply with completion of Work within each duration submitted and approved. Quantity of labor required is the choice of the contractor but should be sufficient to insure completion within the duration submitted and approved. Workdays per task shall be required to accurately produce a Critical Path Method Schedule.

L. A master schedule shall be created by Contract No. 1 - General Construction Contractor using information provided by each Prime Contractor. The master schedule shall be provided to each Prime Contractor.

M. Each Prime Contractor shall be required to attend meetings with the Construction Manager a minimum of once per week for the duration of the project to cooperatively ensure the project schedule is being maintained.

N. Each Prime Contractor shall be responsible to coordinate their respective work with any other work that may affect them. Additional meetings may be required, in addition to meetings referenced in Paragraph 1.3.M above. All Prime Contractors will be required to share the results of such meetings with the Construction Manager, for the purposes of updating and coordinating schedules.

O. All potential schedule conflict items shall immediately be reported, together with a proposed resolution, to the Construction Manager.

1.4 PROPOSED PRODUCTS LIST

A. Within 15 calendar days after date of Notice to Proceed, submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.5 SHOP DRAWINGS

A. Shop Drawings: Submit electronically to Construction Manager for review by the Architect/Engineer for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents. Provide copies and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents purposes described in Section 01 70 00.

B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service or functional equipment and appliances.

C. After review, distribute in accordance with Submittal Procedure article above and provide copies for Record Documents described in Section 01 70 00 – Execution Requirements.

1.6 PRODUCT DATA

A. Product Data: Submit electronically to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents. Provide copies and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents purposes described in Section 01 70 00.

B. Submit one (1) copy of Material Safety Data Sheet for all products used on the project, which will be retained by the Construction Manager.

C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information unique to this Project.

D. After review, distribute in accordance with Submittal Procedures article above and provide copies for Record Documents described in Section 01 70 00 – Execution Requirements.

1.7 SAMPLES

A. Samples: Submit to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents. Provide copies and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents purposes described in Section 01 70 00.

B. Samples for Selection as Specified in Product Sections:

1. Submit to Architect/Engineer for aesthetic, color, or finish selection.

2. Submit samples of finishes from full range of manufacturers' colors, textures, and patterns for Architect/Engineer selection.

3. After review, produce duplicates and distribute in accordance with SUBMITTAL PROCEDURES article for record documents purposes described in Section 01 70 00.

C. Submit samples to illustrate functional and aesthetic characteristics of Products, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

D. Include identification on each sample, with full Project information.

E. Submit the number or samples specified in individual specification Sections, two (2) of which will be retained by Construction Manager.

F. Reviewed samples which may be used in the Work are indicated in individual specification Sections.

G. Samples will not be used for testing purposes unless specifically stated in specification section.

1.8 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual specification Sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, in quantities specified for Product Data.

B. Identify conflicts between manufacturers' instructions and Contract Documents.

C. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.9 MANUFACTURERS' FIELD REPORTS

A. Submit reports for Construction Manager's benefit as contract administrator or for Owner.

B. Submit report in duplicate within thirty (30) days of observation to Construction Manager for information.

C. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.10 MANUFACTURER'S CERTIFICATES

A. When specified in individual specification Sections, submit manufacturers' certificate to Construction Manager for review, in quantities specified for Product Data.

B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference date, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or Product but must be acceptable to Construction Manager and Architect/Engineer.

2 PART 2 PRODUCTS

Not Used

3 PART 3 EXECUTION

Not Used

Arcadis Architects, Engineers and
Landscape Architects, a New York
General Partnership
59-61 Court Street
Suite 300
Binghamton, NY 13901
Phone: 607 772 0007

SUBMITTAL FORM

Project Name: Odessa-Montour CSD
2023 Capital Improvements Phase 2&3

Project No. 143500

Submittal Item No.:		Section:	
Date:		Drawing/Detail:	
Submittal:			
Contractor:			
Subcontractor or Supplier:			

Item Being Submitted:

Product Data	☐	Shop Drawings	☐
Color Charts	☐	Samples	☐
Schedule	☐	Test Reports	☐
Warranties	☐	O&M Manuals	☐
Other			

☐		Submittal is specified item
☐		Submittal is not specified item. I, the Contractor, certify that the item submitted is identical to specified item with the following exceptions:
	1.	
	2.	
	3.	
		I as the contractor further certify that I will pay all costs required by work of other trades to accommodate this substitution and that I will not pass along any additional or unforeseen expenses required to accommodate this substitution by my own forces or forces of my sub contractors.
		Lastly, I acknowledge that the Architect/Engineer reserves the right to make the final decision regarding the equality of the submitted product to that of the specified item.
	The reason for this substitution is:	
	☐	The specified item has been discontinued or is no longer available as specified.
	☐	I am proposing this substitution as a cost saving measure and will provide a credit if it is accepted for use in the project.

_____
Signed

_____
Contractor

END OF SECTION

SECTION 01 40 00

QUALITY CONTROL

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Quality control and control of installation.

B. Tolerances.

C. References.

D. Field Samples.

E. Mock-up requirements.

F. Testing and inspection services.

G. Manufacturers' field services.

H. Examination.

I. Preparation.

1.2 QUALITY CONTROL AND CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply fully with manufacturers' instructions, including each step-in sequence.

C. When manufacturers' instructions conflict with Contract Documents, request clarification from Construction Manager before proceeding.

D. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform Work by persons qualified to produce required and specified quality.

F. Verify field measurements as indicated on Shop Drawings or as instructed by manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

1.3 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. When manufacturers' tolerances conflict with Contract Documents, request clarification from Construction Manager before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

1.4 REFERENCES

A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current on date of Contract Documents, except where specific date is established by code.

C. Obtain copies of standards where required by product specification sections.

D. When specified reference standards conflict with Contract Documents, request clarification from Construction Manager before proceeding.

E. Neither contractual relationships, duties, nor responsibilities of parties in Contract nor those of Construction Manager and Architect/Engineer shall be altered from Contract Documents by mention or inference otherwise in reference documents.

1.5 FIELD SAMPLES

A. Install field samples at the site as required by individual specification Sections for review.

B. Acceptable samples represent a quality level for the Work.

C. Where field sample is specified in individual Sections to be removed, clear area after field sample has been accepted by Construction Manager.

1.6 MOCK-UP REQUIREMENTS

A. Tests will be performed under provisions identified in this section and identified in respective product specification sections.

B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.

C. Accepted mock-ups shall be comparison standard for remaining Work.

D. Where mock-up has been accepted by Construction Manager and Architect/Engineer and is specified in product specification sections to be removed; remove mock-up and clear area when directed to do so by Construction Manager.

1.7 TESTING AND INSPECTION SERVICES

A. Owner will appoint, employ, and pay for services of an independent firm to perform testing and inspection.

B. The independent firm will perform inspections, tests, and other services specified in individual specification Sections and as required by the Construction Manager.

C. Reports will be submitted by the independent firm to the Construction Manager, in triplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.

D. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.

1. Notify Construction Manager and independent firm 48 hours prior to expected time for operations requiring services.

2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.

E. Testing and employment of testing agency or laboratory shall not relieve Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

F. Re-testing or re-inspection required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the Construction Manager. Payment for re-testing will be charged to the Contractor by deducting inspection or testing charges from the Contract Sum/Price.

G. Agency Responsibilities:

1. Test samples of mixes submitted by Contractor.

2. Provide qualified personnel at site. Cooperate with Construction Manager and Contractor in performance of services.

3. Perform specified sampling and testing of products in accordance with specified standards.

4. Ascertain compliance of materials and mixes with requirements of Contract Documents.

5. Promptly notify Construction Manager and Contractor of observed irregularities or non-conformance of Work or products.

6. Perform additional tests required by Construction Manager.

7. Attend preconstruction meetings and progress meetings.

H. Agency Reports: After each test, promptly submit three (3) copies of report to Construction Manager and to Contractor. When requested by Construction Manager, provide interpretation of test results. Include the following:

1. Date issued.

2. Project title and number.

3. Name of inspector.

4. Date and time of sampling or inspection.

5. Identification of product and specifications section.

6. Location in Project.

7. Type of inspection or test.

8. Date of test.

9. Results of tests.

10. Conformance with Contract Documents.

I. Limits on Testing Authority:

1. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.

2. Agency or laboratory may not approve or accept any portion of the Work.

3. Agency or laboratory may not assume duties of Contractor.

4. Agency or laboratory has not authority to stop the Work.

1.8 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.

B. Submit qualifications of observer to Construction Manager thirty (30) calendar days in advance of required observations. Observer subject to approval of Construction Manager.

C. The manufacturer's representative shall be certified to be qualified in design, installation, and servicing of the product. Personnel involved only in sales do not qualify. The manufacturer's representative shall be available to assist and answer questions.

D. When specified in individual specification Sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance of equipment as applicable, and to initiate instructions when necessary.

E. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

F. Refer to Section 01 33 00 – Submittal Procedures, Manufacturers' Field Reports article.

2 PART 2 PRODUCTS

Not Used

3 PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify existing substrate is capable of structural support or attachment of new Work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Verify utility services are available, of correct characteristics, and in correct locations.

3.2 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying new material or substrate in contact or bond.

END OF SECTION

SECTION 01 40 01

SPECIAL INSPECTIONS AND TESTING

1 PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 GENERAL REQUIREMENTS

A. Special Inspections and Testing shall be in accordance with Chapter 17 of the 2018 International Building Code.

B. The program of Special Inspection and Testing is a Quality Assurance program intended to ensure that the work is performed in accordance with the Contract Documents.

C. This Specification Section is intended to inform the Contractor of the Owner's quality assurance program and the extent of the Contractor's responsibilities. This Specification Section also serves to inform the Special Inspector and Inspection and Testing Agents of their requirements and responsibilities.

1.3 SCHEDULE OF INSPECTIONS AND TESTS

A. Required inspections and tests are described in the Schedule at the end of the Statement of Special Inspections.

1.4 QUALIFICATIONS

A. The Special Inspector shall have extensive experience in the building design and construction industry, be professionally trained in engineering, and be approved by the Design Professional in Responsible Charge and the Code Enforcement Official.

B. The Inspection and Testing Agents, including testing laboratories, shall be approved by the Owner's Representative and the Code Enforcement Official.

C. The following specific requirements for Inspection and Testing Agents may be waived by the Code Enforcement Official.

1. Inspectors performing inspections of soils and foundations shall have an education and background in geotechnical engineering.

2. The testing laboratories shall maintain a full time licensed Professional Engineer on staff who shall certify all test reports. This Engineer shall be responsible for the training of the testing technicians and shall be in responsible charge of the field and laboratory testing operations.

3. Technicians performing sampling and testing of concrete shall be ACI certified Concrete Field-Testing Technicians - Grade 1.

4. Inspectors performing inspections of concrete work such as inspections of concrete placement, batching, reinforcing placement, curing and protection, shall be ACI certified Concrete Construction Inspectors or ICBO certified Reinforced Concrete Special Inspector in lieu of being a licensed P.E. or EIT.

5. Inspectors performing inspections of masonry shall be ICBO certified Structural Masonry Special Inspectors.

6. Inspectors performing inspections of structural steel shall be individuals who are either licensed Professional Engineers (P.E.) or Engineers-In-Training (EIT) with an education and background in structural engineering, and ICBO certified as Structural Steel Special Inspectors.

7. Technicians performing visual inspection of welding shall be AWS Certified Welding Inspectors or ICBO certified Structural Steel and Welding Special Inspectors. Technicians performing non-destructive testing such as ultrasonic testing, radiographic testing, magnetic particle testing, or dye-penetrant testing shall be certified as an ASNT-TC Level II or Level III Technician.

8. Inspectors performing inspections of spray fireproofing shall be ICBO certified Spray-Applied Fireproofing Special Inspectors.

9. Technicians performing standard tests described by specific ASTM Standards shall have training in the performance of such tests and must be able to demonstrate either by oral or written examination competence for the test to be conducted. They shall be under the supervision the Owner's Representative and shall not be permitted to independently evaluate test results.

1.5 SUBMITTALS

A. The Special Inspector and Inspection and Testing Agents shall submit to the Owner's Representative and the Code Enforcement Official for review a copy of their qualifications which shall include the names and qualifications of each of the individual inspectors and technicians who will be performing inspections or tests.

B. The Special Inspector and Inspection and Testing Agents shall disclose any past or present business relationship or potential conflict of interest with the Contractor or any of the Subcontractors whose work will be inspected or tested.

1.6 PAYMENT

A. The Owner will engage and pay for the services of the Special Inspector and Inspection and Testing Agents.

B. If any materials which require Special Inspections are fabricated in a plant which is not located within 100 miles of the project, the Contractor shall be responsible for the travel expenses of the Special Inspector or Inspection and Testing Agents.

C. The Contractor shall be responsible for the cost of any retesting or reinspection of work which fails to comply with the requirements of the Contract Documents.

1.7 CONTRACTOR RESPONSIBILITIES

A. The Contractor shall cooperate with the Special Inspector and the Inspection and Testing Agents so that the Special Inspections and Testing may be performed without hindrance.

B. The Contractor shall provide adequate OSHA-compliant access for the Special Inspector and the Inspection and Testing Agents, for them to perform their work.

C. The Contractor shall review the Statement of Special Inspections and shall be responsible for coordinating and scheduling inspections and tests. The Contractor shall notify the Special Inspector or Inspection and Testing Agents at least 24 hours in advance of a required test, and 3 working days in advance of a required inspection. Un-inspected work that required inspection may be rejected solely on that basis.

D. The Contractor shall provide incidental labor and facilities to provide access to the work to be inspected or tested, to obtain and handle samples at the site or at source of products to be tested, to facilitate tests and inspections, storage and curing of test samples.

E. The Contractor shall keep at the project site the latest set of construction drawings, field sketches, approved shop drawings, and specifications for use by the Special Inspector and Inspection and Testing Agents.

F. The Special Inspection program shall in no way relieve the Contractor of his obligation to perform work in accordance with the requirements of the Contract Documents or from implementing an effective Quality Control program. All work that is to be subjected to Special Inspection and Testing shall first be reviewed by the Contractor's quality control personnel.

G. The Contractor shall be solely responsible for construction site safety.

1.8 LIMITS ON AUTHORITY

A. The Special Inspector or the Inspection and Testing Agents may not release, revoke, alter, or enlarge on the requirements of the Contract Documents.

B. The Special Inspector and the Inspection and Testing Agents will not have control over the Contractor's means and methods of construction.

C. The Special Inspector or the Inspection and Testing Agents shall not be responsible for construction site safety.

D. The Special Inspector or the Inspection and Testing Agents have no authority to stop the work.

1.9 STATEMENT OF SPECIAL INSPECTIONS

A. The Statement of Special Inspections will be prepared by the Owner's Representative in Responsible Charge.

B. The Statement of Special Inspections shall be submitted to the Code Enforcement Official with the application for Building Permit.

1.10 RECORDS AND REPORTS

A. Inspection and Testing Agents shall prepare detailed daily reports of each inspection or test and submitted to the Special Inspector. Reports shall include:

1. Date of test or inspection.

2. Name of inspector or technician.

3. Location of specific areas tested or inspected.

4. Description of test or inspection and results.

5. Applicable ASTM standard.

6. Weather conditions (for site inspections or testing).

7. Signature of inspector, or of the individual overseeing the testing.

B. The Special Inspector shall submit interim reports to the Code Enforcement Official, Owner's Representative, and Contractor at the end of each week which include all inspections and test reports received that week.

C. The Special Inspector shall report any discrepancies from the Contract Documents found during an inspection. If the discrepancies are not corrected during the inspection, the Special Inspector shall notify the Owner's Representative and Code Enforcement Official. Reports shall document all discrepancies identified and the corrective action taken.

D. The Testing Laboratory shall promptly notify the Special Inspector and the Owner's Representative by telephone, fax or email of any test results which fail to comply with the requirements of the Contract Documents.

E. The Inspection and Testing Agents shall submit reports to the Special Inspector within 7 days of the inspection or test. Handwritten reports may be submitted if final typed copies are not available.

F. At the completion of the work requiring Special Inspections, each Inspection and Testing Agent, including laboratories, shall provide a statement to the Special Inspector that all work was completed in substantial conformance with the Contract Documents and that all appropriate inspections and tests were performed.

1.11 FINAL REPORT OF SPECIAL INSPECTIONS

A. The Final Report of Special Inspections shall be completed by the Special Inspector and submitted to the Owner's Representative and Code Enforcement Official prior to the issuance of a Certificate of Use and Occupancy.

B. The Final Report of Special Inspections will certify that all required inspections have been performed and will itemize any discrepancies that were not corrected or resolved.

2 PART 2 PRODUCTS

Not Used

3 PART 3 EXECUTION

Not Used

4 PART 4 SCHEDULE

INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)	CONTINUOUS	PERIODIC	REFERENCE STANDARD	BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
A. Steel Construction						
1. Material verification of high-strength bolts, nuts and washers.		X	Applicable ASTM material specifications. AISC 360, Section A3.3	1705.2 1705.12.1	☐	
2. Inspection of high-strength bolting.	X	X	AISC 360, Section M2.5	1705.2 1705.12.1	☐	
3. Material verification of structural steel.			ASTM A 6 or A 568	1705.2, 1705.12.1	☐	
4. Material verification of weld filler materials.			AISC 360, Section A3.5	1705.2 1705.12.1	☐	
5. Inspection of welding:				1705.2		
a. Structural steel	X	X	AWS D1.1, D1,3	1705.2 1705.12.1	☐	
b. Reinforcing steel	X	X	AWS D1.4 ACI 318: 26.6.4	1705.2	☐	
6. Inspection of steel frame joint details.		X		1705.2 1705.12.1	☐	

B. Concrete Construction							
1. Inspection of reinforcing steel, including prestressing tendons, and placement.		X	ACI Ch 20, 25.2, 25.3, 26.6.1-26.6.3		1705.3, 1908.4,	☐	
2. Inspection of reinforcing steel welding.			AWS D1.4; ACI 318: 26.6.4		1705.3	☐	
3. Inspection of bolts to be installed in concrete prior to and during placement.	X		ACI 318: 17.8.2		1705.3	☐	
4. Verify use of required design mix.		X	ACI 318: Ch. 19, 26.4.3, 26.4.4		1705.3, 1904.1, 1904.2 1908.2, 1908.3	☐	
5. Sampling fresh concrete: slump, air content, temperature, strength test specimens.	X		ASTM C 172, C 31; ACI 318: 26.5, 26.12		1705.3, 1908.10	☐	
6. Inspection of placement for proper application techniques.	X		ACI, 318: 26.5		1705.3, 1908.6, 1908.7, 1908.8	☐	
7. Inspection for maintenance of specified curing temperature and techniques.		X	ACI, 318: 26.5.3-26.5.5		1705.3 1908.9	☐	
8. Inspection of prestressed concrete.	X		ACI 318: 26.10		1705.3	☐	
9. Erection of precast concrete members.		X	ACI 318: 26.9		1705.3	☐	
10. Verification of in-situ concrete strength prior to stressing of tendons and prior to removal of shores and forms from beams and slabs.		X	SVI 318: 6.2		1704.4, 1906.2	☐	
11. Inspection of formwork		X	ACI 318:26.11.2(b)			☐	
C. Masonry Construction							
L1 = Level 1 Inspection required for nonessential facilities.			ACI 530/ ASCE 5/TMS 402, Ch. 35	ACI 530.1/ ASCE 6/TMS 602, Ch. 35			

L2 = Level 2 Inspection required for essential facilities. In general, schools are not considered essential facilities unless they are a designated emergency shelter.			ACI 530/ASCE 5/TMS 402, Ch. 35	ACI 530.1/ASCE 6/TMS 602, Ch. 35			
1. Verify to ensure compliance:							
a. Proportions of site prepared mortar and grout.		L1 L2		2.6A	1705.4	☐	
b. Placement of masonry units and construction of mortar joints.		L1 L2		3.3B	1705.4	☐	
c. Location and placement of reinforcement, connectors, tendons, anchorages.		L1 L2	 Sec. 1.13	3.4, 3.6A 3.4, 3.6A	1705.4 1705.4	☐	
d. Prestressing technique. Grout space prior to grouting.	 L2	L1		3.6B 3.2D	1705.4 1705.4	☐	
e. Grade and size of restressing tendons and anchorages. Placement of grout.	 L2	L1		2.4B, 2.4H 3.5	1705.4 1705.4	☐	
f. Grout specs prior to grouting.	L2			3.6C	1705.4	☐	
2. Inspection shall verify:						☐	
a. Size and location of structural elements.		L1 L2		3.3G	1705.4	☐	
b. Type, size, and location of anchors.	L2	L1	Sec. 1.2.2(e), 2.1.4, 3.1.6		1705.4	☐	
c. Specified size, grade, and type of reinforcement.		L1 L2	Sec. 1.13	2.4, 3.4	1705.4	☐	
d. Welding of reinforcing bars.	L1 L2		2.1.7.10.2, 3.3.3.4(b)		1705.4	☐	
e. Cold/hot weather protection of masonry construction.		L1 L2		1.8C, 1.8D	1705.4 2101.03 2105.1	☐	
f. Prestressing force measurement and application.	L2	L1		3.6B	1705.4	☐	

3. Verification prior to grouting.	L2	L1	1.13	3.2D, 3.4, 2.6B,3.3B, 1.4	1705.4 1705.4, 2105	☐	
4. Grout placement.	L1			3.5, 3.6C	1705.4	☐	
5. Preparation of grout specimens, mortar specimens, and/or prisms.	L1 L2			1.4	1705.4 2105.1	☐	
6. Compliance with documents and submittals.		L1 L2		1.5	1705.4	☐	
D. Wood Construction:							
1. Fabrication process of prefabricated wood structural elements and assemblies		X			1705.5	☐	
2. High-load diaphragms designed in accordance with Table 2306.2.					1705.5.1	☐	
E. Soils					1705.6	☐	
F. Pile Foundations.					1705.7	☐	
G. Pier Foundations					1705.8	☐	
1. Helical Pier Foundations					1705.9		
H. Sprayed Fire-Resistant Materials							
1. Structural member surface conditions.					1705.14.2	☐	
2. Application.					1705.14.3	☐	
3. Thickness.				ASTM E 605	1705.14.4	☐	
4. Density.				ASTM E 605	1705.14.5	☐	
5. Bond strength.		X		ASTM E 736	1705.14.6	☐	
I. Mastic and Intumescent Fire-Resistant Coatings					1705.15		
J. Exterior Insulation and Finish Systems (EIFS)					1705.16	☐	
K. Fire-resistant penetrations and joints.					1705.17	☐	
L. Smoke Control					1705.18	☐	
M. Special Inspections for Seismic Resistance							
1. Structural steel.	X			AISC 341	1705.12.1	☐	
2. Structural wood.	X				1705.12.2	☐	
3. Cold-formed steel framing.		X			1705.12.3 1705.12.9	☐	
4. Designated Seismic Systems		X			1705.12.4	☐	
5. Architectural components.		X			1705.12.5	☐	

6. Storage Racks		X		1705.12.7	☐	
7. Plumbing, mechanical, and electrical components		X		1705.12.6		
8. Seismic isolation system.		X		1705.12.8	☐	
N. Structural Testing for Seismic Resistance						
1. Nonstructural Components				1705.13.2	☐	
2. Designated seismic systems.				1705.13.3	☐	
3. Structural steel.			AISC 341, AWS D1.1	1705.13.1	☐	
4. Seismic isolation systems.			Section 17.8 of ASCE 7	1705.13.4	☐	
O. Design Strength of Materials				1706	☐	
P. In-Situ Load Tests				1708	☐	
Q. Preconstruction Load Tests				1709	☐	
R. Special Inspections for Wind Resistance				1705.11		
1. Structural Wood				1705.11.1	☐	
2. Cold Formed Steel light-frame construction.				1705.11.2	☐	
3. Wind Resisting components; Roofing, Exterior Wall covering.				1705.11.3	☐	

END OF SECTION

SECTION 01 41 00

REGULATORY REQUIREMENTS

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Description.

B. Building Codes.

C. Labor Laws.

1.2 DESCRIPTION

A. The following regulatory requirements shall be considered as part of the Contract Documents and shall apply to all contractors and to all Divisions and Sections of the specifications.

1.3 BUILDING CODES

A. Contractor shall conform to and abide by all Local, State and Federal building and sanitary laws, rules and regulations, and industrial safety laws. Such laws shall be considered as an essential part of these Specifications and, in the absence of definite requirements herein, the provisions of such rules and regulations shall be observed by the contractor. If the specifications are at variance therewith, contractor shall so notify the Construction Manager promptly. Should the contractor perform any work contrary to such laws, ordinances, rules and regulations, they shall bear all costs arising therefrom.

1.4 ACCESSIBILITY LAW

A. Access for persons with physical disabilities: Comply with Americans with Disability Act (ADA), including the ADA accessibility guidelines. Documents are available from the U. S. Department of Justice, Civil Rights Division, (202) 514-0301 and from the Architectural and Transportation Barriers Compliance Board (ATBCB), (800) USA-ABLE.

1.5 LABOR LAWS

A. All contractors and subcontractors performing work at the sites of these projects shall comply with the applicable provisions of the "Labor Law", as amended, of the State of New York, including the following provisions:

1. PROHIBITION AGAINST DISCRIMINATION:
   In accordance with the provisions of Section 220-e of the Labor Law, the contractor agrees:
   a. 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 age, race, creed, color, national origin, sexual orientation, gender identity or expression, military status, sex, disability, predisposing genetic characteristics, familial status, marital status, or status as a victim of domestic violence discriminate against any citizen of the State of New York who is qualified and available to perform the work to which the employment relates;

b. That no contractor, subcontractor, nor any person on their behalf shall, in any manner, discriminate against or intimidate any employee hired for the performance of work under this contract on account of age, race, creed, color, national origin, sexual orientation, gender identity or expression, military status, sex, disability, predisposing genetic characteristics, familial status, marital status, or status as a victim of domestic violence;

c. That there may be deducted from the amount payable to the contractor by the state or municipality under this contract a penalty of five 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;

d. That this contract may be cancelled or terminated by the state or municipality, and all moneys due or to become due hereunder may be forfeited, for a second or any subsequent violation of the terms of conditions of this section of the contract; and

e. The aforesaid provisions of this section covering every contract for or on behalf of the state or a municipality for the manufacture, sale or distribution of materials, equipment or supplies shall be limited to operations performed within the territorial limits of the State of New York. The Contractor agrees to comply with the provisions of Section 291-299 of the Executive Law, the Civil Rights Law and any and all regulations issued pursuant thereto.

2. EQUAL OPPORTUNITY:

During the performance of this contract, the contractor agrees as follows:

a. The Contractor will not discriminate against any employee or applicant for employment because of age, race, creed, color, national origin, sexual orientation, gender identity or expression, military status, sex, disability, predisposing genetic characteristics, familial status, marital status, or status as a victim of domestic violence, and will take affirmative action to insure that they are afforded equal employment opportunities without discrimination because of age, race, creed, color, national origin, sexual orientation, gender identity or expression, military status, sex, disability, predisposing genetic characteristics, familial status, marital status, or status as a victim of domestic violence; such action shall be taken with reference, but not be limited to: recruitment, employment, job assignment, promotion, upgrading, demotion, transfer, layoff or termination, rates of pay or other forms of compensation, and selection for training or retraining, including apprenticeship and on-the-job training.

b. The contractor will send to each labor union or representative of workers with which they have or are bound by a collective bargaining or other agreement or understanding, a notice, to be provided by the State Commission for Human Rights, advising such labor union or representative of the contractor's agreement under clause (a) through (g) (hereinafter called "non-discrimination clauses"). If the contractor was directed to do so by the contracting agency as part of the bid specification of this contract, the contractor shall require such labor union or representative to furnish them with written statement that such labor union or representative will not discriminate because of age, race, creed, color, national origin, sexual orientation, gender identity or expression, military status, sex, disability, predisposing genetic characteristics, familial status, marital status, or status as a victim of domestic violence and that such labor union or representative either will affirmatively cooperate, within the limits of its legal and contractual authority, in the implementation of the policy and provisions of these non-discrimination clauses or that it consents and agrees that recruitment, employment and the terms and conditions of employment under this contract shall be in accordance with the purposes and provisions of these non-discrimination clauses. If such labor union or representative fails or refuses to comply with such a request that it furnish such a statement, the contractor shall promptly notify the State Commission for Human Rights of such failure or refusal.

c. The Contractor will post and keep posted in conspicuous places, available to employees and applicants for employment, notices to be provided by the State Commission for Human Rights setting forth the substance of the provision of clauses (a) and (b) and such provisions of the State's Laws against discrimination as the State Commission for Human Rights shall determine.

d. The Contractor will state, in all solicitations and advertisements for employees placed by or on behalf of the contractor, that all qualified applicants will be afforded equal employment opportunities without discrimination because of age, race, creed, color, national origin, sexual orientation, gender identity or expression, military status, sex, disability, predisposing genetic characteristics, familial status, marital status, or status as a victim of domestic violence.

e. The Contractor will comply with the provisions of Section 291-299 of the Executive Law and Civil Rights Law, will furnish all information and reports deemed necessary by the State Commission for Human Rights under these non-discrimination clauses and such sections of the Executive Law, and will permit access to their books, records and accounts by the State Commission for Human Rights, the Attorney General and Industrial Commission for purposes of investigation to ascertain compliance with these non-discrimination clauses and such sections of the Executive Law and Civil Rights Law.

f. This contract may be forthwith cancelled, terminated or suspended in whole or in part, by the contracting agency upon the basis of a finding made by the State Commission for Human Rights that the Contractor has not complied with these non-discrimination clauses, and the Contractor may be declared ineligible for future contracts made by or on behalf of the State or a public authority or agency of the State Commission for Human Rights that they have established and are carrying out a program in conformity with the provisions of these non-discrimination clauses. Such finding shall be made by the State Commission for Human Rights after conciliation efforts by the Commission have failed to achieve compliance with these non-discrimination clauses and after a verified complaint has been filed with the commission, notice thereof has been given to the Contractor and an opportunity has been afforded them to be heard publicly before three members of the Commission. Such sanctions may be imposed, and remedies invoked independently of or in addition to sanctions and remedies otherwise provided by law.

g. The Contractor will include the provisions of clauses (a) through (f) in every subcontract or purchase order in such manner that such provisions will be binding upon each subcontractor or vendor as to operations to be performed within the State of New York. The Contractor will take such action in enforcing such provisions of such subcontract or purchase order as the contracting agency may direct, including sanctions or remedies for non-compliance. If the contractor becomes involved in or is threatened with litigation with a subcontractor or vendor as a result of such direction by the contracting agency, the Contractor shall promptly so notify the Attorney General, requesting them to intervene and protect the interests of the State of New York.

3. AFFIRMATIVE ACTION:

As used herein the work and designation "Affirmative Action" includes, but are not limited to the following:

a. Except as otherwise provided by this contract, the Contractor shall be the judge as to the qualifications of all applicants for employment on or in connection with the construction of the project and where a collective bargaining agreement provides for referral by the union of "qualified journeymen", the Contractor should evaluate the qualifications of such applicants.

b. The Contractor will not limit recruitment or employment, directly or indirectly, to members or referrals or labor organizations which do not have minority group members for employment or do not indicate willingness to admit into journeymen membership a prospective employee or applicant for employment who is a member of a minority group or to permit their employment on the construction site of the project.

c. The Contractor will notify community agencies and communication media associates with minority groups of opportunities for employment.

d. To the extent permitted by law and the applicable collective bargaining agreement not in violation thereof, the contractor will recruit, evaluate and hire, without regard to race, creed, color, age, sex, national origin, or union membership, it being understood that a union may require a new employee to join the union within eight (8) days after they commence work and it being further understood that the contractor may retain in employment any employee they deem qualified whose tender of initiation fees and dues have been refused by the union.

e. To the extent permitted by law and the applicable collective bargaining agreement, not in violation thereof, the contractor will take the initiative in seeking out for prospective employment on the construction site of the project craftspeople who are members of minority groups.

f. To the extent permitted by law and the applicable collective bargaining agreement, not in violation thereof, wherever possible and consistent with the actual requirements of the work to be done, the Contractor will establish entry-level positions, (e.g., mechanic's helper, electrician's helper, laborer's helper, etc.) in which skills may be taught in preparation for, or as an adjunct or alternative to, formal apprenticeship.

g. The Contractor will review their respective collective bargaining agreements in order to indemnify, and discontinue when possible, provisions which tend to limit recruitment or hiring members of minority groups.

h. To the extent permitted by law and the applicable collective bargaining agreement, not in violation thereof, the Contractor will make the fullest possible use of their rights of selection to further the employment of members of minority groups.

i. The Contractor will include the provisions of paragraphs (a) through (h) of this Section in every subcontract or purchase order in such a manner that such provisions will be binding upon each subcontractor or vendor as to operations to be performed within the State of New York. The Contractor will take such action in enforcing such provisions of such subcontract or purchase order as the Owner may direct, including sanctions or remedies for non-compliance.

4. PREVENTION OF DUST HAZARD:

The parties hereto, in accordance with the provision of Section 222-a of the Labor Law, hereby agree as follows:

a. In the construction of public works wherein a harmful dust hazard is created for which appliances or methods for the elimination of harmful dust have been approved by the board of standards and appeals, the installation, maintenance and effective operation of such appliances and methods will be complied with by the Contractor. Failure to do so shall void this contract.

5. EIGHT HOUR DAY:

The parties hereto, in accordance with provisions of Section 220 Subdivision 2 of the Labor Law of the State of New York hereby agree as follows:

a. That no contractor, subcontractor, nor any person on their behalf shall permit or require any laborer, worker, or mechanic to work more than eight hours in any one calendar day, or more than five days in any week except in the case of extraordinary emergency, including fire, flood, or danger to life or property that are outlined in Section 220, subparagraph 2 of the Labor Law, and then only with the special dispensation of the Industrial Commissioner as required by said Section.

6. PREVAILING WAGE RATES REQUIRED BY LAW:

a. The parties hereto, in accordance with the provisions of Section 220 (3) of the Labor Law, hereby agree that there shall be paid each employee engaged in work under this contract not less than the wage rate and supplements set opposite the trade or occupation in which they are engaged, as listed on Schedule "A" attached hereto and made a part of this agreement, which are the wage rates and supplements established as the prevailing rate of wages for the work covered by this contract.

b. Labor classifications not appearing on the schedule of wages can be used only with the consent of the Owner and then the rate to be paid will be given by the Owner after being advised by the Department of Labor.

c. The Contractor shall post in a prominent and accessible place on the site of the work a legible statement in the contract, for the various classes of mechanics, workers, or laborers employed on the work.

7. REQUIRED PROVISIONS OF LAW:

a. Each and every provision of law and clause required by law to be inserted in this contract shall be deemed to have been inserted herein, and if through mistake or otherwise, such provision is not inserted, then upon the application of either party, this contract shall be physically amended forthwith to make such insertion.

b. Each Contractor and subcontractor is hereby notified that all occupations employed directly on the site of the work of this contract shall be paid hourly wage rates not less than that determined by the Industrial Commission of the New York State Department of Labor in accordance with the applicable provision of the "Labor Law". A current Prevailing Rate Schedule, as prepared by the Department of Labor of the State of New York is attached to and made a part of these specifications.

c. Notices of Compliance with Worker's Compensation Law and Disability Benefits Law, as amended, shall be displayed in a prominent place.

2 PART 2 PRODUCTS

Not Used

3 PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Telephone Service.

B. Temporary water service.

C. Temporary sanitary facilities.

D. Water control.

E. Exterior enclosures.

F. Interior enclosures.

G. Protection of installed work.

H. Maintenance of traffic.

I. Parking.

J. Project identification.

K. Field offices and sheds.

L. Scaffolds, staging, and safety devices.

M. Lifting devices and hoisting facilities.

N. Removal of utilities, facilities, and controls.

1.2 RELATED SECTIONS

A. Section 01 50 13 - Safety Standards: Construction contaminants, construction noise, fencing, barriers, security, fire and hazard protection, progress cleaning, and ventilation during construction. .

B. Section 01 50 23 – Uniform Safety Standards for School Construction: Building occupancy, general safety and security standards, separation of construction, exiting plan, ventilation plan, construction noise, construction contaminants, asbestos abatement, and presence of lead.

C. Section 01 51 00 – Temporary Utilities: Electricity, lighting, heat, and ventilation.

1.3 TEMPORARY ELECTRICITY

A. Refer to Section 01 51 00 – Temporary Utilities.

1.4 TEMPORARY LIGHTING

A. Refer to Section 01 51 00 – Temporary Utilities.

1.5 TEMPORARY HEAT

A. Refer to Section 01 51 00 – Temporary Utilities.

1.6 TEMPORARY VENTILATION

A. Refer to Section 01 50 23 – Uniform Safety Standards for School Construction and Section 01 51 00 – Temporary Utilities.

1.7 TELEPHONE SERVICE

A. Each prime Contractor will provide cell phone access at all time of on site construction.

1.8 TEMPORARY WATER SERVICE

A. Each Prime Contractor shall connect to existing water source for construction operations.

B. Owner will pay cost of water used. Exercise measures to conserve water.

C. Each Prime Contractor requiring water shall provide their own hoses and connections as needed. Damage to hose bibbs or other portions of the water system shall be repaired by the contractor causing the damage.

D. All contractors shall cooperate in conserving water.

1.9 TEMPORARY SANITARY FACILITIES

A. Contract No. 4 - Plumbing Construction Contractor shall provide a minimum of (1) temporary toilet per active construction area. Temporary toilets to be maintained and cleaned weekly. Additional temporary toilets may be required to meet DOH minimum standards. Plumbing Contractor will also be responsible for weekly pumping and maintaining of holding tank at temporary construction trailer located at Bus Garage. The toilets shall be decently screened from public observation. Provide within fifteen (15) days of Notice to Proceed.

B. Existing facilities shall not be used.

C. Each contractor shall cooperate in keeping the toilets in a sanitary condition.

D. On completion of the work, the Contract No. 4 – Plumbing Construction Contractor shall remove the temporary toilets and all traces thereof.

E. Temporary Trailer shall be provided by Contract No. 1 – General Construction Contractor at Bus Garage Transportation Department.

1. Duration: 6 Months

2. Specifications: 10'x 40' office trailer with toilet facility similar or equal to Cassone Office Trailer Mobile Unit CA 10' X 40'. Office trailer shall be well-insulated and winterized to allow for use during winter months. Trailer to be submitted to Construction Manager for approval prior to order.

3. Contract No. 3 – Electrical Construction Contractor shall be responsible for providing power and disconnection of power to office trailer.

4. Contract No. 4 – Plumbing Construction Contractor shall be responsible for holding tank, domestic water and sewer connections. Plumbing Construction Contractor shall have holding tank pumped once per week. Upon completion of the work, Plumbing Contractor shall be responsible for disconnection of holding tank, domestic water and sewer connections.

1.10 WATER CONTROL

A. Each Prime Contractor shall grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

B. Each Prime Contractor shall protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

1.11 EXTERIOR ENCLOSURES

A. Contract No. 1 - General Construction Contractor to provide temporary insulated weather-tight closure of exterior openings to provide acceptable working conditions and protection for materials, to allow for temporary heating, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

B. Each Prime Contractor shall be responsible to maintain safe access to and egress from the existing buildings and new construction at all times to meet requirements of New York State Uniform Fire Prevention and Building Code, OSHA, and New York State Education Department regulations.

1.12 INTERIOR ENCLOSURES

A. Contract No. 1 - General Construction Contractor shall provide temporary partitions as required to separate work areas from Owner occupied areas, to prevent penetration of dust and moisture into Owner occupied areas, and to prevent damage to existing materials and equipment.

B. Construction: 3-5/8" steel stud framing with 5/8" fire-rated gypsum board sheet materials both sides, with closed joints and sealed edges at intersections with existing surfaces.

1.13 PROTECTION OF INSTALLED WORK

A. Each Prime Contractor shall protect installed Work and provide special protection where specified in individual specification Sections.

B. Each Prime Contractor shall provide temporary and removable protection for installed Products. Control activity in immediate work area to minimize damage.

C. Each Prime Contractor shall provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

D. Each Prime Contractor shall protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

E. Each Prime Contractor shall prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

F. Each Prime Contractor shall prohibit traffic from landscaped areas.

1.14 MAINTENANCE OF TRAFFIC

A. Contract No. 1 - General Construction Contractor shall maintain roadways, sidewalks, and crosswalks to such an extent as will give safe, unimpeded, practical use. The work shall be conducted so as to cause a minimum of inconvenience to public travel and to permit safe and convenient access to building and parking areas along the line of work. All fire hydrants, fire alarm boxes, water valves, manholes and catch basins shall be kept accessible for use.

B. Contract No. 1 - General Construction Contractor shall provide and maintain all necessary flag persons, barricades, warning lights and signs, and take all necessary precautions for the protection and safety of the public, the workers and the work. Existing warning signs and devices for public safety shall not be disturbed or obstructed without permission from the responsible authority and an approved substitution made. Properly equipped and protected flag persons shall be provided whenever traffic is restricted, or equipment is being operated within the traveled way. Warning signs shall be placed at a reasonable stopping distance both sides of the work. All barricades and signs left in place at night shall be illuminated with flares or blinking lights maintained in operating condition.

C. Contract No. 1 - General Construction Contractor shall maintain vehicular and pedestrian traffic on all roadways unless otherwise authorized by the Owner. In general, one-way traffic shall be maintained at all times. Access to parking areas shall be maintained at all times. Advance notice shall be given to the Owner whenever the use of roadways or parking areas will be restricted.

D. Contract No. 1 - General Construction Contractor shall control any dust caused by their operations by sweeping, flushing, wetting or the use of chemicals, as often as necessary to prevent inconvenience or nuisance.

E. Where a detour is permitted, Contract No. 1 - General Construction Contractor shall be responsible for establishing, maintaining, and eliminating the detour to the satisfaction of the Owner.

F. Contract No. 1 - General Construction Contractor shall provide means of removing mud from vehicle wheels before entering streets.

1.15 PARKING

A. Each Prime Contractor shall make such arrangements with the Owner as required for parking of equipment and employees necessary for construction work.

B. When site space is not adequate, provide additional off-site parking.

C. Each Prime Contractor shall not allow vehicle parking on existing pavement unless authorized by Owner.

1.16 PROJECT IDENTIFICATION

A. Allow no signs or advertising of any kind on the job site, except as specifically approved in advance by the Construction Manager.

1.17 FIELD OFFICES AND SHEDS

A. Each Prime Contractor shall provide and maintain such office, storage sheds, and other temporary buildings or trailers on the project site as required for their own use. The location of the sheds and trailers shall be approved by the Owner and the Construction Manager. Remove sheds and trailers when work is completed or as directed.

B. Storage Sheds for Tools, Materials, and Equipment: Weather-tight, with heat and ventilation for Products requiring controlled conditions, with adequate space for organized storage and access, and lighting for inspection of stored materials.

1.18 SCAFFOLDS, STAGING, AND SAFETY DEVICES

A. Each Prime Contractor shall provide, erect, maintain and remove all scaffolding, staging, platforms, temporary runways, temporary flooring, guards, railings, stairs, etc., as required for their work and the protection of workers and the public. Construction inspection and maintenance of the above items shall comply with all safety codes and regulations as applicable to the Project.

1.19 LIFTING DEVICES AND HOISTING FACILITIES

A. Each Prime Contractor shall provide cranes, hoists, towers and other lifting devices necessary for proper and efficient movement of materials; provide operating personnel for equipment as required. Equipment shall be provided with proper guys, bracing, and other safety devices as required by local and state codes. Remove towers and hoisting equipment when they are no longer needed.

1.20 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary above grade or buried utilities, equipment, facilities, materials, prior to Substantial Completion inspection.

B. Remove temporary materials, equipment, services, and construction prior to Substantial Completion inspection.

C. Clean and repair damage caused by installation or use of temporary work.

D. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

2 PART 2 PRODUCTS

Not Used

3 PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 50 13

SAFETY STANDARDS

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Owner Occupancy.

B. Fencing.

C. Barriers.

D. Security.

E. Fire and Hazard Protection.

F. Progress Cleaning.

G. Ventilation During Construction.

H. Materials Containing Asbestos.

I. Materials Containing Lead-Based Paint.

J. Mold and Mildew.

1.2 OWNER OCCUPANCY

A. All contractors shall construct work to accommodate Owner's occupancy requirements during the construction period. Coordinate construction schedules and operations with Owner, Construction Manager, and Architect at the Pre-Construction Meeting and adjust for subsequent job meetings.

B. Owner will occupy premises during entire period of construction for the conduct of their normal operations. Each Contractor shall cooperate with the Owner to minimize conflict, and to facilitate Owner's operations.

C. Schedule the work and coordinate operations to accommodate this requirement.

D. The occupied portion of any school building shall always comply with the minimum requirements necessary to maintain a Certificate of Occupancy.

1.3 FENCING

A. Construction: Chain link, as approved by Construction Manager.

B. Contract No. 1 – General Construction Contractor shall provide six (6) foot high fence, where designated by Construction Manager, around construction site; equip with vehicular and pedestrian gates. Gates shall always be locked unless a worker is in attendance to prevent unauthorized entry.

C. Each Prime Contractor shall provide fences around construction supplies or debris as required. Fences shall be maintained at all times.

1.4 BARRIERS

A. Contract No. 1 – General Construction Contractor shall provide barriers to prevent unauthorized entry to construction area, to allow for Owner's use of site, and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

B. Contract No. 1 – General Construction Contractor shall provide barricades and covered walkways required by governing authorities for public rights-of-way. Overhead protection shall be provided for any sidewalks or areas immediately beneath the work site, or such areas shall be fenced off and provided with warning signs to prevent entry.

C. Contract No. 1 – General Construction Contractor shall provide separation of construction areas from occupied spaces as designated by Construction Manager. Construction areas under control of the contractor and not occupied by Owner shall be separated from occupied areas. Prevent passage of dust and contaminants into occupied parts of the building. Provide periodic inspection and repair of the containment barriers to prevent exposure to dust or contaminants. Metal stud and gypsum board partitions, conforming to required fire rating, shall be provided in areas of exit ways or other areas requiring fire separation. Heavy-duty plastic sheeting may be used only for vapor, fine dust, or air infiltration barrier, and shall not be used to separate occupied areas from construction areas.

D. Each Prime Contractor shall provide protection for plant life designated to remain. Replace damaged plant life.

E. Each Prime Contractor shall protect non-owned vehicular traffic, stored materials, site and structures from damage.

1.5 SECURITY

A. Each Prime Contractor shall provide security and facilities to protect Work, and existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

B. Construction workers shall not use corridors, stairs or elevators designated for students or school staff. Specific stairwells and/or elevators shall be designated for use by construction workers during Owner occupied hours.

C. Entry Control:

1. Restrict entrance of persons and vehicles into Project site and existing facilities.

2. Allow entrance only to authorized persons with proper identification.

3. Maintain log of workers and visitors; make available to Owner and Construction Manager upon request.

D. Personnel Identification:

1. All workers shall be required to wear photo-identification badges at all times for identification and security purposes while working at occupied sites.

2. Provide identification badge to each person authorized to enter premises.

3. Badge to Include: Personal photograph, name, expiration date, and employer.

4. Maintain list of accredited persons, submit copy to Owner and Construction Manager on request.

5. Require return of badges at expiration of their employment on the Work.

E. All construction materials shall be stored in a safe and secure manner.

1.6 FIRE AND HAZARD PREVENTION

A. No smoking is allowed on public school property, including construction areas.

B. Each Prime Contractor shall cooperate with Owner to perform daily inspection of Owner-occupied areas of project to assure that construction materials, equipment, or debris do not block fire exits or emergency egress windows.

C. Each Prime Contractor shall cooperate with Owner to maintain proper operation of fire extinguishers, fire alarm, and smoke/fire detection systems throughout the project.

D. Any holes in floors or walls should be sealed with a fire-resistant material.

1.7 PROGRESS CLEANING

A. Each Prime Contractor shall maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Each Prime Contractor shall remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Each Prime Contractor shall broom and vacuum clean interior areas prior to start of surface finishing and continue cleaning to eliminate dust.

D. Each Prime Contractor shall remove debris by using enclosed chutes or similar sealed systems. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

E. Each Prime Contractor shall not move debris through corridors of occupied spaces of the building. No material shall be dropped or thrown outside the walls of the building.

F. Each Prime Contractor shall clean all occupied parts of the building affected by their renovation activity at the close of each workday. School buildings occupied during a construction project shall maintain required health, safety and educational capabilities at all times that classes are in session.

G. Each Prime Contractor shall remove waste materials, debris, and rubbish from site weekly and dispose off-site. Do not allow any materials, debris, and rubbish to go onto adjacent properties.

1.8 VENTILATION DURING CONSTRUCTION

A. The Contract No. 2 – Mechanical Construction Contractor shall provide indoor air quality management, when the building is enclosed, as determined by the Construction Manager.

B. Work on construction and maintenance time for off-gassing of volatile organic compounds introduced during construction shall be planned before occupancy is allowed. Specific attention is warranted for activities including glues, paint, furniture, carpeting, wall coverings, and drapery. Manufacturers shall be contacted to obtain information regarding appropriate temperatures and times needed to cure or ventilate the product during use and before safe occupancy of a space can be assured. Building materials or furnishings which off-gas chemical fumes, gases, or other contaminants shall be aired out in a well ventilated heated warehouse before it is brought to the project for installation or the manufacturer's recommended off-gassing periods must be scheduled between installation and use of the space. If the work will generate toxic gases that cannot be contained in an isolated area, the work must be done when school classes and programs are not in session. The building must be properly ventilated. and the material must be given proper time to cure or off-gas before re-occupancy.

C. Provide exhaust air systems for any project indoor areas that could produce fumes, VOC's, off-gassing, dusts, mists, or other emissions.

1. Work area exhaust systems shall terminate at the building exterior.

2. Provide temporary air seals and partitions to prevent the migration of airborne contaminants from Work areas to occupied areas.

3. Provide rerouting, disconnection, or capping of ductwork in order to prevent contaminants from the construction area from entering the occupied portions of the building.

4. Existing ventilation equipment may be utilized when authorized by Construction Manager.

5. Extend and supplement equipment with temporary fan units as required to maintain clean air for construction operations and building occupants, and to prevent contaminants from the construction area from entering the building.

D. Ventilation and heating systems to occupied spaces shall remain operational at all times during construction.

E. Units serving occupied areas may not be disabled.

F. Quality Assurance:

1. Maintain negative pressure between the Work areas and the spaces surrounding the Work areas.

2. Before start of Work, submit a design for the exhaust air system to Construction Manager. Do not begin Work until approval of the Owner and Construction Manager is obtained. Provide the following information:
   a. The number of machines required.
   b. Location of the machines in the Work areas.
   c. Description of the methods used to test airflow and pressure differential.

G. System Operation:

1. A sufficient quantity of exhaust fans in existing window openings or other approved locations shall be operated in accordance with the following applicable standards.
   a. Exhaust air systems shall operate for a minimum of 72 hours after Work is completed, or until all materials have cured sufficiently as to stop off-gassing of fumes or odors, and areas have been ventilated to remove all detectable traces of odors and fumes.
   b. Maintain twenty-five (25) feet clearance from all temporary exhaust outlets to all active building outdoor air intakes.

1.9 MATERIALS CONTAINING ASBESTOS

A. All contractors are advised that materials containing asbestos will not be accepted for use on this project. Contractor shall provide a letter certifying compliance with this requirement.

B. If the Contractor or subcontractors and their employees locate a material of suspicious nature, the Contractor shall notify the Owner prior to disturbing said material in any fashion. Testing of said material will be by Owner. If found to contain asbestos, material will be removed by approved asbestos handlers using approved methods, following all State and Federal regulations. Additional cost will be by Owner.

1. If asbestos is discovered, abatement shall conform to NYSDOL Industrial Code Rule 56 and AHERA regulations.

2. Whenever air clearance is required for an asbestos abatement project, TEM air clearance shall be provided.

C. The presence of asbestos has been detected in identified work areas. A Summary Analysis Report, including confirmed positives (>1.0%) is included in Document 00 31 00.

D. All contractors are advised that materials containing asbestos in existing buildings may be located in areas of work.

E. All contractors shall exercise caution when working in areas containing asbestos materials. Such materials include, but are not limited to:

1. Thermal system insulation in concealed spaces, wall spaces, pipe chases.

2. Floor tile/mastic.

1.10 MATERIALS CONTAINING LEAD-BASED PAINT

A. All contractors are advised that materials containing lead-based paint will not be accepted for use on this project. Contractors shall provide a letter certifying compliance with this requirement.

B. Lead Based Paint Hazard: All structural steel, unless specifically stated otherwise, is assumed to be painted with lead-based paint or primer. Whenever cutting, torching, welding, grinding or heating structural steel is specified the contractor is responsible for compliance related to lead-based paint in accordance with OSHA Instruction TED 01-00-015 [TED 1-0.15A] (Section V: Chapter 3) provides technical guidance for Controlling Lead Exposures in the Construction Industry: Engineering and Work Place Controls. OSHA also provides instruction by Directive Number STD-03-08-001 titled Welding, Cutting or Heating of Metals Coated with Lead-Bearing Paint.

C. In areas outside of the work area or in concealed spaces that have not been tested for the presence of lead-based paint, if the Contractor or subcontractors and their employees locate a material of suspicious nature, the Contractor shall notify the Owner prior to disturbing said material in any fashion. Testing of said material will be by Owner. If found to contain lead-based paint, material will be removed by approved lead-based paint handlers using approved methods, following all State and Federal regulations. Additional cost will be by Owner.

1. The disturbance or dislocation of lead-based painted materials may cause lead dust to be released into the building's atmosphere, thereby creating a potential health hazard to workers, and building occupants. Apprise all workers, supervisory personnel, subcontractors, and consultants who will be at the job site of the seriousness of the hazard and of proper work procedures which must be followed.

2. Where in the performance of the work, workers, supervisory personnel, subcontractors, or consultants may encounter, disturb, or otherwise function in the immediate vicinity of any identified lead-based paint, take appropriate continuous measures as necessary to protect all building occupants from the potential hazard of exposure to lead dust. Such measures shall include the procedures and methods described herein, and compliance with regulations and guidelines of applicable federal, state and local agencies.

D. The presence of lead has been detected in identified work areas. A Summary Analysis Report, including confirmed positives (greater than or equal to 1.0 mg/cm^2) is attached at the end of this section. A copy of a lead survey report with respect to project work areas is available for viewing at the office of Arcadis, 59-61 Court Street, Suite 300, Binghamton, NY 13901.

E. All contractors are advised that materials containing lead in existing buildings may be located in areas of work.

F. All contractors shall exercise caution when working in areas containing lead materials. Such materials include, but are not limited to:

1. Structural steel.

2. Glazed ceramic wall tile.

1.11 MOLD AND MILDEW

A. The disturbance or dislocation of mold and mildew may cause mold spores to be released into the building's atmosphere, thereby creating a potential health hazard to workers. and building occupants. Apprise all workers, supervisory personnel, subcontractors. and consultants who will be at the job site of the seriousness of the hazard and of proper work procedures which must be followed.

B. Where in the performance of the work, workers, supervisory personnel, subcontractors, or consultants may encounter, disturb, or otherwise function in the immediate vicinity of any identified mold and mildew, take appropriate continuous measures as necessary to protect all building occupants from the potential hazard of exposure to lead dust. Such measures shall include the procedures and methods described herein, and compliance with regulations and guidelines of applicable federal, state, and local agencies.

C. If the Contractor or subcontractors and their employees locate a material of suspicious nature, the Contractor shall notify the Owner prior to disturbing said material in any fashion. Testing of said material will be by Owner. If found to contain hazardous mold and mildew, material will be removed by approved handlers using approved methods, following all State and Federal regulations. Additional cost will be by Owner.

D. All contractors are advised that materials containing mold and mildew in existing buildings may be located in areas of work.

2 PART 2 PRODUCTS

Not Used

3 PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 50 23

UNIFORM SAFETY STANDARDS FOR SCHOOL CONSTRUCTION

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Building Occupancy.

B. Lead and Asbestos Testing.

C. General Safety and Security Standards.

D. Separation of Construction.

E. Exiting Plan.

F. Ventilation Plan.

G. Construction Noise.

H. Construction Contaminants.

I. Asbestos Abatement.

J. Presence of Lead.

K. Safety Data Sheets.

1.2 REFERENCE STANDARD

A. Commissioner's Regulations, Part 155.5.

1.3 BUILDING OCCUPANCY

A. The occupied portion of any school building shall always comply with the minimum requirements necessary to maintain a certificate of occupancy. Refer to Section 01 50 13 for additional information.

1.4 LEAD AND ASBESTOS TESTING

A. All school areas to be disturbed during renovation or demolition have been tested for lead and asbestos.

1.5 GENERAL SAFETY AND SECURITY STANDARDS

A. General safety and security standards for construction projects:

1. All construction materials shall be stored in a safe and secure manner.

2. Fences around construction supplies or debris shall be maintained.

3. Gates shall always be locked unless a worker is in attendance to prevent unauthorized entry.

4. During exterior renovation work, overhead protection shall be provided for any sidewalks or areas immediately beneath the work site or such areas shall be fenced off and provided with warning signs to prevent entry.

5. Workers shall be required to wear photo-identification badges at all times for identification and security purposes while working at occupied sites.

6. Refer to Section 01 50 13 for additional information.

1.6 SEPARATION OF CONSTRUCTION

A. Separation of construction areas from occupied spaces:

1. Construction areas which are under the control of a contractor and therefore not occupied by district staff or students shall be separated from occupied areas. Provisions shall be made to prevent the passage of dust and contaminants into occupied parts of the building. Periodic inspection and repairs of the containment barriers must be made to prevent exposure to dust or contaminants. Gypsum board must be used in exit ways or other areas that require fire rated separation. Heavy duty plastic sheeting may be used only for a vapor, fine dust or air infiltration barrier, and shall not be used to separate occupied spaces from construction areas.
   a. A specific stairwell and/or elevator shall be assigned for construction worker use during work hours. In general, workers may not use corridors, stairs or elevators designated for students or school staff.
   b. Large amounts of debris must be removed by using enclosed chutes or a similar sealed system. There shall be no movement of debris through halls of occupied spaces of the building. No material shall be dropped or thrown outside the walls of the building.
   c. All occupied parts of the building affected by renovation activity shall be cleaned at the close of each workday. School buildings occupied during a construction project shall maintain required health, safety and educational capabilities at all times that classes are in session.

B. Refer to Section 01 50 13 for additional information.

1.7 EXITING PLAN

A. Each Prime Contractor shall provide a plan detailing how exiting required by the applicable building code will be maintained.

1.8 VENTILATION PLAN

A. Each Prime Contractor shall provide a plan detailing how adequate ventilation will be maintained during construction. Refer to Sections 01 50 13 and 01 51 00 for additional information.

1.9 CONSTRUCTION NOISE

A. Construction and maintenance operations shall not produce noise in excess of 60 dba in occupied spaces or shall be scheduled for times when the building or affected building spaces are not occupied or acoustical abatement measures shall be taken.

1.10 CONSTRUCTION CONTAMINANTS

A. Each Prime Contractor shall be responsible for the control of chemical fumes, gases, and other contaminates produced by welding, gasoline or diesel engines, roofing, paving, painting, etc. to ensure they do not enter occupied portions of the building or air intakes.

B. Each Prime Contractor shall be responsible to ensure that activities and materials which result in "off-gassing" of volatile organic compounds such as glues, paints, furniture, carpeting, wall covering, drapery, etc. are scheduled, cured or ventilated in accordance with manufacturers recommendations before a space can be occupied.

1.11 ASBESTOS ABATEMENT

A. Large and small asbestos abatement projects as defined by 12NYCRR56 shall not be performed while the building is occupied.

1. The term "building", as referenced in this section, means a wing or major section of a building that can be completely isolated from the rest of the building with sealed non-combustible construction. The isolated portion of the building must contain exits that do not pass through the occupied portion and ventilation systems must be physically separated and sealed at the isolation barrier.

2. Exterior work such as roofing, flashing, siding, or soffit work may be performed on occupied buildings provided proper variances are in place as required, and complete isolation of ventilation systems and at windows is provided. Care must be taken to schedule work so that classes are not disrupted by noise or visual distraction.

1.12 PRESENCE OF LEAD

A. Surfaces that will be disturbed by reconstruction must have a determination made as to the presence of lead. Projects which disturb surfaces that contain lead shall have in the specifications a plan prepared by a certified Lead Risk Assessor or Supervisor which details provisions for occupant protection, work site preparation, work methods, cleaning and clearance testing which are in general accordance with the HUD Guidelines.

1.13 SAFETY DATA SHEETS

A. Manufacturer's safety data sheets (SDS) shall be maintained at the site for all products used in the project. SDS must be provided to anyone who requests them. SDS indicates chemicals used in the product, product toxicity, typical side effects of exposure to the product and safe procedures for use of the product.

2 PART 2 PRODUCTS

Not Used

3 PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 51 00

TEMPORARY UTILITIES

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Temporary Utilities: Electricity and lighting.

1.2 TEMPORARY ELECTRICITY

A. The existing power system shall be made available for the beneficial use of all prime contract work. The use of the permanent system shall be contingent on the inspection and approval by the Architect/Engineer.

1.3 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

A. Cost: By Contract No. 3 - Electrical Construction Contractor; provide and pay for temporary lighting required. Cost of temporary lighting shall be included in the Base Bid.

B. The Contract No. 3 – Electrical Construction Contractor shall provide and maintain lighting for all construction operations to achieve a minimum lighting level of 2 watt/sq ft.

C. The Contract No. 3 – Electrical Construction Contractor shall provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.

D. The Contract No. 3 – Electrical Construction Contractor shall maintain lighting and provide routine repairs.

2 PART 2 PRODUCTS

Not Used

3 PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 57 00

TEMPORARY CONTROLS

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Water control.

B. Dust control.

C. Erosion and sediment control.

D. Noise control.

E. Pest control.

F. Pollution control.

G. Rodent control.

1.2 WATER CONTROL

A. Contract No. 1 – General Construction Contractor shall grade site to drain.

B. Each Prime Contractor shall maintain excavations free of water. Provide, operate, and maintain pumping equipment as may be required.

C. Contract No. 1 – General Construction Contractor shall protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion in accordance with the Contract Documents.

1.3 DUST CONTROL

A. Each Prime Contractor shall execute Work by methods to minimize raising dust from construction operations.

B. Each Prime Contractor shall provide positive means to prevent air-borne dust from dispersing into atmosphere.

1.4 EROSION AND SEDIMENT CONTROL

A. Contract No. 1 - General Construction Contractor shall plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.

B. Contract No. 1 - General Construction Contractor shall minimize amount of bare soil exposed at one time.

C. Contract No. 1 - General Construction Contractor shall provide temporary measures such as berms, dikes, and drains, to prevent water flow.

D. Contract No. 1 - General Construction Contractor shall periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

1.5 NOISE CONTROL

A. Each Prime Contractor shall provide methods, means, and facilities to minimize noise produced by construction operations.

B. Each Prime Contractor shall take necessary precautions so that construction and maintenance operations do not produce noise in excess of 60dba in occupied spaces.

C. Operations shall be scheduled for times when the building or affected building spaces are not occupied, or appropriate acoustical abatement measures shall be taken.

1.6 PEST CONTROL

A. Each Prime Contractor shall provide methods, means, and facilities to prevent pests and insects from damaging the Work.

1.7 POLLUTION CONTROL

A. Each Prime Contractor shall provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.

1.8 RODENT CONTROL

A. Each Prime Contractor shall provide methods, means, and facilities to prevent rodents from accessing or invading premises.

2 PART 2 PRODUCTS

Not Used

3 PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 60 00

PRODUCT REQUIREMENTS

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Products.

B. Product delivery requirements.

C. Product storage and handling requirements.

D. Product options.

E. Product substitution procedures.

1.2 PRODUCTS

A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for reuse.

B. Comply with Specifications and referenced standards as minimum requirements.

C. Furnish products of qualified manufacturers suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise.

D. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.

E. Furnish interchangeable components from same manufacturer for components being replaced.

1.3 PRODUCT DELIVERY REQUIREMENTS

A. Transport and handle products in accordance with manufacturer's instructions.

B. Transport products by methods to avoid product damage; deliver in undamaged condition in manufacturer's unopened containers or packaging, dry.

C. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

D. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.4 PRODUCT STORAGE AND HANDLING REQUIREMENTS

A. Store and protect products in accordance with manufacturers' instructions.

B. Store with seals and labels intact and legible.

C. Store sensitive products in weather-tight, climate-controlled enclosures in an environment favorable to product.

D. For exterior storage of fabricated products, place on sloped supports, above ground.

E. Provide off-site storage and protection when site does not permit on-site storage or protection.

F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation and degradation of products.

G. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

H. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

I. Arrange storage of products to permit access for inspection. Periodically inspect to assure products are undamaged and are maintained under specified conditions.

1.5 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Any Product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Submit a request for equivalent for any manufacturer not named in accordance with Document 00 21 00.

1.6 PRODUCT SUBSTITUTION PROCEDURES

A. Document 00 21 13 – Instruction to Bidders specifies time restrictions for submitting requests for equivalents during bidding period.

B. Substitution: A product or system proposed for substitution, after the award of contract, whose components or characteristics differ from the specified criteria for that product or system. If accepted, a substitution may result in a change to the contract amount. Substitutions will only be accepted in the event that products or systems are discontinued.

C. The materials, products and equipment described in the Contract Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution.

D. Substitutions will only be considered when a Product becomes unavailable through no fault of the Contractor.

E. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents. Such requests shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for an evaluation. A statement setting forth changes in other materials, equipment, or other portions of the work, including changes in the work of other contracts, shall be included. The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect/Engineer's decision of approval or disapproval shall be final.

F. A request constitutes a representation that the Contractor:

1. Has investigated proposed Product and determined that it meets or exceeds the quality level of the specified Product.

2. Will provide the same warranty for the Substitution as for the specified Product.

3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.

4. Waives claims for additional costs or time extensions which may subsequently become apparent.

5. Will reimburse Owner for review or redesign services associated with re-approval by Architect/ Engineer.

G. Substitutions will not be considered when they are indicated or implied on Shop Drawing or Product Data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

H. Substitution Submittal Procedure:

1. Submit three (3) copies of request for Substitution for consideration. Limit each request to one proposed Substitution.

2. Submit shop drawings, product data, and certified test results attesting to the proposed Product equivalence. Burden of proof is on proposer.

3. The Architect/Engineer will notify Contractor in writing of decision to accept or reject request.

2 PART 2 PRODUCTS

Not Used

3 PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 70 00

EXECUTION REQUIREMENTS

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Closeout procedures.

B. Final cleaning.

C. Starting of systems.

D. Demonstration and instruction.

E. Testing, adjusting, and balancing.

F. Protecting installed construction.

G. Project record documents.

H. Operation and maintenance data.

I. Manual for materials and finishes.

J. Manual for equipment and systems.

K. Spare parts and maintenance products.

L. Product warranties and product bonds.

M. Final inspection.

N. Evidence of payments and release of liens.

O. Final application for payment.

P. Final certification for payment.

Q. Asbestos certification.

1.2 CLOSEOUT PROCEDURES

A. Comply with procedures stated in General Conditions of the Contract for issuance of Certificate of Substantial Completion (AIA G734/CMa).

B. When Contractor considers Work has reached final completion, submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Construction Manager and Architect/Engineer's review. Equipment and systems shall have been tested in presence of Owner's Representative and are operational.

C. In addition to submittals required by the conditions of the Contract, provide submittals required by governing authorities.

D. Submit a final statement of accounting giving total adjusted Contract Sum, previous payments, and sum remaining due.

E. Construction Manager will issue a final Change Order reflecting approved adjustments to Contract Sum not previously made by Change Order.

F. Deliver evidence of compliance with requirements of governing authorities.

G. Deliver Certificate of Insurance for Products and Completed Operations.

H. Owner will occupy all portions of building as specified in Section 01 10 00.

1.3 FINAL CLEANING

A. Contract No. 1 - General Construction Contractor shall execute final cleaning prior to final inspection.

B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains, and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

C. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to surface and material being cleaned.

D. Clean debris from roofs, gutters, downspouts, and drainage systems.

E. Clean site; sweep paved areas; rake clean landscaped surfaces.

F. Remove waste and surplus materials, rubbish, and construction facilities from site.

1.4 STARTING OF SYSTEMS

A. Coordinate schedule for start-up of various equipment and systems with Construction Manager.

B. Notify Construction Manager seven (7) days prior to start-up of each item.

C. Verify each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.

D. Verity tests, meter readings, and specified electrical characteristics agree with those required by equipment or system manufacturer.

E. Verify wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision of applicable manufacturer's representative and Construction Manager in accordance with manufacturers' instructions.

G. When specified in individual specification sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

H. Submit a written report in accordance with Section 01 30 00 that equipment or system has been properly installed and is functioning correctly.

1.5 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of Substantial Completion.

B. Demonstrate Project equipment and instruct by qualified manufacturer's representative who is knowledgeable about the Project.

C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.

E. Demonstrate start-up, operation, control, adjustment, troubleshooting, servicing, maintenance, and shutdown of each item of equipment.

F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

1.6 TESTING, ADJUSTING AND BALANCING

A. Contract No. 2 – Mechanical Construction Contractor shall employ and pay for services of independent firm to perform testing, adjusting, and balancing.

B. Independent firm will perform services specified in individual specification sections.

C. Reports will be submitted by independent firm to Construction Manager indicating observations and results of tests and indicating compliance or non-compliance with requirements of Contract Documents.

1.7 PROTECTING INSTALLED CONSTRUCTION

A. Protect installed Work and provide special protection where specified in individual specification sections.

B. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

E. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

F. Prohibit traffic from landscaped areas.

1.8 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:

1. Drawings.

2. Specifications.

3. Addenda.

4. Change Orders and other Modifications to the Contract.

5. Reviewed Shop Drawings, Product Data, and Samples.

6. Manufacturer’s instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store Record Documents separate from documents used for construction.

D. Record information concurrent with construction progress, not less than weekly.

E. Specifications: Legibly mark and record at each product section description of actual Products installed, including the following:

1. Manufacturer's name and product model and number.

2. Product substitutions or alternates utilized.

3. Changes made by Addenda and Modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:

1. Measured depths of foundations in relation to finish first floor datum.

2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.

4. Field changes of dimension and detail.

5. Details not on original Contract Drawings.

G. As-built Survey Mapping: Upon completion of the installation of all proposed sitework features, the contractor shall provide an as-built topographical survey map prepared by a licensed land surveyor showing all features within the project limits. Surveyed features shall include but not be limited to all installed pavements, curbing, fences, signage, plantings, underground utilities, aboveground utilities, contours depicting the grades constructed, and existing features that abut to the installed features. Mapping shall also include rims and inverts for installed utility structures.

H. Maintenance Log: Contractor shall maintain a log of maintenance activities throughout the construction timeframe that documents weekly rainfall rates, dates of seeding and mulching, dates of watering, dates of mowing, dates of fertilizing, dates of core aeration, and all other lawn maintenance activities required by the contract. Log shall be submitted to the Owner's Representative prior to final inspection of lawn areas. If lawn areas do not meet the minimum 80% rate of vegetative cover, then contractor shall continue maintenance activities and update the maintenance log accordingly.

I. Each Prime Contractor shall furnish two (2) hard copy sets (original plus copy) and one electronic copy of Project Record As-Built Drawings at the completion of the Contract. As-Built Drawings shall include:

1. All differences from Bid Drawings, clearly noted.

2. All Change Order and Addendum differences from Bid Drawings, clearly noted.

J. At Contract closeout, submit documents with transmittal letter containing date, Project title, Contractor's name and address, list of documents, and signature of Contractor.

K. Submit documents to Construction Manager with claim for final Application for Payment.

1.9 OPERATION AND MAINTENANCE DATA

A. Submit data bound in 8-1/2 x 11- inch text pages, three D side ring binders with durable plastic covers.

B. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project, and subject matter of binder when multiple binders are required.

C. Internally subdivide binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

D. Drawings: Provide with reinforced punched binder tab. Bind in with text, fold larger drawings to size of text pages.

E. Contents: Prepare Table of Contents for each volume, with each product or system description identified, typed on white paper, in three parts as follows:

1. Part 1: Directory, listing names, addresses, and telephone numbers of Construction Manager, Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.

2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
   a. Significant design criteria.
   b. List of equipment.
   c. Parts list for each component.
   d. Operating instructions.
   e. Maintenance instructions for equipment and systems.
   f. Maintenance instructions for finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.

3. Part 3: Project documents and certificates, including the following:
   a. Shop drawings and product data.
   b. Air and water balance reports.
   c. Certificates.
   d. Originals of warranties and bonds.

F. Provide two (2) sets of hard copies and one electronic copy.

1.10 MANUAL FOR MATERIALS AND FINISHES

A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Construction Manager will review draft and return one copy with comments.

B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.

C. Submit one copy of completed volumes 15 days prior to final inspection. Draft copy will be reviewed and returned after final inspection, with Construction Manager and Architect/Engineer comments. Revise content of document sets as required prior to final submission.

D. Submit three (3) sets of revised final volumes in final form within 10 days after final inspection.

E. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Include information for re-ordering custom manufactured products.

F. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

G. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Include recommendations for inspections, maintenance, and repair.

H. Additional Requirements: As specified in individual product specification sections.

I. Include listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

1.11 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Construction Manager will review draft and return one copy with comments.

B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.

C. Submit one copy of completed volumes fifteen (15) days prior to final inspection. Draft copy will be reviewed and returned after final inspection, with Construction Manager and Architect/Engineer comments. Revise content of document sets as required prior to final submission.

D. Submit three (3) sets of revised final volumes in final form within ten (10) days after final inspection.

E. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.

F. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.

G. Include color-coded wiring diagrams as installed.

H. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shutdown, and emergency instructions. Include summer, winter, and special operating instructions.

I. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and re-assembly instructions; and alignment, adjusting, balancing, and checking instructions.

J. Include servicing and lubrication schedule and list of lubricants required.

K. Include manufacturer's printed operation and maintenance instructions.

L. Include sequence of operation by controls manufacturer.

M. Include original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

N. Include control diagrams by controls manufacturer as installed.

O. Include Contractor's coordination drawings, with color-coded piping diagrams as installed.

P. Include charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

Q. Include list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

R. Include test and balancing reports as specified in Section 01 40 00.

S. Additional Requirements: As specified in individual product specification sections.

T. Include listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.

1.12 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Furnish spare parts, maintenance, and extra products in quantities specified in individual specification sections.

B. Deliver to Project site and place in location as directed by Construction Manager, obtain receipt prior to final payment.

1.13 PRODUCT WARRANTIES AND PRODUCT BONDS

A. Obtain warranties and bonds executed in duplicate by responsible subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.

B. Execute and assemble transferable warranty documents and bonds from subcontractors, suppliers, and manufacturers.

C. Verify documents are in proper form, contain full information, and are notarized.

D. Co-execute submittals when required.

E. Include Table of Contents and assemble in three-D side ring binder with durable plastic cover.

F. Submit prior to final Application for Payment.

G. Time of Submittals:

1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.

2. Make other submittals within ten days after Date of Substantial Completion, prior to final Application for Payment.

3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within ten days after acceptance, listing date of acceptance as beginning of warranty or bond period.

1.14 FINAL INSPECTION

A. Construction Manager and Architect/Engineer will make final inspection within seven days after receipt of certification.

B. Should Construction Manager and Architect/Engineer consider that Work is finally complete in accordance with requirements of Contract Documents, they shall request Contractor to make Project Closeout submittals.

C. Should Construction Manager and Architect/Engineer consider that Work is not finally complete:

1. Construction Manager shall notify Contractor, in writing, stating reasons.

2. Contractor shall take immediate steps to remedy the stated deficiencies and send second written notice to Construction Manager certifying that Work is complete.

3. Construction Manager and Architect/Engineer will re-inspect Work.

1.15 EVIDENCE OF PAYMENTS AND RELEASE OF LIENS (A copy of all of the following documents may be obtained from the Architect's office.)

A. Contractor's Affidavit of Payment of Debts and Claims: AIA G706.

B. Contractor's Affidavit of Release of Liens AIA G706A, with:

1. Consent of Surety to Final Payment: AIA G707.

2. Separate releases of liens for subcontractors, suppliers and others with lien rights against property of Owner, together with list of those parties.

C. Submittals shall be duly executed before delivery to Construction Manager.

D. Attorneys who sign Consent of Surety to Final Payment must file a certified copy of their Power of Attorney to sign Consent with it for final payment.

1.16 FINAL APPLICATION FOR PAYMENT

A. Contractor shall submit final application in accordance with requirements of General and Supplementary Conditions.

1.17 FINAL CERTIFICATION FOR PAYMENT

A. Construction Manager and Architect will issue final certification in accordance with provisions of General Conditions.

B. Should final completion be materially delayed through no fault of Contractor, Architect and Construction Manager may issue a Semi-Final Certification for Payment, in accordance with provisions of General Conditions.

1.18 ASBESTOS CERTIFICATION

A. Contractor shall submit certification that no asbestos- containing materials were used in construction in accordance with specification Section 01 10 00 - Summary.

2 PART 2 PRODUCTS

Not Used

3 PART 3 EXECUTION

Not Used

END OF SECTION

DIVISION 02 – EXISTING CONDITIONS

SECTION 02 41 00

DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Selective demolition of building elements for alteration purposes.

1.02 RELATED REQUIREMENTS

A. Section 01 10 00 - Summary: Limitations on Contractor's use of site and premises.

B. Section 01 10 00 - Summary: Description of items to be salvaged or removed for re-use by Contractor.

C. Section 01 50 00 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.

D. Section 01 60 00 - Product Requirements: Handling and storage of items removed for salvage and relocation.

E. Section 01 70 00 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.

F. Section 07 01 50.19 - Preparation for Re-Roofing: Removal of existing roofing, roof insulation, flashing, trim, and accessories.

G. Section 31 22 00 - Grading: Rough and fine grading.

H. Section 31 23 23 - Fill: Fill material for filling holes, pits, and excavations generated as a result of removal operations.

1.03 DEFINITIONS

A. Demolition: Dismantle, raze, destroy or wreck any building or structure or any part thereof.

B. Remove: Detach or dismantle items from existing construction and dispose of them off site, unless items are indicated to be salvaged or reinstalled.

C. Remove and Salvage: Detach or dismantle items from existing construction in a manner to prevent damage. Clean, package, label and deliver salvaged items to Owner in ready-for-reuse condition.

D. Remove and Reinstall: Detach or dismantle items from existing construction in a manner to prevent damage. Clean and prepare for reuse and reinstall where indicated.

E. Existing to Remain: Designation for existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

PART 2 PRODUCTS

2.01 MATERIALS

A. Fill Material: See Section 31 23 23.

PART 3 EXECUTION

3.01 DEMOLITION

A. Remove paving and curbs required to accomplish new work.

B. Remove concrete slabs on grade as indicated on drawings.

C. Remove other items indicated, for salvage and relocation.

D. Fill excavations, open pits, and holes in ground areas generated as result of removals, using specified fill; compact fill as specified in Section 31 22 00.

3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.

1. Obtain required permits.

2. Use of explosives is not permitted.

3. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.

4. Provide, erect, and maintain temporary barriers and security devices.

5. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.

6. Conduct operations to minimize effects on and interference with adjacent structures and occupants.

7. Do not close or obstruct roadways or sidewalks without permits from authority having jurisdiction.

8. Conduct operations to minimize obstruction of public and private entrances and exits. Do not obstruct required exits at any time. Protect persons using entrances and exits from removal operations.

9. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon, or limit access to their property.

B. Do not begin removal until receipt of notification to proceed from Owner.

C. Do not begin removal until built elements to be salvaged or relocated have been removed.

D. Protect existing structures and other elements to remain in place and not removed.

1. Provide bracing and shoring.

2. Prevent movement or settlement of adjacent structures.

3. Stop work immediately if adjacent structures appear to be in danger.

E. Hazardous Materials:

1. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCBs, and mercury.

F. Perform demolition in a manner that maximizes salvage and recycling of materials.

1. Dismantle existing construction and separate materials.

2. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.

G. Partial Removal of Paving and Curbs: Neatly saw cut at right angle to surface.

3.03 EXISTING UTILITIES

A. Coordinate work with utility companies. Notify utilities before starting work, comply with their requirements, and obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.

E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.

F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

3.04 SELECTIVE DEMOLITION FOR ALTERATIONS

A. Existing construction and utilities indicated on drawings are based on casual field observation and existing record documents only.

1. Verify construction and utility arrangements are as indicated.

2. Report discrepancies to Architect before disturbing existing installation.

3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.

B. Remove existing work as indicated and required to accomplish new work.

1. Remove items indicated on drawings.

C. Services including, but not limited to, HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications: Remove existing systems and equipment as indicated.

1. Maintain existing active systems to remain in operation, and maintain access to equipment and operational components.

2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.

3. Verify that abandoned services serve only abandoned facilities before removal.

4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings. Remove back to source of supply where possible, otherwise cap stub and tag with identification.

D. Protect existing work to remain.

1. Prevent movement of structure. Provide shoring and bracing as required.

2. Perform cutting to accomplish removal work neatly and as specified for cutting new work.

3. Repair adjacent construction and finishes damaged during removal work.

4. Patch to match new work.

3.05 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash from site.

B. Leave site in clean condition, ready for subsequent work.

C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

SECTION 02 82 00

ASBESTOS ABATEMENT

1 PART 1 GENERAL

1.1 EXAMINATION OF SPECIFICATIONS AND SITE OF WORK

A. The Abatement Contractor shall carefully examine the enclosed documents and visit the site of the work. The Abatement Contractor shall fully inform himself prior to preparation of the proposal as to all existing conditions and limitations under which the work is to be performed and shall include in the Bid a sum to cover all costs of all items necessary to perform the work as set forth in these documents. No allowance will be made to the Abatement Contractor because of lack of such examination or knowledge.

1.2 SUBMITTALS

A. The Abatement Contractor shall submit the following documents within ten (10) calendar days after opening of bids, and prior to award of contract:

1. A description of the proposed approach to the project. This should address methodology of abatement, proposed workforce, schedule, access, storage, security, or services and facilities to be provided by the Owner for the project.

2. Verification that the project will be completed within the specified time period.

3. A current NYS Asbestos Abatement Contractor's license.

4. EPA NESHAPS Project Notification.

5. NYSDOL Project Notification.

6. NYSDOL Notification of residential and business occupants.

7. Asbestos Handling Certificates for each worker/ supervisor employed on this project.

8. Proof of OSHA medical surveillance for each worker/supervisor employed on this project.

9. Safety Data Sheets (SDS) for each material used on this project.

10. Copy of state or local license for waste hauler.

11. Name, address, and certification of landfill approved to accept asbestos waste.

B. The following additional submittals shall be required from the Abatement Contractor at the completion of the project.

1. Work area sign-in sheets.

2. Daily logs.

3. OSHA personal air sample results.

4. Waste Shipment Record for friable asbestos waste: Maintain a waste shipment record as required by the NESHAP regulation which indicates chain of custody, waste manifest forms, landfill receipts, waste generator, transporter, and disposal site; and which describes the nature, size, type of container, and form of asbestos waste. Submit within 35 days of departure from building.

5. Waste Shipment Record for non-friable asbestos waste: Trip tickets/weigh scale receipts for any/all non-friable asbestos waste material disposed of as Construction and Demolition debris.

1.3 SCOPE OF WORK

A. The Abatement Contractor shall furnish all components required and supply all labor, materials, tools, equipment, and insurance, necessary to properly complete the work in accordance with the Contract Documents. The scope of work shall include, but not be limited to:

1. The removal, handling and disposal of all asbestos-containing materials identified on the Contract Drawings. Abatement is considered complete when all layers of asbestos-containing materials are removed completely to the satisfaction of the Owner's Representative. The Abatement Contractor is solely responsible for completeness of abatement.
   a. Pipe and Fitting Insulation
   b. Crawl Spaces EPDM installation

2. The minimum criteria by which the work shall be completed are defined in these documents.

1.4 CODES AND REGULATIONS

A. The Abatement Contractor shall assume full responsibility and liability for the compliance with all applicable Federal, State, and local regulations pertaining to work practices, hauling and disposal, protection of workers, visitors to the site, and persons occupying areas adjacent to the site. The Abatement Contractor is responsible for providing medical examinations and maintaining medical records of personnel as required by the applicable Federal, State, and local regulations. The Abatement Contractor shall hold the Owner and Owner’s Representative harmless for failure to comply with any applicable work, hauling, disposal, safety, health, or other regulation on the part of himself, his employees, or his subcontractors.

B. Federal Requirements which govern asbestos abatement work or hauling, and disposal of asbestos waste materials include but are not limited to, the following:

1. U.S. Department of Labor, Occupational Safety and Health Administration, (OSHA), including but not limited to:
   a. Occupational Exposure to Asbestos, Tremolite, Anthophyllite, and Actinolite; Final Rules. Title 29, Part 1910, Section 1001 and Part 1926, Section 58 of the Code of Federal Regulations.
   b. Respiratory Protection.
      Title 29, Part 1910, Section 134 of the Code of Federal Regulations.
   c. Construction Industry
      Title 29, Part 1926 of the Code of Federal Regulations
   d. Access to Employee Exposure and Medical Records
      Title 29, Part 1910, Section 2 of the Code of Federal Regulations
   e. Hazard Communication
      Title 29, Part 1910, Section 1200 of the Code of Federal Regulations
   f. Specifications for Accident Prevention Signs and Tags
      Title 29, Part 1910, Section 145 of the Code of Federal Regulations

2. U.S. Environmental Protection Agency (EPA), including but not limited to:
   a. Asbestos Hazard Emergency Response Act (AHERA) Regulation Asbestos-Containing Materials in Schools Final Rule & Notice Title 40, Part 763, Sub-part E, Appendix C of the Code of Federal Regulations
   b. Training Requirements of (AHERA) Regulation Asbestos containing Materials in Schools Final Rule & Notice Title 40, Part 763, Sub-part E, Appendix C of the Code of Federal Regulations
   c. National Emission Standard for Hazardous Air Pollutants (NESHAPS)
      National Emission Standard for Asbestos Title 40, Part 61, Sub-part A, and Sub-part M (Revised Sub-part B) of the Code of Federal Regulations

3. New York State requirements which govern asbestos abatement work or hauling, and disposal of asbestos waste materials include but are not limited to the following:
   a. New York State Department of Environmental Conservation Regulations - New York State Official Compilation of Codes, Rules and Regulations - 6 NYCRR 360
   b. New York State Department of Environmental Conservation Regulations - New York State Official Compilation of Codes, Rules and Regulations - 6 NYCRR 364
      1) An annual "Industrial Waste Hauler Permit" specifically for asbestos-containing materials is required for transportation of asbestos-containing waste to disposal site.

c. New York State Department of Labor
Asbestos
Industrial Code Rule #56
Title 12, Part 56 of the New York State Official Compilation of Codes, Rules and Regulations - 12 NYCRR 56

d. New York State Department of Labor Public Employees Safety and Health Act
Article 2, Section 27-a of the New York State Labor Law as amended effective August 2, 1985

e. New York State Department of Labor
Asbestos or Products Containing Asbestos: Licensing
Article 30, Sections 900-911 of the New York State Labor Law
Created by Laws of 1986, Chapter 775

f. New York State Department of Health Asbestos Safety Program Requirements title 10, Part 73, Chapter 11 of the New York State Official Compilation of Codes, Rules and Regulations - 10 NYCRR 73

g. School Asbestos Safety Act (SASA)
Article 9A, Sections 530-536 of the New York State Education Law
Created by Laws of 1979, Chapter 501

h. New York State Education Department - 155.5 Uniform Safety Standard for school construction and maintenance. Official compilation of codes, Rules and Regulations of the state of New York, Title 8. Education Department, Chapter II. Regulations of the Commissioner, Subchapter J. Buildings and Transportation Part 155. Educational facilities.

1.5 NOTIFICATIONS

A. The Abatement Contractor shall: Send written notification as required by USEPA National Emission Standards for Hazardous Air Pollutants (NESHAPS) Asbestos Regulations (40 CFR 61, Subpart M) to the regional Asbestos NESHAPS Contact at least 10 days prior to beginning any work on asbestos-containing materials. Send notification to the following address:

1. Asbestos NESHAPS Contact
Waste Management Division
USEPA
26 Federal Plaza
New York, NY 10007
(212) 264-4479

B. Send written notification as required by New York State Industrial Code Rule 56 ten (10) days state prior to beginning any work on asbestos-containing materials to:

1. State of New York
   Department of Labor
   Division of Safety and Health
   Asbestos Control Bureau
   State Office Campus
   Building 12 Room 454
   Albany, NY 12240

C. Include the following information in the notification sent to the NYSDOL contact:

1. The name, address, and asbestos handling number of the Abatement Contractor.

2. The address and description of the building or area, including size and age.

3. The amount of asbestos material present in square feet and/or linear feet. If applicable; room numbers and other local information where asbestos material is found unless such material is found throughout the entire building or structure.

4. The proposed starting and completion dates for abatement.

5. The procedures and equipment, including ventilation/exhaust systems that will be employed.

6. Post all notices required by applicable federal, state, and local regulations. Maintain one copy of each notice at job site and keep one copy in Abatement Contractor's office.

7. Notify emergency services including fire, ambulance, police or other agency that may service the abatement work site in case of an emergency. Notification is to include methods of entering work area, emergency entry and exit locations, modifications to fire notification or fire fighting equipment, and other information needed by agencies providing emergency services.

8. Post in clean room of Personnel Decontamination Unit telephone numbers and locations of emergency services including but not limited to fire, ambulance, doctor, hospital, police, power company, telephone company. Any individual at the job site may notify emergency service agencies, if necessary, without effect on this Bid or the Bid Sum.

D. The Abatement Contractor shall: Post or otherwise provide for written notification to building occupants ten (10) days prior to the commencement of work on any asbestos project in the building.

1.6 ADMINISTRATIVE, SUPERVISORY AND WORKING PERSONNEL

A. Superintendent: Provide a full-time Superintendent who is experienced in administration and supervision of asbestos abatement projects including work practices, protective measures for building and personnel, disposal procedures, etc. This person is the Abatement Contractor's Representative responsible for compliance with all applicable federal, state, and local regulations, particularly those relating to asbestos-containing materials. The Superintendent must have completed a course at an EPA Training Center or equivalent certificate course in asbestos abatement procedures and have had a minimum of two (2) years on-the-job training in asbestos abatement procedures. The Superintendent is to be a Competent Person as required by OSHA in 29 CFR 1926. The Superintendent is to be accredited as an Asbestos Abatement Supervisor in accordance with the AHERA regulation 40 CFR Part 763, Subpart E, Appendix C and hold a valid Asbestos Abatement Handler's license in accordance with New York State Department of Labor Industrial Code Rule 56.

B. Asbestos Abatement Workers: All workers are to be trained, certified and accredited as required by New York State Department of Labor Industrial Code Rule 56. Submit state licenses of all workers on project prior to the start of work. Train, in accordance with 29 CFR 1926, all workers in the dangers inherent in handling asbestos and breathing asbestos dust and in proper work procedures and personal and area protective measures.

1.7 DAILY LOG

A. The Abatement Contractor Shall: Maintain within the Decontamination Unit a daily log documenting the dates and time of but not limited to, the following items:

1. Meetings; purpose, attendees, brief discussion.

2. Visitations; authorized and unauthorized.

3. Personnel, by name, entering and leaving the work area.

4. Special or unusual events, i.e., barrier breaching, equipment failures, accidents.

5. Air monitoring tests and test results.

6. Documentation of Abatement Contractor's completion of the following:
   a. Inspection of work area preparation prior to start of removal and daily thereafter.
   b. Removal of any sheet plastic barriers
   c. Abatement Contractor's inspections prior to spray back, lockback, encapsulation, enclosure or any other operation that will conceal the condition of asbestos-containing materials or the substrate from which such materials have been removed.
   d. Removal of waste materials from work area.
   e. Decontamination of equipment (list items).
   f. Abatement Contractors final inspection/final air test analysis.

7. Type, quantity, and location of all asbestos-containing materials removed. Quantity shall be indicated per linear foot measurement, per square foot measurement.

8. Provide three (3) copies of this log to the Owner's Representative at the completion of the project.

1.8 INSPECTION

A. The Contract Documents include bulk sample information, if available, for building materials suspected to contain asbestos. Prior to disturbance of building materials, the Contractor shall compare the bulk sample results to the scope of work and request, in writing, additional bulk samples or clarification of sample results for any questionable results.

B. Prior to commencement of work, the Abatement Contractor shall inspect areas in which work will be performed, and prepare a listing of damage to structure, surfaces, equipment or of surrounding properties which could be misconstrued as damage resulting from the work.

1.9 STOP WORK

A. If the Owner or the Owner's Representative presents a written stop work order immediately and automatically stop all work. All work areas shall be sealed and made safe in accordance with ICR 56 and OSHA 1926.1101 regulations. Do not recommence work until authorized in writing by Owner's Representative.

B. The Owner's Representative, Project Monitor, Air Sampling Technician, Environmental Consultant, etc. has authority to stop work. Verbal stop order will be followed-up with written stop order. All work areas shall be sealed and made safe in accordance with ICR 56 and OSHA 1926.1101 regulations. Do not recommence work until authorized in writing by Owner's Representative.

1.10 TESTING LABORATORY SERVICES

A. The Owner's Representative will perform air sampling and analysis in accordance with 12 NYCRR Part 56 (PCM) and AHERA (TEM).

B. Asbestos Hazard Emergency Response Act (AHERA):

1. Conduct clearance air sampling in accordance with NYSED requirements revision 7/12/13. PCM clearance sampling/analysis allowed where NYSDOL small and minor projects are involved. TEM clearance sampling/analysis required on NYSDOL large project size work.

C. The Abatement Contractor shall conduct his own personal air monitoring and laboratory testing to meet OSHA 29 CFR 1926.1101. This air monitoring and laboratory testing shall be provided by the Abatement Contractor at no additional cost to the Owner.

D. Additional testing and analysis required as a result of failing test results during the course of the project or for clearance monitoring shall be the financial responsibility of the Abatement Contractor.

E. The Abatement Contractor shall provide the following GFCI protected electrical equipment for use by the air sampling firm during final clearance sampling:

1. Six (6) extension cords (14-3 AWG minimum) inside each NYS Large Project Work Area.

2. Four (4) extension cords (14-3 AWG minimum) inside each NYS Small Project Work Area.

3. Length of extension cords shall be sized to allow for complete coverage within the work area.

1.11 TEMPORARY FACILITIES

A. Temporary Water Service Connection: All connections to the Owner's hot and cold-water system shall include backflow protection provided by the Abatement Contractor. Valves shall be temperature and pressure rated for operation of the temperatures and pressures encountered. After completion of use, connections and fittings shall be removed without damage or alteration to existing water piping and equipment. Leaking or dripping valves shall not be allowed.

B. Electrical Service: The Abatement Contractor shall provide a grounded temporary electric power service and distribution system of sufficient size, capacity, and power characteristics to accommodate performance of work during the construction period. Install temporary lighting adequate to provide sufficient illumination for safe work and traffic conditions in every area of work. Protect each circuit with a ground fault circuit interrupter (GFCI) of proper size located in the temporary panel. Do not use outlet type GFCI devices. Lockout all existing power to or through the work area. Unless specifically noted otherwise existing power and lighting circuits to the Work Area are not to be used. At the Contractor’s expense, a licensed electrician shall perform all connection and disconnection to the Owner’s electric service.

C. The Abatement Contractor shall provide a portable electrical generator if power is interrupted or becomes unavailable at the asbestos work areas. The generator shall be of sufficient capacity to supply electrical power for all required asbestos abatement needs including but not limited to temporary lighting, shower heater, shower pumps, negative air pressure and air sampling equipment. The generator shall be provided at no additional cost to the owner and be available for use during all phases of asbestos abatement.

1.12 WORKER PROTECTION

A. The Abatement Contractor shall require all workers to adhere to 12 NYCRR Part 56, Subpart 4, Work Area Entry and Exit Procedures and OSHA 1926.1101. Require that workers NOT eat, drink, smoke, chew tobacco or gum, or apply cosmetics in the Work Area and the entire facility.

B. Decontamination Units: The Abatement Contractor shall provide Personnel and Waste Decontamination facilities in accordance with 12 NYCRR Part 56 and OSHA 1926.1101. Require that the Personnel Decontamination Unit be the only means of ingress and egress for the Work Area. Require that all materials exit the Work Area through the Waste Decontamination Unit.

2 PART 2 PRODUCTS

NOT USED

3 PART 3 EXECUTION

3.1 REMOVAL OF ASBESTOS-CONTAINING MATERIALS

A. New York State Department of Labor Industrial Code Rule 56:

1. All asbestos abatement shall be completed in accordance with New York State Department of Labor Industrial Code Rule 56 (12 NYCRR Part 56) and any applicable or site-specific variances granted for this project.

2. Site-specific variances, if any, are attached at the end of this section.

B. NYSDOL Large and Small Projects shall not be performed while the building is occupied.

C. Removal and containerization of asbestos-containing materials shall be completed in strict accordance with the standard protocols established by the NYSDOL ICR 56 and OSHA 1926.1101 including, but not limited to, decontamination and waste removal procedures.

D. Thoroughly wet to satisfaction of Environmental Consultant asbestos-containing materials to be removed prior to stripping and/or tooling to reduce fiber dispersal into the air. Accomplish wetting by a fine spray (mist) of amended water or removal encapsulant. Saturate material sufficiently to wet to the substrate without causing excess dripping. Allow time for amended water or removal encapsulant to penetrate material thoroughly. If amended water is used, spray material repeatedly during the work process to maintain a continuously wet condition. If a removal encapsulant is used, apply in strict accordance with manufacturer's written instructions. Perforate outer covering of any installation which has been painted and/or jacketed in order to allow penetration of amended water or removal encapsulant or use injection equipment to wet material under the covering. Where necessary, carefully strip away while simultaneously spraying amended water or removal encapsulant on the installation to minimize dispersal of asbestos fibers into the air.

E. Mist work area continuously with amended water whenever necessary to reduce airborne fiber levels.

F. Remove saturated asbestos-containing material in small sections. Do not allow material to dry out. As it is removed, simultaneously pack material while still wet into disposal bags. Evacuate air from disposal bags with a HEPA filtered vacuum cleaner before sealing. Twist neck of bags, bend over and seal with minimum three wraps of duct tape. Clean outside and move to Waste Decontamination Unit.

G. All systems which may be disturbed in the performance of the work, located either inside or outside of the work area, including but not limited to electrical system, plumbing system, speaker system, fire alarm system, smoke alarm system, computer system, telecommunications system, clock system, etc. shall be protected from damage. Support systems as necessary to prevent damage during the performance of the work. Any damage to systems during the performance of asbestos abatement is the responsibility of the Abatement Contractor.

H. Work Areas shall be isolated from the surrounding environment in accordance with the regulations of New York State Industrial Code Rule 56, including any applicable or site-specific variance granted for this project.

I. Completely isolate work areas prior to demolition of non-asbestos-containing materials (pipe chases, ceilings, etc.) necessary to access asbestos-containing materials. Work area isolation shall be in accordance with NYSDOL ICR 56 and OSHA 1926.1101 regulations.

J. Work Areas shall be placarded with signs that conform to OSHA and ICR56 standards.

K. Pipe and Fitting Insulation: Demolish pipe chase/ceiling spaces as necessary to completely remove all asbestos-containing insulation located within wall/ceiling areas. Spray with a mist of amended water or removal encapsulant. Allow amended water or removal encapsulant to saturate material to substrate. If a removal encapsulant is used, use in strict accordance with manufacturer's instructions. Cut bands holding preformed pipe insulation, slit jackets at seams, remove and hand-place in a disposal bag. Remove job-molded fitting insulation in chunks and hand place in a disposal bag. Do not drop to floor. Remove any residue on pipe or fitting with stiff bristle nylon hand brush. Remove ACM insulation from all through floor/through wall locations. In locations where pipe fitting insulation is removed from pipe with straight runs insulated with fibrous glass or other non-asbestos-containing fibrous material, remove fibrous material 6" from the point where it contacts the asbestos-containing insulation. Lag all ends of pipe insulation at abatement areas with wettable lag cloth.

1. Glovebag Use: Where glovebag methodology is specified for abatement at normally occupied areas, the glovebag operation shall occur within tent enclosures. All tent enclosures shall be provided with a continuous negative pressure differential.

2. Glovebags shall only be used for section of pipe insulation being removed. Glovebags shall not be moved to another section of insulation for re-use. The pipe insulation diameter work shall not be exceeded one-half the bag working length. Duct tape shall be placed securely around the pipe insulation to for a smooth seal. The Glovebag shall then be secured to the duct tape and sealed airtight.

3. The Glovebag seal shall be subject to and pass a smoke test as follows:
   a. Aspirate the contents of a smoke tube through the water port access of the bag.
   b. After twist sealing the access port, the bag shall be squeezed gently and checked for any leakage points which shall be taped airtight.

4. When using a particular brand of Glovebag, the Contractor shall incorporate the manufacturer's instructions into his work procedure.

5. Do not use Glovebag directly on pipe hotter than 130ºF.

6. Insert wetting nozzle in its porthole opening and seal with duct tape. Insert HEPA vacuum nozzle in its pothole and seal with duct tape.

7. Two Person Operation: One-person inserts hand in glove bag sleeves and removes insulation. Second person operates sprayer and vacuum. Cut ends of pipe using bone or a flexible wire saw. Cut insulation along the bottom of the pipe to the two ends. Spray insulation where cut with water; gently remove insulation; and place in bottom of bag.

8. Wash pipe with water and rub clean. Wet down top of the bag and pipe ends and dampen insulation at the bottom of bag. When bag has reached capacity or all insulation has been removed from that pipe, place all tools in one gloved hand, pull the hand out, invert and twist hand to create a separate pouch. Cut between the bag and the pouch and place the tool pouch in the next glovebag or into a bucket or water. Remove water wand and turn on HEPA vacuum and collapse bag. Twist bag below tool pouch and seal with duct tape. Place bottom of glovebag into 6-mil disposal bag (labeled).

9. Remove all tape, unzip, and fold bag carefully into disposal bag. Wet, wipe and/or vacuum pipe and immediate area.

L. Crawl Spaces EPDM: Crawl space has been abated of all visible ACM debris. Clearance included NYSDOL/AHERA clearance air sampling. Cover dirt crawl space floor area with 1 layer of .045" fire retardant, reinforced EPDM. Overlap and seal all seams on EPDM in accordance with manufacturer's specifications. Extend EPDM membrane 6" - 12" up perimeter wall and at all support columns and secure with furring strips and approved mechanical fasteners.

3.2 TRANSPORT AND DISPOSAL

A. The Abatement Contractor shall dispose of all removed materials in accordance with NYS and EPA regulations.

1. All friable asbestos-containing materials must be disposed of as asbestos-containing waste in accordance with NYS and EPA regulations.

2. Non-friable waste may be disposed of as Construction and Demolition debris in accordance with NYS and EPA regulations.

B. Offsite processing including but not limited to removal, handling, disturbance, etc, of friable and/or non-friable asbestos-containing materials is prohibited.

C. Asbestos-containing/contaminated waste may not be recycled.

D. Salvage of building components for scrap or salvage value is permitted only after complete on-site removal of all friable and non-friable asbestos-containing materials.

E. Prior to the start of work, submit to the Owner's Representative a copy of New York State license of waste hauler.

F. Submit three (3) copies of the Abatement Contractor's log including all chain of custody forms, manifests, bills of lading and landfill receipts to the Owner's Representative at the completion of the work. Copies shall be made part of the Abatement Contractor's logbook.

G. HEPA vacuum the exterior surface of plastic disposal bags prior to placing in fiber/metal drums or into additional bags. HEPA vacuum fiber/metal drums prior to loading into the decontamination room.

H. Do not store disposal-bagged material outside of Work Area. Take bags from Work Area directly to a sealed truck lined with 6 mil polyethylene or lockable dumpster lined with 6 mil polyethylene.

I. Asbestos-containing materials which have been removed from the building shall not be stored at the site overnight unless in a locked dumpster or locked truck.

J. Do not transport disposal-bagged materials on open trucks. Label drums with same warning labels as bags. Uncontaminated drums may be reused. Treat drums that have been contaminated as asbestos-containing waste and dispose of in accordance with this specification.

K. Transport and dispose of the asbestos waste following the Environmental Protection Agency Guidelines for the Transport and Disposal of Asbestos Waste (40 CFR 763, Subpart E, Appendix D).

3.3 PROJECT DECONTAMINATION

A. The Work Area shall be cleaned in accordance with NYSDOL ICR 56 and OSHA 1926.1101 and to the satisfaction of the analytical testing laboratory technician.

B. After the area has been cleaned and is determined to be dry, the contractor and the Environmental Consultant shall perform a complete Visual Inspection of the entire Work Area. If any debris, residue, dust or other matter is found the Abatement Contractor shall repeat final cleaning and continue decontamination procedure from that point.

C. If Release Criteria are not met, repeat Final Cleaning and continue Decontamination procedure from that point. The Abatement Contractor will be responsible for the cost incurred by the Owner for additional testing after the Decontamination has been repeated.

3.4 REPAIRS AND FINAL CLEANING

A. Prior to leaving the site and prior to final payment for the work, the Abatement Contractor shall repair all damages made to building structure(s) (except those structures scheduled for demolition) including, but not limited to, nail holes, duct tape marks, etc. from the temporary barrier system. The finishes shall be patched to match the existing colors and textures. All miscellaneous materials generated by the Abatement Contractor's activities shall be removed and properly disposed of as determined by the Owner’s Representative.

END OF SECTION

DIVISION 03 – CONCRETE

SECTION 03 54 00
CAST UNDERLAYMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Liquid-applied self-leveling floor underlayment.

1.02 REFERENCE STANDARDS

A. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50 mm] Cube Specimens) 2021.

B. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete 2018.

C. ASTM C348 - Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars 2021.

D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2023c.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's data sheets documenting physical characteristics and product limitations of underlayment materials. Include information on surface preparation, environmental limitations, and installation instructions.

C. Manufacturer's Instructions.

1.04 QUALITY ASSURANCE

A. Applicator Qualifications: Company specializing in performing the work of this section, and approved by manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Keep dry and protect from direct sun exposure, freezing, and ambient temperature greater than 105 degrees F.

1.06 FIELD CONDITIONS

A. Do not install underlayment until floor penetrations and peripheral work are complete.

B. Maintain minimum ambient temperatures of 50 degrees F 24 hours before, during and 72 hours after installation of underlayment.

C. During the curing process, ventilate spaces to remove excess moisture.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Cementitious Underlayment:

1. ARDEX Engineered Cements; ARDEX V 1200 with ARDEX P51 Primer: www.ardexamericas.com/#sle.

2. Custom Building Products; CL-150 Self-Leveling Underlayment: www.custombuildingproducts.com/#sle.

3. Dayton Superior Corporation; Econolevel with Level Primer J42 : www.daytonsuperior.com/#sle.

4. Kaufman Products Inc; SureFlow 040: www.kaufmanproducts.net/#sle.

5. Koster American Corporation; Koster SL Premium Self-Leveling Underlayment: www.kosterusa.com/#sle.

6. LATICRETE International, Inc; LATICRETE SUPERCAP SC500 with LATICRETE SUPERCAP Primer Plus: www.laticretesupercap.com/#sle.

7. The QUIKRETE Companies; QUIKRETE® Self-Leveling Floor Resurfacer : www.quikrete.com/#sle.

8. Stauf USA LLC; SLC-540 Self Leveling Compound: www.staufusa.com/#sle.

9. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 MATERIALS

A. Cementitious Underlayment: Blended cement mix, that when mixed with water in accordance with manufacturer's directions will produce self-leveling underlayment with the following properties:

1. Compressive Strength: Minimum 4000 pounds per square inch after 28 days, tested per ASTM C109/C109M.

2. Flexural Strength: Minimum 1000 psi after 28 days, tested per ASTM C348.

3. Density: 125 pounds per cubic foot, nominal.

4. Final Set Time: 1-1/2 to 2 hours, maximum.

5. Thickness: Capable of thicknesses from feather edge to maximum 3-1/2 inch.

6. Surface Burning Characteristics: Flame spread/Smoke developed index of 0/0 in accordance with ASTM E84.

B. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to underlayment mix materials.

C. Primer: Manufacturer's recommended type.

D. Joint and Crack Filler: Latex based filler, as recommended by manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are clean, dry, unfrozen, do not contain petroleum byproducts, or other compounds detrimental to underlayment material bond to substrate.

3.02 PREPARATION

A. Concrete: Mechanically prepare steel troweled concrete to create a textured surface necessary to achieve the best bond; acceptable methods include bead blasting and scarifying. Do not use acid etching.

B. Remove substrate surface irregularities. Fill voids and deck joints with filler. Finish smooth.

C. Vacuum clean surfaces.

D. Prime substrate in accordance with manufacturer's instructions. Allow to dry.

E. Close floor openings.

3.03 APPLICATION

A. Install underlayment in accordance with manufacturer's instructions.

B. Place to indicated thickness, with top surface level to 1/8 inch in 10 ft.

C. For final thickness over 1-1/2 inches, place underlayment in layers. Allow initial layer to harden to the point where the material has lost its evaporative moisture. Immediately prime and begin application of the subsequent layer within 24 hours.

D. Place before partition installation.

E. Where additional aggregate has been used in the mix, add a top layer of neat mix (without aggregate), if needed to level and smooth the surface.

F. If a fine, feathered edge is desired, steel trowel the edge after initial set, but before it is completely hard.

3.04 CURING

A. Once underlayment starts to set, prohibit foot traffic until final set has been reached.

B. Air cure in accordance with manufacturer's instructions.

3.05 PROTECTION

A. Protect against direct sunlight, heat, and wind; prevent rapid drying to avoid shrinkage and cracking.

B. Do not permit traffic over unprotected floor underlayment surfaces.

END OF SECTION

DIVISION 04 – MASONRY

ECTION 04 20 00

UNIT MASONRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete block.

B. Clay facing brick.

C. Mortar and grout.

D. Reinforcement and anchorage.

E. Accessories.

1.02 RELATED REQUIREMENTS

A. Section 04 01 00 - Maintenance of Masonry.

B. Section 07 92 00 - Joint Sealants: Sealing control and expansion joints.

1.03 REFERENCE STANDARDS

A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

B. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2022.

C. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire; 2019.

D. ASTM A951/A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement; 2022.

E. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2022.

F. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units; 2023.

G. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2018.

H. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2018.

I. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale); 2023.

J. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2019a, with Editorial Revision.

K. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2024.

L. ASTM C476 - Standard Specification for Grout for Masonry; 2023.

M. ASTM C1714/C1714M - Standard Specification for Preblended Dry Mortar Mix for Unit Masonry; 2019a.

N. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2022, with Errata (2024).

O. UL (FRD) - Fire Resistance Directory; Current Edition.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.

C. Samples: Submit four samples of facing brick units to illustrate color, texture, and extremes of color range.

D. Manufacturer's Qualification Statement.

E. Installer's Qualification Statement.

1.05 QUALITY ASSURANCE

A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.

1. Maintain one copy of each document on project site.

B. Fire Rated Assemblies: Comply with applicable code for UL (FRD) Assembly No. as indicated on drawings.

C. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section with minimum three years of documented experience.

D. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

PART 2 PRODUCTS

2.01 CONCRETE MASONRY UNITS

A. Concrete Block: Comply with referenced standards and as follows:

1. Size: Standard units with nominal face dimensions of 16 by 8 inches and nominal depths as indicated on drawings for specific locations.

2. Special Shapes: Provide nonstandard blocks configured for corners.
   a. Provide bullnose units for outside corners.

3. Nonloadbearing Units: ASTM C129.
   a. Lightweight.

4. Specialty Units: Where indicated on drawings, provide blocks with single vertical score on each exposed face.

2.02 BRICK UNITS

A. Facing Brick: ASTM C216, Type FBS Smooth, Grade SW.

1. Color and texture: To match existing adjacent brick.

2. Nominal size: To match existing brick indicated for replacement.

3. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect.

2.03 MORTAR AND GROUT MATERIALS

A. Hydrated Lime: ASTM C207, Type S.

B. Mortar Aggregate: ASTM C144.

C. Grout Aggregate: ASTM C404.

D. Water: Clean and potable.

E. Packaged Dry Material for Mortar for Unit Masonry: Premixed Portland cement, hydrated lime, and sand; complying with ASTM C1714/C1714M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.

1. Type: Types as scheduled in this section.

2. Color: Standard gray.

F. Packaged Dry Material for Mortar for Repointing: Premixed Portland cement, hydrated lime, and graded sand; capable of producing Type O mortar in accordance with ASTM C270 with the addition of water only.

1. Color: Mineral pigments added as required to produce approved color sample.

2.04 REINFORCEMENT AND ANCHORAGE

A. Reinforcing Steel: ASTM A615/A615M, Grade 40 (40,000 psi), deformed billet bars; galvanized.

B. Single Wythe Joint Reinforcement: ASTM A951/A951M.

1. Type: Ladder.

2. Material: ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M Class 3.

3. Size: 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not less than 5/8 inch of mortar coverage on each exposure.

C. Strap Anchors: Bent steel shapes, 1-1/2 inch width, 0.105 inch thick, 24 inch length, with 1-1/2 inch long, 90 degree bend at each end to form a U or Z shape or with cross pins, hot dip galvanized to ASTM A153/A153M Class B.

D. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not less than 5/8 inch of mortar coverage from masonry face.

2.05 ACCESSORIES

A. Preformed Control Joints: Rubber or Neoprene material. Provide with corner and tee accessories, fused joints.

B. Joint Filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self expanding; in maximum lengths available.

C. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.06 MORTAR AND GROUT MIXING

A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.

1. Masonry below grade and in contact with earth: Type S.

2. Exterior, non-loadbearing masonry: Type N.

3. Interior, non-loadbearing masonry: Type O.

B. New Mortar for Old Brick: Proportion by volume only; no more than 20 percent of the total volume of Portland cement and lime combined to be Portland cement.

1. Sand: Match original mortar as closely as possible in color, size, and texture, without use of other additives.

2. Repointing Mortar: Use proportions from 1 part lime to 2 parts sand with no Portland cement, up to 2 parts Portland cement to 3 parts lime to 6 parts sand.

C. Grout: ASTM C476; consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches.

D. Mixing: Use mechanical batch mixer and comply with referenced standards.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive masonry.

B. Verify that related items provided under other sections are properly sized and located.

3.02 PREPARATION

A. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.03 COLD AND HOT WEATHER REQUIREMENTS

A. Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

3.04 COURSING

A. Establish lines, levels, and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

C. Concrete Masonry Units:

1. Bond: Running.

2. Coursing: One unit and one mortar joint to equal 8 inches.

3. Mortar Joints: Concave.

D. Brick Units:

1. Bond: Running.

2. Mortar Joints: Concave.

3.05 PLACING AND BONDING

A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

B. Lay hollow masonry units with face shell bedding on head and bed joints.

C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.

D. Remove excess mortar and mortar smears as work progresses.

E. Interlock intersections and external corners, except for units laid in stack bond.

F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

H. Cut mortar joints flush where wall tile is scheduled or resilient base is scheduled.

I. Isolate masonry partitions from vertical structural framing members with a control joint.

J. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

3.06 REINFORCEMENT AND ANCHORAGE - GENERAL AND SINGLE WYTHE MASONRY

A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches on center.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.

C. Place continuous joint reinforcement in first and second joint below top of walls.

D. Embed longitudinal wires of joint reinforcement in mortar joint with at least 5/8 inch mortar cover on each side.

E. Lap joint reinforcement ends minimum 6 inches.

F. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 36 inches horizontally and 24 inches vertically.

3.07 LINTELS

A. Install loose steel lintels over openings.

B. Maintain minimum 8 inch bearing on each side of opening.

3.08 GROUTED COMPONENTS

A. Lap splices minimum 24 bar diameters.

B. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.

C. Place and consolidate grout fill without displacing reinforcing.

3.09 CONTROL AND EXPANSION JOINTS

A. Do not continue horizontal joint reinforcement through control or expansion joints.

B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

C. Size control joints as indicated on drawings; if not indicated, 3/4 inch wide and deep.

3.10 BUILT-IN WORK

A. As work progresses, install built-in metal door frames and glazed frames and other items to be built into the work and furnished under other sections.

B. Install built-in items plumb, level, and true to line.

C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.

1. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.

D. Do not build into masonry construction organic materials that are subject to deterioration.

3.11 TOLERANCES

A. Install masonry within the site tolerances found in TMS 402/602.

B. Maximum Variation from Alignment of Columns: 1/4 inch.

C. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.

D. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.

E. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.

F. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.

G. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch.

H. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

3.12 CUTTING AND FITTING

A. Cut and fit for chases. Coordinate with other sections of work to provide correct size, shape, and location.

3.13 CLEANING

A. Remove excess mortar and mortar droppings.

B. Clean soiled surfaces with cleaning solution.

3.14 PROTECTION

A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION

DIVISION 05 – METALS

SECTION 05 50 00

METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Shop fabricated steel items.

B. Steel framing and supports for applications where framing and supports are not specified in other sections.

1.02 PRODUCTS FURNISHED, BUT NOT INSTALLED, UNDER THIS SECTION

A. Loose steel lintels.

1.03 RELATED REQUIREMENTS

A. Section 04 20 00 - Unit Masonry: Placement of metal fabrications in masonry.

1.04 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

B. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2018.

C. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2021.

D. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.

E. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

F. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2021, with Errata (2023).

G. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2023).

H. AWS D1.2/D1.2M - Structural Welding Code - Aluminum; 2014, with Errata (2020).

I. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

C. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.

1.06 QUALITY ASSURANCE

A. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.2/D1.2M and dated no more than 12 months before start of scheduled welding work.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

A. Steel Sections: ASTM A36/A36M.

B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.

C. Plates: ASTM A283/A283M.

D. Mechanical Fasteners: Same material as or compatible with materials being fastened; type consistent with design and specified quality level.

E. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

F. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

2.02 MATERIALS - ALUMINUM

A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.

B. Sheet Aluminum: ASTM B209/B209M, 5052 alloy, H32 or H22 temper.

C. Bolts, Nuts, and Washers: Stainless steel.

D. Welding Materials: AWS D1.2/D1.2M; type required for materials being welded.

2.03 FABRICATION

A. Fit and shop assemble items in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

D. Furnish components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.04 FABRICATED ITEMS

A. Lintels: As detailed; prime paint finish.

B. Door Frames for Overhead Door Openings and Wall Openings: Channel sections; prime paint finish.

2.05 FINISHES - STEEL

A. Prime paint steel items.

1. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.

B. Prime Painting: One coat.

2.06 FABRICATION TOLERANCES

A. Squareness: 1/8 inch maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch.

C. Maximum Misalignment of Adjacent Members: 1/16 inch.

D. Maximum Bow: 1/8 inch in 48 inches.

E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Furnish setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.03 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Perform field welding in accordance with AWS D1.1/D1.1M.

D. Obtain approval prior to site cutting or making adjustments not scheduled.

E. After erection, prime welds, abrasions, and surfaces not shop primed .

3.04 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

DIVISION 06 – WOOD, PLASTICS, AND COMPOSITES

SECTION 06 10 53

MISCELLANEOUS ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Roofing nailers.

B. Preservative treated wood materials.

C. Concealed wood blocking, nailers, and supports.

1.02 REFERENCE STANDARDS

A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

B. AWPA U1 - Use Category System: User Specification for Treated Wood; 2023.

C. PS 20 - American Softwood Lumber Standard; 2021.

D. SPIB (GR) - Standard Grading Rules; 2021.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide technical data on wood preservative materials and application instructions.

1.04 DELIVERY, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.

1. If no species is specified, provide species graded by the agency specified; if no grading agency is specified, provide lumber graded by grading agency meeting the specified requirements.

2. Grading Agency: Grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

A. Grading Agency: Southern Pine Inspection Bureau, Inc; SPIB (GR).

B. Sizes: Nominal sizes as indicated on drawings, S4S.

C. Moisture Content: S-dry or MC19.

D. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:

1. Lumber: S4S, No.2 or Standard Grade.

2. Boards: Standard or No.3.

2.03 ACCESSORIES

A. Fasteners and Anchors:

1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.

2.04 FACTORY WOOD TREATMENT

A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.

1. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

B. Preservative Treatment:

1. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative to 0.10 lb/cu ft retention.
   a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
   b. Treat lumber in contact with roofing, flashing, or waterproofing.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.02 BLOCKING, NAILERS, AND SUPPORTS

A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

B. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.

C. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

D. Provide the following specific nonstructural framing and blocking:

1. Cabinets and shelf supports.

END OF SECTION

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

SECTION 07 84 00

FIRESTOPPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Firestopping systems.

1.02 REFERENCE STANDARDS

A. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (Reapproved 2016).

B. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2022.

C. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2023a.

D. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems; 2015 (Reapproved 2019).

E. ASTM E2837 - Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed between Rated Wall Assemblies and Nonrated Horizontal Assemblies; 2023a.

F. ITS (DIR) - Directory of Listed Products; Current Edition.

G. FM 4991 - Approval Standard of Firestop Contractors; 2013.

H. FM (AG) - FM Approval Guide; Current Edition.

I. UL 1479 - Standard for Fire Tests of Penetration Firestops; Current Edition, Including All Revisions.

J. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems; Current Edition, Including All Revisions.

K. UL (FRD) - Fire Resistance Directory; Current Edition.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on product characteristics, performance ratings, and limitations.

C. Manufacturer's qualification statement.

D. Installer's qualification statement.

1.04 QUALITY ASSURANCE

A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.

1. Listing in UL (FRD), FM (AG), or ITS (DIR) will be considered as constituting an acceptable test report.

2. Valid evaluation report published by ICC Evaluation Service, Inc. (ICC-ES) at www.icc-es.org will be considered as constituting an acceptable test report.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

C. Installer Qualifications: Company specializing in performing the work of this section and:

1. Approved by Factory Mutual Research Corporation under FM 4991, or meeting any two of the following requirements:

2. Verification of minimum three years documented experience installing work of this type.

3. Verification of at least five satisfactorily completed projects of comparable size and type.

4. Licensed by local authorities having jurisdiction (AHJ).

1.05 FIELD CONDITIONS

A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation; maintain minimum temperature before, during, and for three days after installation of materials.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Firestopping Manufacturers:

1. 3M Fire Protection Products: www.3m.com/firestop/#sle.

2. CEMCO: www.cemcosteel.com/#sle.

3. Hilti, Inc: www.hilti.com/#sle.

4. MarinoWARE: www.marinoware.com/#sle.

5. RectorSeal, a CSW Industrials Company: www.rectorseal.com/firestop-solutions/#sle.

6. Specified Technologies Inc: www.stifirestop.com/#sle.

7. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com/#sle.

8. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 MATERIALS

A. Firestopping Materials: Any materials meeting requirements.

B. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Provide type of materials as required for tested firestopping assembly.

C. Fire Ratings: Refer to drawings for required systems and ratings.

2.03 FIRESTOPPING ASSEMBLY REQUIREMENTS

A. Head-of-Wall (HW) Joint System Firestopping at Joints Between Fire-Rated Wall Assemblies and Non-Rated Horizontal Assemblies: Use system that has been tested according to ASTM E2837 to have fire resistance F Rating equal to required fire rating of wall assembly.

B. Floor-to-Floor (FF), Floor-to-Wall (FW), Head-of-Wall (HW), and Wall-to-Wall (WW) Joints, Except Perimeter, Where Both Are Fire-Rated: Use system that has been tested according to ASTM E1966 or UL 2079 to have fire resistance F Rating equal to required fire rating of the assembly in which the joint occurs.

C. Through Penetration Firestopping: Use system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.

D. Acoustically Rated Firestopping: Provide system tested in accordance with ASTM E90 with STC rating of 50, minimum.

2.04 FIRESTOPPING FOR FLOOR-TO-FLOOR, FLOOR-TO-WALL, HEAD-OF-WALL, AND WALL-TO-WALL JOINTS

A. Concrete and Concrete Masonry Walls and Floors:

1. Head-of-Wall Joints at Concrete/Concrete Masonry Wall to Concrete Floor:
   a. 2 Hour Construction: UL System HW-D-0268; Hilti CP 606 Flexible Firestop Sealant.
   b. 2 Hour Construction: UL System HW-D-0312; Specified Technologies Inc. SIL Silicone Sealant.

2. Concrete/Concrete Masonry Wall-to-Wall Joint Systems That Have Movement Capabilities (Dynamic-D):
    a. 2 Hour Construction: UL System WW-D-0025; RectorSeal MetaCaulk 1200 Spray.
    b. 2 Hour Construction: UL System WW-D-0027; RectorSeal MetaCaulk 150+.
    c. 2 Hour Construction: UL System WW-D-0110; RectorSeal MetaCaulk 150+.
    d. 2 Hour Construction: UL System WW-D-1077; Tremco, TREMstop Acrylic Firestop Sealant.
    e. 2 Hour Construction: UL System WW-D-0017; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
    f. 2 Hour Construction: UL System WW-D-0032; Hilti CP 606 Flexible Firestop Sealant.

2.05 FIRESTOPPING PENETRATIONS THROUGH CONCRETE AND CONCRETE MASONRY CONSTRUCTION

A. Blank Openings:

1. In Floors or Walls:
    a. 2 Hour Construction: UL System C-AJ-0090; Hilti FS-ONE MAX Intumescent Firestop Sealant.
    b. 2 Hour Construction: UL System C-AJ-0015; Specified Technologies Inc. SSM Mortar.
    c. 2 Hour Construction: UL System C-AJ-0116; Specified Technologies Inc. Composite Sheet.
    d. 2 Hour Construction: UL System C-AJ-0136; Specified Technologies Inc. SSM Mortar.

B. Penetrations Through Floors or Walls By:

1. Multiple Penetrations in Large Openings:
    a. 2 Hour Construction: UL System C-AJ-8143; Hilti FS-ONE MAX Intumescent Firestop Sealant.
    b. 2 Hour Construction: UL System C-AJ-8035; Specified Technologies Inc. SSM Mortar.
    c. 2 Hour Construction: UL System C-AJ-8042; RectorSeal MetaCaulk 1000.
    d. 2 Hour Construction: UL System C-AJ-8055; Specified Technologies Inc. SSP Firestop Putty.
    e. 2 Hour Construction: UL System C-AJ-8093; Specified Technologies Inc. SSB Intumescent Firestop Pillows.
    f. 2 Hour Construction: UL System C-AJ-8114; Specified Technologies Inc. SSM Mortar.
    g. 2 Hour Construction: UL System C-AJ-8115; Specified Technologies Inc. SSM Mortar.
    h. 2 Hour Construction: UL System C-AJ-8129; RectorSeal MetaCaulk 1200 Spray.
    i. 2 Hour Construction: UL System C-AJ-8149; RectorSeal MetaCaulk 1000.
    j. 2 Hour Construction: UL System C-AJ-8171; RectorSeal MetaCaulk Wrap Strip.
    k. 2 Hour Construction: UL System C-AJ-8181; Specified Technologies Inc. Composite Sheet.
    l. 2 Hour Construction: UL System C-AJ-8220; Specified Technologies Inc. SSM Mortar.

2. Uninsulated Metallic Pipe, Conduit, and Tubing:
    a. 2 Hour Construction: UL System C-AJ-1036; RectorSeal MetaCaulk 950.
    b. 2 Hour Construction: UL System C-AJ-1090; Specified Technologies Inc. SSP Firestop Putty.
    c. 2 Hour Construction: UL System C-AJ-1186; RectorSeal MetaCaulk 950.
    d. 2 Hour Construction: UL System C-AJ-1198; Specified Technologies Inc. SIL Silicone Sealant.
    e. 2 Hour Construction: UL System C-AJ-1226; Hilti FS-ONE MAX Intumescent Firestop Sealant.
    f. 2 Hour Construction: UL System C-AJ-1240; Specified Technologies Inc. LC Endothermic Firestop Sealant.
    g. 2 Hour Construction: UL System C-AJ-1425; Hilti CFS-S SIL GG Firestop Silicone Sealant Gun-Grade.
    h. 1 Hour Construction: UL System C-AJ-1039; RectorSeal MetaCaulk 950.

3. Uninsulated Non-Metallic Pipe, Conduit, and Tubing:
    a. 2 Hour Construction: UL System C-AJ-2047; RectorSeal MetaCaulk 1000.
    b. 2 Hour Construction: UL System C-AJ-2167; Hilti FS-ONE MAX Intumescent Firestop Sealant.
    c. 2 Hour Construction: UL System C-AJ-2109; Hilti CP 643N/644 Firestop Collar.
    d. 2 Hour Construction: UL System C-AJ-2106; Specified Technologies Inc. SSW Wrap Strips.
    e. 2 Hour Construction: UL System C-AJ-2282; Specified Technologies Inc. SSW Wrap Strips.
    f. 2 Hour Construction: UL System C-AJ-2297; Specified Technologies Inc. SSC Collars.
    g. 2 Hour Construction: UL System C-AJ-2297; Specified Technologies Inc. SSW Wrap Strips.
    h. 2 Hour Construction: UL System C-AJ-2298; Specified Technologies Inc. LCC Intumescent Firestop Collars.
    i. 2 Hour Construction: UL System C-AJ-2348; RectorSeal MetaCaulk 150+.
    j. 2 Hour Construction: UL System C-AJ-2588; Specified Technologies Inc. RTC Range-Taking Collar.
    k. 2 Hour Construction: UL System C-AJ-2707; RectorSeal MetaCaulk 1000.
    l. 2 Hour Construction: UL System C-AJ-2772; Specified Technologies Inc. SSW Wrap Strips.
    m. 2 Hour Construction: UL System C-BJ-2021; Hilti CP 643N Firestop Collar.

4. Electrical Cables Not In Conduit:
    a. 2 Hour Construction: UL System C-AJ-3213; Specified Technologies Inc. LCC Intumescent Firestop Collars.
    b. 2 Hour Construction: UL System C-AJ-3213; Specified Technologies Inc. SSC Collars.
    c. 2 Hour Construction: UL System W-J-3046; Specified Technologies Inc. SSP Firestop Putty.
    d. 2 Hour Construction: UL System C-AJ-3154; Specified Technologies Inc. SSP Firestop Putty.
    e. 2 Hour Construction: UL System C-AJ-3216; Hilti CFS-PL Firestop Plug.
    f. 2 Hour Construction: UL System C-AJ-3283; Hilti CP653 Speed Sleeve.
    g. 2 Hour Construction: UL System C-AJ-3283; Hilti CFS-SL SK Firestop Sleeve Kit.
    h. 2 Hour Construction: UL System C-AJ-3283; Hilti CFS-SL SK Firestop Sleeve Kit with Hilti CFS-SL GP Gangplate.

i. 2 Hour Construction: UL System W-J-3198; Hilti CFS-SL RK Retrofit Sleeve Kit for Existing Cables.
j. 2 Hour Construction: UL System W-J-3199; Hilti CFS-SL SK Firestop Sleeve Kit.
k. 2 Hour Construction: UL System F-A-3085, F-A-3087, F-A-3088, W-J-3277, W-J-3278, W-J-3279, W-L-3481, W-L-3482, W-L-3483, and W-L-3484.; Hilti CFS-MSL L Modular Sleeve.

5. Cable Trays with Electrical Cables:
   a. 2 Hour Construction: UL System C-AJ-4094; Hilti CFS-BL Firestop Block.

6. Insulated Pipes:
   a. 2 Hour Construction: UL System C-AJ-5048; Hilti FS-ONE MAX Intumescent Firestop Sealant, CP 606 Flexible Firestop Sealant, CP 601S Elastomeric Firestop Sealant, CP 604 Self-Leveling Firestop Sealant or CFS-S SIL GG Firestop Silicone Sealant Gun-Grade.
   b. 2 Hour Construction: UL System C-AJ-5087; Specified Technologies Inc. SSS Intumescent Firestop Sealant.
   c. 2 Hour Construction: UL System C-AJ-5091; Hilti FS-ONE IMAX Intumescent Firestop Sealant.
   d. 2 Hour Construction: UL System C-AJ-5138; Specified Technologies Inc. LCI Intumescent Firestop Sealant.
   e. 2 Hour Construction: UL System C-AJ-5313; Specified Technologies Inc. LC Endothermic Firestop Sealant.

7. HVAC Ducts, Uninsulated:
   a. 2 Hour Construction: UL System C-AJ-7111; Hilti FS-ONE MAX Intumescent Firestop Sealant.

2.06 FIRESTOPPING SYSTEMS

A. Firestopping: Any material meeting requirements.

1. Fire Ratings: Use system that is listed by FM (AG), ITS (DIR), or UL (FRD) and tested in accordance with ASTM E814, ASTM E119, or UL 1479 with F Rating equal to fire rating of penetrated assembly and minimum T Rating Equal to F Rating and in compliance with other specified requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify openings are ready to receive the work of this section.

3.02 PREPARATION

A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other materials that could adversely affect bond of firestopping material.

B. Remove incompatible materials that could adversely affect bond.

3.03 INSTALLATION

A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.

B. Install labeling required by code.

3.04 CLEANING

A. Clean adjacent surfaces of firestopping materials.

3.05 PROTECTION

A. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SECTION 07 92 00

JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Nonsag gunnable joint sealants.

B. Joint backings and accessories.

1.02 RELATED REQUIREMENTS

A. Section 09 21 16 - Gypsum Board Assemblies: Sealing acoustical and sound-rated walls and ceilings.

1.03 REFERENCE STANDARDS

A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2015 (Reapproved 2022).

B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.

C. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016 (Reapproved 2023).

D. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants; 2022.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Submit manufacturer's technical datasheets for each product to be used; include the following:

1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.

2. List of backing materials approved for use with the specific product.

3. Backing material recommended by sealant manufacturer.

4. Substrates that product is known to satisfactorily adhere to and with which it is compatible.

5. Substrates the product should not be used on.

C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.

D. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.

E. Manufacturer's qualification statement.

F. Installer's qualification statement.

G. Executed warranty.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of documented experience.

1.06 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide 2-year manufacturer warranty for installed sealants and accessories that fail to achieve a watertight seal, exhibit loss of adhesion or cohesion, or do not cure. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Nonsag Sealants:

1. Dow: www.dow.com/#sle.
2. Henry Company: www.henry.com/#sle.
3. Hilti, Inc: www.hilti.com/#sle.
4. Pecora Corporation: www.pecora.com/#sle.
5. Sika Corporation: www.usa.sika.com/#sle.
6. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com/#sle.
7. W. R. Meadows, Inc: www.wrmeadows.com/#sle.

2.02 JOINT SEALANT APPLICATIONS

A. Scope:

1. Exterior Joints:
   a. Do not seal exterior joints unless indicated on drawings as sealed.

2. Interior Joints:
   a. Seal the following joints:
      1) Joints between door frames and window frames and adjacent construction.
      2) In sound-rated wall and ceiling assemblies, gaps at electrical outlets, wiring devices, and piping penetrations.
      3) In sound-rated wall and ceiling assemblies, seal joints between wall assemblies and ceiling assemblies; between wall assemblies and other construction; between ceiling assemblies and other construction.

3. Do Not Seal:
   a. Intentional weep holes in masonry.
   b. Joints indicated to be covered with expansion joint cover assemblies.
   c. Joints where sealant installation is specified in other sections.

B. Exterior Joints: Use nonsag nonstaining silicone sealant, unless otherwise indicated.

C. Interior Joints: Use nonsag polyurethane sealant, unless otherwise indicated.

1. Joints between Tile in Wet Areas and Floors, Walls, and Ceilings: Mildew-resistant silicone sealant; white.

D. Interior Wet Areas: Bathrooms and restrooms; fixtures in wet areas include plumbing fixtures, countertops, and other similar items.

2.03 JOINT SEALANTS – GENERAL

A. Sealants and Primers: Provide products with acceptable levels of volatile organic compound (VOC) content; see Section 01 61 16.

2.04 NONSAG JOINT SEALANTS

A. Nonstaining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.

1. Movement Capability: Plus and minus 50 percent, minimum.

2. Nonstaining to Porous Stone: Nonstaining to light-colored natural stone when tested in accordance with ASTM C1248.

3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.

4. Hardness Range: 15 to 35, Shore A, when tested in accordance with ASTM C661.

5. Color: To be selected by Architect from manufacturer's standard range.

B. Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.

1. Color: White.

C. Tamper-Resistant, Silyl-Terminated Polyether (STPE) and Polyurethane (STPU) Sealant: ASTM C920, Grade NS, Uses M and A; single component; not expected to withstand continuous water immersion or traffic.

1. Movement Capability: Plus and minus 50 percent, minimum

2. Hardness Range: 25 to 30, Shore A, when tested in accordance with ASTM C661.

3. Color: To be selected by Architect from manufacturer's standard range.

D. Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; not expected to withstand continuous water immersion or traffic.

1. Movement Capability: Plus and minus 50 percent, minimum.

2.05 ACCESSORIES

A. Sealant Backing Materials, General: Materials placed in joint before applying sealants; assists sealant performance and service life by developing optimum sealant profile and preventing three-sided adhesion; type and size recommended by sealant manufacturer for compatibility with sealant, substrate, and application.

B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.

C. Joint Cleaner: Noncorrosive and nonstaining type, type recommended by sealant manufacturer; compatible with joint forming materials.

D. Primers: Type recommended by sealant manufacturer to suit application; nonstaining.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that joints are ready to receive work.

B. Verify that backing materials are compatible with sealants.

C. Verify that backer rods are of the correct size.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

3.03 INSTALLATION

A. Install this work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Provide joint sealant installations complying with ASTM C1193.

C. Measure joint dimensions and size joint backers to achieve the following, unless otherwise indicated:

1. Width/depth ratio of 2:1.

2. Neck dimension no greater than 1/3 of the joint width.

3. Surface bond area on each side not less than 75 percent of joint width.

D. Install bond breaker backing tape where backer rod cannot be used.

E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.

F. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.

G. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

END OF SECTION

DIVISION 08 - OPENINGS

SECTION 08 06 71

DOOR HARDWARE SCHEDULE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section references specification sections relating to commercial door hardware for the following:

1. Swinging doors.

2. Sliding Doors.

3. Other doors to the extent indicated.

B. Commercial door hardware includes, but is not necessarily limited to, the following:

1. Mechanical door hardware.

2. Electromechanical and access control door hardware.

3. Electromechanical and access control door hardware power supplies, back-ups and surge protection.

4. Automatic operators.

5. Cylinders specified for doors in other sections.

C. Related Sections:

1. Division 08 Section “Door Hardware”.

2. Division 28 Section “Campus Access Control Hardware Devices”.

D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.

2. ICC/IBC - International Building Code.

3. NFPA 70 - National Electrical Code.

4. NFPA 80 - Fire Doors and Windows.

5. NFPA 101 - Life Safety Code.

6. NFPA 105 - Installation of Smoke Door Assemblies.

7. State Building Codes, Local Amendments.

E. Standards: Reference Related Sections for requirements regarding compliance with applicable industry standards.

1.3 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."

2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.

3. Content: Include the following information:
   a. Type, style, function, size, label, hand, and finish of each door hardware item.
   b. Manufacturer of each item.
   c. Fastenings and other pertinent information.
   d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.

e. Explanation of abbreviations, symbols, and codes contained in schedule.
f. Mounting locations for door hardware.
g. Door and frame sizes and materials.

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

C. Keying Schedule: Prepared under the supervision of the Owner, separate schedule detailing final keying instructions for locksets and cylinders in writing. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner to approve submitted keying schedule prior to the ordering of permanent cylinders.

D. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals. The manual to include the name, address, and contact information of the manufacturers providing the hardware and their nearest service representatives. The final copies delivered after completion of the installation test to include "as built" modifications made during installation, checkout, and acceptance.

F. Warranties and Maintenance: Special warranties and maintenance agreements specified in the Related Sections.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.5 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

1.6 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. Refer to “PART 3 – EXECUTION” for required specification sections.

PART 3 - EXECUTION

3.1 DOOR HARDWARE SETS

A. The door hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

1. Quantities listed are for each pair of doors, or for each single door.

2. The supplier is responsible for handing and sizing all products.

3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.

4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.

B. Products listed in the hardware sets shall be supplied by and in accordance with the requirements described in the specification section as noted for each item.

1. Section 08 71 00 – Door Hardware.

2. Section 28 15 00 – Campus Access Control Hardware Devices.

C. Manufacturer's Abbreviations:

1. MK - McKinney
2. PE - Pemko
3. SU - Securitron
4. RO - Rockwood
5. SA - SARGENT
6. OT - Other

Hardware Sets

Set: 02

Doors: 015.6, 015.7, 118A

3	Hinge, Full Mortise	TA2714 [NRP] FT	US26D	MK 087100
1	Storeroom/Closet Lock	11727P 8204 LNL	US26D	SA 087100
1	Core	Type/qty as required	US15	SA 087100
1	Surface Closer	351 O/P3 (Arm to suit)	EN	SA 087100
1	Kick Plate	K1050 10" high BEV CSK	US32D	RO 087100
1	Wall Stop	RM860/RM861 (As Required)	US26D	RO 087100
1	Gasketing	S88BL (Head & Jambs)		PE 087100

Set: 02.1

Doors: 013.4

3	Hinge, Full Mortise	TA2714 [NRP] FT	US26D	MK 087100
1	Storeroom/Closet Lock	11727P 8204 LNL	US26D	SA 087100

1	Core	Type/qty as required	US15	SA 087100
1	Concealed Overhead Stop	690S (Size to opening)	EN	SA 087100
1	Kick Plate	K1050 10" high BEV CSK	US32D	RO 087100
1	Wall Stop	RM860/RM861 (As Required)	US26D	RO 087100
1	Gasketing	S88BL (Head & Jambs)		PE 087100
3	Silencer	608		RO 087100

Set: 02.2

Doors: 011.3, 012.2

3	Hinge, Full Mortise	TA2714 [NRP] FT	US26D	MK 087100
1	Storeroom/Closet Lock	11727P 8204 LNL	US26D	SA 087100
1	Core	Type/qty as required	US15	SA 087100
1	Surface Overhead Stop	590S (Size to opening)	EN	SA 087100
1	Surface Closer	351 O/P3 (Arm to suit)	EN	SA 087100
1	Kick Plate	K1050 10" high BEV CSK	US32D	RO 087100
1	Wall Stop	RM860/RM861 (As Required)	US26D	RO 087100
1	Gasketing	S88BL (Head & Jambs)		PE 087100
3	Silencer	608		RO 087100

Set: 03

Doors: 301.1A, 301.1B

3	Hinge, Full Mortise	TA2714 [NRP] FT	US26D	MK 087100
1	Classroom Lock	11727P 8237 LNL	US26D	SA 087100
1	Core	Type/qty as required	US15	SA 087100
1	Surface Closer	351 O/P3 (Arm to suit)	EN	SA 087100

1	Electromagnetic Holder	1560/1561 (As required)	EN	SA	087100
1	Kick Plate	K1050 10" high BEV CSK	US32D	RO	087100
1	Gasketing	S88BL (Head & Jambs)		PE	087100

Set: 04

Doors: 011.5, 015.5, 301.9

3	Hinge, Full Mortise	TA2714 [NRP] FT	US26D	MK	087100
1	Finger Protection	FSR6000 x Length Required	C	PE	087100
1	Institutional Privacy Lock	11727P LB V21 8267 LNL	US26D	SA	087100
1	Core	Type/qty as required	US15	SA	087100
1	Surface Closer	351 O/P3 (Arm to suit)	EN	SA	087100
1	Kick Plate	K1050 10" high BEV CSK	US32D	RO	087100
1	Wall Stop	RM860/RM861 (As Required)	US26D	RO	087100
1	Gasketing	S88BL (Head & Jambs)		PE	087100
1	Coat Hook	RM801	US26D	RO	087100

Set: 04.1

Doors: 013.3, 015.4

3	Hinge, Full Mortise	TA2714 [NRP] FT	US26D	MK	087100
1	Institutional Privacy Lock	11727P LB V21 8267 LNL	US26D	SA	087100
1	Core	Type/qty as required	US15	SA	087100
1	Concealed Overhead Stop	690S (Size to opening)	EN	SA	087100
1	Surface Closer	351 O/P3 (Arm to suit)	EN	SA	087100
1	Kick Plate	K1050 10" high BEV CSK	US32D	RO	087100

1	Gasketing	S88BL (Head & Jambs)		PE	087100
1	Coat Hook	RM801	US26D	RO	087100

Set: 04.2

Doors: 001.1, 002.1, 003.1, 004.1, 005.1, 006.1, 007.1, 008.1, 010.1, 012.1

3	Hinge, Full Mortise	TA2714 [NRP] FT	US26D	MK	087100
1	Finger Protection	FSR6000 x Length Required	C	PE	087100
1	Institutional Privacy Lock	11727P LB V21 8267 LNL	US26D	SA	087100
1	Core	Type/qty as required	US15	SA	087100
1	Wall Stop	RM860/RM861 (As Required)	US26D	RO	087100
1	Gasketing	S88BL (Head & Jambs)		PE	087100
1	Coat Hook	RM801	US26D	RO	087100

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Set: 05

Doors: 015.10

1	Continuous Hinge	CFM_SLF-HD1 PT x Length Required		PE	087100
1	Electric Power Transfer	EL-CEPT	630	SU	087100
1	Access Control Mort Lock	11727P SN200-82271-24V LNL	US26D	SA	281500
2	Core	Type/qty as required	US15	SA	087100
1	Concealed Overhead Stop	690S (Size to opening)	EN	SA	087100
1	Surface Closer	281 P10	EN	SA	087100
1	Drop Plate	As required	EN	SA	087100
1	Blade Stop Spacer Kit	As required	EN	SA	087100
1	ElectroLynx Harness - Frame	QC-C1500P		MK	087100
1	ElectroLynx Harness - Door	QC-CXXX (Size as required)		MK	087100
1	Power Supply	AQL4-R8E1 x Relays as Required		SU	087100

1 Wiring Diagram	Elevation and Point to Point as Specified		OT 087100

Notes: Perimeter and meeting stile gasket by door / frame manufacturer.
Operational narrative: Authorized access by valid credential or key retracting latchbolt. Free egress. REX switch allows exit without alarm condition. Door position switches monitor open/closed status. Door remains latched and secure in event of power loss or fire alarm.

Set: 06

Doors: 011.1, 011.4, 011.6, 013.1, 013.2, 015.2, 015.3, 015.8, 015.9

3 Hinge, Full Mortise	TA2714 [NRP] FT	US26D	MK 087100
1 Office/Entry Lock	11727P 8205 LNL	US26D	SA 087100
1 Core	Type/qty as required	US15	SA 087100
1 Wall Stop	RM860/RM861 (As Required)	US26D	RO 087100
3 Silencer	608		RO 087100
1 Coat Hook	RM801	US26D	RO 087100

Set: 06.1

Doors: 301.9

3 Hinge, Full Mortise	TA2714 [NRP] FT	US26D	MK 087100
1 Office/Entry Lock	11727P 8205 LNL	US26D	SA 087100
1 Core	Type/qty as required	US15	SA 087100
1 Surface Closer	351 CPS	EN	SA 087100
1 Gasketing	S88BL (Head & Jambs)		PE 087100
1 Coat Hook	RM801	US26D	RO 087100

Set: 07

Doors: 011, 015.1, 015.1A

3 Hinge, Full Mortise	TA2714 [NRP] FT	US26D	MK 087100
1 Office/Entry Lock	11727P 8205 LNL	US26D	SA 087100
1 Core	Type/qty as required	US15	SA 087100
1 Surface Closer	351 O/P3 (Arm to suit)	EN	SA 087100
1 Wall Stop	RM860/RM861 (As	US26D	RO 087100

		Required)			
1	Gasketing	S88BL (Head & Jambs)		PE	087100

Set: 08

Doors: 118

6	Hinge, Full Mortise	TA2714 [NRP] FT	US26D	MK	087100
1	Dust Proof Strike	570	US26D	RO	087100
2	Flush Bolt	555	US26D	RO	087100
1	Classroom Lock	11727P 8237 LNL	US26D	SA	087100
1	Core	Type/qty as required	US15	SA	087100
2	Kick Plate	K1050 10" high BEV CSK	US32D	RO	087100
2	Wall Stop	RM860/RM861 (As Required)	US26D	RO	087100
3	Silencer	608		RO	087100

Notes: Ensure closer is mounted to provide 180° swing.
Holder connected to alarm system to release upon fire alarm or loss of power.

Set: 09

Doors: 015.10A, V1

1	Continuous Hinge	CFM_SLF-HD1 PT x Length Required		PE	087100
1	Electric Power Transfer	EL-CEPT	630	SU	087100
1	Rim Exit Device	11727P 16 56-SN200-PE8804 FSL	US32D	SA	281500
2	Core	Type/qty as required	US15	SA	087100
1	Concealed Overhead Stop	690S (Size to opening)	EN	SA	087100
1	Surface Closer	281 P10	EN	SA	087100
1	Drop Plate	As required	EN	SA	087100
1	Blade Stop Spacer Kit	As required	EN	SA	087100
1	ElectroLynx Harness - Frame	QC-C1500P		MK	087100
1	ElectroLynx Harness - Door	QC-CXXX (Size as required)		MK	087100

1	Position Switch	DPS - M/W	SU 087100
1	Power Supply	AQL4-R8E1 x Relays as Required	SU 087100
1	Wiring Diagram	Elevation and Point to Point as Specified	OT 087100

Notes: Perimeter and meeting stile gasket by door / frame manufacturer.
Operational narrative: Authorized access by valid credential or key retracting latchbolt. Free egress. REX switch allows exit without alarm condition. Door position switches monitor open/closed status. Door remains latched and secure in event of power loss or fire alarm.

END OF SECTION

SECTION 08 11 13

HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Hollow metal frames for wood doors.

B. Fire-rated hollow metal doors and frames.

C. Hollow metal borrowed lites glazing frames.

1.02 RELATED REQUIREMENTS

A. Section 08 71 00 - Door Hardware.

B. Section 08 80 00 - Glazing: Glass for doors and borrowed lites.

1.03 REFERENCE STANDARDS

A. ADA Standards – 2010 ADA Standards for Accessible Design; 2010.

B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2024.

C. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2023.

D. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2020.

E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.

F. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2023, with Editorial Revision.

G. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2023.

H. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2020.

I. ASTM C476 - Standard Specification for Grout for Masonry; 2023.

J. BHMA A156.115 - Hardware Preparation in Steel Doors and Frames; 2016.

K. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

L. ITS (DIR) - Directory of Listed Products; Current Edition.

M. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.

N. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.

O. NAAMM HMMA 840 - Guide Specifications for Receipt, Storage and Installation of Hollow Metal Doors and Frames; 2024.

P. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; 2014.

Q. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2025.

R. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2022.

S. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames; 2023.

T. UL (DIR) - Online Certifications Directory; Current Edition.

U. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced standards/guidelines.

C. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Provide hollow metal doors and frames from SDI Certified manufacturer: https://steeldoor.org/sdi-certified/#sle.

B. Maintain at project site copies of reference standards relating to installation of products specified.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.

B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Hollow Metal Doors and Frames:

1. Ceco Door, an Assa Abloy Group company: www.assaabloydss.com/#sle.

2. Curries, an Assa Abloy Group company: www.assaabloydss.com/#sle.

3. Premier Steel Doors and Frames: www.trustpremier.com/#sle.

4. Republic Doors, an Allegion brand: www.republicdoor.com/#sle.

5. Steelcraft, an Allegion brand: www.allegion.com/#sle.

6. Pioneer Industries.

2.02 PERFORMANCE REQUIREMENTS

A. Requirements for Hollow Metal Doors and Frames:

1. Steel Sheet: Comply with one or more of the following requirements; galvannealed steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.

2. Accessibility: Comply with ICC A117.1 and ADA Standards.

3. Door Edge Profile: Manufacturers standard for application indicated.

4. Typical Door Face Sheets: Flush.

5. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings. Style: Manufacturer's standard.

6. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.

B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.03 HOLLOW METAL DOORS

A. Door Finish: Factory primed and field finished.

B. Fire-Rated Doors:

1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
   a. Level 2 - Heavy-duty.
   b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
   c. Model 1 - Full Flush.
   d. Door Face Metal Thickness: 18 gauge, 0.042 inch, minimum.

2. Fire Rating: As indicated on Door Schedule, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").

3. Provide units listed and labeled by UL (DIR) or ITS (DIR).
   a. Attach fire rating label to each fire rated unit.

4. Door Core Material: Manufacturers standard core material/construction in compliance with requirements.

5. Door Thickness: 1-3/4 inches, nominal.

2.04 HOLLOW METAL FRAMES

A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.

B. Frame Finish: Factory primed and field finished.

C. Door Frames, Fire-Rated: Full profile/continuously welded type.

1. Fire Rating: Same as door, labeled.

2. Frame Metal Thickness: 16 gauge, 0.053 inch, minimum.

D. Frames for Wood Doors: Comply with frame requirements in accordance with corresponding door.

E. Borrowed Lites Glazing Frames: Construction and face dimensions to match door frames, and as indicated on drawings.

F. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.

G. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inches high to fill opening without cutting masonry units.

H. Frames Wider than 48 inches: Reinforce with steel channel fitted tightly into frame head, flush with top.

2.05 FINISHES

A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

2.06 ACCESSORIES

A. Glazing: As specified in Section 08 80 00, factory installed.

B. Removable Stops: Formed sheet steel, shape as indicated on drawings, mitered or butted corners; prepared for countersink style tamper proof screws.

C. Astragals for Double Doors: Specified in Section 08 71 00.

D. Grout for Frames: Mortar grout complying with ASTM C476 with maximum slump of 4 inches as measured in accordance with ASTM C143/C143M for hand troweling in place; plaster grout and thinner pumpable grout are prohibited.

E. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.

F. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Verify that finished walls are in plane to ensure proper door alignment.

3.02 PREPARATION

A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.03 INSTALLATION

A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.

B. Install fire rated units in accordance with NFPA 80.

C. Coordinate frame anchor placement with wall construction.

D. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.

E. Install door hardware as specified in Section 08 71 00.

F. Comply with glazing installation requirements of Section 08 80 00.

G. Coordinate installation of electrical connections to electrical hardware items.

H. Touch up damaged factory finishes.

3.04 TOLERANCES

A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.

B. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.05 ADJUSTING

A. Adjust for smooth and balanced door movement.

END OF SECTION

SECTION 08 11 16

ALUMINUM DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Flush aluminum doors with fiberglass reinforced plastic (FRP) face sheets.

B. Aluminum frames.

C. Flush door panels.

1.02 RELATED REQUIREMENTS

A. Section 07 92 00 - Joint Sealants: Sealing joints between door frames and adjacent construction.

B. Section 08 71 00 - Door Hardware: Hardware for aluminum doors.

C. Section 08 80 00 - Glazing: Glazing materials for aluminum doors and frames.

1.03 REFERENCE STANDARDS

A. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document); 2015.

B. AAMA 611 - Specification for Anodized Architectural Aluminum; 2024.

C. AAMA 701/702 - Performance Specification for Pile Weatherstrips (AAMA 701) and Polymer Weatherseals (AAMA 702); 2023.

D. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

E. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

F. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.

G. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

H. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.

I. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.

J. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's descriptive literature for each type of door; include information on fabrication methods.

C. Shop Drawings: Include elevations of each opening type.

1. Verify dimensions by field measurements before fabrication and indicate on shop drawings.

D. Selection Samples: Complete set of color and finish options, using actual materials, for Architect's selection.

E. Manufacturer's qualification statement.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with not less than five years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver aluminum components in manufacturer's standard protective packaging, palleted, crated, or banded together.

B. Inspect delivered components for damage and replace. Repaired components will not be accepted.

C. Store components in clean, dry, indoor area, under cover in manufacturer's packaging until installation.

D. Protect materials and finish from damage during handling and installation.

1.07 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide 10-year manufacturer warranty for defects in workmanship and materials. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Flush Aluminum Doors with Fiberglass Reinforced Plastic (FRP) Face Sheets:

1. Cline Aluminum Doors, Inc; Series 200BE (FRP Facer): www.clinedoors.com/#sle.

2. Special-Lite, Inc; SL-17: www.special-lite.com/#sle.

3. FRP Architectural Doors, Inc.: FD55; www.frparch.com .

4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Aluminum Frames:

1. Arcadia, Inc: www.arcadiainc.com/#sle.

2. Cline Aluminum Doors, Inc: www.clinedoors.com/#sle.

3. EFCO Corporation: www.efcocorp,com.

4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 DOORS AND FRAMES

A. Accessibility: Comply with ICC A117.1 and ADA Standards.

B. Flush Aluminum Doors with Fiberglass Reinforced Plastic (FRP) Face Sheets: Aluminum internal framing; no steel components.

1. Thickness: 1-3/4 inches.

2. Aluminum Finish: Class I - Natural anodized.

3. Facing: Seamless, ultraviolet stabilized laminated FRP sheet.
   a. Sheet Thickness: 0.12 inch, minimum.
   b. Texture - FRP: Pebble grain.
   c. Surface Burning Characteristics: Flame spread index (FSI) of 0 to 25, Class A, and smoke developed index (SDI) of 450 or less; when tested in accordance with ASTM E84.
   d. Color: As selected by Architect from manufacturer's standard line.

4. Core: Poured-in-place polyurethane foam.
   a. Foam Plastic Insulated Doors: IBC 2603.4.
      1) Foam plastic shall be separated from the interior of a building by an approved thermal barrier.
      2) Approved thermal barrier must meet the acceptance criteria of the Temperature Transmission Fire Test and Integrity Fire Test as stated in NFPA 275.

3) IBC 2603.4.1.7 foam plastic insulation, having a flame spread index less than 75 and a smoke developed index of not more than 450 shall be permitted as a door core when the face is metal minimum 0.032" aluminum or 0.016" steel.
4) Standard door assembly can be tested to show it meets these requirements without the use of thermal barrier. If no independent testing conducted all doors with foam plastic core must have a thermal barrier.

C. Aluminum Frames for Doors, Sidelights, or Transoms: Extruded aluminum, non-thermally broken hollow or C-shaped sections; no steel components.

1. Frame Depth: 4-1/4 inches, unless noted otherwise on drawings.

2. Finish: Class I - Natural anodized.

3. Weatherstripping: Replaceable pile type; at jambs and head.

D. Dimensions and Shapes: As indicated on drawings; dimensions indicated are nominal.

1. Provide vision lites as indicated on drawings.

2. Provide the following clearances:
   a. Hinge and Lock Stiles: 1/8 inch.
   b. Between Meeting Stiles: 1/4 inch.
   c. At Top Rail and Bottom Rail: 1/8 inch.

2.03 COMPONENTS

A. Flush Door Panels: Without visible seams on face sheet.

1. Framing and Hardware Backup: Extruded aluminum tubing, 1/8 inch minimum thickness.

2. Perimeter Edges: Extruded aluminum cap.

3. Laminating Adhesive: Manufacturer's standard low-VOC materials.

B. Frames: Extruded aluminum shapes, not less than 0.062 inch thick, reinforced at hinge and strike locations.

1. Corner Brackets: Extruded aluminum, fastened with stainless steel screws.

2. Trim: Extruded aluminum, not less than 0.062 inch thick, removable snap-in type without exposed fasteners.

C. Vision Lites: Extruded aluminum framed, gasket glazed.

1. Glazing: See Section 08 80 00.

D. Additional Door Hardware: See Section 08 71 00.

E. Replaceable Weatherstripping: AAMA 701/702 wool pile.

2.04 MATERIALS

A. Aluminum Sheet: ASTM B209/B209M, alloy 5005, temper H14, stretcher leveled.

B. Extruded Aluminum: ASTM B221 (ASTM B221M), alloy 6063, temper T5, or alloy 6463, temper T5.

2.05 FINISHES

A. Class I Natural Anodized Finish: Clear anodic coating; AAMA 611 AA-M12C22A41, minimum dry film thickness (DFT) of 0.7 mils, 0.0007 inch.

B. Touch-Up Materials: As recommended by coating manufacturer for field application.

2.06 ACCESSORIES

A. Fasteners: Aluminum, non-magnetic stainless steel, or other material warranted by manufacturer as non-corrosive and compatible with aluminum components.

B. Brackets and Reinforcements: Manufacturer's high-strength aluminum units where feasible, otherwise, non-magnetic stainless steel or steel hot-dip galvanized in compliance with ASTM A123/A123M.

C. Bituminous Coating: Cold-applied asphaltic mastic, compounded for 30-mil thickness per coat.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that wall surfaces and openings are ready to receive frames and are within tolerances specified in manufacturer's instructions.

3.02 PREPARATION

A. Perform cutting, fitting, forming, drilling, and grinding of frames as required for project conditions.

B. Replace components with damage to exposed finishes.

C. Separate dissimilar metals to prevent electrolytic action between metals.

3.03 INSTALLATION

A. Install doors and frames in accordance with manufacturer's instructions and approved shop drawings.

B. Set frames plumb, square, level, and aligned to receive doors. Anchor frames to adjacent construction in strict accordance with manufacturer's recommendations and within specified tolerances.

C. Where aluminum surfaces contact metals other than stainless steel, zinc, or small areas of white bronze, protect from direct contact by painting dissimilar metal with heavy coating of bituminous paint.

D. Hang doors and adjust hardware to achieve specified clearances and proper door operation.

E. Install door hardware. See Section 08 71 00.

F. Comply with glazing installation requirements. See Section 08 80 00.

3.04 CLEANING

A. Upon completion of installation, thoroughly clean door and frame surfaces in accordance with AAMA 609 & 610.

B. Do not use abrasive, caustic, or acid cleaning agents.

3.05 PROTECTION

A. Protect products of this section from damage caused by subsequent construction until Date of Substantial Completion.

B. Replace damaged or defective components that cannot be repaired to a condition indistinguishable from undamaged components.

END OF SECTION

SECTION 08 14 16

FLUSH WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Flush wood doors; flush configuration; fire-rated and non-rated.

1.02 RELATED REQUIREMENTS

A. Section 08 11 13 - Hollow Metal Doors and Frames.

B. Section 08 71 00 - Door Hardware.

1.03 REFERENCE STANDARDS

A. AWI (QCP) - Quality Certification Program; Current Edition.

B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).

C. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.

D. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2025.

E. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.

C. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.

1. Provide information as required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).

D. Samples: Submit two samples of door veneer, 4 by 4 inches in size illustrating wood grain, stain color, and sheen.

E. Certificate: Submit labels and certificates required by quality assurance and quality control programs.

F. Manufacturer's qualification statement.

G. Installer's qualification statement.

H. Specimen warranty.

I. Warranty, executed in Owner's name.

1.05 QUALITY ASSURANCE

A. Maintain one copy of the specified door quality standard on site for review during installation and finishing.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with not less than three years of documented experience.

1. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.

C. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.

D. Woodwork Quality Assurance Program:

1. Comply with AWI (QCP) woodwork association quality assurance service/program in accordance with requirements for work specified in this section; www.awiqcp.org/#sle.

2. Provide labels indicating that the installed work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.

3. Provide designated labels on shop drawings as required by quality assurance program.

4. Provide designated labels on installed products as required by quality assurance program.

5. Submit documentation upon completion of installation that verifies this work is in compliance with specified requirements.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Package, deliver and store doors in accordance with specified quality standard.

B. Accept doors on site in manufacturer's packaging, and inspect for damage.

C. Protect doors with resilient packaging sealed with heat shrunk plastic; do not store in damp or wet areas or areas where sunlight might bleach veneer; seal top and bottom edges with tinted sealer if stored more than one week, and break seal on site to permit ventilation.

1.07 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide manufacturer's warranty on interior doors for the life of the installation. Complete forms in Owner's name and register with manufacturer.

1. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Wood Veneer Faced Doors:

1. Masonite Architectural: www.architectural.masonite.com/#sle.

2. VT Industries, Inc: www.vtindustries.com/#sle.

3. Eggers Industries: www.eggersindustries.com.

4. Graham Wood Doors: www.grahamdoors.com.

5. Marshfield Door Systems, Inc: www.marshfielddoors.com.

6. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 DOORS AND PANELS

A. Doors: See drawings for locations and additional requirements.

1. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.

B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.

1. Provide solid core doors at each location.

2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with UL 10C - Positive Pressure; Underwriters Laboratories Inc (UL) or Intertek/Warnock Hersey (WHI) labeled without any visible seals when door is open.

2.03 DOOR AND PANEL CORES

A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated.

B. Fire-Rated Doors: Mineral core type, with fire resistant composite core (FD), plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.

2.04 DOOR FACINGS

A. Veneer Facing for Transparent Finish: White birch, veneer grade in accordance with quality standard indicated, plain sliced (flat cut), with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.

1. Vertical Edges: Same species as face veneer.

2. "Running Match" each pair of doors and doors in close proximity to each other.

3. "Pair Match" each pair of doors; "Set Match" pairs of doors within 10 feet of each other when doors are closed.

2.05 DOOR CONSTRUCTION

A. Fabricate doors in accordance with door quality standard specified.

B. Cores Constructed with stiles and rails:

1. Provide solid blocks at lock edge for hardware reinforcement.

2. Provide solid blocking for other throughbolted hardware.

C. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.

D. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.

E. Provide edge clearances in accordance with the quality standard specified.

2.06 FINISHES - WOOD VENEER DOORS

A. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:

B. Factory finish doors in accordance with approved sample.

2.07 ACCESSORIES

A. Hollow Metal Door Frames: See Section 08 11 13.

B. Door Hardware: See Section 08 71 00.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.02 INSTALLATION

A. Install doors in accordance with manufacturer's instructions and specified quality standard.

1. Install fire-rated doors in accordance with NFPA 80 requirements.

B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.

C. Use machine tools to cut or drill for hardware.

D. Coordinate installation of doors with installation of frames and hardware.

3.03 TOLERANCES

A. Comply with specified quality standard for fit and clearance tolerances.

B. Comply with specified quality standard for telegraphing, warp, and squareness.

3.04 ADJUSTING

A. Adjust doors for smooth and balanced door movement.

B. Adjust closers for full closure.

END OF SECTION

SECTION 08 33 13

COILING COUNTER DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fire-rated coiling counter doors and operating hardware.

B. Electric motor operation; wiring from electric circuit disconnect to operator to control station.

1.02 RELATED REQUIREMENTS

A. Section 08 71 00 - Door Hardware: Cylinder cores and keys.

B. Section 26 05 83 - Wiring Connections: Power to disconnect.

C. Section 28 46 00 - Fire Detection and Alarm: Fire alarm interconnection.

1.03 REFERENCE STANDARDS

A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.

B. ITS (DIR) - Directory of Listed Products; Current Edition.

C. NEMA MG 1 - Motors and Generators; 2021.

D. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2025.

E. UL (DIR) - Online Certifications Directory; Current Edition.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Submit manufacturer's standard literature showing materials and details of construction and finish. Include data on electrical operation.

C. Shop Drawings: Indicate rough and actual opening dimensions, anchorage methods, hardware locations, and installation details.

D. Samples: Two slats, 4 inches long, illustrating shape, color, and finish texture.

E. Manufacturer's qualification statement.

F. Specimen warranty.

G. Operation and Maintenance Data: Indicate modes of operation, lubrication requirements and frequency, and periodic adjustments required.

H. Project Record Documents: Include as-built electrical diagrams for electrical operation and connection to fire alarm system.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

B. Products Requiring Electrical Connection: Listed and classified by ITS (DIR), UL (DIR), or testing firm acceptable to authorities having jurisdiction as suitable for the purpose specified in this section and indicated on the drawings.

1.06 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide 2-year manufacturer warranty for counterbalance shaft assembly. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Coiling Counter Fire Doors:

1. Overhead Door Corporation; Fire-Rated Counter Door - Model 640: www.overheaddoor.com/#sle.

2. Clopay Building Products; Model CERC11: www.clopaydoor.com/#sle.

3. Cornell Iron Works, Inc; Model ERC11: www.cornelliron.com/#sle.

4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 COILING COUNTER DOORS

A. Coiling Counter Metal Doors, Fire-Rated: Stainless steel slat curtain.

1. Mounting: Between jambs, within prepared opening.

2. Fire Rating: 3/4 hour; comply with NFPA 80.

3. Nominal Slat Size: 1-1/4 inches wide.

4. Slat Profile: Flat.

5. Finish: Galvanized steel, factory primed.

6. Guides: Formed track; same material and finish unless otherwise indicated.

7. Hood Enclosure: Manufacturer's standard; primed steel.

8. Fire Release Mechanism: Motorized door release device, actuated by fire alarm system.

9. Electric operation.

10. Locking Devices: Lock and latch handle on outside.

2.03 COMPONENTS

A. Metal Curtain Construction: Interlocking, single-thickness slats.

1. Slat Ends: Alternate slats fitted with end locks to act as wearing surface in guides and to prevent lateral movement.

2. Curtain Bottom: Fitted with angles to provide reinforcement and positive contact in closed position.

3. Steel Slats: ASTM A653/A653M galvanized steel sheet, with minimum G90/Z275 coating; minimum thickness 16 gauge, 0.06 inch..

B. Guide Construction: Continuous, of profile to retain door in place, with mounting brackets of same metal.

1. Guides for Galvanized Curtains: ASTM A36/A36M steel angles, size as indicated, hot-dip galvanized per ASTM A123/A123M.

C. Hood Enclosure: Internally reinforced to maintain rigidity and shape.

D. Lock Hardware:

1. Cylindrical Locking Mechanism: Latchset lock cylinder, specified in Section 08 71 00.

2. For motor operated units, additional lock or latching mechanisms are not required.

3. Latch Handle: Manufacturer's standard.

E. Roller Shaft Counterbalance: Steel pipe and torsion steel spring system, capable of producing torque sufficient to ensure smooth operation of curtain from any position and capable of holding position at mid-travel; with adjustable spring tension; requiring 25 lb nominal force to operate.

2.04 ELECTRIC OPERATION

A. Operator, Controls, Actuators, and Safeties: Listed and classified by ITS (DIR), UL (DIR), or testing agency acceptable to authorities having jurisdiction (AHJ) as suitable for purpose specified and indicated.

1. Provide interlock switches on motor operated units.

B. Electric Operators:

1. Mounting: Side mounted.

2. Motor Enclosure: NEMA MG 1.

3. Motor Rating: As recommended by manufacturer; continuous duty.

4. Motor Voltage: 110-120 VAC, single phase, 60 Hz.

5. Opening Speed: 6 inches per second.

6. Manual override in case of power failure.

C. Control Station: Standard key operated switch momentary control for each electrical operator.

1. Controls: 24 VAC circuit.

2. Surface mounted.

D. Safety Edge: Located at bottom of curtain, full width, electro-mechanical sensitized type, wired to stop operator upon striking object, hollow neoprene covered.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that adjacent construction is suitable for door installation.

B. Verify that electrical services have been installed and are accessible.

C. Verify that door opening is plumb, header is level, and dimensions are correct.

D. Notify Architect of any unacceptable conditions or varying dimensions.

E. Commencement of installation indicates acceptance of substrate and door opening conditions.

3.02 INSTALLATION

A. Install units in accordance with manufacturer's instructions.

B. Install fire-rated doors in accordance with NFPA 80.

C. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.

D. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.

E. Fit and align assembly including hardware; level and plumb, to provide smooth operation.

F. Coordinate installation of electrical service with Section 26 05 83.

G. Complete wiring from disconnect to unit components.

H. Complete wiring from fire alarm system .

3.03 TOLERANCES

A. Maintain dimensional tolerances and alignment with adjacent work.

B. Maximum Variation From Plumb: 1/16 inch.

C. Maximum Variation From Level: 1/16 inch.

D. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch per 10 ft straight edge.

3.04 ADJUSTING

A. Adjust operating assemblies for smooth and noiseless operation.

3.05 CLEANING

A. Clean installed components.

B. Remove labels and visible markings.

END OF SECTION

SECTION 08 33 23

OVERHEAD COILING DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fire-rated coiling doors.

B. Electric operators and control stations.

C. Wiring from electric circuit disconnect to operators and control stations.

1.02 RELATED REQUIREMENTS

A. Section 08 71 00 - Door Hardware: Cylinder cores and keys.

B. Section 26 05 83 - Wiring Connections: Power to disconnect.

C. Section 28 46 00 - Fire Detection and Alarm: Fire alarm interconnection.

1.03 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

B. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.

C. ITS (DIR) - Directory of Listed Products; Current Edition.

D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2020.

E. NEMA ICS 2 - Industrial Control and Systems Controllers, Contactors and Overload Relays Rated 600 Volts; 2008 (Reaffirmed 2020).

F. NEMA MG 1 - Motors and Generators; 2021.

G. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2025.

H. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives; 2025.

I. UL (DIR) - Online Certifications Directory; Current Edition.

J. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; Current Edition, Including All Revisions.

K. UL 1784 - Standard for Air Leakage Tests of Door Assemblies; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide general construction, electrical equipment, and component connections and details.

C. Shop Drawings: Indicate pertinent dimensioning, anchorage methods, hardware locations, and installation details.

D. Samples: Two slats, 2 by 4 inches in size illustrating shape, color and finish texture.

E. Manufacturer's qualification statement.

F. Maintenance Data: Indicate lubrication requirements and frequency, periodic adjustments required.

G. Specimen warranty.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

B. Products Requiring Electrical Connection: Listed and classified by ITS (DIR), UL (DIR), or testing firm acceptable to authorities having jurisdiction as suitable for purpose specified and indicated.

1.06 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide 2-year manufacturer warranty for roller shaft counterbalance assembly. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Overhead Coiling Fire Doors:

1. Clopay Building Products; Model CERD11: www.clopaydoor.com/#sle.

2. Cornell Iron Works, Inc; Model ERD11: www.cornelliron.com/#sle.

3. Overhead Door Corporation; FireKing Model 630 Fire Doors: www.overheaddoor.com/#sle.

4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 COILING DOORS

A. Fire-Rated Coiling Doors: Stainless steel slat curtain; comply with NFPA 80.

1. 3/4 hour fire rating.
   a. Provide smoke and draft control door assemblies tested in accordance with UL 1784.

2. Provide products listed and labeled by ITS (DIR) or UL (DIR) as suitable for purpose specified and indicated on drawings.

3. Oversized Openings: Provide certificate of compliance from authorities having jurisdiction indicating approval of fire rated units and operating hardware assembly.

4. Single Thickness Slats: Manufacturer's standard.
   a. Nominal Slat Size: 2 inches wide by required length.

5. Finish: Primed.

6. Guides, Angles: Primed steel.

7. Hood Enclosure: Manufacturer's standard; primed steel.

8. Coiling Door Release Mechanism: Fire alarm system activated with automatically governed closing speed.

9. Electric operation.

10. Mounting: Surface mounted.

11. Locking Devices: Lock and latch handle on outside.

2.03 MATERIALS

A. Metal Curtain Construction: Interlocking slats.

1. Curtain Bottom for Slat Curtains: Fitted with angles to provide reinforcement and positive contact in closed position.

2. Smoke Seals: Provide brush or gasket type weatherstripping seals to prevent passage of smoke and hot gases in compliance with UL 1784 testing requirements.

3. Steel Slats: Minimum thickness, 20 gauge, 0.0396 inch, complying with ASTM A 653, galvanized steelr.

B. Guide Construction: Continuous, of profile to retain door in place with snap-on trim, mounting brackets of same metal.

C. Guides - Angle: ASTM A36/A36M metal angles, size as indicated.

1. Prime painted.

D. Hood Enclosure and Trim: Internally reinforced to maintain rigidity and shape.

E. Lock Hardware:

1. Cylindrical Locking Mechanism: Latchset lock cylinder, specified in Section 08 71 00.

2. For motor operated units, additional lock or latching mechanisms are not required.

3. Latch Handle: Manufacturer's standard.

2.04 ELECTRIC OPERATION

A. Operator, Controls, Actuators, and Safeties: Comply with UL 325; provide products listed by ITS (DIR), UL (DIR), or testing agency acceptable to authorities having jurisdiction.

1. Provide interlock switches on motor operated units.

B. Electric Operators:

1. Mounting: Side mounted.

2. Motor Enclosure:
   a. Interior Coiling Doors: NEMA MG 1, Type 1; open drip proof.

3. Motor Rating: 1/3 HP; continuous duty.

4. Motor Voltage: 120 volts, single phase, 60 Hz.

5. Motor Controller: NEMA ICS 2, full voltage, reversing magnetic motor starter.

6. Controller Enclosure: NEMA 250, Type 4.

7. Opening Speed: 12 inches per second.

8. Brake: Manufacturer's standard type, activated by motor controller.

9. Manual override in case of power failure.

10. See Section 26 05 83 for electrical connections.

C. Control Station: Provide standard key-operated, 'Open-Close-Stop' momentary-contact control device for each operator complying with UL 325.

1. 24 volt circuit.

2. Surface mounted, at interior door jamb.

3. Entrapment Protection Devices: Provide sensing devices and safety mechanisms complying with UL 325.
   a. Primary Device: Provide electric sensing edge, wireless sensing, NEMA 1 photo eye sensors, or NEMA 4X photo eye sensors as required with momentary-contact control device.

D. Safety Edge: Located at bottom of coiling door, full width, electro-mechanical sensitized type, wired to stop and reverse door direction upon striking object, hollow neoprene covered.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that adjacent construction is suitable for door installation.

B. Verify that electrical services have been installed and are accessible.

C. Verify that door opening is plumb, header is level, and dimensions are correct.

D. Notify Architect of any unacceptable conditions or varying dimensions.

E. Commencement of installation indicates acceptance of substrate and door opening conditions.

3.02 INSTALLATION

A. Install units in accordance with manufacturer's instructions.

B. Install fire-rated doors in accordance with NFPA 80.

C. Install smoke door assemblies in accordance with NFPA 105.

D. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.

E. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.

F. Fit and align assembly including hardware; level and plumb, to provide smooth operation.

G. Coordinate installation of electrical service with Section 26 05 83.

H. Complete wiring from disconnect to unit components.

I. Complete wiring from fire alarm system.

J. Install enclosure and perimeter trim.

3.03 TOLERANCES

A. Maintain dimensional tolerances and alignment with adjacent work.

B. Maximum Variation From Plumb: 1/16 inch.

C. Maximum Variation From Level: 1/16 inch.

D. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch per 10 feet straight edge.

3.04 ADJUSTING

A. Adjust operating assemblies for smooth and noiseless operation.

3.05 CLEANING

A. Clean installed components.

B. Remove labels and visible markings.

END OF SECTION

SECTION 08 56 59
SERVICE AND TELLER WINDOW UNITS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Service and teller window units.

B. Accessories.

1.02 REFERENCE STANDARDS

A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2012.

B. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2015.

C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.

D. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.

E. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2013.

F. ASTM F588 - Standard Test Methods for Measuring the Forced Entry Resistance of Window Assemblies, Excluding Glazing Impact; 2014.

G. ASTM F1233 - Standard Test Method for Security Glazing Materials And Systems; 2008 (Reapproved 2013).

H. UL 752 - Standard for Bullet-Resisting Equipment; Current Edition, Including All Revisions.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit manufacturer's product data for specified products indicating materials, operation, glazing, finishes, and installation instructions.

C. Shop Drawings: Indicate configuration, sizes, rough-in, mounting, anchors and fasteners, and installation clearances.

D. Test Data: Test reports for specific window model and glazing to be furnished, showing compliance with all specified requirements; window and glazing may be tested separately, provided window test sample adequately simulates the glazing to be used.

E. Samples for Selection of Finishes:

1. Applied Finishes: Color charts for factory finishes.

F. Installer qualification data.

G. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum ten years documented experience, with ability to provide test reports showing that their standard manufactured products meet the specified requirements.

B. Installer Qualifications: Company specializing in performing work of the type specified in this section.

C. Testing Agency Qualifications: Independent testing agency able to show experience in conducting tests of the type specified and experienced in the type of testing specified.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver units in manufacturer's original packaging and unopened containers with identification labels intact.

B. Store units in area protected from exposure to weather and vandalism.

1.06 WARRANTY

A. See Section 01 70 00 - Execution Requirements, for additional warranty requirements.

B. Provide manufacturer's warranty agreeing to repair or replace units and their components that fail in materials or workmanship within two years from Date of Substantial Completion.

PART 2 PRODUCTS

2.01 SERVICE AND TELLER WINDOW UNITS

A. Pass-Through Window:

1. Location: Interior.

2. Forced Entry Resistance: Tested to meet ASTM F588, Grade 10 for window type and ASTM F1233, Class Achieved 1.0 for security glazing.

3. Ballistic Resistance: Tested to meet UL 752, Level 3.

4. Window: Single horizontal sliding.
   a. Operation: Manual, self-closing.
   b. Mounting: Flush with the wall surface.
   c. Size: As indicated on drawings.
   d. Counter Space Size: Manufacturer's standard size.
   e. Material: Aluminum.
   f. Finish: Pigmented coating, manufacturer's standard type.
   g. Finish Color: As selected from manufacturer's standard colors.

5. Glazing: Single (monolithic), clear.
   a. Laminated safety glazing.

6. Communication: Amplified talk-thru portal.

7. Products:
   a. C.R. Laurence Co., Inc.: Product SBRWP3 CRL Powder Painted Bullet Resistant Level 3 Manual Sliding Service Window; www.crlaurence.com.
   b. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 COMPONENTS

A. Windows: Factory-fabricated, -finished, and -glazed, extruded aluminum frame and glazing stops; complete with hardware and anchors.

1. Provide window units that are re-glazable from the secure side without dismantling the non-secure side of framing.

2. Rigidly fit and secure joints and corners with internal reinforcement. Make joints and connections flush, hairline, and weatherproof. Fully weld corners.

3. Apply factory finish to all exposed surfaces.

4. Apply bituminous paint to concealed metal surfaces in contact with cementitious or dissimilar materials.

5. Wind Design: Design and size components to withstand dead loads and live loads caused by pressure and negative wind loads acting normal to plane of window as calculated in accordance with applicable code.

6. Horizontal Sliding Windows: Top-hung operable sash; hook bolt locking device with thumb-turn release.

7. Self-Closing Operation: Manual open and self-closing with auto-locking handles and magnetic hold-open device.

2.03 MATERIALS

A. Aluminum Extrusions: Minimum 1/8 inch thick frame and sash material complying with ASTM B221 and ASTM B221M.

1. Finish: Class I clear anodized.

B. Concealed Steel Items: Galvanized in accordance with ASTM A123/A123M to thickness Grade 85, 2.0 ounces per square foot.

C. Ballistic Resistant Glazing: Laminated plastic and glass construction, with glass on both faces; complying with performance level indicated.

D. Sealant for Setting Sills and Sill Flashing: Non-curing butyl type.

2.04 FINISHES

A. Class I Color Anodized Finish: AAMA 611 AA-M12C22A42 Integrally colored anodic coating not less than 0.7 mils thick.

B. Pigmented Organic Coating System: AAMA 2603; polyester or acrylic baked enamel finish.

C. Color: Clear Anodized.

2.05 ACCESSORIES

A. Hardware and Security Devices for Sliding Windows:

1. Auto-Lock Handle: Stainless steel auto-locking handle on all self-closing sliders to prevent intrusion.

2. Weather Stripping: Factory applied.

3. Bottom Sills: Stainless steel construction, no bottom tracks and no pop rivets.

4. Handles: Stainless steel, manufacturer's standard profile and finish.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that window openings are ready for installation of windows.

B. Verify that correct embedded anchors are in place and in proper location; repair or replace anchors as required to achieve satisfactory installation.

C. Notify Architect if conditions are not suitable for installation of units; do not proceed until conditions are satisfactory.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install units in correct orientation (inside/outside or secure/non-secure).

C. Anchor units securely in manner so as to achieve performance specified.

D. Set sill members and sill flashing in continuous bead of sealant.

E. Separate metal members from concrete and masonry using bituminous paint or with products recommended in writing by the manufacturer for this purpose.

3.03 ADJUSTING

A. Adjust operating components for smooth operation while also maintaining a secure, weather-tight enclosure and a tight fit at the contact points; lubricate operating hardware.

3.04 CLEANING AND PROTECTION

A. Remove protective material from factory finished surfaces.

B. Clean exposed surfaces promptly after installation without damaging finishes.

C. Remove and replace defective work.

D. Provide temporary protection to ensure that security windows are without damage upon Date of Substantial Completion.

3.05 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain operable units.

1. Instructor: Manufacturer's training personnel.

2. Location: At project site.

3. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.

END OF SECTION

SECTION 08 71 00

DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes commercial door hardware for the following:

1. Swinging doors.

2. Other doors to the extent indicated.

B. Door hardware includes, but is not necessarily limited to, the following:

1. Mechanical door hardware.

2. Electromechanical door hardware.

3. Cylinders specified for doors in other sections.

C. Related Sections:

1. Division 06 Section “Rough Carpentry”.

2. Division 06 Section “Finish Carpentry”.

3. Division 08 Section “Hollow Metal Doors and Frames”.

4. Division 08 Section “Flush Wood Doors”.

5. Division 08 Section “Aluminum-Framed Entrances and Storefronts”.

6. Division 28 Section “Access Control Hardware Devices”.

D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.

2. ICC/IBC - International Building Code.

3. NFPA 70 - National Electrical Code.

4. NFPA 80 - Fire Doors and Windows.

5. NFPA 101 - Life Safety Code.

6. NFPA 105 - Installation of Smoke Door Assemblies.

7. State Building Codes, Local Amendments.

E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:

1. ANSI/BHMA Certified Product Standards - A156 Series.

2. UL10C - Positive Pressure Fire Tests of Door Assemblies.

3. ANSI/UL 294 - Access Control System Units.

4. UL 305 - Panic Hardware.

5. ANSI/UL 437- Key Locks.

1.3 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing, fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."

2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.

3. Content: Include the following information:
   a. Type, style, function, size, label, hand, and finish of each door hardware item.
   b. Manufacturer of each item.
   c. Fastenings and other pertinent information.
   d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
   e. Explanation of abbreviations, symbols, and codes contained in schedule.
   f. Mounting locations for door hardware.
   g. Door and frame sizes and materials.
   h. Warranty information for each product.

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

C. Shop Drawings: Details of electrified access control hardware indicating the following:

1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:
   a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
   b. Complete (risers, point-to-point) access control system block wiring diagrams.
   c. Wiring instructions for each electronic component scheduled herein.

2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.

D. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.

E. Informational Submittals:

1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

1.4 CLOSEOUT SUBMITTALS

A. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

B. Project Record Documents: Provide record documentation of as-built door hardware sets in digital format (.pdf, .docx, .xlsx, .csv) and as required in Division 01, Project Record Documents.

1.5 QUALITY ASSURANCE

A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).

C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware 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.

D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.

1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.

2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.

F. Each unit to bear third party permanent label indicating compliance with the referenced testing standards.

G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:

1. Function of building, purpose of each area and degree of security required.

2. Plans for existing and future key system expansion.

3. Requirements for key control storage and software.

4. Installation of permanent keys, cylinder cores and software.

5. Address and requirements for delivery of keys.

H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.

1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.

2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.

3. Review sequence of operation narratives for each unique access controlled opening.

4. Review and finalize construction schedule and verify availability of materials.

5. Review the required inspecting, testing, commissioning, and demonstration procedures

I. At completion of installation, provide written documentation that components were applied according to manufacturer's instructions and recommendations and according to approved schedule.

1.6 DELIVERY, STORAGE AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.7 COORDINATION

A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.

C. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.8 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:

1. Structural failures including excessive deflection, cracking, or breakage.

2. Faulty operation of the hardware.

3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

4. Electrical component defects and failures within the systems operation.

C. Warranty Period: Unless otherwise indicated, warranty shall be one year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 BUTT HINGES

A. Hinges: ANSI/BHMA A156.1 butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.

1. Quantity: Provide the following hinge quantity:
   a. Two Hinges: For doors with heights up to 60 inches.
   b. Three Hinges: For doors with heights 61 to 90 inches.
   c. Four Hinges: For doors with heights 91 to 120 inches.
   d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.

2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
   a. Widths up to 3’0”: 4-1/2” standard or heavy weight as specified.
   b. Sizes from 3’1” to 4’0”: 5” standard or heavy weight as specified.

3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
   a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
   b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.

4. Hinge Options: Comply with the following:
   a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for all out-swinging lockable doors.

5. Manufacturers:
   a. McKinney (MK) - TA/T4A Series, 5-knuckle.
   b. Or Approved Equal.

2.2 CONTINUOUS HINGES

A. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 continuous geared hinge. with minimum 0.120-inch thick extruded 6063-T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.

   1. Manufacturers:.
      a. Pemko (PE).
      b. Or Approved Equal.

2.3 POWER TRANSFER DEVICES

A. Concealed Quick Connect Electric Power Transfers: Provide concealed wiring pathway housing mortised into the door and frame for low voltage electrified door hardware. Furnish with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

   1. Manufacturers:
      a. Securitron (SU) - EL-CEPT Series.

b. Or Approved Equal.

B. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.

1. Provide one each of the following tools as part of the base bid contract:
   a. McKinney (MK) - Electrical Connecting Kit: QC-R001.
   b. McKinney (MK) - Connector Hand Tool: QC-R003.

2. Manufacturers:
   a. McKinney (MK) - QC-C Series.
   b. Or Approved Equal.

2.4 DOOR OPERATING TRIM

A. Flush Bolts and Surface Bolts: Provide products conforming to ANSI/BHMA A156.3 and A156.16, Grade 1.

1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.

2. Furnish dust proof strikes for bottom bolts.

3. Surface bolts to be minimum 8” in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.

4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.

5. Manufacturers:
   a. Rockwood (RO).
   b. Or Approved Equal.

B. Coordinators: ANSI/BHMA A156.3 door coordinators consisting of active-leaf, hold-open lever and inactive-leaf release trigger. Model as indicated in hardware sets.

1. Manufacturers:
   a. Rockwood (RO).
   b. Or Approved Equal.

C. Door Push Plates and Pulls: ANSI/BHMA A156.6 door pushes and pull units of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.

1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.

2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.

3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.

4. Pulls, where applicable, shall be provided with a 10” clearance from the finished floor on the push side to accommodate wheelchair accessibility.

5. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets. When through-bolt fasteners are in the same location as a push plate, countersink the fasteners flush with the door face allowing the push plate to sit flat against the door.

6. Manufacturers:
   a. Rockwood (RO).
   b. Or Approved Equal.

2.5 CYLINDERS AND KEYING

A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.

B. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:

1. Threaded mortise cylinders with rings and cams to suit hardware application.

2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.

3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.

4. Tubular deadlocks and other auxiliary locks.

5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.

6. Keyway: Match Facility Standard.

C. Small Format Interchangeable Cores: Provide small format interchangeable cores (SFIC) as specified, core insert, removable by use of a special key; usable with other manufacturers' cylinders.

D. Patented Cylinders: ANSI/BHMA A156.5, Grade 1 Certified Products Directory (CPD) listed cylinders employing a utility patented and restricted keyway requiring the use of a patented key. Cylinders are to be protected from unauthorized manufacture and distribution by manufacturer’s United States patents.

1. Patented key systems shall not be established with products that have an expired patent. Expired systems shall only be specified and supplied to support existing systems.

2. Manufacturers:
   a. Sargent (SA) - XC.

E. Keying System: Each type of lock and cylinders to be factory keyed.

1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.

2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.

3. Existing System: Field verify and key cylinders to match Owner's existing system.

F. Key Quantity: Provide the following minimum number of keys:

1. Change Keys per Cylinder: Three (3).

2. Master Keys (per Master Key Level/Group): Five (5).

3. Construction Keys (where required): Ten (10).

4. Construction Control Keys (where required): Two (2).

5. Permanent Control Keys (where required): Two (2).

G. Construction Keying: Provide temporary keyed construction cores.

H. Key Registration List (Bitting List):

1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.

2. Provide transcript list in writing or electronic file as directed by the Owner.

2.6 MORTISE LOCKS AND LATCHING DEVICES

A. Mortise Locksets, Grade 1 (Heavy Duty): Provide ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed mortise locksets. Listed manufacturers shall meet all functions and features as specified herein.

1. Manufacturers:
   a. Sargent Manufacturing (SA) - 8200 Series.
   b. Or Approved Equal.

2.7 DEADLOCKS AND LATCHES

A. Mortise Deadlocks, Small Case: ANSI/BHMA A156.36, Grade 1, small case mortise type deadlocks constructed of heavy gauge wrought corrosion resistant steel. Steel or stainless steel bolts with a 1" throw and hardened steel roller pins. Deadlocks to be products of the same source manufacturer and keyway as other specified locksets.

1. Manufacturers:
   a. Sargent Manufacturing (SA) - 4870 Series.
   b. Or Approved Equal.

2.8 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.

2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.

3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.

4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

B. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.

2. Strikes for Bored Locks and Latches: BHMA A156.2.

3. Strikes for Auxiliary Deadlocks: BHMA A156.36.

4. Dustproof Strikes: BHMA A156.16.

2.9 SURFACE DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.

2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.

3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.

4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.

5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.

6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

B. Door Closers, Surface Mounted (Large Body Cast Iron): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control.

1. Large body cast iron surface mounted door closers shall have a 30-year warranty.

2. Manufacturers:
   a. Sargent Manufacturing (SA) - 281 Series.
   b. Or Approved Equal.

C. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.

1. Heavy duty surface mounted door closers shall have a 30-year warranty.

2. Manufacturers:
   a. Sargent Manufacturing (SA) - 351 Series.
   b. Or Approved Equal.

2.10 SURFACE MOUNTED CLOSER HOLDERS

A. Electromagnetic Door Holders: ANSI A156.15 electromagnetic door holder/releases with a minimum 20 to 40 pounds holding power and single coil construction able to accommodate.12VDC, 24VAC, 24VDC and 120VAC. Coils to be independently wound, employing an integral fuse and armatures to include a positive release button.

1. Manufacturers:
   a. Sargent Manufacturing (SA) - 1560 Series.
   b. Or Approved Equal.

2.11 ARCHITECTURAL TRIM

A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.

2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1” LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.

3. Where plates are applied to fire rated doors with the top of the plate more than 16” above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer’s catalog and template book for specific requirements for size and applications.

4. Protection Plates: ANSI/BHMA A156.6 protection plates (kick, armor, or mop), fabricated from the following:
   a. Stainless Steel: 300 grade, 050-inch thick.

5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.

6. Manufacturers:
   a. Rockwood (RO).
   b. Or Approved Equal.

2.12 DOOR STOPS AND HOLDERS

A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.

B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

1. Manufacturers:
   a. Rockwood (RO).
   b. Or Approved Equal.

C. Overhead Door Stops and Holders: ANSI/BHMA A156.8, Grade 1 Certified Products Directory (CPD) listed overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.

1. Manufacturers:
   a. Norton Rixson (RF).

b. Or Approved Equal.

2.13 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.

1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.

1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NFPA 252, Standard Methods of Fire Tests of Door Assemblies.

D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

F. Manufacturers:

1. Pemko (PE).

2. Or Approved Equal.

2.14 ELECTRONIC ACCESSORIES

A. Door Position Switches: Door position magnetic reed contact switches specifically designed for use in commercial door applications. On recessed models the contact and magnetic housing snap-lock into a 1" diameter hole. Surface mounted models include wide gap distance design complete with armored flex cabling. Provide SPDT, N/O switches with optional Rare Earth Magnet installation on steel doors with flush top channels.

1. Manufacturers:
    a. Securitron (SU) - DPS Series.
    b. Or Approved Equal.

B. Intelligent Switching Power Supplies: Provide power supplies with single, dual or multi-voltage configurations at 12 and/or 24VDC. Power Supply shall have battery backup function with an integrated battery charging circuit. The power supply shall have a standard, integrated Fire Alarm Interface (FAI). The power supply shall provide capability for secondary voltage, power distribution, direct lock control and network monitoring through add on modules. The power supply shall be expandable up to 16 individually protected outputs. Output modules shall provide individually protected, continuous outputs and/or individually protected, relay controlled outputs. Network modules shall provide remote monitoring functions such as status reporting, fault reporting and information logging.

1. Provide the least number of units, at the appropriate amperage level, sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.

2. Manufacturers:
    a. Securitron (SU) - AQL Series.
    b. Or Approved Equal.

2.15 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.16 FINISHES

A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware

C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.

1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.

B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."

2. DHI TDH-007-20: Installation Guide for Doors and Hardware.

3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."

4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

D. Push Plates and Door Pulls: When through-bolt fasteners are in the same location as a push plate, countersink the fasteners flush with the door face allowing the push plate to sit flat against the door.

E. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

F. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

A. Field Inspection (Punch Report): Reference Division 01 Sections “Closeout Procedures”. Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.

1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

B. Clean adjacent surfaces soiled by door hardware installation.

C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

1. Quantities listed are for each pair of doors, or for each single door.

2. The supplier is responsible for handing and sizing all products.

3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.

4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.

B. Refer to Section 080671, Door Hardware Sets, for hardware sets.

END OF SECTION

SECTION 08 80 00

GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Glazing units.

B. Plastic films.

C. Glazing compounds.

1.02 RELATED REQUIREMENTS

A. Section 08 11 13 - Hollow Metal Doors and Frames: Glazed lites in doors and borrowed lites.

B. Section 08 88 13 - Fire-Rated Glazing.

1.03 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.

B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015 (Reaffirmed 2020).

C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

D. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2019).

E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.

F. ASTM C1036 - Standard Specification for Flat Glass; 2021.

G. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.

H. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016 (Reapproved 2023).

I. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2016.

J. GANA (GM) - GANA Glazing Manual; 2022.

K. GANA (SM) - GANA Sealant Manual; 2008.

L. GANA (LGRM) - Laminated Glazing Reference Manual; 2019.

M. IGMA TM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use; 1990 (Reaffirmed 2016).

N. NFRC 100 - Procedure for Determining Fenestration Product U-factors; 2023.

O. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence; 2023.

P. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems; 2023.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data on Insulating Glass Unit and Glazing Unit Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.

C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.

D. Samples: Submit two samples 12 by 12 inch in size of insulated glass units, showing coloration and design.

E. Installer's qualification statement.

F. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with GANA (GM), GANA (SM), GANA (LGRM), and IGMA TM-3000 for glazing installation methods. Maintain one copy on site.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

C. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.

D. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

1.06 FIELD CONDITIONS

A. Do not install glazing when ambient temperature is less than 40 degrees F.

B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.07 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Insulating Glass Units: Provide a five (5) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.

C. Heat Soaked Tempered Glass: Provide a five (5) year manufacturer warranty to include coverage for spontaneous breakage of fully tempered glass caused by nickel sulfide (NiS) inclusions.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Float Glass Manufacturers:

1. Cardinal Glass Industries: www.cardinalcorp.com/#sle.

2. Guardian Glass, LLC: www.guardianglass.com/#sle.

3. Pilkington North America Inc: www.pilkington.com/na/#sle.

4. Saint Gobain North America: www.saint-gobain.com/#sle.

5. Vitro Architectural Glass (formerly PPG Glass): www.vitroglazings.com/#sle.

6. Substitutions: See Section 01 60 00 - Product Requirements.

B. Plastic Films Manufacturers:

1. 3M Window Film
: solutions.3m.com/wps/portal/3M/en_US/Window_Film/Solutions/#sle.

2. Flexvue Films: www.flexvuefilms.com/#sle.

3. LLumar, an Eastman Chemical Company; LLumar: www.llumar.com/#sle.

4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES

A. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.

1. Design Pressure: Calculated in accordance with ASCE 7.

2. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.

3. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.

4. Glass thicknesses listed are minimum.

B. Thermal and Optical Performance: Provide exterior glazing products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:

1. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.

2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.

3. Solar Optical Properties: Comply with NFRC 300 test method.

2.03 GLASS MATERIALS

A. Float Glass: Provide float glass based glazing unless otherwise indicated.

1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality - Q3.

2. Kind HS - Heat-Strengthened Type: Complies with ASTM C1048.

3. Kind FT - Fully Tempered Type: Complies with ASTM C1048.

4. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.

5. Tinted Type: ASTM C1036, Class 2 - Tinted, Quality - Q3, with color and performance characteristics as indicated.

6. Thicknesses: As indicated; provide greater thickness as required for exterior glazing wind load design.

2.04 GLAZING UNITS

A. Type G-1 - Monolithic Safety Glazing: Non-fire-rated.

1. Applications:
   a. Glazed lites in doors, except fire doors.
   b. Glazed sidelights to doors, except in fire-rated walls and partitions.
   c. Other locations required by applicable federal, state, and local codes and regulations.
   d. Other locations indicated on drawings.

2. Glass Type: Fully tempered safety glass as specified.

3. Tint: Clear.

4. Thickness: 1/4 inch, nominal.

5. Manufacturers:
   a. Glass: Any of the manufacturers specified for float glass..

2.05 PLASTIC FILMS

A. Decorative Plastic Film: Polyvinyl butyral (PVB) type.

1. Application: Locations as indicated on drawings.

2. Series Type: Frost.

3. Color: As selected by Architect from manufacturer's full range.

2.06 GLAZING COMPOUNDS

A. Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; nonbleeding, nonstaining; ASTM C920 Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; color as selected.

B. Manufacturers:

1. Bostik Inc: www.bostik-us.com/#sle.

2. Dow Corning Corporation: www.dowcorning.com/construction/#sle.

3. Pecora Corporation: www.pecora.com/#sle.

4. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com/#sle.

5. Substitutions: See Section 01 60 00 - Product Requirements.

2.07 ACCESSORIES

A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch by width of glazing rabbet space minus 1/16 inch by height to suit glazing method and pane weight and area.

B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch long by one half the height of the glazing stop by thickness to suit application, self adhesive on one face.

C. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.

D. Glazing Splines: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.

B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.

C. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.03 INSTALLATION, GENERAL

A. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.

B. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.

3.04 INSTALLATION - WET/DRY GLAZING METHOD (TAPE AND SEALANT)

A. Application - Interior Glazed: Set glazing infills from the interior of the building.

B. Cut glazing tape to length and install against permanent stops, projecting 1/16 inch above sight line.

C. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

D. Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of pane or unit.

E. Install removable stops, spacer shims inserted between glazing and applied stops at 24 inch intervals, 1/4 inch below sight line.

F. Fill gaps between pane and applied stop with silicone type sealant to depth equal to bite on glazing, to uniform and level line.

G. Carefully trim protruding tape with knife.

3.05 INSTALLATION - PLASTIC FILM

A. Install plastic film with adhesive, applied in accordance with film manufacturer's instructions.

B. Place without air bubbles, creases or visible distortion.

C. Install film tight to perimeter of glass and carefully trim film with razor sharp knife. Provide 1/16 inch to 1/8 inch gap at perimeter of glazed panel unless otherwise required. Do not score the glass.

3.06 CLEANING

A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.

B. Remove nonpermanent labels immediately after glazing installation is complete.

C. Clean glass and adjacent surfaces after sealants are fully cured.

D. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.07 PROTECTION

A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.

B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION

SECTION 08 88 13
FIRE-RATED GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fire-rated glazing units.

B. Glazing compounds.

1.02 RELATED REQUIREMENTS

A. Section 08 14 16 - Flush Wood Doors: Glazed lites in doors.

1.03 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials Current Edition.

B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test 2015 (Reaffirmed 2020).

C. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers 2005 (Reapproved 2019).

D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.

E. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2018.

F. ASTM C1193 - Standard Guide for Use of Joint Sealants 2016 (Reapproved 2023).

G. GANA (GM) - GANA Glazing Manual 2022.

H. GANA (SM) - GANA Sealant Manual 2008.

I. GANA (LGRM) - Laminated Glazing Reference Manual 2019.

J. ICC (IBC) - International Building Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

K. IGMA TM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use 1990 (2016).

L. ITS (DIR) - Directory of Listed Products Current Edition.

M. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies 2022.

N. NFPA 257 - Standard on Fire Test for Window and Glass Block Assemblies 2022.

O. UL (DIR) - Online Certifications Directory Current Edition.

P. UL 9 - Standard for Fire Tests of Window Assemblies Current Edition, Including All Revisions.

Q. UL 10B - Standard for Fire Tests of Door Assemblies Current Edition, Including All Revisions.

R. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data on Glazing Unit Glazing Types: Provide structural, physical, and environmental characteristics, size limitations, special handling and installation requirements.

C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.

D. Certificate: Certify that products of this section meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with GANA (GM), GANA (SM), GANA (LGRM), and IGMA TM-3000 for glazing installation methods. Maintain one copy on site.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

C. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

1.06 FIELD CONDITIONS

A. Ambient Conditions: Do not install glazing when ambient temperature is less than 40 degrees F.

B. Maintain minimum ambient temperature before, during, and 24 hours after installation of glazing compounds.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Fire-Protection-Rated Glass:

1. Manufacturers:
   a. SAFTIFIRST, a division of O'Keeffe's Inc; SuperLite I-XL : www.safti.com/#sle.
   b. SCHOTT North America Inc; PYRAN Platinum: www.us.schott.com/#sle.
   c. Technical Glass Products: www.fireglass.com/#sle.
   d. Vetrotech North America; Keralite/Select: www.vetrotechusa.com/#sle.
   e. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 GLASS MATERIALS

A. Float Glass: Provide float glass based glazing unless otherwise indicated.

1. Kind FT - Fully Tempered Type: Comply with ASTM C1048.

2. Impact-Resistant Safety Glass: Comply with ANSI Z97.1 - Class B, or 16 CFR 1201 - Category I criteria.

2.03 GLAZING UNITS

A. Type FPG-1 - Fire-Protection-Rated Glazing: Type, thickness, and configuration of glazing that contains flame, smoke, and does not block radiant heat, as required to achieve indicated fire rating period of 90 minutes or less.

1. Applications:
   a. Glazing in fire-resistance-rated door assembly.

2. Glass Type: Specialty tempered float glass.

3. Provide products listed by ITS (DIR) or UL (DIR) and approved by authorities having jurisdiction.

4. Safety Glazing Certification: 16 CFR 1201 Category II.

5. Glazing Method: As required for fire rating.

6. Fire-Rating Period: As indicated on drawings.

7. Markings for Fire-Protection-Rated Glazing Assemblies: Provide permanent markings on fire-protection-rated glazing in compliance with ICC (IBC), local building code, and authorities having jurisdiction
    a. "D" - meets fire door assembly criteria of NFPA 252, UL 10B, or UL 10C fire test standards.
    b. "OH" - meets fire window assembly criteria, including hose stream test of NFPA 257 or UL 9 fire test standards.
    c. "H" - meets fire door assembly hose stream test of NFPA 252, UL 10B, or UL 10C fire tests standards.
    d. "XXX" - placeholder that represents fire-rating period, in minutes.

2.04 GLAZING COMPOUNDS

A. Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; nonbleeding, nonstaining; ASTM C920 Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; color as selected from manufacturer's full range.

1. Manufacturers:
    a. BASF Corporation: www.basf.com/#sle.
    b. Dow Corning Corporation : www.dowcorning.com/construction/#sle.
    c. Pecora Corporation: www.pecora.com/#sle.
    d. Tremco Commercial Sealants & Waterproofing : www.tremcosealants.com/#sle.
    e. Substitutions: See Section 01 60 00 - Product Requirements.

2.05 ACCESSORIES

A. Setting Blocks: Aluminum silicate, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch by width of glazing rabbet space minus 1/16 inch by height to suit glazing method and pane weight and area.

B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Continuous by one half the height of glazing stop by thickness to suit application, self adhesive on one face.

C. Glazing Tape: Flexible tape made from spun calcium-magnesium-silica fibers in binder; designed to remain stable at temperatures up to 2,012 degrees F.

1. Thickness: As recommended by framing manufacturer for glazing application.

D. Glazing Gaskets: Flexible intumescent seals.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.

B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.

3.02 PREPARATION

A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.03 INSTALLATION - GENERAL

A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers unless more stringent requirements are indicated, including those in referenced glazing standards.

B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.

C. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.

D. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.

E. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.

F. Prevent glass from contact with contaminating substances that may result from construction operations including, but not limited to weld spatter, fire-safing, plastering, mortar droppings, etc.

3.04 INSTALLATION - WET/DRY GLAZING METHOD (TAPE AND SEALANT)

A. Application - Interior Glazed: Set glazing infills from interior of building.

B. Cut glazing tape to length and install against permanent stops, projecting 1/16 inch above sightline.

C. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.

D. Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of pane or unit.

E. Install removable stops, spacer shims inserted between glazing and applied stops at 24-inch intervals, 1/4 inch below sight line.

F. Fill gaps between pane and applied stop with silicone type sealant to depth equal to bite on glazing, to uniform and level line.

G. Carefully trim protruding tape with knife.

3.05 CLEANING

A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.

B. Remove nonpermanent labels immediately after glazing installation is complete.

C. Clean glass and adjacent surfaces after sealants are fully cured.

D. Clean glass on both exposed surfaces not more than four days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.06 PROTECTION

A. After installation, mark pane with 'X' by using removable plastic tape or paste; do not mark heat-absorbing or reflective glass units.

B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION

DIVISION 09 - FINISHES

SECTION 09 21 16

GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal stud wall framing.

B. Metal channel ceiling framing.

C. Acoustic insulation.

D. Gypsum wallboard.

E. Joint treatment and accessories.

1.02 RELATED REQUIREMENTS

A. Section 09 30 00 - Tiling: Tile backing board.

1.03 REFERENCE STANDARDS

A. AISI S220 - North American Standard for Cold-Formed Steel Nonstructural Framing; 2020.

B. AISI S240 - North American Standard for Cold-Formed Steel Structural Framing; 2015, with Errata (2020).

C. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members; 2015.

D. ASTM C1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories; 2020.

E. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2017 (Reapproved 2022).

F. ASTM C514 - Standard Specification for Nails for the Application of Gypsum Board; 2004 (Reapproved 2020).

G. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2020.

H. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2023.

I. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2022.

J. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2022.

K. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base; 2019.

L. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.

M. ASTM C1658/C1658M - Standard Specification for Glass Mat Gypsum Panels; 2019, with Editorial Revision (2020).

N. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2021.

O. GA-216 - Application and Finishing of Gypsum Panel Products; 2024.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data:

1. Provide data on metal framing, gypsum board, accessories, and joint finishing system.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store gypsum products and accessories indoors and keep above freezing. Elevate boards above floor, on nonwicking supports, in accordance with manufacturer's recommendations.

B. Store metal products to prevent corrosion.

PART 2 PRODUCTS

2.01 METAL FRAMING MATERIALS

A. Steel Sheet: ASTM A1003/A1003M, subject to the ductility limitations indicated in AISI S220 or equivalent.

B. Manufacturers - Metal Framing, Connectors, and Accessories:

1. ClarkDietrich: www.clarkdietrich.com/#sle.

2. MarinoWARE: www.marinoware.com/#sle.

3. Phillips Manufacturing Co: www.phillipsmfg.com/#sle.

4. Steel Construction Systems: www.steelconsystems.com/#sle.

5. Substitutions: See Section 01 60 00 - Product Requirements.

C. Nonstructural Framing System Components: AISI S220; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/120 at 5 psf.

1. Studs: C-shaped.

2. Minimum Base Metal Thickness: 0.0329 inch, unless noted otherwise

3. Runners: U shaped, sized to match studs.

4. Ceiling Channels: C-shaped.

5. Furring Members: Hat-shaped sections, minimum depth of 7/8 inch.

2.02 BOARD MATERIALS

A. Manufacturers - Gypsum-Based Board:

1. American Gypsum Company: www.americangypsum.com/#sle.

2. CertainTeed Corporation: www.certainteed.com/#sle.

3. Georgia-Pacific Gypsum: www.gpgypsum.com/#sle.

4. Gold Bond Building Products, LLC provided by National Gypsum Company: www.goldbondbuilding.com/#sle.

5. PABCO Gypsum: www.pabcogypsum.com/#sle.

6. USG Corporation: www.usg.com/#sle.

B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.

1. Application: Use for ceilings, unless otherwise indicated.

2. Glass mat faced gypsum panels, as defined in ASTM C1658/C1658M, suitable for paint finish, of the same core type and thickness may be substituted for paper-faced board.

3. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
   a. Mold resistant board is required at all kitchen and serving line ceiling applications .

4. Thickness:
   a. Vertical Surfaces: 5/8 inch.
   b. Ceilings: 1/2 inch.

C. Ceiling Board: Special sag resistant gypsum ceiling board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.

1. Application: Ceilings, unless otherwise indicated.

2. Thickness: 1/2 inch.

3. Edges: Tapered.

2.03 GYPSUM BOARD ACCESSORIES

A. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.

B. Beads, Joint Accessories, and Other Trim: ASTM C1047, rigid plastic, galvanized steel, or rolled zinc, unless noted otherwise.

C. Decorative Metal Trim:

1. Material: Extruded aluminum alloy 6063-T5 temper.

2. Finish: Anodized, clear.

3. Type: As indicated on drawings.
   a. Products:
      1) Gordon Inc: www.gordon-inc.com/#sle.

2) Tamlyn: www.tamlyn.com/#sle.
3) Fry Reglet: www.fryreglet.com.
4) Substitutions: See Section 01 60 00 - Product Requirements.

D. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.

E. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inches in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion-resistant.

F. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws, corrosion-resistant.

G. Nails for Attachment to Wood Members: ASTM C514.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.02 FRAMING INSTALLATION

A. Metal Framing: Install in accordance with ASTM C1007AISI S220 and manufacturer's instructions.

B. Suspended Ceilings and Soffits: Space framing and furring members as indicated.

1. Laterally brace entire suspension system.

C. Studs: Space studs at 16 inches on center.

1. Extend partition framing to structure in all locations.

D. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.

3.03 ACOUSTIC ACCESSORIES INSTALLATION

A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.

B. Acoustic Sealant: Install in accordance with manufacturer's instructions.

3.04 BOARD INSTALLATION

A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Exposed Gypsum Board in Interior Wet Areas: Seal joints, cut edges, and holes with water-resistant sealant.

C. Installation on Metal Framing: Use screws for attachment of gypsum board.

D. Installation on Wood Framing: For rated assemblies, comply with requirements of listing authority. For nonrated assemblies, install as follows:

1. Single-Layer Applications: Screw attachment.

3.05 JOINT TREATMENT

A. Glass Mat Faced Gypsum Board and Exterior Glass Mat Faced Sheathing: Use fiberglass joint tape, embed and finish with setting type joint compound.

B. Paper Faced Gypsum Board: Use paper joint tape, embed with drying type joint compound and finish with drying type joint compound.

C. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:

1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.

2. Level 1: Fire-resistance-rated wall areas above finished ceilings, whether or not accessible in the completed construction.

D. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.

1. Feather coats of joint compound so that camber is maximum 1/32 inch.

3.06 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

3.07 PROTECTION

A. Protect installed gypsum board assemblies from subsequent construction operations.

END OF SECTION

SECTION 09 30 00
TILING phase 2

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Tile for floor applications.

B. Tile for wall applications.

C. Cementitious backer board as tile substrate.

D. Stone thresholds.

E. Ceramic accessories.

F. Ceramic trim.

G. Non-ceramic trim.

1.2 REFERENCE STANDARDS

A. ANSI A108/A118/A136.1 - American National Standard Specifications for the Installation of Ceramic Tile - Version; 2013.1.

B. ANSI A108.1A - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar; 2013.1.

C. ANSI A108.1B - American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar; 2013.1.

D. ANSI A108.1C - Specifications for Contractors Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Bed with Dry-Set or Latex-Portland Cement Mortar; 2013.1.

E. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile-Setting Epoxy Adhesive; 2013.1.

F. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar; 2013.1.

G. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy; 2013.1.

H. ANSI A108.8 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout; 2013.1.

I. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout; 2013.1.

J. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework; 2013.1.

K. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units; 2013.1.

L. ANSI A108.12 - American National Standard Specifications for Installation of Ceramic Tile with EGP (Exterior Glue Plywood) Latex-Portland Cement Mortar; 2013.1.

M. ANSI A108.13 - American National Standard Specifications for Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone; 2013.1.

N. ANSI A118.3 - American National Standard Specifications for Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive; 2013.1.

O. ANSI A118.4 - American National Standard Specifications for Modified Dry-Set Cement Mortar; 2013.1.

P. ANSI A118.6 - American National Standard Specifications for Standard Cement Grouts for Tile Installation; 2013.1.

Q. ANSI A118.8 - American National Standard Specifications for Modified Epoxy Emulsion Mortar/Grout; 2012.1.

R. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units; 2013.1.

S. ANSI A118.10 - American National Standard Specifications for Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation; 2013.1.

T. ANSI A118.11 - American National Standard Specifications for EGP (Exterior Glue Plywood) Latex-Portland Cement Mortar; 2013.1.

U. ANSI A118.12 - American National Standard Specifications for Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation; 2013.1.

V. ANSI A118.13 - American National Standard Specifications for Bonded Sound Reduction Membranes for Thin-Set Ceramic Tile Installation; 2013.1.

W. ANSI A137.1 - American National Standard Specifications for Ceramic Tile - Version; 2013.1.

X. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation - Version; 2013.1.

1.3 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.

C. Samples for verification: Samples of each color of tile, marble threshold, or accessory to be provided, for verification purposes. Where products involve normal color and texture variations, included sample sets showing the full range of variations expected.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

E. Maintenance Data: Include recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.

F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. See Section 01 60 00 - Product Requirements, for additional provisions.

2. Extra Tile: 1 percent of each size, color, and surface finish combination, but not less than 25 of each type.

1.4 QUALITY ASSURANCE

A. Maintain one copy of and ANSI A108/A118/A136.1 and TCNA (HB) on site.

B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum 5 years of documented experience.

C. Installer Qualifications: Company specializing in performing tile installation, with minimum of 5 years of documented experience.

D. Single-Source Responsibility for Tile: Obtain each color, grade, finish, type, composition, and variety from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying process of the Work.

1.5 MOCK-UP

A. See Section 01 40 00 - Quality Requirements, for general requirements for mock-up.

B. Construct tile mock-up where indicated on the drawings, incorporating all components specified for the location.

1. Minimum size of mock-up is indicated on the drawings.

2. Approved mock-up may remain as part of the Work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

B. Deliver and store packaged material in original containers with seals unbroken and labels intact until time of use. Comply with requirement of ANSI A137.1 for labeling sealed tile packages.

1.7 FIELD CONDITIONS

A. Do not install solvent-based products in an unventilated environment.

B. Maintain ambient and substrate temperature of 50 degrees F during installation of mortar materials.

PART 2 PRODUCTS

2.1 GENERAL

A. ANSI Standard for Ceramic Tile: Comply with ANSI A137.1 "American National Standard Specifications for Ceramic tile" for types, compositions, and grades of tile indicated.

B. ANSI Standard for Tile Installation Materials: Comply with ANSI standard referenced with products and materials indicated for setting and grouting.

C. Colors, Textures, and Patterns: Where manufacturer's standard products are indicated for tile grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements:

1. Match color, texture, and pattern indicated by reference to manufacturer's standard designations for these characteristics.

2. Provide tile trim and accessories that match color and finish of adjoining flat tile.

D. Factory Blending: For tile exhibiting color variations within the ranges selected during sample submittals, blend tile in factory and package accordingly so that tile units taken from one package show the same range in colors as those taken from other packages and match approved samples.

2.2 TILE

A. Manufacturers: All products by the same manufacturer.

1. American Olean, www.americanolean.com

2. Daltile: www.daltile.com

3. Equivalents: See Section 01 60 00 - Product Requirements and Section 00 21 13.

B. Porcelain Tile, for floors (PT): ANSI A137.1, and as follows:

1. Product: Daltile, Saddle Brook

2. Breaking Strength: Greater than 275 lbs (ASTM C648)

3. Chemical Resistance: Resistant(ASTM C650)

4. Water Absorption: <0.5% (ASTM C373)

5. Scratch Hardness: 8.0 (Mohs Scale)

6. Wet Dynamic DCOF: Greater than or equal to 0.42 (ANSI A326.3)

7. Finish: Matte

8. Color(s): Gravel Road SD16. Final color(s) shall be selected by Architect from manufacturer's standard range..

9. Size: 6 x 36 inches.

10. Trim: 3 x 18 inch bullnose.

11. Thickness: 5/16 inch.

12. Location and pattern. Refer to RFS and elevations.

C. Glazed Wall Tile, for patterns: GWT and GWT-1: ANSI A137.1, and as follows:

1. Product: American Olean, Color Story Collection

2. Breaking Strength: 120-230lbs (ASTM C648)

3. Water Absorption: <20.0%

4. Scratch Hardness: 4.0-6.0 (MOHS)

5. Chemical Resistance: Resistant (ASTM C650)

6. Finish: Gloss

7. Colors: Ice White 0025, Balance 0014 and Passion 0019. Final color(s) shall be selected by Architect from manufacturer's standard range.

8. Size: 4" x 12", 2" x 8", 4" x 12" Cove Base.

9. Thickness: 5/16 inch.

10. Trim: As required

11. Location and pattern. Refer to RFS and elevations.

D. Ceramic Mosaic Tile, Type CMT: ANSI A137.1, and as follows:

1. Product: American Olean, Unglazed Mosaics

2. Breaking Strength: >300lbs (ASTM C648)

3. Water Absorption: <5.0%

4. Scratch Hardness: (MOHS) 7.0-8.0

5. Chemical Resistance: Resistant (ASTM C650)

6. Finish: Unglazed

7. Wet Dynamic DCOF: >=0.42 (DCOF AcuTest)

8. Colors: Final color(s) shall be selected by Architect from manufacturer's standard range.

9. Size: 2" x 2" Mosaic (dot-mounted) and 1" Penny Round (dot-mounted)

10. Thickness: 1/4 inch.

11. Tim: As required

12. Location and pattern. Refer to RFS and elevations.

2.3 TRIM AND ACCESSORIES

A. Porcelain Accessories: Same color and finish as adjacent field tile; same manufacturer as tile.

B. Porcelain Trim: Matching bullnose, double bullnose, cove base, and cove ceramic shapes in sizes coordinated with field tile.

1. Applications:
   a. Open Edges: Bullnose.
   b. Inside Corners: Jointed.
   c. Outside Corners: Bullnose.
   d. Floor to Wall Joints: Cove base.

2. Manufacturers: Same as for tile.

C. Non-Ceramic Trim: Satin brass anodized extruded aluminum, style and dimensions to suit application, for setting using tile mortar or adhesive.
   1. Exposed edges where bullnose tile cannot be used.

D. Thresholds: Marble, white or gray, honed finish; 4 inches wide by full width of wall or frame opening; 1/2 inch thick; beveled one long edge with radiused corners on top side; without holes, cracks, or open seams.

1. Applications:
   a. At doorways where tile terminates.
   b. At open edges of floor tile where adjacent finish is a different height.

2.4 SETTING MATERIALS

A. All mortars shall meet or exceed SCAQMD (South Coast Air Quality Management District) Rule #1168 for VOC content.

B. Latex-Portland Thin Set Cement Mortar Bond Coat: ANSI A118.4, and ANSI 118.11. Contains antimicrobial protection.

1. Products:
   a. LATICRETE International, Inc; LATICRETE 254 Platinum: www.laticrete.com.
   b. Mapei Corp: Ultracontact
   c. Substitutions: See Section 01 60 00 - Product Requirements.

2. Medium Bed Mortar: Latex modified Portland cement mortar: Comply with ANSI A118.4 and ANSI 118.11- Non Slump: for tiles larger than 14x14 on walls and floors. Mortar shall be manufactured where waterproofing membrane is used, waterproofing membrane and mortar shall be by same manufacturer.
   a. Provide the following:
      1) Laticrete 220 Marble and Granite Mortar (use with admix 3701 for submerged applications)
      2) 3N1 Performance Mortar by TEC

C. Mortar Bed Materials: Pre-packaged mix of Portland cement, sand, latex additive, and water.

1. Products:
   a. LATICRETE International, Inc; LATICRETE 3701 Fortified Mortar Bed: www.laticrete.com.
   b. Substitutions: See Section 01 60 00 - Product Requirements.

2.5 GROUTS

A. Manufacturers:

1. LATICRETE International, Inc; LATICRETE PERMACOLOR Grout:

   www.laticrete.com.

2. Mapei Corporation; Product as required for application: www.mapei.com.

3. TEC; Product as required for application: www.tecspecialty.com

B. All grouts shall meet or exceed SCAQMD (South Coast Air Quality Management District) Rule #1168 for VOC content.

C. Standard Grout: ANSI A118.6 standard latex Portland cement grout.

1. Applications: Use this type of grout where indicated for Unglazed Wall Tile.

2. Use sanded grout for joints 1/8 inch wide and larger; use unsanded grout for joints less than 1/8 inch wide.

3. Products:
   a. LATICRETE International, Inc; LATICRETE 1500 Sanded Grout: Use with 1776 admix with anti-microbial protection. www.laticrete.com.
   b. AccuColor XT Sanded Grout TEC
   c. Mapei Ultra Color Plus, Premium Rapid setting sanded grout with polymer

D. Latex-Portland Cement Grout for Glazed Wall Tile: ANSI A118.6, consisting of commercial unsanded Portland cement grout with latex additive. For use with narrow grout joints. Provide the following, or equal, in color as selected by Architect.

1. Laticrete 1600 Unsanded premium grout

2. Accucolor XT Unsanded grout by TEC

3. Mapei Keracolor U, premium unsanded grout with polymer

E. Stain resistant Grout for floors: ANSI A118.3, consisting of commercial sanded cement grout with anti-microbial protection. Provide one of the following, in color as selected by Architect.

1. Laticrete PermaColor.

2. Accucolor XT 650 sanded by TEC

3. Opticolor by Mapei stain free grout.

2.6 THICK-BED MATERIALS

A. Mortar Bed Materials: Portland cement, sand, latex additive, and water.

1. Products:
   a. LATICRETE International, Inc; LATICRETE 3701 Fortified Mortar Bed: www.laticrete.com.
   b. TEC Specialty:
   c. Mapei Corp:
   d. Substitutions: See Section 01 60 00 - Product Requirements.

2. Thick Bed Mortar: One step polymer fortified blend of raw materials, Portland cement and aggregates. 5 % water absorption as per ANSI A118.7.3.4, 28 day comprehensive strength and flexural strength as per ANSI A118.7.3.5, shrinkage 7 day cure .05% as per ASTM C-157 and a 25 year warranty. Use the following or approved equal in areas with slope to drain:
   a. Laticrete 3701 Fortified Mortar Bed.
   b. Mapei 4 to 1 Mud Bed Mix.

2.7 ACCESSORY MATERIALS

A. Waterproofing Membrane/ crack isolation membrane at Floors: Specifically designed for bonding to cementitious substrate under thick mortar bed or thin-set tile; complying with ANSI A118.10.

1. Type: Bonded Sheet Membrane.

2. Anti-fracture protection up to 1/8" over nonstructural cracks.

3. ASTM C627- Robinson Floor test, ANSI A118.10, ANSI A118.12.

4. Antimicrobial Protection

5. Installation: Allow for flood testing in 2 hours at 70 degrees F of higher. Tile can be installed directly onto membrane.

6. Thickness: 25 mils, minimum, dry film thickness.

7. Products:
    a. LATICRETE International, Inc; LATICRETE HYDRO BAN: www.laticrete.com.
    b. Mapei AquaDefense.

B. Backer Board: Cementitious type complying with ANSI A118.9; high density, glass fiber reinforced, 1/2 inch thick; 2 inch wide coated glass fiber tape for joints and corners.

C. Metal Cove Base: Aluminum Cove-shaped profile for floor/wall transitions, inside and outside corners. Similar to Schluter DILEX-AHK.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.

B. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of setting materials to sub-floor surfaces.

C. Verify that concrete sub-floor surfaces are ready for tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by tile manufacturer and setting materials manufacturer.

D. Verify that required floor-mounted utilities are in correct location.

3.2 PREPARATION

A. Protect surrounding work from damage.

B. Vacuum clean surfaces and damp clean.

C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

D. Install backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of setting material to a feather edge.

E. Blending: For tile exhibiting color variations within the ranges selected during sample submittals, verify that tile has been blended in factory and packaged accordingly so that tile unit taken from one package show the same range in colors as those taken from other packages and match approved samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 INSTALLATION - GENERAL

A. Install tile, thresholds, and stair treads and grout in accordance with applicable requirements of ANSI A108.1A thru A108.13, manufacturer's instructions, and TCNA (HB) recommendations.

B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.

C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.

D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.

E. Form internal angles square and external angles bullnosed.

F. Install ceramic accessories rigidly in prepared openings.

G. Install non-ceramic trim in accordance with manufacturer's instructions.

H. Install thresholds where indicated.

I. Sound tile after setting. Replace hollow sounding units.

J. Keep control and expansion joints free of mortar, grout, and adhesive.

K. Prior to grouting, allow installation to completely cure; minimum of 48 hours.

L. Grout tile joints unless otherwise indicated. Use standard grout unless otherwise indicated.

M. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.

N. Jointing Pattern: If offset pattern is required for rectangles larger than 12 inches, the offset shall be no greater than 33%.

O. Extend tile work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions except as otherwise shown. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

P. Before grouting entire area do a test area to assure there will be no permanent staining or discoloration of the tile and to verify that the grout is easily removed from the surface. If necessary, pre-coat exposed surfaces of tile with a grout release as recommended by the manufacturer.

3.4 INSTALLATION - FLOORS - THIN-SET METHODS

A. Over interior concrete substrates, install in accordance with TCNA (HB) Method F113, dry-set or latex-Portland cement bond coat, with standard grout, unless otherwise indicated.

   1. Where waterproofing membrane is indicated, install in accordance with TCNA (HB) Method F122, with latex-Portland cement grout.

B. Install tile-to-tile floor movement joints in accordance with TCNA (HB) Method EJ171F.

3.5 INSTALLATION - FLOORS - MORTAR BED METHODS

A. Over interior concrete substrates, install in accordance with TCNA (HB) Method F111, with cleavage membrane, unless otherwise indicated.

   1. Where waterproofing membrane is indicated, with standard grout or no mention of grout type, install in accordance with TCNA (HB) Method F121.

B. Cleavage Membrane: Lap edges and ends.

C. Mortar Bed Thickness: 5/8 inch, unless otherwise indicated.

3.6 INSTALLATION - WALL TILE

A. On exterior walls install in accordance with TCNA (HB) Method W244, thin-set over cementitious backer units, with waterproofing membrane.

B. Over cementitious backer units on studs, install in accordance with TCNA (HB) Method W244.

C. Over gypsum wallboard on wood or metal studs install in accordance with TCNA (HB) Method W243, thin-set with dry-set or latex-Portland cement bond coat, unless otherwise indicated.

D. Over interior concrete and masonry install in accordance with TCNA (HB) Method W202, thin-set with dry-set or latex-Portland cement bond coat.

3.7 CLEANING

A. Clean tile and grout surfaces.

B. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

C. Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work.

D. Sealing: Seal all non-glazed ceramic tile surfaces including tile and grout with a penetrating sealer. Apply per manufacturer's instructions. Do not seal porcelain tile.

E. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

3.8 PROTECTION

A. Do not permit traffic over finished floor surface for 4 days after installation.

B. Where tiled surfaces will be subject to equipment or wheel traffic or heavy construction traffic, and during move-in of furniture and equipment, cover protective covering with 1/4" hardboard, plywood or similar material.

END OF SECTION

SECTION 09 51 13

ACOUSTICAL PANEL CEILINGS

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 acoustical panels and exposed suspension systems for interior ceilings.

B. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at time and place to be determined.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Product Data: For recycled content, indicating postconsumer and pre-consumer recycled content and cost.

2. Laboratory Test Reports: For ceiling products, indicating compliance with requirements for low-emitting materials.

C. Samples: For each exposed product and for each color and texture specified, 6 inches in size.

D. Samples for Initial Selection: For components with factory-applied finishes.

E. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:

1. Acoustical Panels: Set of 6-inch-square samples of each type, color, pattern, and texture.

2. Exposed Suspension-System Members, Moldings, and Trim: Set of 6-inch-long Samples of each type, finish, and color.

3. Clips: Full-size hold-down, impact and seismic clips as required.

F. Delegated-Design Submittal: For seismic restraints for ceiling systems.

1. Include design calculations for seismic restraints including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Ceiling suspension-system members.

2. Structural members to which suspension systems will be attached.

3. Method of attaching hangers to building structure.
   a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.

4. Carrying channels or other supplemental support for hanger-wire attachment where conditions do not permit installation of hanger wires at required spacing.

5. Size and location of initial access modules for acoustical panels.

6. Items penetrating finished ceiling and ceiling-mounted items including the following:
   a. Lighting fixtures.
   b. Diffusers.
   c. Grilles.
   d. Speakers.
   e. Sprinklers.
   f. Access panels.
   g. Perimeter moldings.

7. Show operation of hinged and sliding components covered by or adjacent to acoustical panels.

8. Minimum Drawing Scale: 1/8 inch = 1 foot

B. Qualification Data: For testing agency.

C. Product Test Reports: For each acoustical panel ceiling, for tests performed by manufacturer and witnessed by a qualified testing agency.

D. Evaluation Reports: For each acoustical panel ceiling suspension system from ICC-ES.

E. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For finishes to include in maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Acoustical Ceiling Units: Full-size panels equal to 2 percent of quantity installed. No less than one full box.

2. Suspension-System Components: Quantity of each exposed component equal to 2 percent of quantity installed.

3. Hold-Down Clips: Equal to 2 percent of quantity installed.

4. Impact Clips: Equal to 2 percent of quantity installed.

1.8 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Build mockup of typical ceiling area as shown on Drawings.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

1.10 FIELD CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, 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. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Ceiling products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. Ceiling products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

C. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design seismic restraints for ceiling systems.

D. Seismic Performance: Suspended ceilings shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

E. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: Class A, B, and C according to ASTM E 1264.

2. Smoke-Developed Index: 450 or less.

F. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL or from the listings of another qualified testing agency.

2.3 ACOUSTICAL PANELS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. American Gypsum.

2. Armstrong World Industries, Inc.

3. Tectum Inc.

B. Acoustical Panel Standard: Provide manufacturer's standard panels according to ASTM E 1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.

C. Acoustical Panels TYPE – 1: Painted mineral fiber, ASTM E 1264 Type III, Form 2, pattern CE, Class A.

1. Size: 24 x 48 inches.

2. Thickness: 3/4" inches (19 mm).

3. Composition: Mineral fiber.

4. Light Reflectance: 85 percent, determined as specified in ASTM E 1264.

5. NRC Range: 0.70, determined as specified in ASTM E 1264.

6. Ceiling Attenuation Class (CAC): 35, determined as specified in ASTM E 1264.

7. Edge: Angled Tegular 15/16”.

8. Surface Color: White.

9. Sag Resistance Treatment: Armstrong HumiGaurd Plus or equivalent. Superior resistance to sagging in high humidity conditions.

10. Anti-Mold and Mildew Treatment: Face and back of panel treated with anti-microbial treatment and provides guaranteed resistance against growth of mold/ mildew and Gam-positive and Gam-negative odor/stain causing bacteria for 30 years.

11. Warranty: 30 year system.

12. Recycled content greater than 50%.

13. Classified as low-emitting per standards established by the Collaborative for High-Performance Schools - CHPS Section 1350 requirements. (Independent test reports available upon request).

14. Surface Pattern: Non-directional fissured, fine texture.

15. Product: School Zone Fine Fissured 1824, by Armstrong.

16. Suspension System: Exposed grid Type 1.

D. Acoustical Panels TYPE - 2: Mineral fiber, ASTM E 1264 Type IV, Form 2, pattern E, Class A.

1. Size: 24 x 48 inches / 24 x 24 inches. Refer to Reflected Ceiling Plans for locations.

2. Thickness: 3/4" inches (19 mm).

3. Composition: Mineral fiber.

4. Light Reflectance: 87 percent, determined as specified in ASTM E 1264.

5. NRC Range: 0.80, determined as specified in ASTM E 1264.

6. Ceiling Attenuation Class (CAC): 35, determined as specified in ASTM E 1264.

7. Articulation Class (AC): 170

8. Edge: Beveled Tegular 15/16”.

9. Surface Color: White.

10. Sag Resistance Treatment: Armstrong HumiGaurd Plus or equivalent. Superior resistance to sagging in high humidity conditions.

11. Anti-Mold and Mildew Treatment: Face and back of panel treated with anti-microbial treatment and provides guaranteed resistance against growth of mold/ mildew and Gam-positive and Gam-negative odor/stain causing bacteria for 30 years.

12. Warranty: 30 year system.

13. Recycled content greater than 50%.

14. Classified as low-emitting per standards established by the Collaborative for High-Performance Schools - CHPS Section 1350 requirements. (Independent test reports available upon request).

15. Surface Pattern: Fine texture.

16. Product: Ultima High NRC: 1941

17. Suspension System: Exposed grid Type 1.

E. Acoustical Panels TYPE - 3: Mineral Fiber, ASTM E 1264 Type IX, Form 2, pattern G, Class A.

1. Size: 24 x 48 inches.

2. Thickness: 5/8 inches.

3. Light Reflectance: 89 percent, determined as specified in ASTM E 1264.

4. NRC Range: N/A.

5. Sound Blocking (CAC): 33.

6. Edge: Square Lay-In 15/16”.

7. Surface Color: White.

8. Water Repellent – product resists water for 15 minutes.

9. Sage Resistance Treatment: Armstrong HumiGuard Plus or equivalent. Superior resistance to sagging in high humidity conditions.

10. Anti-Mold and Mildew Treatment: Face and back of panel treated with anti-microbial treatment and provides guaranteed resistance against growth of mold / mildew and Gam-positive and Gam-negative odor/stain causing bacteria for 30 years.

11. Warranty: 30 year system.

12. Recycled Content: Up to 36%.

13. Classified as low-emitting per standards established by the Collaborative for High-Performance Schools - CHPS Section 1350 requirements. (Independent test reports available upon request).

14. Surface Pattern: Smooth texture.

15. Product: Kitchen Zone 672, by Armstrong.

16. Suspension System: Exposed grid Type 1 with hold down clips.

F. Acoustical Panels TYPE - 4: Mineral Fiber, ASTM E 1264 Type IV, Form 2, pattern E, Class A.

1. Size: 24 x 48 inches / 24 x 24 inches. Refer to Reflected Ceiling Plans for locations.

2. Thickness: 3/4" inches (19 mm).

3. Light Reflectance: 87 percent, determined as specified in ASTM E 1264.

4. NRC Range: 0.80, determined as specified in ASTM E 1264.

5. Sound Blocking (CAC): 35

6. Articulation Class (AC): 170.

7. Edge: Square Lay-In 15/16”.

8. Surface Color: White.

9. Sag Resistance Treatment: Armstrong HumiGaurd Plus or equivalent. Superior resistance to sagging in high humidity conditions.

10. Anti-Mold and Mildew Treatment: Face and back of panel treated with anti-microbial treatment and provides guaranteed resistance against growth of mold/ mildew and Gam-positive and Gam-negative odor/stain causing bacteria for 30 years.

11. Warranty: 30 year system.

12. Recycled content greater than 75%.

13. Classified as low-emitting per standards established by the Collaborative for High-Performance Schools - CHPS Section 1350 requirements. (Independent test reports available upon request).

14. Surface Pattern: Non-directional fissured, fine texture.

15. Product: Ultima High NRC: 1943, by Armstrong.

16. Suspension System: Exposed grid Type 1.

2.4 METAL SUSPENSION SYSTEM

A. Manufacturers:

1. Same as for acoustical units.

2. Armstrong

3. USG Interiors, Inc.

4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Suspension Systems - General: ASTM C 635; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.

C. Exposed Steel Suspension System Type 1: Formed hot dipped galvanized steel.

1. Profile: Double flange, for square edge panels, with recess; 15/16 inch wide face.

2. Construction: Double web with Superlock click-in-place installation system.

3. Seismic Performance: Suspended Grid Ceiling Accessories for Seismic Design Category "C" Locations.

4. Finish: White.

5. Recycled content greater than 12.5% (25% pre-consumer, 0% post-consumer).

6. Product: Prelude XL, by Armstrong.

D. Drywall Grid System , ASTM C 635 Heavy Duty main beam classification, ASTM A 653 zinc coated hot dipped galvanized steel. Exposed surface chemically cleansed, zinc coated and pre-finished. Materials conform to the performance standard ASTM C 645 (Standard Specification for Rigid Furring Channels for Screw applications of Gypsum Board)

1. Components
   a. Main Beam: Double-web constructions, profile height 1-11/16" with peaked roof top bulb and 1-1/2" knurled flange.
   b. Cross Tees: Double-web constructions, profile height 1-11/16" with peaked roof top bulb and 1-1/2" : knurled flange.
   c. Molding: Provide manufacturer's recommended molding at window where grid will be visible from exterior.

2. Seismic Performance: Suspended Grid Ceiling Accessories and perimeter supports for Seismic Design Category "C" Locations.

3. Product Drywall Grid system by USG Inc.

2.5 ACCESSORIES

A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.

B. Perimeter Moldings: Same material and finish as grid.

1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.

C. Seismic Performance: Suspended Grid Ceiling Accessories and perimeter supports for Seismic Design Category "C" Locations.

D. Touch-Up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that layout of hangers will not interfere with other work.

3.2 INSTALLATION - SUSPENSION SYSTEM

A. Install suspension system in accordance with ASTM C 636/C 636M, ASTM E 580/E 580M, and manufacturer's instructions and as supplemented in this section.

B. Rigidly secure system, including mechanical and electrical components, for maximum deflection of 1:360.

C. Lay out system to a balanced grid design with edge units no less than 50 percent of acoustical unit size.

D. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.

E. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.

F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.

G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

H. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.

I. Do not eccentrically load system or induce rotation of runners.

J. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junction with other interruptions.

1. Use longest practical lengths.

2. Overlap and rivet corners.

3.3 INSTALLATION - ACOUSTICAL UNITS

A. Install acoustical units in accordance with manufacturer's instructions.

B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.

C. Lay directional patterned units with pattern parallel to longest room axis.

D. Fit border trim neatly against abutting surfaces.

E. Install units after above-ceiling work is complete.

F. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

G. Cutting Acoustical Units:

1. Make field cut edges of same profile as factory edges.

2. Double cut and field paint exposed reveal edges.

H. Install hold-down clips on panels within 20 ft. of an exterior door and in toilet rooms.

1. Accessories: Install accessories as applicable to meet the project requirements.

3.4 TOLERANCES

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.

B. Maximum Variation from Plumb of Grid Members: Caused by Eccentric Loads: 2 degrees.

END OF SECTION

SECTION 09 65 00

RESILIENT FLOORING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Resilient tile.

B. Resilient rubber base.

C. Installation accessories.

1.2 REFERENCE STANDARDS

A. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2014c.

B. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2011.

C. ASTM F970 - Standard Test Method for Static Load Limit; 2007 (Reapproved 2011).

D. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile; 2004 (Reapproved 2014).

E. ASTM F1861 - Standard Specification for Resilient Wall Base; 2008 (Reapproved 2012).

F. BAAQMD 8-51 - Bay Area Air Quality Management District Regulation 8, Rule 51, Adhesive and Sealant Products; www.baaqmd.gov; 2002.

G. CAL (CHPS LEM) - Low-Emitting Materials Product List; California Collaborative for High Performance Schools (CHPS); current edition at www.chps.net/.

H. GEI (SCH) – GREENGUARD "Children and Schools" Certified Products; GREENGUARD Environmental Institute; current listings at www.greenguard.org.

I. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2015.

J. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition; www.aqmd.gov.

K. SCS (CPD) - SCS Certified Products; Scientific Certification Systems; current listings at www.scscertified.com.

1.3 SUBMITTALS

A. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns, and colors available; and installation instructions.

B. Shop Drawings: Indicate seaming plan.

C. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.

D. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

E. LEED Report shall contain the following information where applicable:

1. VOC content for sealants and adhesives as required by Division 01.

2. Report rapidly renewable content and urea-formaldehyde content.

3. Recycled Content, pre-consumer, and post-consumer.

4. Location of Manufacturer.

5. Applicable environmental certifications including FloorScore certification or equivalent.

6. End of use recyclable content.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect roll materials from damage by storing on end.

1.5 FIELD CONDITIONS

A. Maintain temperature in storage area between 55 degrees F (13 degrees C) and 90 degrees F (72 degrees C).

B. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 68 degrees F to achieve temperature stability. The permanent HVAC should be fully operational, controlled and set at a minimum of 68 degrees F for a minimum of seven days prior to, during, and seven days following the installation.

PART 2 PRODUCTS

2.1 RESILIENT FLOORING

A. Manufacturers:

1. Armstrong Flooring: www.arstrongflooring.com

2. Tarkett: www.tarkett.com

3. Equivalents: See Section 01 60 00 - Product Requirements and Section 00 21 13.

B. Vinyl Composition Tile: Type (VCT)

1. Minimum Requirements: Comply with ASTM F 1066 - Class 2 Through Pattern ISO 10595 Type II.

2. Critical Radiant Flux (CRF): Class 1, Minimum 0.45 watt per square centimeter, when tested in accordance with (ASTM E 648).

3. Smoke Evolution: 450 or less (ASTM E 662)

4. Size: 12 by 12 inch

5. VOC Content: Certified as Low Emission by one of the following:
   a. GreenGuard Children and Schools; www.greenguard.org.
   b. SCS Floorscore; www.scscertified.com.
   c. Product listing in the CHPS Low-Emitting Materials Product List at; www.chps.net/manual/lem_table.htm.

6. Overall Thickness / Wear Layer Thickness: 1/8 inch (3.2 mm).

7. Color: Up to 10 colors, chosen by Architect from manufacturer's full range and as shown on floor finish patterns.

8. Slip Resistance: ADA Compliant.

9. Static Load Resistance @ 125 psi: (ASTM F 970) - Meets Requirements.

10. Warranty: 5 year Manufacturer's Warranty

11. Installation:

    Manufacturer's recommended adhesive.

12. Product:
    a. Standard Excelon Imperial Texture by Armstrong Flooring.

C. Resilient Homogeneous Tile (RHT):

1. Manufacturer:
   a. Tarkett Commercial, www.tarkett.com
   b. Substitutions: See Section 01 60 00 – Product Requirements.

2. Product: iQ Optima, no wax, no polish homogeneous tile flooring designed for heavy commercial interiors.

3. Material: Meets ASTM F 1913 performance standards, Class 1, ASTM F 1700.

4. Slip Resistance (ASTM D2047): SCOF greater than or equal to 0.5.

5. Static Load Limit: ASTM F 970 – 250 psi less than or equal to 0.005".

6. Fire Performance (ASTM E648 Flooring Radiant Panel): Class 1.

7. Chemical Resistance (ASTM F925): Passes.

8. Total Thickness (ASTM F386): 0.080" (2 mm).

9. Flexibility (ASTM F137): Passes.

10. Tile Squareness (ASTM F2055): Passes.

11. Tile Dimensional Stability (ASTM F2199): Passes

12. Size: 12x12 inch, 12x24inch, 24x24inch.

13. Colors: Up to 4 colors, chosen by Architect from manufacturer's full range and as shown on floor finish patterns.

14. Installation: Follow manufacturer's instructions and use recommended adhesive for heavy wheeled traffic.

D. Resilient Homogeneous Sheet (LVT):

1. Manufacturer:
   a. Patcraft, www.patcraft.com
   b. Substitutions: See Section 01 60 00 – Product Requirements.

2. Product: Linocut, heavy commercial luxury vinyl tile with fiberglass. ASTM F1700 Class III printed film vinyl tile Type B (embossed)

3. Wear Layer Thickness: 20 mil / 0.02 inches

4. Overall Thickness: 0.197 inches / 5 mm

5. Edge Profile: Squared Edge

6. Installation: Glue Down

7. Recommended Adhesive 4200, 2200 or 4252

8. Slip Resistance (ASTM D2047): SCOF greater than 0.6.

9. Static Load Limit: ASTM F 970 – Passes (Modified), *1000 lbs.

10. Fire Performance (ASTM E648 Flooring Radiant Panel): Class 1.

11. Chemical Resistance (ASTM F925): Passes, Class 1.

12. Size: 9”W x 36”L.

13. Colors: Up to 4 colors, chosen by Architect from manufacturer’s full range and as shown on floor finish patterns.

14. Installation: Follow manufacturer’s instructions and use recommended adhesive for heavy traffic.

2.2 RESILIENT BASE

A. Resilient Base: Type (RB). ASTM F 1861, Type TP, rubber, thermoplastic; top set Style B, Cove, and Style A straight and as follows:

1. Meets the performance and dimensional requirements of ASTM F-1861, type TV, group 1 standard specifications for resilient wall base.

2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648 or NFPA 253.

3. Height: 4 inches (100 mm).

4. Thickness: 0.125 inch (3.2 mm) thick.

5. Finish: Satin.

6. Length: 100' or 120' coils

7. Profiles: Coved/ with toe.

8. Color: Color as selected from manufacturer's full line.

9. Recycled Content: Contains 14% pre-consumer content.

10. End of Use: Product shall be 100% recyclable at end of useful life.

11. Rapidly renewable materials: Product to contain 1% rapidly renewable content.

12. VOC Content: Product to be third party certified to comply with FloorScore requirements and guidelines for indoor air quality.

13. Manufacture location within 500 miles.

14. Warranty- Limited 1- year warranty.

15. Manufacturers:
    a. Johnsonite, a Tarkett Company: www.johnsonite.com.
    b. Roppe Corp: www.roppe.com.
    c. Substitutions: See Article II Section 2.20 Equivalents - Approved Equal.

2.3 ACCESSORIES

A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.

B. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer.

1. Provide only products having lower volatile organic compound (VOC) content than required by the more stringent of the South Coast Air Quality Management District Rule No.1168 and the Bay Area Air Quality Management District Regulation 8, Rule 51.

2. Provide High-Moisture Adhesive where required due to high relative moisture content of concrete slab. All adhesive shall be manufacturers recommended to protect warranty.

C. Moldings, Transition and Edge Strips: Rubber.

D. Color: To be selected by architect from manufacturers full line and coordinate with base and rubber flooring materials.

E. Rubber Transition Strips: Provide in locations of exposed edges, or where flooring finishes of dissimilar material/height meet.

1. Product: CTA-XX-N manufactured by Johnsonite, or approved transition for application.
2 Resilient Edge/Transition Strips: Height and shape required to protect exposed edge of resilient flooring and of maximum lengths to minimize running joints. Moldings shall comply with ADA requirements and exceed ASTM E 648 Class 1 Flammability requirements.

F. Filler for Coved Base: Plastic.

G. Sealer and Wax: Types recommended by flooring manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. General: Examine areas where installation of flooring will occur, with installer present, to verify that substrates and conditions are satisfactory for flooring installation and comply with flooring manufacturer's requirements and those specified in this Section.

B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:

1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials whose presence would interfere with bonding of adhesive. Determine adhesion and dryness characteristics by performing bond tests recommended by flooring manufacturer.

2. Finishes of subfloors comply with tolerances and other requirements specified in Division 03 Section "Cast-In-Place Concrete" for slabs receiving resilient flooring.

3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits of any kind.

C. Concrete Moisture Emission Tests: Perform calcium chloride, rH, and pH tests as per manufacturer's directions, as follows, and other tests if recommended by resilient flooring and adhesive manufacturer:

1. Perform moisture test at rate of one per 2,000 sq. ft. of new and existing floor area to be covered.

2. Report test results in writing to Architect, and Contractor within 24 hours after tests are completed. Reports of concrete moisture emission tests shall contain the Project identification name and number, date of test location of test within structure.

3. Perform additional moisture emission tests of in-place concrete when test results indicate specified moisture content has been exceeded, as directed by Architect.
   a. Repeat test one week after initial test minimally and additionally repeat test if required by field conditions to determine moisture levels in area of resilient flooring application.

D. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Comply with manufacturer's installation specifications to prepare substrates indicated to receive flooring.

B. Use trowel-able leveling and patching compounds per flooring manufacturer's directions to fill cracks, holes, and depressions in substrates and to patch and level floors as required to provide suitable substrate for flooring application.

C. Remove coatings, including curing compounds, and other substances that are incompatible with flooring adhesives by using a grinder, sander, or polishing machine with a heavy-duty wire brush.

D. Broom or vacuum clean substrates to be covered by flooring immediately before installation of flooring. Following cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust.

E. Apply concrete slab primer, if recommended by flooring manufacturer, prior to applying adhesive. Apply according to manufacturer's directions.

F. Seal concrete substrates as required by moisture test results to ensure proper adhesion of resilient flooring to substrate.

3.3 TILE INSTALLATION

A. General: Comply with tile manufacturer's installation directions and other requirements indicated that are applicable to each type of tile installation included in Project.

B. Lay out tiles from center marks established with principal walls so tiles at opposite edges of room are of equal width. Install tiles square with room axis, unless otherwise indicated.

C. Match tiles for color and pattern by selecting tiles from cartons in same sequence as manufactured and packaged, if so numbered. Cut tiles neatly around all fixtures. Discard broken, cracked, chipped, or deformed tiles.

1. Lay tiles in decorative pattern as indicated on drawings.

D. Scribe, cut, and fit tiles to butt tightly to vertical surfaces and edgings.

E. Extend tiles into toe spaces, door reveals, closets, and similar openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use chalk or other non- permanent, non-staining marking device.

G. Install tiles on covers for telephone and electrical ducts, and similar items in finished floor areas. Maintain overall continuity of color and pattern with pieces of flooring installed on covers. Tightly adhere edges to perimeter of floor around covers and to covers.

H. Adhere tiles to flooring substrates without producing open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections in completed tile installation.

I. Use full spread of adhesive applied to substrate in compliance with tile manufacturer's directions including those for trowel notching, adhesive mixing, and adhesive open and working times.

J. Hand roll tile where required by tile manufacturer.

3.4 INSTALLATION OF RESILIENT BASE AND ACCESSORIES

A. General: Install resilient accessories according to manufacturer's written installation instructions.

B. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches (45 mm) between joints.

C. Apply resilient wall base to walls, pilasters, casework, and other permanent fixtures in rooms and areas where base is required. Install wall base in lengths as long as practicable. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

1. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.

3.5 CLEANING

A. Perform the following operations immediately after completing installation:

1. Remove visible adhesive and other surface blemishes using cleaner recommended by manufacturers.

2. Sweep or vacuum floor thoroughly.

3. Do not wash floor until after time-period recommended by resilient flooring manufacturer.

4. Damp-mop flooring to remove black marks and soil.

B. Protect flooring against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods indicated or recommended by flooring manufacturer.

1. Apply protective floor polish to flooring surfaces that are free from soil, visible adhesive, and surface blemishes. Coordinate selection of floor polish with Owner's maintenance service requirements.

2. Cover flooring with undyed, untreated building paper until inspection for Substantial Completion.

C. Clean flooring not more than 4 days prior to dates scheduled for inspections intended to establish date of Substantial Completion in each area of Project. Clean flooring using method recommended by manufacturer.

3.6 PROTECTION

A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION

SECTION 09 90 00

PAINTING AND COATING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints, stains, varnishes, and other coatings.

C. Paint exposed surfaces, except where the paint schedules indicate that a surface or material is not to be painted or is to remain natural. If the paint schedules do not specifically mention an item or a surface, paint the item or surface the same as similar adjacent materials or surfaces whether or not schedules indicate colors. If the schedules do not indicate color or finish, the Architect will select from any custom or standard colors and finishes available.

D. Scope: Finish all interior and exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:

E. Do Not Paint or Finish the Following Items:

1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.

2. Items indicated to receive other finishes.

3. Items indicated to remain unfinished.

4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.

5. Floors, unless specifically so indicated.

6. Glass.

7. Concealed pipes, ducts, and conduits.

1.02 DEFINITIONS

A. Conform to ASTM D16 for interpretation of terms used in this section.

1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.

2. Eggshell refers to low-sheen finish with a gloss range between 5 and 20 when measured at a 60-degree meter.

3. Satin refers to low-sheen finish with a gloss range between 15 and 35 when measured at a 60-degree meter.

4. Semigloss refers to medium-sheen finish with a gloss range between 30 and 65 when measured at a 60-degree meter.

5. Full gloss refers to high-sheen finish with a gloss range more than 65 when measured at a 60-degree meter.

1.03 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2014.

C. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials; 2007.

D. GreenSeal GS-11 - Paints and Coatings; 2013.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on all finishing products, including VOC content.

C. Material List: Provide an inclusive list of required coating materials referenced to the substrates. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification. Cross reference any substitutions to Benjamin Moore products specified and indicate substrate; substitutions without cross reference will be returned due to lack of information for evaluation.

D. Manufacturer's Information: Provide manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material proposed for use.

E. Certification: By manufacturer that all paints and coatings comply with VOC limits specified.

F. LEED Report: VOC content of all interior opaque coatings actually used.

G. Manufacturer's Instructions: Indicate special surface preparation procedures.

H. Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.

I. 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.

1.05 EXTRA MATERIALS: FURNISH THE FOLLOWING FOR OWNER'S USE IN MAINTENANCE OF PROJECT.

A. See Section 01 60 00 - Product Requirements, for additional provisions.

B. Extra Paint and Coatings: 1 gallon (4 L) of each color; store where directed.

C. Label each container with color in addition to the manufacturer's label.

D. Coating Maintenance Manual: Upon Conclusion of the project, the Contractor or paint manufacturer/supplier shall furnish a coating maintenance manual, such as the Sherwin-Williams "Custodian Project Color and Product Information" report or equal. Manual shall include an Area Summary with finish schedule. Area Detail designating where each product/color/finish was used, product data pages, Material Safety Data Sheets, care, and cleaning instructions, touch up procedures, and color samples of each color and finish used.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 3- years' experience.

C. Source Limitations: Obtain block fillers, primers, and undercoat materials for each coating system from the same manufacturer as the finish coats.

1.07 MOCK-UP

A. See Section 01 40 00 - Quality Requirements, for general requirements for mock-up.

B. Benchmark Samples (Mockups): Provide a full-coat benchmark finish sample of each type of coating and substrate required on the Project. Duplicate finish of approved prepared samples.

C. The Architect will select one room or surface to represent surfaces and conditions for each color selected.

1. W all Surfaces: Provide samples on at least 100 sq. ft. (9 sq. m) of wall surface.

2. Small Areas and Items: Architect will designate items or areas required.

D. After permanent lighting and other environmental services have been activated, apply coatings in this room or to each surface according to the Schedule or as specified. Provide required sheen, color, and texture on each surface.

1. After finishes are accepted, the Architect will use the room or surface to evaluate coating systems of a similar nature.

2. Final approval of colors and textures will be from job-applied samples.

E. Mock-up may remain as part of the work if approved.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, VOC content, instructions for mixing and reducing, and mixed date.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

D. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and application.

1.09 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

D. Minimum Application Temperatures for Latex Paints: 45 degrees F (7 degrees C) for interiors; 50 degrees F (10 degrees C) for exterior; unless required otherwise by manufacturer's instructions. Maximum temperature is 90 degrees F (32 degrees C).

E. Minimum Application Temperature for Varnish Finishes: 65 degrees F (18 degrees C) for interior or exterior, unless required otherwise by manufacturer's instructions. Maximum temperature is 95 degrees F (35 degrees C).

F. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide all paint and coating products used in any individual system from the same manufacturer.

B. Paints:

1. Base Manufacturer: Sherwin Williams Co.

2. PPG Professional Paints: www.ppg.com.

3. Benjamin Moore & Co: www.benjaminmoore.com.

C. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 PAINTS AND COATINGS - GENERAL

A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating. All paints and coatings shall be of professional grade.

1. Material Compatibility: Provide block fillers, primers, undercoats, and finish-coat materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

2. Supply each coating material in quantity required to complete entire project's work from a single production run.

3. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.

B. Primers: As follows unless other primer is required or recommended by manufacturer of top coats; where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

C. Volatile Organic Compound (VOC) Content:

1. Provide coatings that comply with the most stringent requirements specified in the following and refer to schedule for any specific requirements:
   a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
   b. Ozone Transport Commission (OTC) Model Rule, Architectural, Industrial, and Maintenance Coatings; www.otcair.org; specifically:
      1) Opaque, Flat: 50 g/L, maximum.
      2) Opaque, Non-flat: 150 g/L, maximum.
      3) Opaque, High Gloss: 250 g/L, maximum.
      4) Varnishes: 350 g/L, maximum.
   c. Architectural coatings VOC limits of New York.
   d. USGBC LEED Rating system for IEQc4.2 Applicable VOC limits. Following guidelines from SCAQUMD Rule 1113, 2004 and Green Seal GS-11, 1993. Shall comply with the following limits (in g/L minus water):
      1) Interior flat coating or primer: 50
      2) Interior non-flat coating or primer: 150
      3) Anti-corrosive/ anti-rust paint: 250
      4) Clear wood finish: Lacquer: 550
      5) Clear wood finish: Sanding sealer: 350
      6) Clear wood finish: Varnish: 350
      7) Clear brushing lacquer: 680
      8) Floor coatings: 100
      9) Sealers and under-coaters: 200
      10) Shellac: Pigmented: 550
      11) Stain:250
      12) Concrete curing compounds:350
      13) Waterproofing sealers: 250
      14) Waterproofing concrete/ masonry sealers: 400

2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

3. Tints/Colorants Shall Add No VOC

D. Chemical Content: The following compounds are prohibited:

1. Aromatic Compounds: In excess of 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).

2. Acrolein, acrylonitrile, antimony, benzene, butyl benzyl phthalate, cadmium, di (2-ethylhexyl) phthalate, di-n-butyl phthalate, di-n-octyl phthalate, 1,2-dichlorobenzene, diethyl phthalate, dimethyl phthalate, ethylbenzene, formaldehyde, hexavalent chromium, isophorone, lead, mercury, methyl ethyl ketone, methyl isobutyl ketone, methylene chloride, naphthalene, toluene (methylbenzene), 1,1,1-trichloroethane, vinyl chloride.

E. Flame Spread Rating:

1. All products must meet or exceed Class A: (0-25) Flame Spread Index and (0-450) Smoke Developed Index and in accordance to ASTM E84.

F. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

G. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.

H. Colors: As indicated on drawings.

1. Selection to be made by Architect after award of contract.

2. Allow for minimum of three colors for each system, unless otherwise indicated, without additional cost to Owner.

3. Extend colors to surface edges; colors may change at any edge as directed by Architect.

4. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under.

5. In utility areas, finish equipment, piping, conduit, and exposed duct work in colors according to the color coding scheme indicated.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with the Applicator present, under which painting will be performed for compliance with paint application requirements. Surfaces receiving paint must be thoroughly dry before paint is applied.

1. Do not begin to apply paint until unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.

2. Start of painting will be construed as the Applicator's acceptance of surfaces and conditions within a particular area.

B. Test shop-applied primer for compatibility with subsequent cover materials.

C. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:

1. Gypsum Wallboard: 12 percent.

2. Plaster and Stucco: 12 percent.

3. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.

4. Interior Wood: 15 percent, measured in accordance with ASTM D4442.

5. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.

6. Concrete Floors and Traffic Surfaces: 8 percent.

D. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

E. Notify the Architect about anticipated problems using the materials specified over substrates primed by others.

3.02 PREPARATION

A. Cleaning: Before applying paint or other surface treatments, clean the substrates of substances that could impair the bond of the various coatings. Remove oil and grease before cleaning. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

B. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of the size or weight of the item, provide surface-applied protection before surface preparation and painting. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.

C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.

1. Provide barrier coats over incompatible primers or remove and reprime.

D. Remove or repair existing coatings that exhibit surface defects.

E. Seal surfaces that might cause bleed through or staining of topcoat.

F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

G. Concrete and Unit Masonry Surfaces to be Painted: Remove dirt, efflorescence, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.

    1. Use abrasive blast-cleaning methods if recommended by paint manufacturer.

    2. Brush all surfaces with a stiff fiber brush to remove all loose particles.

    3. Cure all surfaces for a minimum of 60 days before painting.

    4. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition before application. Do not paint surfaces where moisture content exceeds that permitted in manufacturer's written instructions.

H. Gypsum Board Surfaces to be Painted: Repair all surface defects with finishing compound for wallboard joint concealment or spackling compound, filled out flush and smooth, and sanded. Remove all sanding dust and verify that joint compound is dry prior application of primer. After application of prime coat, again fill and sand smooth all defects that have been made visible by primer coat application. Remove all sanding dust and spot prime over areas of repair.

I. Plaster Surfaces to be Painted: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.

J. Concrete Floors and Traffic Surfaces to be Painted: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.

K. Aluminum Surfaces to be Painted: Remove surface contamination by steam or high pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.

L. Galvanized Surfaces to be Painted: Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods. Lightly sand surfaces with 200 or greater grit sand paper, and solvent clean in accordance with SSPC-SP1. Apply coat of etching primer.

M. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with the Steel Structures Painting Council's (SSPC) recommendations.

1. New Surfaces Without Shop Coat: Solvent clean to remove oil and grease in accordance with SSPC-SP1. Surfaces that contain loose rust, loose mill scale, and other foreign substances shall be mechanically cleaned by power wire brushing in accordance with SSPC-SP3. Remove welding flux, slag and fume deposits, weld spatters, and burrs. Immediately apply primer coat, before rust re-appears.

2. Shop Coated Surfaces: Protect from corrosion before and after installation by treating corroded areas immediately upon detection. W ire brush or sand abraded or corroded spots to bright metal and touch up with same paint used for shop coat.

N. Aluminum and Stainless Steel Surfaces: Clean surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Lightly sand surfaces with 200 or greater grit sand paper, and solvent clean in accordance with SSPC-SP1.

O. Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.

P. Interior Wood Surfaces to Receive Opaque Finish: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.

Q. Interior Wood Surfaces to Receive Transparent Finish: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.

1. Prime, stain, or seal wood to be painted immediately on delivery. Prime edges, ends, faces, undersides, and backsides of wood, including cabinets, counters, cases, and paneling.

2. When transparent finish is required, back prime with spar varnish or polyurethane.

R. Exterior Wood Surfaces to Receive Opaque Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior calking compound after prime coat has been applied. Back prime concealed surfaces before installation.

S. Materials Preparation: Mix and prepare paint materials according to manufacturer's written instructions.

1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.

2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.

3. Use only thinners approved by paint manufacturer and only within recommended limits.

T. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of the same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.03 APPLICATION

A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.

1. Paint colors, surface treatments, and finishes are indicated in the schedules.

2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.

3. Provide finish coats that are compatible with primers used.

4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, convector covers, covers for finned-tube radiation, grilles, and similar components are in place. Extend coatings in these areas, as required, to maintain the system integrity and provide desired protection.

5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before the final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.

6. Paint interior surfaces of ducts with a flat, non-specular black paint where visible through registers or grilles.

7. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.

8. Sand lightly between each succeeding enamel or varnish coat.

B. Exterior Wood to Receive Opaque Finish: If final painting must be delayed more than 2 weeks after installation of woodwork, apply primer within 2 weeks and final coating within 4 weeks.

C. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

1. The number of coats and the film thickness required are the same regardless of application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.

2. Omit primer on metal surfaces that have been shop primed and touchup painted.

3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.

4. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.

5. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and where application of another coat of paint does not cause the undercoat to lift or lose adhesion.

D. Application Procedures: Apply paints and coatings by brush or roller according to the manufacturer's directions. Spray application is not permitted, unless specifically approved by Architect in advance for each individual situation. Roller application on woodwork is not permitted.

1. Brushes: Use brushes best suited for the type of material applied. Use brush of appropriate size for the surface or item being painted.

2. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the material and texture required.

3. Spray Equipment: Use airless spray equipment with orifice size as recommended by the manufacturer for the material and texture required.

E. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer.

F. In addition to items listed on the finish schedule and finish drawings, general construction items which require painting are include but are not limited to the following:

1. Steel ladders.

2. Steel supports.

3. Roof hatches and smoke vents

4. Steel stairs and railings.

5. Steel lintels.

6. Exposed structural steel.

7. Steel louvers.

8. All other items which are not factory finished.

G. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and in occupied spaces.

1. Mechanical items to be painted include, but are not limited to, the items indicated on drawings.

H. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.

I. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn through or other defects due to insufficient sealing.

J. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

K. Transparent (Clear) Finishes: Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, runs, cloudiness, color irregularity, brush marks, orange peel, nail holes, or other surface imperfections.

L. Provide satin finish for final coats.

M. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

O. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING

A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from the site.

1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping. Be careful not to scratch or damage adjacent finished surfaces.

B. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION

A. Protect work of other trades, whether being painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.

B. Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations.

1. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

C. Correcting Defective Work:

1. Repair and repaint all defective surfaces that have been painted, stained, finished, or otherwise treated under this Section, to the satisfaction of the Architect and at no additional cost.

2. Rejected surfaces shall be repainted over the entire plane on which they occur (corner to corner/floor to ceiling/etc.) and as otherwise required by the Architect.

D. Protect finished coatings until completion of project.

E. Touch-up damaged coatings after Substantial Completion.

3.06 SCHEDULE - EXTERIOR

A. Type EP-1 Precast, Masonry paint..

1. Lusterless (Flat) Acrylic Finish: Two finish coats over masonry conditioner.
   a. Primer Coat: S-W Loxon Conditioner (LX03W0100
   b. First Coat: S-W Loxon Acrylic Coating (A24W350 series)
   c. Second Coat: S-W Loxon Acrylic Coating (A24W350 series)

B. Type EP-2 Concrete: Cementitious Siding, Flexboard, Transite Board, Non-Roof Shingles, Common Brick, Stucco, Tilt-up, Precast, and Poured-in-place Cement.

1. Latex Systems: Semi-Gloss Finish:
   a. 1st Coat: S-W Loxon Concrete and Masonry Primer Sealer, LX02W50 (5.3-8.0 mils wet, 2.1-3.2 mils dry).
   b. 2nd Coat: S-W Pro Industrial Acrylic Semi-Gloss, B66-650 Series.
   c. 3rd Coat: S-W Pro Industrial Acrylic Semi-Gloss, B66-650 Series. (6.0-12.0 mils wet, 2.0-4.0 mils dry per coat).

C. Type EP -5 Ferrous Metals, Structural Steel: High-performance, polyamide-epoxy/polyurethane coating system - two finish coats over metal primer. Sherwin Williams - no substitutions.

1. Metal Primer: High-performance aromatic urethane, zinc rich primer; Sherwin Williams Corothane I Gal Va Pac Zinc Primer Series B65G00010

2. First Coat: High-performance, polyamide-epoxy coating; Sherwin Williams Macropoxy 646 Fast Cure Epoxy, Series B58W00610, tinted slightly lighter than top coat.

3. Second Coat: Two component high-performance, pigmented, aliphatic acrylic polyurethane coating; Sherwin Williams HS Polyurethane 250 Series B65-300.

D. Type EP-6 Zinc-Coated (Galvanized) Metal: Full-gloss, acrylic-enamel finish - 2 finish coats over a galvanized metal primer. .

1. Primer: Galvanized metal primer: Sherwin-Williams DTM Primer/Finish (B66 W00011)

2. First and Second Coats: Full-gloss, exterior, acrylic enamel; Sherwin-Williams DTM Acrylic Coating B66W01051.

E. Type EP-7 Exterior Wood: Two Coats Satin Self Priming Acrylic Latex

1. First and Second Coats: Sherwin Williams Duration K33 Series

3.07 SCHEDULE- INTERIOR

A. Type IP-1 Concrete Masonry Units: Eggshell, latex-enamel finish - 2 finish coats over a block filler.

1. Block Filler: High-performance, latex-based, block filler; Sherwin-Williams Loxon Block Surfacer, Series LX01W0200.

2. First and Second Coats: Eggshell, latex enamel, Sherwin Williams Super Paint Air Purifying Interior Latex Eggshell (A87 Series)

B. Type IP-2 Gypsum Drywall and Veneer Plaster Walls: Eggshell, latex enamel finish 2 finish coats over a primer.

1. Primer: Latex-based, interior primer: Sherwin-Williams Pro Mar 200 Zero VOC Primer (B28 Series)

2. First and Second Coats: Eggshell, acrylic latex, SuperPaint Air Purifying interior paint zero VOC, Low Odor; Sherwin-Williams SuperPaint Air Purifying Interior Paint Satin(A87 series (Satin)).

C. Type IP-2.1 Existing Gypsum Drywall, Veneer Plaster Walls and CMU Walls: Semi-gloss, latex enamel finish 2 finish coats over spot primer, as required.

1. Primer: Latex-based, interior primer: Sherwin-Williams SuperPaint Air Purifying Interior Latex (A87 series).

2. First and Second Coats: Satin, acrylic latex, Sherwin-Williams SuperPaint Air Purifying Interior Latex (A87 series).

D. Type IP-2.2. Existing Wallcovering to be painted.

1. Ensure that the existing wall covering is sound and filly adhered to the wall. If pealing wall covering is pealing, wallcovering must be removed..

2. Primer: Sherwin Williams PrimeRX acrylic bonding primer, sealer, clear, Series B51T00600

3. First and Second Coats: Semi-gloss, latex enamel, SuperPaint Air Purifying interior paint Sherwin-Williams SuperPaint Air Purifiying Interior Latex Semigloss(A88 Series).

E. Type IP-3 Gypsum Board and Veneer Plaster Ceilings: Flat latex enamel finish - 2 finish coats over a primer..

1. Primer: Latex-based, interior primer: Sherwin-Williams SuperPaint Air Purifying Interior Latex Flat (A86 Series)

2. First and Second Coats: Flat, acrylic latex, interior paint Super Paint Air Purifying Interior Latex Flat (A86 Series)

F. Type IP-4 Gypsum Wallboard: Egg-shell, waterborne acrylic epoxy finish - 2 finish coats over a primer. Use at wet areas, janitor's closets and maintenance areas. .

1. Primer: Sherwin Williams ProMar 200, Zero VOC interior latex primer, B28W02600

2. First and Second Coats: SW Pro Industrial Pre Catalyzed Epoxy, K45W00151 series.

G. Type IP-4.1 Gypsum Wallboard: Semi-gloss, latex based finish. Use in Bathroom applications.

1. Primer: Latex-based, interior primer: Sherwin-Williams Pro Mar 200 Zero VOC Primer (B28 Series)

2. First and Second Coats: Semi-gloss, acrylic latex, Super Paint Air Purifying interior paint, Sherwin-Williams SuperPaint Air Purifying Interior Latex Semigloss (A88 Series)

H. Type IP-5 Concrete Masonry Units: Satin, waterborne acrylic epoxy finish - 2 finish coats over a block filler. Use at wet areas, janitor's closets and maintenance areas..

1. Block Filler: Sherwin Williams Loxon Block Surfacer, LX01W0200 Series

2. First and Second Coats: SW Pro Industrial Pre Catalyzed Epoxy, K45W00151 series.

I. Type IP-5 Concrete Masonry Units: Satin, waterborne acrylic epoxy finish - 2 finish coats over a block filler. Sherwin Williams, no substitution. Use at wet areas, janitor's closets and maintenance areas.

1. Block Filler: High-performance, waterborne cementitious acrylic block filler; Sherwin Williams Cement Plex 875 Acrylic Block Filler B42W00200 Series

2. First and Second Coats: Sherwin Williams Pro Industrial Water Based Catalyzed Epoxy B73W00361.

J. Type IP-6: Exposed Structural Ceilings Ferrous and Galvanized Metal"

1. Waterborne Acrylic Coating, Flat Finish with flash rust resistance and low odor and low VOC (White or Black only). .

2. Primer: Sherwin Williams Pro Industrial Pro Cryl Primer (B66 Series) on Steel if not factory primed.

3. First and Second Coats: Sherwin Williams Pro Industrial Waterborne Acrylic Dryfall (B42).

K. Type IP-7 Stained Wood and Woodwork: Polyurethane-based satin finish - 2 finish coats of a polyurethane-based, clear-satin finish over an alkyd-based, interior wood stain. Provide wood filler on open-grain wood before applying first coat.

1. Stain Coat: Alkyd-Based, interior wood stain; Sherwin Williams ~~Wood~~ Minwax Performance 250 Stain

2. First and Second Finish Coats: Polyurethane satin finish; Sherwin-Williams MinWax Fast Dry Polyurethane

L. Type 8: Painted Wood Trim. Prep existing wood trim as required to accept new paint.

1. Primer: 1 coat Sherwin Williams Premium Interior Wall and Wood Primer (B28 W8111)

2. First and Second Coats: Semi-gloss, latex enamel, Sherwin Williams SuperPaint Air Purifying Interior Latex Semigloss (A88 Series)

M. Type IP-9 Natural-Finish Wood and Woodwork: Polyurethane-based varnish, satin finish - 2 finish coats of a polyurethane-based, satin finish. Provide wood filler on open-grain wood before applying first coat.

1. First and Second Finish Coats: Waterborne Polyurethane satin finish; Sherwin-Williams Wood Classics 250 VOC Stain Series.

N. Type IP-10 Hollow Metal Doors, Frames, and Sidelights, and Ferrous Metals: Semigloss, interior acrylic enamel finish - 2 finish coat over primer. Primer is not required on shop-primed items.

1. Primer: Quick-drying, rust-inhibitive, alkyd-based or epoxy-metal primer; Sherwin-Williams Pro Industrial Pro Cryl Universal Metal Primer (B66 series)

2. First and Second Coats: Semi-gloss, exterior, acrylic enamel; Sherwin-Williams DTM Acrylic Coating B66-100.

O. Type IP-10a Shop Primed Metal, drywall, masonry, wood or concrete. Zero VOC, two coats over shop primed items.

1. Two finish coats Sherwin Williams ProMar 200 Interor Latex, zero VOC. Low sheen, deep base B24W04653.

P. Type IP-11 Aluminum and Galvanized Metals: Semigloss, interior acrylic enamel finish - 2 finish coat over primer. Primer is not required on shop-primed items..

1. Primer: Galvanized metal primer: Sherwin-Williams Pro-Industrial Pro-Cryl Universal Primer B66-310 series

2. First and Second Coats: Semi-gloss, Sherwin Williams Pro Industrial Acrylic Coating B66-600 Series

Q. Type IP-12 Concrete Floors: Sealed Concrete Floors: Gloss, high solids, urethane finish - 2 finish coats over prepared concrete. Coordinate sealer with that specified in Section 03 31 00.

1. First and Second Coats: Sherwin-Williams ArmorSeal 8100, Clear (B70 Series)

R. Type IP-12.1 Concrete Floors: Epoxy finish- two finish coats over primer and surface preparation.

1. Mechanical Surface Preparation: SSPC-SP13/NACE 6or ICRI 03732: Power tool methods as per ASTM D4259. Use to remove existing coating, laitance, weak concrete. Method include circular grinding, sanding, and wire brushing.

2. Primer: B70-8100 - ArmorSeal® 8100 Water Based Epoxy Primer (Part A) Off White. 2 Coats: B70-8100 - ArmorSeal®

3. 8100 Water Based Epoxy (Part A) White/Tint Base

S. Type IP-13 Concrete Floors: Semigloss, waterborne epoxy-amine self-priming finish 2 finish coats over prepared concrete.

1. Primer: ArmorSeal 8100 Primer

2. First and Second Coats: SW ArmorSeal 8100 (B70 series)

T. Type IP-14 Painted Wood Floor - Three (3) finished coats over a primer.

1. Primer: Water based primer, SW ArmorSeal Tread-Plex Primer

2. First and Second Coats: ArmorSeal Tread-Plex Water Based Acrylic Floor coating (B90 series)

U. Type IP-16 Lane Marking Paint: Sherwin Williams SetFast Solvent-Based Striping Paint.

V. Type IP-17 Electrostatic Spray Painting: Sherwin Williams Pro Industrial Urethane Alkyd 10% MEK mx. Prepare surface as stated above in Part 3 Execution, by washing and removing any existing peeled or checked paint, and by following the instructions of the paint manufacturer and paint sprayer manufacturer.

END OF SECTION

DIVISIONS 10 - SPECIALTIES

SECTION 10 02 13

RECYCLED POLYVINYL SAFETY FLOORING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. This section includes furnishing all materials, labor, equipment, and related services necessary to supply and install recycled Polyvinyl safety flooring as indicated in the contract documents, and in compliance with applicable codes.

1.2 RELATED SECTIONS

A. ASTM E648 – Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2014C.

B. ASTM F970 – Standard Test Method for Static Load Limit; 2007 (Reapproved 2011).

C. BAAQMD 8-51 – Bay Area Air Quality Management District Regulation 8, Rule 51, Adhesive and Sealant Products; 2002.

D. GEI (SCH) – GREENGUARD "Children and Schools: Certified Products; GREENGUARD Environmental Institute; current listings at www.greenguard.org.

E. SCAQMD 1168 – South Coast Air Quality Management District Rule No. 0068; current edition; www.aqmd.gov.

F. SCS (CPD) – SCS Certified Products; Scientific Certification Systems; current listing at www.scscertified.com.

1.3 RELATED SECTIONS

A. Division 03 Section "Maintenance of Cast in Place Concrete" for general building applications of concrete.

B. Division 22 Section "Plumbing" for drain, floor sink, floor troughs, cleanouts, and plumbing penetration conditions

1.4 INFORMATIONAL SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for Commercial kitchen applications.

B. Samples: Submit 3 samples in the color reflected on the finish drawings.

C. Certification: Submit evidence of contractor qualifications as outlined under 1.05 Quality Assurance. Provide letter from the manufacturer attesting to the installer certification.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: Provide detailed maintenance instructions.

B. Warranties: Provide manufacturer and installation warranties as noted under Section 1.05 Quality Assurance.

1.6 QUALITY ASSURANCE

A. Contractor will assure compliance with 1.06 Project Conditions to allow for proper installation.

B. Comply with local governing codes and regulations.

C. Use factory trained installers that are certified and recommended by manufacturer.

D. Manufacturer must provide a limited 10-year product warranty against manufacturing defects.

E. Factory trained installer must provide a 1-year installation defect warranty.

1.7 PROJECT CONDITIONS

A. Comply with manufacturer's written instructions for substrate temperature and humidity, ambient temperature and humidity, ventilation, and other conditions affecting the installation.

B. Environmental Limitations: Do not install flooring until building is enclosed and weatherproof, wet work is complete, and the HVAC system or temporary heating maintains temperature and humidity at normal occupancy levels.

C. Acclimate flooring parts for a minimum of 24 hours to the ambient temperature and humidity levels of spaces in which they are to be installed

D. Verify that substrate conditions provide for slope to drains allowing water flow without assistance to drainage points. ¼" per 1-foot average slope for radius' to 4' from drain center points are required.

E. Verify that floor drains are set ¼" above with finished concrete surface, and that floor waste/grease sinks and troughs are level and set ¼" above the finished concrete surface to prevent floor drainage to those elements once the ¼" floor is installed tight to these penetrations.

F. Substrates must be dry and free of curing compounds, sealers, hardeners, and other materials whose presence would interfere with bonding of adhesive.

G. Verify a clean, dry, and structurally sound surface to accept adhesive, free of cracks, ridges, depression, scales, and foreign deposits of any kind.

H. Verify that sub-floor surfaces are ready for resilient flooring installation by testing moisture emission rate and alkalinity, in accordance with ASTM F 710; obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.
   1. Reference ASTM F 710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.

I. Do not begin installation of flooring until all Project Conditions have been met.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS (SRVF)

A. Eco-Grip Safety Flooring as manufactured by Allied Industries International, Inc.

   1. Eco-Grip Commercial Flooring. Sheets 5' x 8' in 1/4" thickness with color chosen by architect as noted on plans.

   2. Eco-Grip Epoxy Flooring Adhesive.

   3. Eco-Grip V-Rod, welding rod.

   4. Eco-Grip Polyvinyl Cove Base Cap (high impact Polyvinyl).

   5. Stainless Steel drain rings and transition strips, and #10 stainless screws and lead anchors as required

   6. Eco-Grip sealants

   7. Other installation materials as required and supplied by Eco-Grip.

B. Protect-All Commercial Flooring as manufactured by Oscoda Plastics®, Inc.

   1. Protect-All sheets in 5’ x 8’ or 5’ x 5’ in ¼" thickness with color chosen by Architect from manufacturer's samples in matte finish.

   2. Protect-All 2-part epoxy flooring adhesives.

   3. Protect-All cove base system with a minimum height of 6".
      a. Protect-All Rapid Weld™ or corner rod for the cove base system.

   4. Protect-All Rapid Weld or V-Rod for floor seams.

   5. Protect-All aluminum or stainless steel cove base cap (Z-bar).

   6. Protect-All stainless steel drain rings, corner guards, and transition strips as provided by Oscoda Plastics.
      a. Protect-All stainless steel fasteners and anchors for drain rings, corner guards, and transition strips

7. Protect-All E-6100 sealant.

8. Other installation materials as required and supplied by Protect-All.

C. Specified products are to establish a level of quality; for substitutions refer to Section 01 60 00 – Product Requirements.

D. Flooring must meet the following test standards:

1. ASTM G-21 Bacteria & Mildew Resistance Excellent

2. ASTM D-751 Breaking Strength (md) 405lbs

3. ASTM D-751 Breaking Strength (cmd) 723lbs

4. ASTM D-2047 Coefficient of Friction (avg) Dry 1.31

5. ASTM D-695 Compressive Strength @ 20% Deformation 641 psi

6. ASTM D-751 Elongation (md) 76.5%

7. ASTM D-751 Elongation (cmd) 88.5%

8. ASTM E-648 Critical Radiant Flux 1.05W/cm2 – Type 1 NFPA fire classification

9. ASTM E-648 Burn Distance 12 cm

10. Shore A Hardness 85-90 avg

11. ASTM D-751 Tear Strength (md) 76.5lbs

12. ASTM D-751 Tear Strength (cmd) 84lbs

13. NFSI UWT-101A Coefficient of Friction Standard >.06

PART 3 EXECUTION

3.1 INSTALLATION

A. Follow manufacturer recommendations for laying sheets out. All welded joints must be offset with flooring sheets installed in an Ashlar fashion.

B. Flooring must be cut tight to all penetrations.

C. Adhere the floor material with Eco-Grip 2-part Epoxy mastic using the manufacturer's recommended trowel notch size (3/32).

D. Eco-Grip seal cartridge adhesive/sealant should be used to seal base top and cap per the "Base Cap Detail" drawing, around all drains and sinks, and at all floor penetrations and transitions.

E. Roll floor into adhesive with 100 lb. roller immediately

F. Install floor drains in accordance with drawing for “Stainless Collar Floor Drain Detail” drawings. Stainless steel drain rings are to be routed into floor surface and mounted flush with top of flooring. Secure drain rings using stainless steel fasteners and lead anchors that will properly anchor the ring to the substrate.

G. Install cove base as recommended by manufacturer with proper adhesive and top sealant.

H. Route out V-grooves between sheets and weld all seams using Eco-Grip 7mm V-shaped welding rod in accordance with Eco-Grip Floorings installation guidelines.

I. 16-gauge Stainless steel transitions are to be installed at all doorways and transition areas. Use stainless steel fasteners, and lead anchors to secure.

J. All exposed edges are to be sealed with manufacturer’s recommended sealant to assure a watertight seal.

3.2 CLEANING

A. Sweep-clean the floor after installation and clear area of scrap materials. The floor can be saturated and then deck brushed, power washed, or power scrubbed (only us the 3M Green Cleaning Pad) to remove construction debris.

B. Installer must provide two copies of manufacturers cleaning recommendations for contractor and owner use.

END OF SECTION

SECTION 10 11 01

VISUAL DISPLAY BOARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Markerboards, and Tackboards.

B. Markerboard Cabinet

1.02 REFERENCE STANDARDS

A. ANSI A135.4 - American National Standard for Basic Hardboard; 2012.

B. ASTM A424/A424M - Standard Specification for Steel, Sheet, for Porcelain Enameling; 2009a.

C. ASTM C208 - Standard Specification for Cellulosic Fiber Insulating Board; 2012.

D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

E. ASTM F793 - Standard Classification of Wall Covering by Use Characteristics; 2010a.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's data on markerboard, tackboard, tackboard surface covering, trim, accessories, and display cases, menu boards and magazine racks.

C. Shop Drawings: Indicate wall elevations, dimensions, joint locations, special anchor details.

D. Samples: Submit color charts for selection of color and texture of markerboard, tackboard, tackboard surface covering, and trim.

E. Test Reports: Show conformance to specified surface burning characteristics requirements.

F. Manufacturer's printed installation instructions.

G. Maintenance Data: Include data on regular cleaning, stain removal .

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.05 WARRANTY

A. See Section 01 70 00 – Execution Requirements, for additional warranty requirements.

B. Submit a "life of the building" warranty, stating that under normal usage and maintenance, and when installed in accordance with manufacturer's instructions and recommendations, porcelain enamel steel markerboard and chalkboard writing surfaces are guaranteed for the life of the building. Guarantee covers replacement of defective boards but does not include cost of removal or reinstallation.

C. A standard warranty, stating that when installed in accordance with manufacturer's instructions and recommendation, Claridge tackboards are guaranteed for one year against defects in materials and workmanship. Guarantee does not cover normal wear and tear, improper handling, any misuse, or any defects caused by vandalism or subsequent abuse. Guarantee covers replacement of defective material but does not include cost of removal or reinstallation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Markerboards and Tackboards:

1. Claridge Products and Equipment, Inc; www.claridgeproducts.com.

2. Platinum Visual Systems: www.pvsusa.com.

3. ASi Visual Display Products .www.asi-visualdisplayproducts.com

4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 MARKERBOARDS AND TACKBOARDS

A. Performance requirements.

1. Surface-burning characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markeing of applicable testing agency.
   a. Flame-spread index: 25 or less.
   b. Smoke-developed index: 450 or less.

B. Markerboards: Porcelain enamel on steel, laminated to core.

1. Construction: Steel covered on both sides with enamel coatings in accordance with PEI-1002 Manual and Performance Specifications for LCS Porcelain Enamel Writing Surfaces.

2. Height: 48 inches (1220 mm) or as indicated on schedule.

3. Color: As selected from manufacturer’s full range.

4. Length: As indicated on schedule.

5. Frame: Extruded aluminum, with concealed fasteners.

6. Frame Finish: Anodized, natural.

7. Accessories: Provide chalk tray, map rail, and flag holder.

8. Recycled content: Cold rolled steel shall be manufactured from a minimum of 30 percent post-consumer and post-industrial waste. Fiberboard shall contain 90% post-industrial waste.

C. Tackboards: Fine-grained, homogeneous natural cork.

1. Cork Thickness: 1/4 inch (6 mm).

2. Fabric: Vinyl coated fabric, self-healing, washable, and mildew resistant.

3. Color: As selected from manufacturer's full range.

4. Backing: Class A rated fiberboard, 1/4 inch (6 mm) thick, laminated to tack surface.

5. Surface Burning Characteristics: Flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E84.

6. Height: 48 inches (1220 mm) or as indicated on schedule.

7. Length: As indicated on schedule.

8. Frame: Extruded aluminum, with concealed fasteners.

9. Frame Profile: Manufacturer's standard

10. Frame Finish: Anodized, natural.

11. Accessories: Provide map rail.

D. Enclosed Conference Cabinet: Furnish with two hinged doors, 48”W x 48”H erasable porcelain magnetic whiteboard, and two 24”W x 48”H self-healing natural cork tackboards on the inside of each hinged door.

1. Size: 48”W x 48”H x 5”D

2. Mahogany or oak texture laminate finish

3. Similar to Ghent’s Conference Cabinet Number C1-44M.

E. Materials:

1. Enameled Steel Sheet: ASTM A 424, Type I, Commercial Steel, with fired-on vitreous finish.

2. Vinyl Coated Fabric: ASTM F 793 Category VI.FS CCC-W-408: Type 11 medium: Class 1-regular: Clear top overcoat of polyvinyl fluoride in accordance with FS L-P-1040 Type 1, Grade B, Class 2, 0.0005 inch thick.

3. Hardboard for Cores: AHA A135.4, Class 1 - Tempered, S2S (smooth two sides).

4. Fiber Board: ASTM C 208, cellulosic fiber board. Class A rated.

5. Foil Backing: Aluminum foil sheet, 0.005 inch thick.

6. Adhesives: Type used by manufacturer.

F. Accessories:

1. Map Rail: Extruded aluminum, manufacturer's standard profile, with cork insert and runners for accessories; 1 inch wide overall, full width of frame.

2. Map Supports: Formed aluminum sliding hooks and roller brackets to fit map rail.

3. Temporary Protective Cover: Sheet polyethylene, 8 mil thick.

4. Flag Holders: Cast aluminum bored to receive 1 inch diameter flag staff, bracketed to fit top rail of board.

5. Chalk Tray: Aluminum, manufacturer's standard profile one piece full length of chalkboard, molded ends; concealed fasteners, same finish as frame.

6. Mounting Brackets: Concealed.

7. Display Rail: Extruded Aluminum, manufacturer's standard profile, with cork insert, with the ability to be screwed directly to plaster or block walls, 2" wide and lengths as required on plans and elevations. Similar to Claridge product No. 74, Deluxe Map and Display Rail.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that internal wall blocking is ready to receive work and positioning dimensions are as indicated on shop drawings.

3.02 INSTALLATION

A. Installation of all products shall be in accordance with manufacturer's instructions.

B. Secure units level and plumb.

C. Butt Joints: Install with tight hairline joints.

D. Installation of Boards:

1. Install with top of chalk tray at 36 inches above finished floor or as indicated on drawings.

3.03 CLEANING

A. Clean board surfaces in accordance with manufacturer's instructions.

B. Cover with protective cover, taped to frame.

C. Remove temporary protective cover at Date of Substantial Completion.

3.04 SCHEDULE

A. Refer to sizes located on drawings.

END OF SECTION

SECTION 10 14 19

DIMENSIONAL LETTER SIGNAGE

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Cutout dimensional characters.

2. Custom letter and logo signage.

1.02 REFERENCE STANDARDS

A. AAMA 2603-2013: Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.

B. ASTM B 209-14: Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

C. ASTM D 1187/D 1187M-97 (Reapproved 2011: Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal).

1.03 SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For signs.

1. Include fabrication and installation details and attachments to other work.

2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.

3. Show message list, typestyles, graphic elements, and layout for each sign.

C. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.

1. Include representative Samples of available typestyles and graphic symbols.

1.04 INFORMATIONAL SUBMITTALS

A. Qualification Data: For installer.

B. Sample Warranty: For special warranty.

1.05 CLOSEOUT SUBMITTALS

A. Maintenance Data: For signs to include in maintenance manuals.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.07 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Deterioration of finishes beyond normal weathering.
   b. Separation or delamination of sheet materials and components.
2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Structural Performance: Signs and supporting elements shall withstand the effects of gravity and other loads within limits and under conditions indicated.

1. Uniform Wind Load: As indicated on Drawings.
2. Concentrated Horizontal Load: As indicated on Drawings.
3. Other Design Load: As indicated on Drawings
4. Uniform and concentrated loads need not be assumed to act concurrently.

2.02 DIMENSIONAL CHARACTERS

A. Cutout Characters: Characters with uniform faces; square-cut, smooth edges; precisely formed lines and profiles; and as follows:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. ASI Sign Systems, Inc.: asisignage.com
   b. Gemini Incorporated.: www.geminisignproducts.com
   c. InPro Corporation (IPC).: www.inprocorp.com
   d. APCO: www.apcosigns.com
   e. Substitutions: See Section 01 60 00 "Product Requirements".

2. Character Material: Sheet or plate aluminum.

3. Character Height: As indicated on Drawings.

4. Thickness: Manufacturer's standard for size of character.

5. Finishes:
   a. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard, in color as selected by Architect from manufacturer's full range.

6. Mounting: Concealed studs.

7. Typeface: Arial.

2.03 CUSTOM LETTERS AND LOGOS

A. Flat Cut: Laser or waterjet cut using computer guided equipment, fabricated as single piece or multiple pieces assembled in field.

1. Manufacturers: Custom logo signage shall be furnished by same manufacturer as dimensional characters.

2. Logo Material: Sheet or plate aluminum.

3. Logo Height: As indicated on Drawings.

4. Thickness: As recommended by manufacturer for size of logo.

5. Finishes:
   a. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard, in color as selected by Architect from manufacturer's full range.

6. Mounting: Concealed studs.

2.04 DIMENSIONAL CHARACTER AND LOGO MATERIALS

A. Aluminum Sheet and Plate: ASTM B 209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.

B. Paints and Coatings for Sheet Materials: Inks, dyes, and paints that are recommended by manufacturer for optimum adherence to surface and are UV and water resistant for colors and exposure indicated.

2.05 ACCESSORIES

A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signs, noncorrosive and compatible with each material joined, and complying with the following:

1. Use concealed fasteners and anchors unless indicated to be exposed.

2. For exterior exposure, furnish nonferrous-metal devices unless otherwise indicated.

3. Sign Mounting Fasteners:
   a. Concealed Studs: Concealed (blind), threaded studs welded or brazed to back of sign material, screwed into back of sign assembly, or screwed into tapped lugs cast integrally into back of cast sign material, unless otherwise indicated.

B. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

2.06 FABRICATION

A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.

1. Preassemble signs and assemblies in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.

2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.

3. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed connections of flux, and dress exposed and contact surfaces.

4. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.

5. Provide rabbets, lugs, and tabs necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.

6. Castings: Fabricate castings free of warp, cracks, blowholes, pits, scale, sand holes, and other defects that impair appearance or strength. Grind, wire brush, sandblast, and buff castings to remove seams, gate marks, casting flash, and other casting marks before finishing.

2.07 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Directional Finishes: Run grain with long dimension of each piece and perpendicular to long dimension of finished trim or border surface unless otherwise indicated.

D. Organic, Anodic, and Chemically Produced Finishes: Apply to formed metal after fabrication but before applying contrasting polished finishes on raised features unless otherwise indicated.

2.08 ALUMINUM FINISHES

A. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Verify that sign-support surfaces are within tolerances to accommodate signs without gaps or irregularities between backs of signs and support surfaces unless otherwise indicated.

C. Verify that electrical service is correctly sized and located to accommodate signs.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.

1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.

2. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.

3. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

B. Mounting Methods:

1. Concealed Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.
   a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place sign in position and push until flush to surface, embedding studs in holes. Temporarily support sign in position until adhesive fully sets.
   b. Thin or Hollow Surfaces: Place sign in position and flush to surface, install washers and nuts on studs projecting through opposite side of surface, and tighten.

3.03 ADJUSTING AND CLEANING

A. Remove and replace damaged or deformed characters and signs that do not comply with specified requirements. Replace characters with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.

B. Remove temporary protective coverings and strippable films as signs are installed.

C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION

SECTION 10 14 23

ROOM-IDENTIFICATION SIGNAGE

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Room-identification signs.

1.2 REFERENCE STANDARDS

A. 36 CFR 1191 – Americans with Disabilities Act (ADA) Accessibility Guidelines for Building and Facilities, Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.

B. ADA Standards – Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

C. ICC A117.1 – Accessible and Usable Building and Facilities; 2009.

1.3 SUBMITTALS

A. See Section 01 30 00 – Administrative Requirements, for submittal procedures.

B. Product Data: For each type of product.

C. Shop Drawings: For room-identification signs.

1. Include fabrication and installation details and attachments to other work.
2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
3. Show message list, typestyles, and graphic elements, including raised characters and Braille, and layout for each sign.

D. Samples for Verification: For each type of sign assembly showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:

1. Room-Identification Signs: Full-size Sample.

E. Product Schedule: For room-identification signs. Use same designations indicated on Drawings or specified. Submit for approval by Owner through Architect prior to fabrication.

F. Selection Samples: Submit two sets of color selection charts or chips.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer ad manufacture.

B. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For signs to include in 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.

B. Manufacturer's Installation Instruction: Include installation templates and attachment devices.

C. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.8 FIELD CONDITIONS

A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.

B. Maintain this minimum temperature during and after installation of signs.

1.9 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
    a. Deterioration of finishes beyond normal weathering.
    b. Deterioration of embedded graphic image.
    c. Separation or delamination of sheet materials and components.
2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Mohawk Sign Systems, Inc.: www.mohawksign.com

B. Substitutions: See Section 01 60 00 – Product Requirements.

2.2 PERFORMANCE REQUIREMENTS

A. Signage shall consist of room number and room function to meet the requirements of the Americans with Disabilities Act 1990 (ADA) and CABO / ANSI A117.1 – 1992.

2.3 GRAPHIC PROCESS

A. All signs shall be manufactured using a sand – carved process from hard phenolic ES/MP plastic laminate. Sandblasting shall remove background material, leaving raised characters of 1/32". The braille and copy characters shall remain an intrinsic part of the sign that cannot be removed. .

B. All text shall be accompanied by Grade 2 braille. Braille shall be separated 1/2" from the corresponding raised characters or symbols.

C. All letters, numbers and / or symbols shall contrast with their background.

D. Size of letters and numbers shall be as follows:

1. Room numbers shall be 1".
2. Lettering for room ID Signs shall be 3/4".
3. Symbol size shall be 4".
4. Standard Grade 2 braille shall be 1/2" below copy.

2.4 ACCESSORIES

A. Adhesive: As recommended by sign manufacturer.

B. Two-Face Tape: Manufacturer's standard high-bond, foam-core tape, 0.045 inch (1.14 mm) thick, with adhesive on both sides.

2.5 SIGN TYPES

A. Sign Type A: Room function signs:

1. 2" x length as required.
2. Copy: Room name or number with Grade 2 braille below.

B. Sign Type B: Classroom signs:

1. 6” x 6”
2. One window, two windows where required, Window inserts by owner.
3. Copy: Room number with Grade 2 braille below.

C. Sign Type C: Restroom signs:

1. 8” x 8”
2. 4” accessibility symbol and gender symbol.
3. Copy – Toilet, Boys, Girls or ALL GENDER with Grade 2 braille below.

D. Refer to renovation plans for locations.

2.6 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.

1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
2. Install signs so they do not protrude or obstruct according to the accessibility standard.
3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.

B. Accessibility: Install signs in locations on walls as indicated on Drawings and according to the accessibility standard.

C. Mounting Methods:

1. Two-Face Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges. Place sign in position, and push to engage tape adhesive.

3.2 ADJUSTING AND CLEANING

A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.

B. Remove temporary protective coverings and strippable films as signs are installed.

C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION

SECTION 10 21 23

CUBICLE CURTAINS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Surface mounted overhead metal curtain track and guides.

B. Curtains.

C. Provide in Donnelly elementary school nurse suite cot area and middle school nurse suite cot area. One curtain/track per bed

1.2 REFERENCE STANDARDS

A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2012.

B. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films; National Fire Protection Association; 2010.

1.3 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data including durability, fade resistance, and fire-test-response characteristics for each type of curtain fabric specified.

C. Samples: Submit 12 x 12- inch sample patch of curtain cloth with representative hem stitch detail, heading with reinforcement, and carrier attachment to curtain header.

D. Shop Drawings: Showing layout and type of cubicles, size of curtains, number of carriers, anchorage details, and conditions requiring accessories. Indicate dimensions taken from field measurements.

E. Coordination Drawings for reflected ceiling plans drawn accurately to scale and coordinating penetrations and ceiling-mounted items. Show the following:

1. Ceiling suspension assembly members.

2. Method of attaching cubicle curtain track hangers to building structure.

3. Ceiling-mounted items including light fixtures, diffusers, grilles, speakers, sprinklers, and access panels.

F. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.

G. Maintenance Data: Include recommended cleaning methods and materials and stain removal methods.

1.4 SYSTEM PERFORMANCE REQUIREMENTS

A. Fire Performance Characteristics: Provide cubicle curtain fabric which complies or exceeds with the requirements of NFPA Bulletin 701.

1.5 QUALITY ASSURANCE

A. Single-Source Responsibility: Obtain cubicle curtain and track system from one source from a single manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to project site in original factory wrappings and containers, clearly labeled with identification of manufacturer, brand name, quality or grade, fire performance characteristics, and lot number.

B. Comply with instructions and recommendations of manufacturer for special delivery, storage, and handling requirements.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Cubicle Track and Curtains:

1. A. R. Nelson Co: www.arnelson.com.

2. C/S General Cubicle: www.c-sgroup.com/cubicle-track-curtains.

3. Imperial Fastener Co., Inc: www.imperialfastener.com.

4. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 TRACKS AND TRACK COMPONENTS

A. Curtain Track: Extruded 6063-T5 aluminum alloy track with clear satin anodized finish designed for surface mounting to ceiling. Track shall be nominally 1-3/8"W x 3/4"H with .058" wall thickness. Provide tracks with all necessary connectors, end stops, and other accessories as required.

1. Structural Performance: Capable of supporting vertical test load of 50 lbs. without visible deflection of track or damage to supports, safely supporting moving loads, and sufficiently rigid to resist visible deflection and without permanent set.

2. Track End Stop, Tees, Y's, and Switches: To fit track section.

3. Track Bends: Minimum 12- inch radius; fabricated without deformation of track section or impeding movement of carriers.

4. Splicing Clamp: Same material and finish as track.

5. Finish on Exposed Surfaces: Clear anodized finish.

B. Curtain Carriers: Nylon slider to accurately fit track; designed to eliminate bind when curtain is pulled; fitted to curtain to prevent accidental curtain removal.

C. Track Accessories: Provide end caps, connectors, end stops, coupling sleeves, wall brackets, and other accessories as required for secure and operational installation. Provide a quantity of carriers for 6-inch spacing the full length of the curtain plus 1 additional carrier.

D. Operating Wand: Aluminum hollow section, attached to lead carrier, for pull-to-close action, not less than 30 inches long.

2.3 CUBICLE CURTAIN

A. Fabric: Provide Trevira polyester cubicle curtain fabrics with the following characteristics:

1. Weight: Approximately 12 ounces per linear yard.

2. Fabrics are launderable to a temperature of not less than 160 degrees F (71 degrees C).

3. Fabrics are anti-bacterial, self-deodorizing, sanitized and preshrunk.

4. Fabrics are flame resistant and are identical to those that have passed NFPA 701 when tested by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify fabrics with appropriate markings of applicable testing and inspecting agency.

5. Curtain Color/Pattern: As selected by Architect from manufacturer's standards.

B. Curtain Top: 20-inch wide No. 40 nylon mesh overlap seams and double-lock stitch to body of curtain.

C. Provide curtains fabricated to comply with the following requirements.

1. Width: Equal to track length from which curtain is hung plus 10 percent, but not less than 12 inches.

2. Length: Equal to floor-to-ceiling height minus 20 inches from finished ceiling at top and 15 inches above finished floor.

3. Top Hem: Not less than 1 inch and not more than 1-1/2 inches wide, triple thickness, reinforced with integral web, and double-stitched.

4. Grommets: 2-piece, rolled-edge, rustproof, nickel-plated brass and spaced not more than 6 inches o.c.

5. Bottom and Side Hems: Not less than 1 inch wide, reinforced, triple thickness, and single stitched.

6. Seams: Not less than 1/2 inch wide, double turned, and double stitched.

D. Curtain Drop: Beaded chain with aluminum hook.

E. Curtain Tieback: At each termination.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine ceilings for suitable conditions where cubicle track is to be installed.

B. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install cubicle curtain and track system and accessories in compliance with manufacturer's recommendations.

B. Surface-mount curtain track on ceiling surface by fastening track through finished ceiling to steel support framing above ceiling using metal fasteners of type and at spacing recommended by manufacturer.

1. Install ceiling-mounted tracks at intervals of not less than 24 inches (610 mm).

2. Center fastener in track to insure unencumbered carrier operation.

C. Wherever possible, install curtain track in uninterrupted lengths to avoid splices.

D. Attach curtain to hangers just prior to Substantial Completion to ensure curtain is clean and undamaged at time of Owner's acceptance of work.

3.3 ADJUSTING

A. Where recommended by the manufacturer, lubricate bearings and sliding parts; adjust to ensure smooth, easy operation.

3.4 PROTECTION

A. Protect installed track opening with a non-residue adhesive tape to prevent debris from the ceiling finishing operation from impeding carrier operation.

END OF SECTION

SECTION 10 28 00

TOILET ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Public-use washroom accessories.

1.02 REFERENCED STANDARDS

A. ASTM A 153/A 153M-05: Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

B. ASTM A 653/A 653M-11: Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

C. ASTM A 666-10: Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.

D. ASTM A 1008/A 1008M-12a: Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.

E. ASTM B 456-11: Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.

F. ASTM C 1503-08 (Reapproved 2013): Specification for Silvered Flat Glass Mirror.

G. ASTM F 446-85 (Reapproved 2009): Consumer Safety Specification for Grab Bars and Accessories Installed in the Bathing Area.

H. Code of Federal Regulations. 29 CFR - Labor; Chapter XVII - Occupational Safety and Health Administration, Department of Labor, Part 1910 - "Occupational Safety and Health Standards," Section 19 10 .141 - "Sanitation”.

I. International Code Council. ICC A117.1: Accessible and Usable Buildings and Facilities. (ANSI)

1.03 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.04 SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.

3. Include electrical characteristics.

B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. Identify locations using room designations indicated.

2. Identify accessories using designations indicated on Drawings.

1.05 CLOSEOUT SUBMITTALS

A. Maintenance Data: For accessories to include in maintenance manuals.

1.06 WARRANTY

A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, visible silver spoilage defects.

2. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

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.

2.02 PUBLIC-USE WASHROOM ACCESSORIES

A. Source Limitations: Obtain public-use washroom accessories from single source from single manufacturer.

B. Grab Bar TA-9:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. American Specialties, Inc.
   b. Bobrick Washroom Equipment, Inc.
   c. Bradley Corporation.
   d. Substitutions: See Section 01 60 00 – Product Requirements for substitutions.
2. Mounting: Flanges with exposed fasteners.
3. Material: Stainless steel, 0.05 inch thick.
   a. Finish: Smooth, No. 4 finish (satin) on ends and slip-resistant texture in grip area.
4. Outside Diameter: 1-1/2 inches.
5. Length:
   a. Accessible Water Closet Compartment: TA-9a, 36 inches mounted horizontally behind water closet; TA-9b, 42 inches mounted horizontally to side of water closet; TA-9d, 18 inches mounted vertically to side of water closet.
6. Configuration and Length: As indicated on Drawings.

C. Mirror Unit TA-5:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. American Specialties, Inc.
   b. Bobrick Washroom Equipment, Inc.
   c. Bradley Corporation.
   d. Substitutions: See Section 01 60 00 – Product Requirements for substitutions.
2. Frame: 20 gauge type 304 satin finish stainless steel channel.
   a. Corners: One-piece roll formed member that encases mirror and backing revealing a tight mitered corner.
3. Hangers: Produce rigid, tamper- and theft-resistant installation, using method indicated below.
   a. Wall bracket of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.
4. Glazing: Tempered Glass – ¼” thick polished tempered glass with two coats of silver. Hermetically sealed. Back of mirror finished with waterproof paint. Glazing must meet ASTM C-1503 & ASTM C 1048-92

5. Size:
   a. Type TA-5a: 18 inches wide by 36 inches high, Model #0620-B1836 (Asi).

2.03 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch minimum nominal thickness unless otherwise indicated.

B. Brass: ASTM B 19, flat products; ASTM B 16/B 16M, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.

C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.036-inch minimum nominal thickness.

D. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 hot-dip zinc coating.

E. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.

F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.

G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).

H. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

2.04 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

B. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to ASTM F 446.

3.02 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written instructions.

3.03 SCHEDULE

A. See Drawings for Toilet Accessory Schedule, mounting heights and locations for toilet accessory types listed above.

END OF SECTION

SECTION 10 56 13
METAL STORAGE SHELVING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal storage shelving.

B. Shelving accessories.

1.02 RELATED REQUIREMENTS

A. Section 06 10 53 – Miscellaneous Rough Carpentry: Blocking and reinforcement in walls for anchoring shelving units.

1.03 REFERENCE STANDARDS

A. ANSI MH28.1 - American National Standard for the Design, Testing, Utilization and Application of Industrial Grade Steel Shelving - Specifications; 1997.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Rated uniform shelf loads.

2. Details of shelving assemblies, including reinforcement.

3. Accessories.

C. Test Reports: Provide independent agency test reports documenting compliance with specified structural requirements.

D. Shop Drawings: Indicate location, type, and layout of shelving, including lengths, heights, and aisle layout, and relationship to adjacent construction.

1. Indicate methods of achieving specified anchoring requirements.

E. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Inspect for dents, scratches, or other damage. Replace damaged units.

B. Store in manufacturer's unopened packaging until ready for installation.

C. Store under cover and elevated above grade.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Four Post Shelving:

1. Hallowell, Div. of List Industries, Inc;: www.hallowell-list.com.

2. Penco Products, Inc;: www.pencoproducts.com.

3. SpaceSaver Corporation;: www.spacesaver.com.

4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 SHELVING - GENERAL

A. Shelving: Provide products certified to comply with ANSI MH28.1 for design criteria, lateral stability, shelf connections, and shelf capacity.

B. Anchors: Provide anchoring hardware to secure each shelving unit to floor and wall.

1. Provide hardware of type recommended by manufacturer for substrate.

2.03 FOUR POST SHELVING

A. Four Post Shelving: Steel post-and-beam or post-and-shelf type with sway bracing, shelving brackets, shelving surfaces, and accessories as specified.

1. Shelf Capacity: Uniform distributed load of 50 psf (2.4 kPa), minimum.

2. Shelf Deflection: L/140, maximum, under specified uniform load.

3. Adjustability of Shelving: At intervals of 6 inches (150 mm) on center, minimum.

4. Unit Depth: Not more than 1/4 inch (6 mm) greater than shelf depth.

5. Unit Height: 72 inches overall .

6. Finish: Baked enamel, medium gloss.

7. Color: Manufacturer's standard gray.

8. Provide single-face and double-face units where indicated.

9. Number of Units: As indicated on drawings.

B. Posts and Beams: Formed sheet members; perforations exposed on face of members are not acceptable.

1. Metal Thickness: 16 gage, 0.0598 inch (1.52 mm).

2. Post Shape: Tee intermediate posts, angle end posts forming corners.

3. Post Face Width: 2 inches (51 mm), maximum.

4. Connecting Hardware: Manufacturer's standard.

5. Post Bases: Flat steel foot plate, with manufacturer's recommended adjustable leveling device.

C. Bracing: Formed sheet members.

1. Back Sway Bracing: Either strap or panel; at back of each unit.

2. Side Sway Bracing: Either strap or panel; at each side of each unit.

3. Strap Sway Bracing: One strap installed diagonally, 16 gage, 0.0598 inch (1.52 mm); welded, riveted, or bolted to uprights.

4. Panel Sway Bracing: Formed sheet metal panels, 20 gage, 0.0359 inch (0.91 mm); welded, riveted, or bolted to uprights.

D. Shelves: Formed sheet, finished on all surfaces, with slots for dividers.

1. Metal Thickness: 16 gage, 0.0598 inch (1.52 mm).

2. Shelf Connection to Posts via male/ female rivets: Manufacturer's standard.

2.04 ACCESSORIES

A. Kick Plates: Formed sheet metal; enclose open space between bottom shelf and floor on all front sides and open ends; finished to match.

2.05 SCHEDULE

A. MT-1: 48”W x 24”D x 78”H

B. MT-2: 36”W x 24”D x 78”H

C. MT-3: 36”W x 18”D x 78”H

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate is level and that clearances are as specified.

B. Verify that walls are suitable for shelving attachment.

C. Do not begin installation until substrates have been properly prepared.

D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Anchor and reinforce as specified, as indicated on drawings, and as recommended by manufacturer.

C. Install shelving with shelf surfaces level and vertical supports plumb; adjust feet and bases as required.

D. Out-Of-Square Tolerance - Four Post Shelving: Maximum of 1/8 inch (3 mm) difference in distance between bottom shelf and canopy top, measured along any post in any direction.

3.04 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

DIVISION 11 - EQUIPMENT

SECTION 11 30 13

RESIDENTIAL APPLIANCES

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. Refrigeration appliances.

B. Related Requirements:

1. Section 22 40 00 "Plumbing Fixtures" for kitchen sinks, dishwasher air-gap fittings, waste (garbage) disposers, and instant hot- water dispensers.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include installation details, material descriptions, dimensions of individual components, and finishes for each appliance.

2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.

B. Sustainable Design Submittals:

1. Product Data: For indicated products, indicating compliance with requirements for ENERGY STAR product labeling.

2. Product Data: For water-efficient clothes washer, indicating compliance with requirements.

C. Samples: For each exposed product and for each color and texture specified, in manufacturer's standard size.

D. Product Schedule: For appliances refer to plans and elevations for locations.

1. Type RA-1, Top-Freezer Refrigerator:
   a. Capacity: 19.1 cu. ft.
   b. Approximate Dimensions: 29.75 in. W. x 66.75 in. H. x 32.125 in. D.
   c. Controls: Upfront
   d. Lighting: LED
   e. Power: 120v; 60 Hz; 15A
   f. Features: Fixed and adjustable shelves, humidity-controlled crispers, spillproof freezer floor.
   g. Exterior Finish: White.

h. Model: GTE19DTNRWW by GE.
i. Manufacturers:
   1) GE Appliances; www.geappliances.com
   2) Substitutions: See Section 01 60 00 – Product Requirements.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer.

B. Product Certificates: For each type of appliance.

C. Field quality-control reports.

D. Sample Warranties: For manufacturers' special warranties.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For each residential appliance to include in operation and maintenance manuals.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Maintains, within 50 miles of Project site, a service center capable of providing training, parts, and emergency maintenance repairs.

1.7 WARRANTY

A. Warranties: Manufacturer agrees to repair or replace residential appliances or components that fail in materials or workmanship within specified warranty period for each appliance.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain each type of residential appliance from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Electrical Appliances: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Gas-Fueled Appliances: Certified by a qualified testing agency for each type of gas-fueled appliance according to ANSI Z21 Series standards.

C. Accessibility: Where residential appliances are indicated to comply with accessibility requirements, comply with applicable provisions in the DOJ's 2010 ADA Standards for Accessible Design the ABA standards of the Federal agency having jurisdiction and ICC A117.1.

2.3 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, power connections, and other conditions affecting installation and performance of residential appliances.

B. Examine roughing-in for piping systems to verify actual locations of piping connections before appliance installation.

C. Examine walls, ceilings, and roofs for suitable conditions where overhead exhaust hoods and microwave ovens with vented exhaust fans will be installed.

D. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install appliances according to manufacturer's written instructions.

B. Built-in Equipment: Securely anchor units to supporting cabinets or countertops with concealed fasteners. Verify that clearances are adequate for proper functioning and that rough openings are completely concealed.

C. Freestanding Equipment: Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate to properly operate equipment.

D. Range Anti-Tip Device: Install at each range according to manufacturer's written instructions.

3.3 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Perform visual, mechanical, and electrical inspection and testing for each appliance according to manufacturers' written recommendations. Certify compliance with each manufacturer's appliance-performance parameters.

2. Leak Test: After installation, test for leaks. Repair leaks and retest until no leaks exist.

3. Operational Test: After installation, start units to confirm proper operation.

4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and components.

B. An appliance will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

3.4 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain residential appliances.

END OF SECTION

SECTION 11 40 00

FOODSERVICE EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 01 Specifications Sections, apply to this Section.

1.2 SUMMARY

A. Supply, deliver and set in place all food service equipment at identified locations, and level before and after final connections by others. FEC to coordinate with authorized service agents any startup requirements called out in this written specification as well as provide prompt demonstrations to owner.

1.3 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, which is current as of date of the Contract Documents.

2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.

3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

C. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by Contract Documents. Substitutions require approval by Architect for use or implementation.

1. Substitutions provisions are handled under Division 01 Section.

1.4 REFERENCES

A. All food service refrigeration equipment must comply with C403.10 Refrigeration equipment performance requirements of the 2020 energy conservation code of New York State.

B. All Food Service Equipment provided and installed must comply with below agencies, state department of health and county or local laws and ordinance.

C. American Society for Testing Materials (ASTM):

1. ASTM A167, Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.

2. ASTM A446, Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.

3. ASTM C1036, Specification for Flat Glass.

4. ASTM C1048, Specification for Heat Treated Flat Glass-Kind HS, Kind FT Coated and Uncoated Glass.

D. American Welding Society (AWS).

E. National Electrical Manufacturers Association (NEMA).

F. National Fire Protection Association (NFPA 96).

G. National Sanitation Foundation (NSF).

H. Underwriters Laboratories Listing (UL).

I. Reference Standard AGS Grease Hoods, ductwork and fire extinguishing system per NYSBC 904.2.1

J. All walk in boxes must comply with the following:

1. All Panels must comply with NYS ECCC C403.10.2 R value requirements

2. All walk in doors are to comply with OSHA 1910.36 exit hardware to prevent entrapment.

1.5 SUBMITTALS

A. Within sixty (60) days after award of contract (before equipment is purchased) the flowing shall be submitted in accordance with Section 013300 SUBMITAL PROCEDURES. It shall be the responsibility of the FEC (Food Equipment Contractor) to confirm construction schedule with Architect and adjust the submittal process to accommodate any fast track projects.

1. The submittal package will include the following: Product data book (cut sheet book) this product Databook should account for all item numbers in this contract up to and including spare numbers and existing equipment. Product data cut sheets shall be marked up in a way that indicates (required) model and accessories included with the item. No generic manuals will be accepted.

2. Submittal drawings will consist of the following: Custom shop drawings (hoods, walk-ins, millwork, serving lines custom fabrication, etc.) Equipment layout drawings, Plumbing connection drawings, electrical connection drawings, HVAC layout drawings and Special condition drawings (Wall backing, floor depressions, etc.)

3. All submittal packages shall be at least 98% complete at submission unless pre-approved by Architect and Food Service Consultant

B. Electronically submit (PDFs) assembly drawings, electrical and mechanical rough-in connection plans, details for plumbing, electrical, air conditioning and ventilation services for all kitchen equipment and brochures, catalog cut-sheets, specifications and operating characteristics for buy-out equipment. Clearly indicate any deviations from contract Documents, such as arrangement of piping, connections, wiring method of fabrication, manner of structural conditions, standard shop practices, or other reasons, and note in Cover Sheet accompanying submittals.

C. Drawing of fabricated equipment shall not be less than ¾” equal one-foot scale.

D. Rough-in drawings shall not be less than ¼” equal one-foot scale.

E. Product Data: Provide data on appliances; indicate configuration, sizes, materials, finishes, locations, utility connections and locations.

F. Samples: Submit samples of stainless steel and other finish materials for color selection.

G. Manufacturer’s Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

H. Manufacturer’s Certificate: Certify that exhaust system and tests meet or exceed specified requirements.

I. It shall be the FEC responsibility to coordinate all color selections that are not already selected with the Architect. Any color selections stated in written specifications shall be confirmed by the FEC with Architect prior to ordering

1.6 CLOSEOUT SUBMITTALS

A. Within thirty (30) days after completion of contract the following shall be submitted.

1. Operation and Maintenance Data:
   a. Operation Data: Provide manuals with a sequence of operation and utility connection diagram explaining system operation and corresponding to actual devices. After approval, submit 2 sets of three ring binders and an electronic copy.
   b. Maintenance Data: Provide lubrication and periodic maintenance requirement schedules.
   c. Within this manual Provide serial numbers on all equipment including walk in boxes and refrigeration when manual covers more than one model, indicate model provided
   d. FEC to indicate model of each item provide NO generic manuals will be accepted.

2. Warranty letter by the FEC (Foodservice Equipment Contractor) stating date of completion of installation for warranty issues.

3. Demonstration sign in sheet listing what was demonstrated and all parties that attended this demonstration

4. Equipment keys and spare parts list to include what was turned over and to whom. FEC to provide a singed transmittal of all spare parts and keys that have been turned over CM/GC or owner.

5. Signed by owner or owner's representative the punch list determining that all punch list items have been completed and to the owner's satisfaction.

6. Provide documentation on all cooking equipment startups performed by an authorized service agent.

7. Documentation of startups by authorized service agent

8. Provide copy of Ansul tag and testing

9. Provide signed transmittal of all spare parts and keys have been turned over to CM/GC or owner

1.7 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Conform to applicable State and local codes for utility requirements.

2. Products Requiring Electrical Connection: Listed and classified by Underwriters' Laboratories, Inc. as suitable for the purpose specified and indicated.

B. Energy Ratings: Provide appliances with energy guide labels with energy cost analysis (annual operating costs) and efficiency information as required by Federal Trade Commission.

1. Provide all appliances that are Energy Star Rated.

1.8 QUALIFICATIONS

A. Installer: Must have a minimum of 5 years documented installation experience with projects similar to this project.

B. Fabricator: Must specialize in manufacture of commercial food services equipment with minimum 5 years documented experience.

C. Manufacturer: Must specialize in manufacturing products specified in this section with a minimum of 5 years documented equipment manufacturing experience.

D. One site superintendent all be satisfactory to the Owner and Architect in all respects, and owner shall have the right to require Contractor to dismiss from the project any superintendent whose performance is not satisfactory to Owner and Architect except with another superintendent satisfactory to the Owner and Architect in all respects. At the request of the Architect, the Contractor's superintendent shall attend project meetings, whether the project meetings are prior to the start of the Contractor's work.

1. Contractor shall provide a superintendent with experience in managing project of this size and complexity with minimum three (3) projects including projects completed on time per contract. Experience shall be documents in writing from end user and design consultant

1.9 DELIVERY, STORAGE AND HANDLING

A. Store products clear of floor in a manner to prevent damage.

B. Coordinate size of access and route to place of equipment installation.

C. Coordinate equipment delivery and installation with all other trades.

D. Contractor takes all responsibility for equipment damage incurred before, during and after installation, until Substantial Completion has been determined by Architect.

1.10 COORDINATION

A. Coordinate existing equipment with Owner per Part 3 Existing Equipment.

B. Coordinate with other trades to ensure existing equipment is disconnected prior to removal by this contractor. Supply and install all necessary drain traps, steam traps, vents, shut-offs, valves, pipe fittings, and/or other materials to complete final plumbing and electrical or steam connections between the rough-in and the connection or connections on each piece of equipment.

C. Ductwork and ductwork connections from hoods collars to duct work provided by HVAC unless otherwise indicated.

D. Install all drain fittings, tailpieces, faucets, operating switches, and/or starters.

E. Coordinate sequencing of equipment installation with other trades prior to installing any piece of equipment.

F. Coordinate special conditions with other trades, i.e. floor depression, soda line conduit requirements, roof curbs, control wiring, etc.

1.11 WARRANTY

A. Provide a one (1) year parts and labor guarantee on all new equipment.

B. Components of equipment subject to replacement prior to one year's use and those items which may fail due to improper or inadequate periodic maintenance by the Owner/Operator are not intended to be included within the scope of warranty.

C. For all equipment that has refrigeration systems and semi-hermetic compressors, furnish an additional four (4) year warranty on all compressors.

D. Guarantee/Warranty period shall commence with the date of Substantial Completion.

E. Warranty includes all costs incurred for removal and re-installation of the replacement component or equipment.

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for complete installation and indicated use and effect.

2. All products shall be new. Use salvaged materials only where specifically directed to do so.

3. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.

4. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.

5. Where products require color selection the Architect will make the selection.

6. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

7. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

1. Products:
   a. Non-restricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.

2. Manufacturers:
    a. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:

1. Evidence that the proposed product does not require revisions to the Contract Documents that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.

2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.

3. Evidence that proposed product provides specified warranty.

4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.

5. Samples, if requested.

2.3 MATERIALS

A. Sheet Steel: ASTM A446; 1.25 ounce per square foot galvanized coating.

B. Stainless Steel: ASTM A167; Type 304 commercial grade, No. 4 finish.

C. Glass: 3/16-inch float conforming to ASTM C1036 and ASTM C1048; exposed edges ground; cut or drilled to receive hardware.

D. Plastic Laminate: NEMA LD3; 0.050-inch-thick; color as selected by Architect.

E. Laminate Backing Sheets: LD3-BK20, 0.020-inch-thick, unfinished plastic laminate.

F. Finish Hardware: Manufacturer's standard.

G. Work Surfaces: As specified.

H. Fittings: Sink drains with crumb cup and waste fittings, faucets, and electrical outlets.

I. Service Outlet Covers and Escutcheons: Stainless steel.

J. Service Accessories and Connections:

1. Provide control switch or starter on each motor-driven appliance or heating element, under provisions of UL requirements.

2. Provide internal wiring for equipment, including electrical devices, wiring controls, and switches to a common junction box.

3. Provide suitable length of 4 wire cord with plugs to match building receptacles.

4. Provide lamps for fixtures in equipment.

5. Provide equipment with connection terminals, so that connections of plumbing, gas, steam, electrical, ventilation, and refrigeration services can be made. Where receptacles are specified for custom equipment, supply cut-outs and outlet boxes set in place accessible for connections of electrical work.

2.4 EQUIPMENT

A. Provide rough-in hardware, supports and connections, attachment devices, closure panels, trim strips, and all accessories required for proper operation of equipment.

B. Standard of Comparison: The specified equipment has been established to set a standard of quality and features.

C. If substitutions require different utility/building conditions, electrical, plumbing, ventilation, etc., from those specified, a complete list of those changes for each item shall be included with the request for substitution. Any costs associated with these changes will become the responsibility of this Contractor.

D. Verify direction of door swings.

2.5 FABRICATION

A. General Requirements:

1. Stainless Steel Fastenings and Fittings: Bolts and screws with countersunk flat heads at interior and exterior visible or accessible surfaces. Use concealed fastenings where possible

2. Form edges smooth. Fabricate sheet material for work surfaces, facings, shelves, and drainboards of straight length in one continuous sheet when not over 12 feet in length.

3. Fix leg-mounted units by dowelling to floor with 1/4-inch stainless steel pins, where vibration or oscillation is anticipated.

4. Provide legs with stainless steel adjustable feet. Fasten legs to equipment securely and rigidly.

5. Install rubber or nylon button feet or other protective device on bearing surface of any item positioned on a finished surface.

6. Isolate rotating or reciprocating machinery to prevent noise and vibration.

7. Provide accommodation for installation of final connections by other trades and accessibility to components such as compressors, junction boxes, etc.

8. Grind welds of stainless steel smooth and flush; polish to match adjacent surfaces.

9. Cut and drill components for service outlets and fixtures.

10. Provide access panels where required to access utilities.

11. Shop assemble work where possible.

B. Load Carrying Counter Surfaces: Reinforce frame support system and surfaces so that surfaces may safely support a load of 200 pounds concentrated on one square foot in any area or surface with no indentation showing on surface, and with permanent set not exceeding 0.005 inches.

2.6 FINISHES

A. Metal (Except Stainless Steel): Degrease and phosphate etch followed by primer and minimum 2 coats factory baked epoxy enamel, color as selected by Architect from manufacturer's full range of standard and custom colors.

B. Plastic Laminate: Color as selected by Architect from manufacturer's full range of standard and custom colors.

C. Stainless Steel: Number 4 finish (unless indicated otherwise).

D. Bituminous Paint: Sound deaden internal surfaces of metal work and underside of metal counters and sinks.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify all existing conditions and existing equipment requirements.

B. Verify ventilation outlets, service connections, and supports are correct and in required location.

C. Verify operational condition of existing equipment.

D. Immediately upon finding, Report equipment discrepancies or non-operational equipment to the Architect.

3.2 INSTALLATION

A. Pre-installation site visits are required to obtain field measurements, verify finish dimensions, examine rough in progress and to coordinate with trades on site.

B. Use anchoring devices approved by manufacture are made with a material that will not rust and are appropriate for equipment and expected usage.

C. Verify equipment is installed in accordance with the manufacturer's recommendations and requirement.

D. Insulate to prevent electrolysis between dissimilar metals. Provide sealant to achieve clean joint without crevices.

E. Weld and grind joints in stainless steel work tight, without open seams, where necessary due to limitations of sheet sizes or installation requirements.

F. Sequence installation and erection to ensure mechanical, plumbing and electrical connections are achieved in an orderly and expeditious manner.

G. Cut, fit, and patch where necessary. Coordinate work with other trades.

H. Cut and drill tops, backs or other elements for service outlets, fixtures, and fittings.

I. Provide access panel or cutting and patching of items of this Section required for the installation or services of equipment.

J. Remove and reinstall existing equipment required under this Section. Foodservice Equipment contractor shall verify condition of existing equipment prior to removal, if being reinstalled by this contactor or reused by Owner.

K. Protect new and existing equipment during construction phase as required to prevent damage to equipment.

3.3 EXISTING EQUIPMENT

A. The Owner reserves the right to keep any existing equipment, coordinate with Owner on removal and transportation of equipment to a location of their choice. It shall be the responsibility of this contractor to salvage equipment the Owner chooses not to retain.

1. Prior to removal from the kitchen any equipment that is labeled existing & relocate, Existing & remains or existing & reuse, the FEC shall verify that the equipment is in working order and document via photos any damage and cleanliness Any damaged or not working equipment should be reported to GC/CM or Architect prior to moving.
    a. GC/CM will coordinate with owner if additional funds are required to bring equipment to owners expectations

B. MEP disconnections by related trades, move, store and re-install equipment, ready for utility connection.

C. Coordinate scope of work and timeline with Owner and other trades prior to removal of existing equipment.

D. Clean and re-furbish existing equipment to be re-used to “like new” condition, as noted.

E. It is the responsibility of this contractor to provide storage as required until the piece of equipment is installed or re-installed

1. Prior to removal from the kitchen any equipment that is labeled existing & relocate, Existing & remains or existing & reuse, the FEC shall verify the cleanliness of existing equipment Any overly dirty/overly damaged equipment should be reported to the GC/CM or Architect prior to moving.

F. It is the responsibility of this contractor to evacuate refrigerant, dismantle and remove all refrigeration equipment associated with existing walk-in cooler, freezer or ANY equipment with remote refrigeration components (as applicable).

3.4 ADJUSTING

A. Upon completion of installation, adjust new and existing equipment and apparatus to ensure proper working order and conditions.

B. If a new piece of equipment is not functioning properly and determined to be non-repairable in the field it shall be removed and replaced with a new piece of equipment.

C. Inspect all equipment and run each piece of equipment through a complete operating cycle to verify that equipment is fully operational.

3.5 CLEANING

A. Cleaning shall be conducted prior to the turnover of the kitchen to the owner

B. Remove masking or protective covering from stainless steel and other finished surfaces. Including walk in panels/exhaust hood door handles and trim strips

C. Remove all packing materials and debris from jobsite.

D. Wash and clean new and existing equipment.

E. Polish glass, plastic, hardware and accessories, fixtures and fittings.

3.6 DEMONSTRATION AND TESTING

A. Demonstrations shall be conducted prior to the turnover of the kitchen to owner. FEC (Food Equipment Contractor) shall provide sign in sheet from the demonstration showing attendance and what items were demonstrated. It is expected that the FEC attends all demonstrations to ensure all were conducted. This document will be included with closeout documents.

B. Demonstrations shall be coordinated by the FEC and conducted prior to the turnover of kitchen to the owner. FEC shall provide sign in sheet from the demonstration showing attendance and what items were demonstrated. This document will be included with closeout documents.

C. Demonstrations shall be performed by factory authorized personnel not the food service contractor.

D. Test existing and new equipment prior to demonstration.

E. At completion of work, provide qualified and trained personnel to demonstrate operation of each item of equipment and instruct Owner in operating procedures and maintenance.

F. Individuals performing demonstration shall be fully knowledgeable of all operating and service aspects of equipment.

G. Start-up, test, and adjust new equipment. Authorized factory technicians shall start up equipment requiring testing and balancing, i.e. hoods, pulping systems, equipment with remote components, etc. Startups are not to be performed by the FEC but by the authorized service agent

H. All equipment that qualifies for factory startups will be coordinated by FEC and completed prior to equipment turnover to owner.

I. IT SHALL BE THE RESPONSIBILITY OF THE FSC TO ENSURE THAT ALL START UPS ARE COMPLETED AND ANY RETURN TRIPS BY SERVICE AGENT TO FINISH DUE TO INCORRECT CONNECTIONS WILL BE PAID BY THIS CONTRACTOR.

PART 4 - LISTING OF FOODSERVICE EQUIPMENT

4.1 Item 1 - Walk-in Freezer – One (1) Required

A. Custom Model BALLY Sectional Walk-in Freezer complete with doors shall be manufactured by Bally Refrigerated Boxes, Inc. drawing # 38033 Overall size of walk-in shall be approximately 14’- 5 1/2” long x 13’- 6” wide x 8’-6” high, size and configuration per Bally’s current drawing# 38033 drawing (field verify Size).

1. Foam core panels shall be Underwriters Laboratories-listed as having flame spread of 25 or lower and smoke generation of 450 or lower when tested in accordance with ASTME-84-76. Panels shall be approved by Factory Mutual as a Class I building type. They shall be foamed using HCFC expanding agents and shall meet all current international standards.

2. All work and materials shall be in full accordance with local and/or state ordinances, and with other prevailing rules or regulations.

3. Panels shall consist of interior and exterior metals skins precisely foamed with steel and dies and roll-form equipment and thoroughly checked with gauges for accuracy. The metal skins shall be placed into heated molds and liquid urethane injected between them. Urethane shall be foamed-inplace (poured, not frothed) and, when completely heatcured, shall bind tenaciously to the metal skins to form an insulated panel. Panels shall contain 100 percent urethane insulation and have no internal wood or structural members between the skins. To insure tight joints, panel edges must have foamed-in-place tongues and grooves with a flexible vinyl gasket on the interior and exterior of all tongue edges. Gaskets shall be resistant to damage from oil, fats, water and detergents and must be NSF-approved. Panel thickness shall be 4” thick.

4. Exterior Finish:
   a. Walls, floor and ceiling shall be Stucco-embossed aluminum.

5. Interior Finish:
   a. Floor panels shall have ¾” plywood foamed in place with 1/8” Diamond Tread.
   b. Walls and ceiling shall be Stucco-embossed aluminum

6. All panels except corner panels shall be made in 23” and 46” widths, fully interchangeable for fast, easy assembly. Panels 11-1/2”, 17-1/4” or 34-1/2” wide are to be furnished only if required to fit the allocated space. To assure perfect alignment and maximum strength, corner panels shall employ a right-angle configuration with exterior horizontal dimensions of 12” on each side. Vertical panels (except corner panels) shall be supplied in a single length up to 28’ high (16” high for installations with aluminum or stainless-steel finish). For outdoor applications, single-height panels greater than 19” (16” for aluminum) or multi-tiered vertical panels must be secured to horizontal girts mounted between building columns. 8. Panels shall be equipped with Bally Speed-lok diaphragmatic joining devices. The distance between locks shall not exceed 46”. Each device shall consist of a cam action, hooked locking arm placed in one panel, and a steel rod positioned in the adjoining panel, so that when the arm is rotated, the hook engages the rod and draws the panels tightly together with cam action. Arms and rods shall be housed in individual steel pockets. Pockets on one side of the panel shall be connected to pockets on the other side in width, by the use of 2” -wide metal straps set into and completely surrounded by the insulation. When panels are joined together, these straps shall form lock-to-lock connections for extra strength. All panel must comply with NYS ECCC C403.10.2 R value requirements.

7. Floor Construction –Bally floor panels shall be 4” thick 1/8” Aluminum diamond tread panels that comply with NSF.

8. Supply One (1) Super Doors 36” wide x 78” height. Doors are in-fitting and flush mounted. Magnetic core, thermoplastic gaskets installed on the top edge and both sides of the door shall keep the door in a closed position, forming a tight seal; a flexible, dual blade wiper gasket shall be installed at the bottom of the door. NSF-approved gaskets shall be replaceable and resistant to damage from oil, fats, water and detergent. A heavy U-channel structural steel frame around the perimeter of the door opening shall prevent racking or twisting; steel frame is to be reinforced for hardware attachment. Anti-condensate heater wire shall be concealed behind the metal edge of the doorjambs. The door panel shall also include a vapor-proof interior lamp with LED light fixture; junction box for 120v., 60 cycle, 1 phase, a.c. service (15 amp maximum); 2”-dia. flush-face dial thermometer (field mounted on 60” wide doors). All walk in doors are to comply with OSHA 1910.36 exist hardware to prevent entrapment

9. Hardware
   a. Supply with each door: two spring-loaded, self-closing hinges and door closer. Provide satin aluminum finish.

10. Door Options
    a. Provide one Observation Window in each Entrance Door - (a 14-1/2” x 24” heated observation window shall be provided in the entrance door. It consists of three panes of glass with sealed air spaces between them. The window shall be supplied with heated glass and frame and units shall be removable for replacement.)
    b. Provide one NSF-approved Strip Curtain for each door – clear-vinyl strip curtains shall permit easy passage while minimizing air infiltration.
    c. Bally’s standard door latch hardware.
    d. 1/8" D.T. Kickplate Int. & Ext.
    e. INTERIOR RAMP

11. Options:
    a. Provide Pressure Relief Port in freezer compartment
    b. Alarm Systems - Provide one (1) 75LC Multi-Monitor w/ push button & MC1F Mag. Contacts, one motion detector & one IP1 Panic button.
    c. Vinyl rub rail along entire exposed front (verify color with Architect). Rail to be installed at cart height
    d. Six (6) LED Kason 1809-3 Lights (2) LED 17” long, including bulbs.
    e. Provide trim strips alongside walls & closure panels along the top to finish ceiling (same finish as wall panel).

12. Construction shall be of a design approved by the National Sanitation Foundation and shall carry the NSF Label of Approval mounted on each door section.

13. Warranties
    a. Bally shall warrant that any part of the structure it supplies (except the refrigeration system and its related accessories) is free from defects in materials or workmanship under normal use and service. The insulated panel portion of the structure is warranted free from defects under normal use and service for a period of 10 years from date of installation (but in no event shall the warranty be in force for more than 10 years and 6 months from the date the product was first shipped by Bally). Panel surface condition is warranted free from defects under normal use and service for one year from installation, provided the panel is stored and installed according to Bally’s instructions. Mechanical (including hardware, gasketing, Speed-lok assemblies, aluminum weather roofs) and electrical components, except refrigeration systems (which are covered by a separate warranty) are warranted to be free from defects under normal use and service for one year from date of installation. (In no case shall this portion of the warranty be in force for more than one year and six months from the date the product was first shipped by Bally.) The warranty shall not include any labor charges for replacement or repair of defective parts or refrigeration. Full warranty information is to be provided with the walk-in.

14. CONTRACTOR'S RESPONSIBILITIES:
    a. It shall be the responsibility of this Contractor to Deliver, set-in-place and completely assemble the walk-in components and refrigeration systems. Install trim strips and closure panels (as specified - securely attached and sealed with silicone) between the box and all adjoining wall and ceiling areas. Material shall be of the same type and finish as the walk-in box surface. This contractor shall verify existing building conditions and field verify size and location of space where the walk-in is scheduled to be installed. Coordinate finished floor elevation with the Architect.
    b. Installation requirements of the walk-in box shall not be limited to but also include the following items:
        1) Verify that all panel to panel am locks are fully engaged and stainless cover caps are in place.
        2) Entrance door should close and seal on its own. Verify seal at gasket by checking for light from inside of door with interior light turned off. Adjust door hinges as required to obtain a tight seal.
        3) Remove all protective coating, shipping materials and packaging labels from panel surfaces, both inside and outside of the box
        4) Neatly seal all penetrations/gaps to prevent condensation or ice from occurring. Seal or verify seal at all electrical conduits both internally & externally at entrance point. FEC TO VERIFY PC & EC TRADES COMPLETELY SEAL ANY WALL OR CEILING PENATRATIONS PRIOR TO TURNING REFRIGERATION ON
        5) Fasten door threshold plates to the floor panel using 12-24 x ½ self-tapping screws provided by Bally
        6) Check door lock for proper operation, key should rotate freely for 90 degrees from the open to lock position. The key should sassily be removed from the cylinder in either the open or locked position.
        7) Verify door frame heater operation. Heater strikes should feel warm to the touch.
    c. Refrigerant used shall be of the latest type available and shall meet all codes and governmental requirements. All condensing units shall be factory assembled using UL listed or recognized components. Evaporators shall be forced air type, designed for ceiling installation. Freezer evaporators shall come with automatic electric defrost system with time clock, fan delay thermostat, heaters and heated drain pan. Evaporators shall be UL listed or recognized.
    d. Verify location of condensing units with Architect.
    e. It shall be the responsibility of this Contractor to completely install all refrigeration piping and controls (including interconnection of all electric) and pipe drain lines from coils in rigid copper to the floor drain, leaving the unit ready for final connections only by other trades. Drain line heater for freezer shall be supplied and installed by this Contractor. Electrical Contractor to interwire lights to switch.

4.2 Item 1A – Freezer Refrigeration System – One Lot (1 Lot) Required

A. Custom Model BALLY

1. Freezer : One (1) Scroll Condensing Unit – BEZA 035 L9 HT3E (208-230/3/60) 3.5HP A/C S/H Outdoor Med Unit (AL2 System R454A refrigerant on typical size units/or equal per current gudelings) 11780 BTU.

2. Freezer: One (1) Evaporator Coil SmartVapII – BLP 211LE-SV+ 11602 BTU (208-230/1/60). Leak Mitigation to be part of the SmartVap+ controller. Leak sensors are pre-installed inside the evaporator.

3. 1 ea. Disconnect switch, fused 208-230

4. 1 ea. Heated and insulated receiver

5. Five (5) year total refrigeration parts and compressor warranty(s).

6. Refrigeration piping and control wiring by Foodservice Contractor.

7. Safety shut off valves are shipped loose with evaporator for field installation on lines by FEC installation must be installed out side of the walk in
   a. Check valve is to be installed on suction line
   b. Solenoid is to be installed on liquid line, solenoid coil shall be 24VAC and wired back to leak mitigation controller installed in the evaporator
   c. Use 18 AWG Class 2 cable or equivalent (control wiring NOT provided by Bally)

8. Installation requirements of the refrigeration system shall not be limited to but include the following:
   a. Purge refrigerant lines with nitrogen while brazing to avoid carbon formation in the line sets. Installation of a field mounted liquid line filter drier is recommending just outside the evaporator cabinet to catch any contaminants that may have entered the system during installation
   b. Perform leak check of all factory & field installed joints and mechanical connections. Double evacuate entire system to 250microns. Weigh in and document refrigerant type and total charge for cold weather operation.
   c. Verify that site voltage is within specifications of equipment. Supply must be 5/+10% of name plate voltage. Verify that all mechanical and connections are tight and sealed correctly
   d. Evaporator drain lines must be properly trapped to avoid moisture and contaminates from being pulled back into the walk in. Maintain adequate slope to allow for a fast removal of moisture from the line
   e. Check and set pressure controls with refrigeration gauges. Make certain that differential settings allow the compressor to remain off line during any off-cycle periods

f. Check and adjust superheat at the evaporator coil. Coolers 8-12-degree F. Maintain an minimum of 20 degrees of super heat at the compressor to avoid liquid flood back
g. Suction lines must be insulated properly and neatly with no gaps through the entire length of the run. This insulation should be run through the insulated Bally panel and not just up to the penetration to avoid vapor leaks at the panel juncture.
h. Run systems through a complete operation cycle allowing them to pull down to set point temperature including a defrost cycle to verify all functions, setting and pressures are operation as specified.
i. On Smart Vap Controllers-(smart electric & air defrost systems) adjust the air sensor on the rear of the evaporator coil to a distance of 6” from the face of the coil surface
j. Smart Vap Electric defrost controller Should be set at a factory default for defrost is on a Demand basis. Adjustment under advance menu may be required
k. Condensate lines that will be installed either by the FEC or PC should be run from the drain connection, sloping at least 1” per foot and have the size at least as large as the drain connection. A trap in warm area outside the room must be provided to allow proper draining through tubing. Connection should be made to proper drainage facilities that comply with local regulations. To prevent free up when the temperature of the refrigerated space is 35F or lower the drain line should be heated along its run inside the cold room. The heated drain line should be insulated. It is recommended that the heater be energized at all times. A heat input of 20 watts per foot in a 25F room and 30 watts per foot for -20F rooms, is satisfactory. Drain line heaters are not required for constant room temperatures above 35F. Always trap evaporator drain line individually to prevent vapor migration. Endure that the drain line has sufficient slop for proper drainage (prevention of ice build up/blockage in pan).
l. The drain line should be run from the drain connection, sloping at least 1” (25 mm) per foot and should have the size at least as large as the drain connection. A trap in a warm area outside the room must be provided to allow proper draining through the tubing. Connection should be made to proper drainage facilities that comply with local regulations.
m. To prevent freeze-up when the temperature of the refrigerated space is 35°F (2 °C) or lower, the drain line should be heated along its run inside the cold room. The heated drain line should be insulated. It is recommended that the heater be energized at all times. A heat input of 20 watts per foot in a 28°F (-2°C) room and 30 watts per foot for -20°F (-29°C) rooms, is satisfactory. Drain line heaters are not required for constant room temperature above 35°F (2°C). Always trap evaporator drain line individually to prevent vapor migration. Ensure that the drain line has sufficient slope for proper drainage (prevention of ice build up/blockage in pan).

9. Roof curb will be furnished by this contractor and installed by others. Provide Roof Products, INC model# RPES-3 equipment support, 18 ga. galvanized steel construction; 2 X 4 pressure-treated wood nailers; vertical C-channel bulkheads; one-piece outer shell with welded corners; 18 ga. galvanized counterflashing. All welds micro-sealed and prime painted after fabrication. Provide two (2) supports per condensing unit: 48" - 42" long x 16" tall (size per manufacture recommendations).

4.3 Item 2 - Freezer Shelving – One Lot (1 lot) Required

A. Four tier Metro Model A----NK3 Super Adjustable Super Erecta® Shelf, wire, Metroseal 3 (corrosion-resistant) finish, corner release system, with Microban® antimicrobial protection, NSF.

B. Each shelving unit shall have four (4) Model 74PK3 Super Erecta® SiteSelect™ Post, 74-5/8"H, adjustable leveling bolt, posts are grooved at 1" increments & numbered at 2" increments, double grooved every 8", Metroseal 3™ epoxy-coated corrosion-resistant finish with Microban® antimicrobial protection. Shelving shall be provided as shown on drawing (No "S" clips allowed),

1. It shall be the responsibility of this contractor to verify and adjust shelving sizes to insure proper fit

4.4 Item 3 - Freezer Dunnage – One Lot (1 Lot) Required

A. New Age

1. 3 ea. Model 2016 Dunnage Rack, 60"W x 24"D x 8"H, all welded aluminum construction, 1-1/2" x 1-3/4" x 0.070 tubing, welded aluminum caps on feet, weight capacity 2000 lbs., NSF, Made in USA (standard factory lead time)

2. 5 ea. Model 2015 Dunnage Rack, 48"W x 24"D x 8"H, all welded aluminum construction, 1-1/2" x 1-3/4" x 0.070 tubing, welded aluminum caps on feet, weight capacity 2500 lbs., NSF, Made in USA (standard factory lead time)

3. 1 ea. Lifetime warranty against rust & corrosion, 5 year workmanship and material defects warranty, standard

4. It shall be the responsibility of this contractor to verify and adjust dunnage sizes to insure proper fit

4.5 Item 4 - Mop Sink (By Plumbing Contractor) – One (1)

4.6 Item 5 - Walk-in Cooler – One (1) Required

A. Custom Model BALLY Sectional Walk-in Cooler complete with doors shall be manufactured by Bally Refrigerated Boxes, Inc. drawing # 38033 Overall size of walk-in shall be approximately 15'- 10 ¾"" long x 11'- 1-1/4"" wide x 8'-6" high, size and configuration per Bally's current drawing# 38033 drawing (field verify Size).

1. Foam core panels shall be Underwriters Laboratories-listed as having flame spread of 25 or lower and smoke generation of 450 or lower when tested in accordance with ASTME-84-76. Panels shall be approved by Factory Mutual as a Class I building type. They shall be foamed using HCFC expanding agents and shall meet all current international standards.

2. All work and materials shall be in full accordance with local and/or state ordinances, and with other prevailing rules or regulations.

3. Panels shall consist of interior and exterior metals skins precisely foamed with steel and dies and roll-form equipment and thoroughly checked with gauges for accuracy. The metal skins shall be placed into heated molds and liquid urethane injected between them. Urethane shall be foamed-inplace (poured, not frothed) and, when completely heatcured, shall bind tenaciously to the metal skins to form an insulated panel. Panels shall contain 100 percent urethane insulation and have no internal wood or structural members between the skins. To insure tight joints, panel edges must have foamed-in-place tongues and grooves with a flexible vinyl gasket on the interior and exterior of all tongue edges. Gaskets shall be resistant to damage from oil, fats, water and detergents and must be NSF-approved. Panel thickness shall be 4" thick.
4. Exterior Finish:
a. Walls, floor and ceiling shall be Stucco-embossed aluminum.

5. Interior Finish:
a. Floor panels shall have ¾" plywood foamed in place with 1/8" Diamond Tread.
b. Walls and ceiling shall be Stucco-embossed aluminum

6. All panels except corner panels shall be made in 23" and 46" widths, fully interchangeable for fast, easy assembly. Panels 11-1/2", 17-1/4" or 34-1/2" wide are to be furnished only if required to fit the allocated space. To assure perfect alignment and maximum strength, corner panels shall employ a right-angle configuration with exterior horizontal dimensions of 12" on each side. Vertical panels (except corner panels) shall be supplied in a single length up to 28' high (16" high for installations with aluminum or stainless-steel finish). For outdoor applications, single-height panels greater than 19" (16" for aluminum) or multi-tiered vertical panels must be secured to horizontal girts mounted between building columns. 8. Panels shall be equipped with Bally Speed-lok diaphragmatic joining devices. The distance between locks shall not exceed 46". Each device shall consist of a cam action, hooked locking arm placed in one panel, and a steel rod positioned in the adjoining panel, so that when the arm is rotated, the hook engages

the rod and draws the panels tightly together with cam action. Arms and rods shall be housed in individual steel pockets. Pockets on one side of the panel shall be connected to pockets on the other side in width, by the use of 2” -wide metal straps set into and completely surrounded by the insulation. When panels are joined together, these straps shall form lock-to-lock connections for extra strength. . All panels must comply with NYS ECCC C403.10..2 R value requirements

7. Floor Construction –Bally floor panels shall be 4” thick 1/8” Aluminum diamond tread panels that comply with NSF.

8. Supply One (1) Super Doors 36” wide x 78” height. Doors are in-fitting and flush mounted. Magnetic core, thermoplastic gaskets installed on the top edge and both sides of the door shall keep the door in a closed position, forming a tight seal; a flexible, dual blade wiper gasket shall be installed at the bottom of the door. NSF-approved gaskets shall be replaceable and resistant to damage from oil, fats, water and detergent. A heavy U-channel structural steel frame around the perimeter of the door opening shall prevent racking or twisting; steel frame is to be reinforced for hardware attachment. Anti-condensate heater wire shall be concealed behind the metal edge of the doorjambs. The door panel shall also include a vapor-proof interior lamp with LED light fixture; junction box for 120v., 60 cycle, 1 phase, a.c. service (15 amp maximum); 2”-dia. flush-face dial thermometer (field mounted on 60” wide doors). All walk in doors are to comply with OSHA 1910.36 exist hardware to prevent entrapment

9. Hardware
   a. Supply with each door: two spring-loaded, self-closing hinges and door closer. Provide satin aluminum finish.

10. Door Options
    a. Provide one Observation Window in each Entrance Door - (a 14-1/2” x 24” heated observation window shall be provided in the entrance door. It consists of three panes of glass with sealed air spaces between them. The window shall be supplied with heated glass and frame and units shall be removable for replacement.)
    b. Provide one NSF-approved Strip Curtain for each door – clear-vinyl strip curtains shall permit easy passage while minimizing air infiltration.
    c. Bally’s standard door latch hardware.
    d. 1/8" D.T. Kickplate Int. & Ext.
    e. INTERIOR RAMP

11. Options:
    a. Alarm Systems - Provide one (1) 75LC Multi-Monitor w/ push button & MC1F Mag. Contacts and one motion detector.
    b. Vinyl rub rail along entire exposed front (verify color with Architect). Rail to be installed at cart height
    c. Six (6) LED Kason 1809-3 Lights (2) LED 17” long, including bulbs.
    d. Provide trim strips alongside walls & closure panels along the top to finish ceiling (same finish as wall panel).

12. Construction shall be of a design approved by the National Sanitation Foundation and shall carry the NSF Label of Approval mounted on each door section.

13. Warranties
    a. Bally shall warrant that any part of the structure it supplies (except the refrigeration system and its related accessories) is free from defects in materials or workmanship under normal use and service. The insulated panel portion of the structure is warranted free from defects under normal use and service for a period of 10 years from date of installation (but in no event shall the warranty be in force for more than 10 years and 6 months from the date the product was first shipped by Bally). Panel surface condition is warranted free from defects under normal use and service for one year from installation, provided the panel is stored and installed according to Bally's instructions. Mechanical (including hardware, gasketing, Speed-lok assemblies, aluminum weather roofs) and electrical components, except refrigeration systems (which are covered by a separate warranty) are warranted to be free from defects under normal use and service for one year from date of installation. (In no case shall this portion of the warranty be in force for more than one year and six months from the date the product was first shipped by Bally.) The warranty shall not include any labor charges for replacement or repair of defective parts or refrigeration. Full warranty information is to be provided with the walk-in.

14. CONTRACTOR'S RESPONSIBILITIES:
    a. It shall be the responsibility of this Contractor to Deliver, set-in-place and completely assemble the walk-in components and refrigeration systems. Install trim strips and closure panels (as specified - securely attached and sealed with silicone) between the box and all adjoining wall and ceiling areas. Material shall be of the same type and finish as the walk-in box surface. This contractor shall verify existing building conditions and field verify size and location of space where the walk-in is scheduled to be installed. Coordinate finished floor elevation with the Architect.
    b. Installation requirements of the walk-in box shall not be limited to but also include the following items:
        1) Verify that all panel to panel am locks are fully engaged and stainless cover caps are in place.
        2) Entrance door should close and seal on its own. Verify seal at gasket by checking for light from inside of door with interior light turned off. Adjust door hinges as required to obtain a tight seal.
        3) Remove all protective coating, shipping materials and packaging labels from panel surfaces, both inside and outside of the box
        4) Neatly seal all penetrations/gaps to prevent condensation or ice from occurring. Seal or verify seal at all electrical conduits both internally & externally at entrance point. FEC TO VERIFY PC & EC TRADES COMPLETELY SEAL ANY WALL OR CEILING PENATRATIONS PRIOR TO TURNING REFRIGERATION ON

5) Fasten door threshold plates to the floor panel using 12-24 x ½ self-tapping screws provided by Bally
6) Check door lock for proper operation, key should rotate freely for 90 degrees from the open to lock position. The key should sassily be removed from the cylinder in either the open or locked position.
7) Verify door frame heater operation. Heater strikes should feel warm to the touch.

c. Refrigerant used shall be of the latest type available and shall meet all codes and governmental requirements. All condensing units shall be factory assembled using UL listed or recognized components. Evaporators shall be forced air type, designed for ceiling installation. Freezer evaporators shall come with automatic electric defrost system with time clock, fan delay thermostat, heaters and heated drain pan. Evaporators shall be UL listed or recognized.
d. Verify location of condensing units with Architect.
e. It shall be the responsibility of this Contractor to completely install all refrigeration piping and controls (including interconnection of all electric) and pipe drain lines from coils in rigid copper to the floor drain, leaving the unit ready for final connections only by other trades. Drain line heater for freezer shall be supplied and installed by this Contractor. Electrical Contractor to interwire lights to switch.

4.7 Item 5A – Cooler Refrigeration System – One Lot (1 Lot) Required

A. Custom Model BALLY

1. Cooler: One (1) Scroll Condensing Unit – BEZA 009 H9 HT3E (208-230/3/60) .9 HP A/C S/H Outdoor Med Unit (R454A) 9863 BTU.

2. Cooler: One (1) Evaporator Coil SmartVap – BLP 211 MA -S1E-E 11602 BTU (115/1/60). Leak mitigation to be part of SmartVap+ controller. Leak sensors are pre-installed inside the evaporator

3. 1 ea. Disconnect switch, fused 208-230

4. 1 ea. Heated and insulated receiver

5. Refrigeration required (2) two separate power sources; one to the condensing unit and one to the SmartVap+ evaporator.

6. Five (5) year total refrigeration parts and compressor warranty(s).

7. Refrigeration piping and control wiring by Foodservice Contractor.

8. Safety shut off valves are shipped loose with evaporator for field installation on lines by FEC installation must be installed out side of the walk in
   a. Check valve is to be installed on suction line
   b. Solenoid is to be installed on liquid line, solenoid coil shall be 24VAC and wired back to leak mitigation controller installed in the evaporator

c. Use 18 AWG Class 2 cable or equivalent (control wiring NOT provided by Bally)

9. Installation requirements of the refrigeration system shall not be limited to but include the following:
   a. Purge refrigerant lines with nitrogen while brazing to avoid carbon formation in the line sets. Installation of a field mounted liquid line filter drier is recommending just outside the evaporator cabinet to catch any contaminants that may have entered the system during installation
   b. Perform leak check of all factory & field installed joints and mechanical connections. Double evacuate entire system to 250microns. Weigh in and document refrigerant type and total charge for cold weather operation.
   c. Verify that site voltage is within specifications of equipment. Supply must be 5/+10% of name plate voltage. Verify that all mechanical and connections are tight and sealed correctly
   d. Evaporator drain lines must be properly trapped to avoid moisture and contaminates from being pulled back into the walk in. Maintain adequate slope to allow for a fast removal of moisture from the line
   e. Check and set pressure controls with refrigeration gauges. Make certain that differential settings allow the compressor to remain off line during any off-cycle periods
   f. Check and adjust superheat at the evaporator coil. Coolers 8-12-degree F. Maintain an minimum of 20 degrees of super heat at the compressor to avoid liquid flood back
   g. Suction lines must be insulated properly and neatly with no gaps through the entire length of the run. This insulation should be run through the insulated Bally panel and not just up to the penetration to avoid vapor leaks at the panel juncture.
   h. Run systems through a complete operation cycle allowing them to pull down to set point temperature including a defrost cycle to verify all functions, setting and pressures are operation as specified.
   i. On Smart Vap Controllers-(smart electric & air defrost systems) adjust the air sensor on the rear of the evaporator coil to a distance of 6” from the face of the coil surface
   j. Smart Vap Electric defrost controller Should be set at a factory default for defrost is on a Demand basis. Adjustment under advance menu may be required
   k. Condensate lines that will be installed either by the FEC or PC should be run from the drain connection, sloping at least 1” per foot and have the size at least as large as the drain connection. A trap in warm area outside the room must be provided to allow proper draining through tubing. Connection should be made to proper drainage facilities that comply with local regulations. To prevent free up when the temperature of the refrigerated space is 35F or lower the drain line should be heated along its run inside the cold room. The heated drain line should be insulated. It is recommended that the heater be energized at all times. A heat input of 20 watts per foot in a 25F room and 30 watts per foot for -20F rooms, is satisfactory. Drain line heaters are not required for constant room temperatures above 35F. Always trap evaporator drain line individually to prevent vapor migration.

Endure that the drain line has sufficient slop for proper drainage (prevention of ice build up/blockage in pan).

l. The drain line should be run from the drain connection, sloping at least 1” (25 mm) per foot and should have the size at least as large as the drain connection. A trap in a warm area outside the room must be provided to allow proper draining through the tubing. Connection should be made to proper drainage facilities that comply with local regulations.

m. To prevent freeze-up when the temperature of the refrigerated space is 35°F (2 °C) or lower, the drain line should be heated along its run inside the cold room. The heated drain line should be insulated. It is recommended that the heater be energized at all times. A heat input of 20 watts per foot in a 28°F (-2°C) room and 30 watts per foot for -20°F (-29°C) rooms, is satisfactory. Drain line heaters are not required for constant room temperature above 35°F (2°C). Always trap evaporator drain line individually to prevent vapor migration. Ensure that the drain line has sufficient slope for proper drainage (prevention of ice build up/blockage in pan).

10. Roof curb will be furnished by this contractor and installed by others. Provide Roof Products, INC model# RPES-3 equipment support, 18 ga. galvanized steel construction; 2 X 4 pressure-treated wood nailers; vertical C-channel bulkheads; one-piece outer shell with welded corners; 18 ga. galvanized counterflashing. All welds micro-sealed and prime painted after fabrication. Provide two (2) supports per condensing unit: 48” - 42” long x 16” tall (size per manufacture recommendations).

4.8 Item 6 - Cooler Shelving – One Lot (1 Lot) Required

A. Four tier Metro Model A----NK3 Super Adjustable Super Erecta® Shelf, wire, Metroseal 3 (corrosion-resistant) finish, corner release system, with Microban® antimicrobial protection, NSF.

B. Each shelving unit shall have four (4) Model 74PK3 Super Erecta® SiteSelect™ Post, 74-5/8"H, adjustable leveling bolt, posts are grooved at 1" increments & numbered at 2" increments, double grooved every 8", Metroseal 3™ epoxy-coated corrosion-resistant finish with Microban® antimicrobial protection. Shelving shall be provided as shown on drawing (No “S” clips allowed),

1. It shall be the responsibility of this contractor to verify and adjust shelving sizes to insure proper fit

4.9 Item 7 - Cooler Dunnage Racks – One Lot (1 Lot) Required

A. New Age

1. 2 ea. Model 2014 Dunnage Rack, 36"W x 24"D x 8"H, all welded aluminum construction, 1-1/2" x 1-3/4" x 0.070 tubing, welded aluminum caps on feet, weight capacity 2500 lbs., NSF, Made in USA (standard factory lead time)

2. Lifetime warranty against rust & corrosion, 5 year workmanship and material defects warranty, standard

3. It shall be the responsibility of this contractor to verify and adjust shelving sizes to insure proper fit

4.10 Item 8 - Walk In Freezer – One (1) Required

A. Custom Model BALLY Sectional Walk-in Freezer complete with doors shall be manufactured by Bally Refrigerated Boxes, Inc. drawing # 38033 Overall size of walk-in shall be approximately 12'- 6 1/2" long x 8'- 8"- 8-1/2" wide x 8'-6" high, size and configuration per Bally's current drawing# 38033 drawing (field verify Size).

1. Foam core panels shall be Underwriters Laboratories-listed as having flame spread of 25 or lower and smoke generation of 450 or lower when tested in accordance with ASTME-84-76. Panels shall be approved by Factory Mutual as a Class I building type. They shall be foamed using HCFC expanding agents and shall meet all current international standards.

2. All work and materials shall be in full accordance with local and/or state ordinances, and with other prevailing rules or regulations.

3. Panels shall consist of interior and exterior metals skins precisely foamed with steel and dies and roll-form equipment and thoroughly checked with gauges for accuracy. The metal skins shall be placed into heated molds and liquid urethane injected between them. Urethane shall be foamed-inplace (poured, not frothed) and, when completely heatcured, shall bind tenaciously to the metal skins to form an insulated panel. Panels shall contain 100 percent urethane insulation and have no internal wood or structural members between the skins. To insure tight joints, panel edges must have foamed-in-place tongues and grooves with a flexible vinyl gasket on the interior and exterior of all tongue edges. Gaskets shall be resistant to damage from oil, fats, water and detergents and must be NSF-approved. Panel thickness shall be 4" thick.

4. Exterior Finish:
   a. Walls, floor and ceiling shall be Stucco-embossed aluminum.

5. Interior Finish:
   a. Floor panels shall have ¾” plywood foamed in place with 1/8” Diamond Tread.
   b. Walls and ceiling shall be Stucco-embossed aluminum

6. All panels except corner panels shall be made in 23” and 46” widths, fully interchangeable for fast, easy assembly. Panels 11-1/2”, 17-1/4” or 34-1/2” wide are to be furnished only if required to fit the allocated space. To assure perfect alignment and maximum strength, corner panels shall employ a right-angle configuration with exterior horizontal dimensions of 12” on each side. Vertical panels (except corner panels) shall be supplied in a single length up to 28’ high (16” high for installations with aluminum or stainless-steel finish). For outdoor applications, single-height panels greater than 19” (16” for aluminum) or multi-tiered vertical panels must be secured to horizontal girts mounted between building columns. 8. Panels shall be equipped with Bally Speed-lok diaphragmatic joining devices. The distance between locks shall not exceed 46”. Each device shall consist of a cam action, hooked locking arm placed in one panel, and a steel rod positioned in the adjoining panel, so that when the arm is rotated, the hook engages the rod and draws the panels tightly together with cam action. Arms and rods shall be housed in individual steel pockets. Pockets on one side of the panel shall be connected to pockets on the other side in width, by the use of 2” -wide metal straps set into and completely surrounded by the insulation. When panels are joined together, these straps shall form lock-to-lock connections for extra strength. . All panels must comply with NYS ECCC C403.10..2 R value requirements

7. Floor Construction –Bally floor panels shall be 4” thick 1/8” Aluminum diamond tread panels that comply with NSF.

8. Supply One (1) Super Doors 36” wide x 78” height. Doors are in-fitting and flush mounted. Magnetic core, thermoplastic gaskets installed on the top edge and both sides of the door shall keep the door in a closed position, forming a tight seal; a flexible, dual blade wiper gasket shall be installed at the bottom of the door. NSF-approved gaskets shall be replaceable and resistant to damage from oil, fats, water and detergent. A heavy U-channel structural steel frame around the perimeter of the door opening shall prevent racking or twisting; steel frame is to be reinforced for hardware attachment. Anti-condensate heater wire shall be concealed behind the metal edge of the doorjambs. The door panel shall also include a vapor-proof interior lamp with LED light fixture; junction box for 120v., 60 cycle, 1 phase, a.c. service (15 amp maximum); 2”-dia. flush-face dial thermometer (field mounted on 60” wide doors).). All walk in doors are to comply with OSHA 1910.36 exist hardware to prevent entrapment

9. Hardware
   a. Supply with each door: two spring-loaded, self-closing hinges and door closer. Provide satin aluminum finish.

10. Door Options
    a. Provide one Observation Window in each Entrance Door - (a 14-1/2” x 24” heated observation window shall be provided in the entrance door. It consists of three panes of glass with sealed air spaces between them. The window shall be supplied with heated glass and frame and units shall be removable for replacement.)
    b. Provide one NSF-approved Strip Curtain for each door – clear-vinyl strip curtains shall permit easy passage while minimizing air infiltration.
    c. Bally’s standard door latch hardware.
    d. 1/8" D.T. Kickplate Int. & Ext.
    e. INTERIOR RAMP

11. Options:
    a. Provide Pressure Relief Port in freezer compartment
    b. Alarm Systems - Provide one (1) 75LC Multi-Monitor w/ push button & MC1F Mag. Contacts, one motion detector & one IP1 panic button.
    c. Vinyl rub rail along entire exposed front (verify color with Architect). Rail to be installed at cart height
    d. Three (3) LED Kason 1809-3 Lights 17” long, including bulbs.
    e. Provide trim strips alongside walls & closure panels along the top to finish ceiling (same finish as wall panel).

12. Construction shall be of a design approved by the National Sanitation Foundation and shall carry the NSF Label of Approval mounted on each door section.

13. Warranties
    a. Bally shall warrant that any part of the structure it supplies (except the refrigeration system and its related accessories) is free from defects in materials or workmanship under normal use and service. The insulated panel portion of the structure is warranted free from defects under normal use and service for a period of 10 years from date of installation (but in no event shall the warranty be in force for more than 10 years and 6 months from the date the product was first shipped by Bally). Panel surface condition is warranted free from defects under normal use and service for one year from installation, provided the panel is stored and installed according to Bally’s instructions. Mechanical (including hardware, gasketing, Speed-lok assemblies, aluminum weather roofs) and electrical components, except refrigeration systems (which are covered by a separate warranty) are warranted to be free from defects under normal use and service for one year from date of installation. (In no case shall this portion of the warranty be in force for more than one year and six months from the date the product was first shipped by Bally.) The warranty shall not include any labor charges for replacement or repair of defective parts or refrigeration. Full warranty information is to be provided with the walk-in.

14. CONTRACTOR'S RESPONSIBILITIES:
    a. It shall be the responsibility of this Contractor to Deliver, set-in-place and completely assemble the walk-in components and refrigeration systems. Install trim strips and closure panels (as specified - securely attached and sealed with silicone) between the box and all adjoining wall and ceiling areas. Material shall be of the same type and finish as the walk-in box surface. This contractor shall verify existing building conditions and field verify size and location of space where the walk-in is scheduled to be installed. Coordinate finished floor elevation with the Architect.
    b. Installation requirements of the walk-in box shall not be limited to but also include the following items:
        1) Verify that all panel to panel am locks are fully engaged and stainless cover caps are in place.
        2) Entrance door should close and seal on its own. Verify seal at gasket by checking for light from inside of door with interior light turned off. Adjust door hinges as required to obtain a tight seal.
        3) Remove all protective coating, shipping materials and packaging labels from panel surfaces, both inside and outside of the box
        4) Neatly seal all penetrations/gaps to prevent condensation or ice from occurring. Seal or verify seal at all electrical conduits both internally & externally at entrance point. FEC TO VERIFY PC & EC TRADES COMPLETELY SEAL ANY WALL OR CEILING PENATRATIONS PRIOR TO TURNING REFRIGERATION ON
        5) Fasten door threshold plates to the floor panel using 12-24 x ½ self-tapping screws provided by Bally
        6) Check door lock for proper operation, key should rotate freely for 90 degrees from the open to lock position. The key should sassily be removed from the cylinder in either the open or locked position.
        7) Verify door frame heater operation. Heater strikes should feel warm to the touch.
    c. Refrigerant used shall be of the latest type available and shall meet all codes and governmental requirements. All condensing units shall be factory assembled using UL listed or recognized components. Evaporators shall be forced air type, designed for ceiling installation. Freezer evaporators shall come with automatic electric defrost system with time clock, fan delay thermostat, heaters and heated drain pan. Evaporators shall be UL listed or recognized.
    d. Verify location of condensing units with Architect.
    e. It shall be the responsibility of this Contractor to completely install all refrigeration piping and controls (including interconnection of all electric) and pipe drain lines from coils in rigid copper to the floor drain, leaving the unit ready for final connections only by other trades. Drain line heater for freezer shall be supplied and installed by this Contractor. Electrical Contractor to interwire lights to switch.

4.11 Item 8A – Freezer Refrigeration System – One Lot (1 Lot) Required

A. Custom Model BALLY

1. Freezer: One (1) Scroll Condensing Unit – BEZA 025 L9 HT3E (208-230/3/60) 2.5HP A/C S/H Outdoor Med Unit (R454A) 8853 BTU.

2. Freezer: One (1) Evaporator Coil SmartVapII – BLP 209LE-S2E-E 9390 BTU (208-230/1/60). Leak mitigation to be part of SmartVap+ controller. Leake sensors are pre installed inside the evaporator

3. 1 ea. Disconnect switch, fused 208-230

4. 1 ea. Heated and insulated receiver

5. Refrigeration required (2) two separate power sources; one to the condensing unit and one to the SmartVap+ evaporator.

6. Five (5) year total refrigeration parts and compressor warranty(s).

7. Refrigeration piping and control wiring by Foodservice Contractor.

8. Safety shut off valves are shipped loose with evaporator for field installation on lines by FEC installation must be installed out side of the walk in
   a. Check valve is to be installed on suction line
   b. Solenoid is to be installed on liquid line, solenoid coil shall be 24VAC and wired back to leak mitigation controller installed in the evaporator
   c. Use 18 AWG Class 2 cable or equivalent (control wiring NOT provided by Bally)

9. Installation requirements of the refrigeration system shall not be limited to but include the following:
   a. Purge refrigerant lines with nitrogen while brazing to avoid carbon formation in the line sets. Installation of a field mounted liquid line filter drier is recommending just outside the evaporator cabinet to catch any contaminants that may have entered the system during installation
   b. Perform leak check of all factory & field installed joints and mechanical connections. Double evacuate entire system to 250microns. Weigh in and document refrigerant type and total charge for cold weather operation.
   c. Verify that site voltage is within specifications of equipment. Supply must be 5/+10% of name plate voltage. Verify that all mechanical and connections are tight and sealed correctly
   d. Evaporator drain lines must be properly trapped to avoid moisture and contaminates from being pulled back into the walk in. Maintain adequate slope to allow for a fast removal of moisture from the line
   e. Check and set pressure controls with refrigeration gauges. Make certain that differential settings allow the compressor to remain off line during any off-cycle periods

f. Check and adjust superheat at the evaporator coil. Coolers 8-12-degree F. Maintain an minimum of 20 degrees of super heat at the compressor to avoid liquid flood back
g. Suction lines must be insulated properly and neatly with no gaps through the entire length of the run. This insulation should be run through the insulated Bally panel and not just up to the penetration to avoid vapor leaks at the panel juncture.
h. Run systems through a complete operation cycle allowing them to pull down to set point temperature including a defrost cycle to verify all functions, setting and pressures are operation as specified.
i. On Smart Vap Controllers-(smart electric & air defrost systems) adjust the air sensor on the rear of the evaporator coil to a distance of 6” from the face of the coil surface
j. Smart Vap Electric defrost controller Should be set at a factory default for defrost is on a Demand basis. Adjustment under advance menu may be required
k. Condensate lines that will be installed either by the FEC or PC should be run from the drain connection, sloping at least 1” per foot and have the size at least as large as the drain connection. A trap in warm area outside the room must be provided to allow proper draining through tubing. Connection should be made to proper drainage facilities that comply with local regulations. To prevent free up when the temperature of the refrigerated space is 35F or lower the drain line should be heated along its run inside the cold room. The heated drain line should be insulated. It is recommended that the heater be energized at all times. A heat input of 20 watts per foot in a 25F room and 30 watts per foot for -20F rooms, is satisfactory. Drain line heaters are not required for constant room temperatures above 35F. Always trap evaporator drain line individually to prevent vapor migration. Endure that the drain line has sufficient slop for proper drainage (prevention of ice build up/blockage in pan).
l. The drain line should be run from the drain connection, sloping at least 1” (25 mm) per foot and should have the size at least as large as the drain connection. A trap in a warm area outside the room must be provided to allow proper draining through the tubing. Connection should be made to proper drainage facilities that comply with local regulations.
m. To prevent freeze-up when the temperature of the refrigerated space is 35°F (2 °C) or lower, the drain line should be heated along its run inside the cold room. The heated drain line should be insulated. It is recommended that the heater be energized at all times. A heat input of 20 watts per foot in a 28°F (-2°C) room and 30 watts per foot for -20°F (-29°C) rooms, is satisfactory. Drain line heaters are not required for constant room temperature above 35°F (2°C). Always trap evaporator drain line individually to prevent vapor migration. Ensure that the drain line has sufficient slope for proper drainage (prevention of ice build up/blockage in pan).

10. Roof curb will be furnished by this contractor and installed by others. Provide Roof Products, INC model# RPES-3 equipment support, 18 ga. galvanized steel construction; 2 X 4 pressure-treated wood nailers; vertical C-channel bulkheads; one-piece outer shell with welded corners; 18 ga. galvanized counterflashing. All welds micro-sealed and prime painted after fabrication. Provide two (2) supports per condensing unit: 48” - 42” long x 16” tall (size per manufacture recommendations).

4.12 Item 9 - Spare Number

4.13 Item 10 -Cooler Shelving Units – One Lot (1 Lot) Required

A. Four tier Metro Model A----NK3 Super Adjustable Super Erecta® Shelf, wire, Metroseal 3 (corrosion-resistant) finish, corner release system, with Microban® antimicrobial protection, NSF.

B. Each shelving unit shall have four (4) Model 74PK3 Super Erecta® SiteSelect™ Post, 74-5/8"H, adjustable leveling bolt, posts are grooved at 1" increments & numbered at 2" increments, double grooved every 8", Metroseal 3™ epoxy-coated corrosion-resistant finish with Microban® antimicrobial protection. Shelving shall be provided as shown on drawing (No “S” clips allowed),

1. It shall be the responsibility of this contractor to verify and adjust shelving sizes to insure proper fit

4.14 Item 11 -Freezer Dunnage – One Lot (1 Lot) Required

A. New Age

1. 1 ea. Model 2016 Dunnage Rack, 60"W x 24"D x 8"H, all welded aluminum construction, 1-1/2" x 1-3/4" x 0.070 tubing, welded aluminum caps on feet, weight capacity 2000 lbs., NSF, Made in USA (standard factory lead time)

2. 1 ea. Lifetime warranty against rust & corrosion, 5 year workmanship and material defects warranty, standard

3. 1 ea. Model 2015 Dunnage Rack, 48"W x 24"D x 8"H, all welded aluminum construction, 1-1/2" x 1-3/4" x 0.070 tubing, welded aluminum caps on feet, weight capacity 2500 lbs., NSF, Made in USA (standard factory lead time)

4. It shall be the responsibility of this contractor to verify and adjust shelving sizes to insure proper fit

4.15 Item 12 -Dry Storage Shelving – One Lot (1 Lot) Required

A. Four tier Metro Model A----NK3 Super Adjustable Super Erecta® Shelf, wire, Metroseal 3 (corrosion-resistant) finish, corner release system, with Microban® antimicrobial protection, NSF.

B. Each shelving unit shall have four (4) Model 74PK3 Super Erecta® SiteSelect™ Post, 74-5/8"H, adjustable leveling bolt, posts are grooved at 1" increments & numbered at 2" increments, double grooved every 8", Metroseal 3™ epoxy-coated corrosion-resistant finish with Microban® antimicrobial protection. Shelving shall be provided as shown on drawing (No “S” clips allowed),

1. It shall be the responsibility of this contractor to verify and adjust shelving sizes to insure proper fit

4.16 Item 13 – Dry Storage Dunnage - One Lot (1 Lot) Required

A. New Age Model CUSTOM

1. 4 ea. Model 2016 Dunnage Rack, 60"W x 24"D x 8"H, all welded aluminum construction, 1-1/2" x 1-3/4" x 0.070 tubing, welded aluminum caps on feet, weight capacity 2000 lbs., NSF, Made in USA (standard factory lead time)

2. 1 ea. Lifetime warranty against rust & corrosion, 5 year workmanship and material defects warranty, standard

3. 2 ea. Model 2015 Dunnage Rack, 48"W x 24"D x 8"H, all welded aluminum construction, 1-1/2" x 1-3/4" x 0.070 tubing, welded aluminum caps on feet, weight capacity 2500 lbs., NSF, Made in USA (standard factory lead time)

4. It shall be the responsibility of this contractor to verify and adjust shelving sizes to insure proper fit

4.17 Item 14 -Can Rack – One (1) Required

A. Piper Products/Servolift Eastern Model CSR-FF-156 Dimensions: 81.06(h) x 27.25(w) x 42(d) Can Rack, (156) #10 cans, all welded aluminum

1. 1 ea. 1 year warranty parts and labor

2. 1 set Model -Y4 Polyurethane 4" casters, set of 4, with ball bearing seals

3. 1 set Model -WB Wheel brakes (set of 2)

4.18 Item 15 -Utility Carts (Existing Item #E9 – Existing & Relocate) – One Lot (1 Lot)

4.19 Item 16 -Fire Suppression System – One Lot (1 Lot) Required

A. Ansul R-102 Ansul Fire Protection System

1. This item shall provide coverage for items 69, 70, 71, 73, 75, 77 &, 79 Furnish a complete wet chemical fire suppression system model R102 as manufactured by “Ansul” or equal in compliance with U.L. 300 standards. The system shall include factory prepipe, all permits and test as required by the authority having jurisdiction.

2. Automatic actuation shall be by means of fusible with no visible conduit. System shall include an electrically actuated release mechanism.

3. System shall be furnished and installed by an Ansul certified distributor in accordance with manufacturer's instructions and the authority having jurisdiction.

4. Microswitches shall be furnished as part of the fire protection system for tie in of building alarm and for makeup air/fire/fuel shut down.

5. All access openings, holes, sleeves, chases, etc., in building structure necessary to permit piping and control tubing to be run between system unit, ventilator and duct work are to be provided by the General Contractor.

6. The Building Alarm System Contractor is to furnish a control relay to detect operation of the system by connection to the microswitches supplied. The Electrical Contractor is to furnish and install all wiring required for the system specified.

7. All exposed piping and nozzles of fire protection system shall be chrome or Stainless steel sleeved including manual pull station piping.

8. Whenever possible coordinate with general contractor and fire suppression supplier and architect to run pull station piping recessed in wall. This will need to be completed during framing of wall.

9. All horizontal piping is to be done on the top of the ventilator unless otherwise specified.

10. Verify location of remote manual pull station.

11. "Electrical contractor/ shunt trip breaker by EC

12. FEC to provide tag and testing documents at close out

4.20 Item 17 -Hand Sinks – One Lot (1 Lot) Required

A. Advance Tabco Model 7-PS-60 Dimensions: 13(h) x 17.25(w) x 15.25(d) Hand Sink, wall mounted, 14" wide x 10" front-to-back x 5" deep bowl, 20-gauge 304 stainless steel, with splash mounted heavy duty gooseneck faucet, basket drain, wall bracket, NSF, cCSAus. Provide with the following:

1. 1. Ea. Model K-316-LU Wrist Handles Only, for splash or deck mount hand sink faucet (1 pair hot & cold 4" long blades), fits faucets supplied after November 2015 with hot & cold color rings that do not have exposed screw head

2. 1 ea. Model K-170 Eye Wash Attachment, attaches to standard spout, adjustable aerated outlet heads, float-off dust covers, pull knob activation, removable aerator on bottom, chrome plated forged brass body (

3. 1 ea. Model 7-PS-10 P-trap, heavy duty, 1-1/2", 17 gauge

4. PLACE EYE WASH ON HAND SINK IN THE DISH WASH AREA

4.21 Item 18 -Spare Number

4.22 Item 19 -Slicer (Existing – Relocate)– One (1)

4.23 Item 20 -Island Worktable W/2 Sinks – One (1) Required

A. Custom Model by Marlo/EMI size and shape as shown on drawing#24OS01. Approximately 42” X 120” X 34” high. Top to be constructed of a 14-gauge 304 stainless steel with S/S channel edge construction. “C” channel bracing cylindrical gussets and mastic sound deadening. 1 5/8” OD stainless legs adjustable s/s flanged front feet.

B. 16-gauge under shelf the length of the table. Under Shelf to be welded to legs 10” AFF with S/S “C” Channel bracing. (excluding sink section)

C. Provide two (2) 20” X 20” stainless steel drawers as seen on drawing. Drawers to be double pan construction with HD S/S rollers bearing, integral pull handle, lock and cutting boards.

D. Two (2) 20” x 20” X 10” deep coved construction prep sink with twist handle waste with bracket and overflow. Provide pre-rinse bracket post. S/S flanged feet at front legs. No under shelf at sink area.

E. Over prep sink area provide approximately 48” single line overhead pot/pan rack. 2” x 3/16” S/S flat bar welded to 1 5/8” OD S/S Tubular sleeves. Provide (8) eight corrosion resistant s/s type pot hooks.

F. Provide TWO (2) dog house GFI outlets (120/1/15AMPS) as indicted on drawings for items #19 & 21 outlet internally factory wired to junction box (UL certified) to a single point connection at a chase.

G. 18-gauge S/S chase to run from tabletop connection to floor. Chase to have (2) removable access panels to provide access for connections ID to be approximately 2” x 4” provide 4” x 6” end flanges at floor and table top connections. FEC to seal chase to floor . It will be the responsibility of the FEC to coordinate electrical rough ins to land in the chase area as designed. Supply with the following:

1.1 ea. T&S Brass Model MPZ-8DLN-06 Mini Pre-Rinse Unit, 8" deck mount base faucet, compact spring & flex hose, spray valve, 6" wall bracket, lever handles, 6" add on faucet.

2.1 ktT&S Brass Model B-0425-KIT Inlet Kit with 24" supply hoses, Nipples, Washer and Locknuts that provide 1/2" NPT male outlet and 3/8" female compression inlet. Certified to ASME A112.18.1/CSA B125.1, NSF 61-Section 9 and NSF 372.

4.24 Item 21 -Can Opener – One (1) Required

A. Edlund Model 270/115V Dimensions: 11.5(h) x 6.75(w) x 10(d) Can Opener, electric, for heavy volume, 2-speed motor, knife and gear assemblies that are removable for cleaning, recommended for up to 200 cans per day, cULus, CE, NSF certified, 115v/60/1-ph, 1.5 amp. Provide with the following:

1. 1 ea. 3 year limited warranty, standard

4.25 Item 22 -Pot/Pan Drying Rack – One (1) Required

A. Metro

1. 4 ea. Model MQ2442G Quick Ship - MetroMax® Q Shelf, 42"W x 24"D, removable open grid polymer shelf mats on an epoxy coated steel frame with quick adjust corner releases, (4) wedge connectors, Microban® antimicrobial product protection, 800 lb. capacity per shelf, NSF

2. 4 ea. Model MQ74UPE Quick Ship - MetroMax® Q Post, 73-3/16"H, for use with stem casters, epoxy coated steel with built in Microban® antimicrobial product protection, taupe

3. 2 ea. Model 5PCX Quick Ship - Polymer Stem Caster, swivel, 5" dia., 1-1/4"W face, -20° F to 120°F temperature range, polyurethane wheel tread, 300 lb. capacity, NSF (donut bumpers included) (for use with all MetroMax posts & shelves)

4. 2 ea. Model 5PCBX Quick Ship - Polymer Stem Caster, brake, 5" dia., 1-1/4"W face, -20° F to 120°F temperature range, polyurethane wheel tread, 300 lb. capacity, NSF (donut bumpers included) (for use with all MetroMax posts & shelves)

5. 1 ea. Model MEH24S Extended Handle, fits 24"D shelving, includes: (2) tri-lobal adapters, stainless steel, NSF(Compatible with MetroMax® i, MetroMax® Q, & MetroMax® 4).

6. The FEC will be required to field measure to ensure a proper fit.

4.26 Item 23 -3 Compartment Sink – One (1) Required

A. Custom Model by Marlo/EMI size and shape as shown on drawing#24OS01 Approximately 31” X 138” X 34” high. 1 5/8” OD S/S legs with adjustable S/S flanged feet on front legs, S/S adjustable bullet feet on back 1 5/8” OD S/S cross bracing at 10” AFF, welded to legs. 14-gauge 304 S/S top with raised rolled edges. (finished edges if meets wall) 3 drain boards 31-1/4” each

B. S/S channel edge construction “C”, channel bracing cylindrical gussets and mastic sound deadening. 10” back splash at 45 degree & ¾ turn down enclosed back and ends. Three (3) 24” wide X 24” long X 14” deep S/S sinks coved corner with S/S apron coved corner. 31 1/4” left and right drain boards sloped to sink. Lever waste valves with overflow and support bracket. Accommodate for Two (2) 8” OC faucets. To be NSF & UL approved. Supply with the following:

1. 1 ea. T&S Brass Model B-0133-A12-B08 EasyInstall Pre-Rinse Unit, 8" wall mount, adjustable centers, EasyInstall 12" add-on faucet with stream regulator, spring action gooseneck, quarter-turn Eterna cartridges with spring checks, lever handles with color coded indexes, 18"rigid riser, 44" flexible stainless-steel hose, 1.07 GPM JeTSpray spray valve, 6" adjustable wall bracket, 1/2" NPT, low lead, NSF, cCSAus

2. 1 kt T&S Brass Model B-0230-K Installation Kit, (2) 1/2" NPT nipples, lock nuts & washers, (2) short "Ell" 1/2" NPT female x male

3. 1 kt T&S Brass Model B-0230-KIT Inlet Kit, 1/2" NPT nipple, close elbows, 24" flex supply hoses

4. 1 ea. T&S Brass 3 year limited warranty, standard

5. 1 ea. T&S Brass Model 5F-8WLS12 Equip Faucet, 8" wall mount 12" swivel nozzle, lever handles & inlet supply kit, ceramic cartridges, low lead, ADA Compliant

4.27 Item 24 -Hose Reel W/Control Cabinet – One (1) Required

A. T&S Brass Model B-7242-C05 Hose Reel System, enclosed, 3/8" x 50' hose with stainless steel front trigger spray valve (with a 5/16" orifice), with ratcheting system & adjustable hose bumper, epoxy coated steel. Provide with the following:

1. 1 ea. 1 year limited warranty, standard
2. 1 ea. 1 year limited warranty for hose, standard
3. 1 ea. 2 year limited warranty for hose reel, standard
4. FEC to install so that it does not interfere with dish washing operations

B. 1 ea. Fisher Model 1801 Reel Rinse Control Unit, valves, gauges and connections are completely enclosed within a stainless-steel cabinet, dual check backflow preventer, water hammer silencer, 90° panel lock, padlock hasp & finger latch, 1/2" NPT female inlets & outlets

4.28 Item 25 -Soiled Dish Table – One (1) Required

A. Custom model by Marlo/EMI "L" shaped size and shape as shown on drawing #24OS01Approximately 148” X 60" long X 30” Wide X 34” high. 1 5/8” OD S/S legs with adjustable S/S flanged feet on front legs, S/S adjustable bullet feet on back.

B. 16 gauge under shelf the length of table. Under shelf to welded to legs 10” AFF. (excluding waste collector area) 14-gauge 304 S/S top with raised rolled edges. Top to be constructed of a 14-gauge 304 stainless steel with S/S channel edge construction. “C” channel bracing cylindrical gussets and mastic sound deadening.

C. Fully weld in top item # 26 (Salvajor waste collector) Install collector on table per manufactures guidelines.

D. Provide radius rack roller section with PVC Roller Mitered Counter and basket waste drain. Size Roller section to fit through dish machine for cleaning. No under shelf to be provided under roller sections.

E. WITH 48” WIDE PASS THROUGH OPEN ROLL DOWN DOOR. 10” back splash at wall locations with a 2” off set at window. Provide a step-up though ledge. 16 gauge of the wall thickness and turn down.

F. Window frame to be provided and coordinated with coiling roll down door. FSC is required to provide approved roll down door cut sheet to Marlo/EMI at the time of order.

4.29 Item 26 -Scrapper Collector – One (1) Required

A. Salvajor Model S914 Dimensions: 35.88(h) x 24.81(w) x 22.25(d) Scrap Collector™, scrapping, pre-flushing & collecting system (widely accepted in areas where disposers are restricted), NEMA 4 HYDROLOGIC® control panel with patented operator sensor, two water saving modes (timed run & auto start/stop), safety line disconnect, LCD readout, salvage basin & silverware trap, scrap basket, 3/4 HP corrosion-resistant pump, pump intake screen, stainless steel construction, UL, CSA, CE, NSF. Provide with the following:

1. 1 ea. Collector top to ship to the fabricator for factory installation
2. 1 ea. Domestic factory authorized start up FEC to coordinate
3. 1 ea. Domestic factory authorized demo FEC to coordinate
4. 1 ea. 208v/60/3-ph, 3.2 amps

4.30 Item 27- Spare Number

4.31 Item 28 -Mobile Breakdown Table – One (1) Required

A. Custom Model by Marlo/EMI size and shape as shown on drawing # 24OS01 Approximately 30"" X 72” X 34: high. Provide with casters with ALL with brake, no under shelf cross braces on at customer side on ends and center brace coordinate location of center brace w 14-gauge stainless steel top construction “C”: channel bracing cylindrical gussets and mastic sound deadening. Stainless steel legs, Provide (2) 12" cut out for trash receptacles (by owner) NSF. FEC to coordinate item 29 Garbage Cans with owner.

4.32 Item 29 -Garbage Cans (By Owner)– One Lot (1 Lot) Required

4.33 Item 30 -Vent Duct Risers – One Lot (1Lot) Required

A. Custom model by Marlo/EMI size and shape as shown on drawing #24OS01 Approximately 4” x 16” with angle collar for each riser. 18-gauge 304 stainless steel. Include collar at ceiling. All seams to be continuously welded, ground and polished to eliminate any condensation. Vent stack shall run from vent cowl on the dish washer to 3” AFC.

1. This is required HVAC supplied risers will not be accepted

4.34 Item 31 - Dish Washer w/Water Softener – One (1) Required

A. Hobart Model CL44-ADV+BUILDUP Dimensions: 68.5(h) x 44.75(w) x 31.25(d) Conveyor Dishwasher, single tank, Automatic Soil Removal, Drain Water Energy Recovery with factory-installed drain water tempering kit; (202) racks/hour, .45 gallon/rack, Complete Delime with Booster Guard, Touch Screen Controls with diagnostics, troubleshooting, and SmartConnect App, capless wash arms, NSF Pot & Pan mode, pumped rinse, insulated hinged doors, cULus, NSF, ENERGY STAR®, Provide with the following:

1. Free factory start to be coordinated by the FEC
2. 1 ea. Standard warranty - 1-Year parts, labor & travel time during normal working hours within the USA
3. 1 ea. Model CL44ADV-HTE15K Electric tank heat 15kW
4. 1 ea. Model CL44ADV-ERH18K With 18 kW Booster (default)
5. 1 ea. Model CL44ADV-ELE0AX 208v/60/3-ph
6. Single point connection standard (field convertible to dual point) TO BE CONFIGERTED TO DUAL POINT CONNECTION IN FIELD
7. 1 ea. Model CL44ADV-HGTHTS Higher than Standard 24”H x22”W opening, fits large oval trays, tall drink dispensers
8. 1 ea. Model CL44BAS-DIRVER Verify direction of operation. FEC to verify
9. 1 ea. Model WS40-NOINSTALL Water Softening System, 2,527 grains/lb. capacity, 5 gallons regeneration volume, & salt alarm, holds 1 bag of salt, pricing DOES NOT include standard installation. INSTALLATION BY AUTHORIZED HOBART SERVICE OFFICE
10. 1 ea. Model VNTHD/E-ADJ E-series vent hood domestic (adjustable)
11. 4 ea. Model DISHRAK-PEG20 Peg Rack
12. 4 ea. Model DISHRAK-COM20 Combination Rack
13. 4 ea. Model SHTPAN-RACK Rack, 6 sheet pan
14. 1 ea. Model PRESREG-1/20BR 1/2" brass pressure regulator
15. 2 ea. Model 1/2INSHK-ABSRBR Water Shock Absorber Kit (2 required - 1 each incoming hot and cold-water lines)
16. 1 ea. Model TBLLIM-CL Table limit switch for CL & CLEN series. FEC to install in soiled dish table final connection by EC

17. 1 ea. Model CL44EN-BASFETSTD Standard feet

18. DUAL POINT CONNECTION REQUIRED

4.35 Item 32 – Power Dry Unit – One (1) Required

A. San-Aire Industries Model PD-100-M Dimensions: 9.5(h) x 28(w) x 9.5(d) PowerDry™ Kitchenware Dryer, Electric, lighted on/off rocker switch, (2) 20" x 6" x 3/8" removable aluminum filter, 826 CFM blower, adjustable air distribution louver, stainless steel housing, UL, CUL, NSF. Provide with the following:

1. 1 ea. 120v/60/1, 4.33amps, 500w, cord with NEMA 5-15P

2. 1 ea. Model SMB-PD-100M Standard Wall Mount Bracket

3. FEC to mount unit per Aan-Aire clearance requirements and so that it **MUST CLEAR SHEET PANS**

4.36 Item 33 -Clean Dish Table - One (1) Required

A. Custom model by Marlo/EMI size and shape as shown on drawing #24OD01 Approximately 90” long X 30” Wide X 34” high. 1 5/8” OD S/S legs with adjustable S/S flanged feet on front legs, S/S adjustable bullet feet on back. 16 gauge under shelf the length of table. Under shelf to welded to legs 10” AFF. 14-gauge 304 S/S top with raised rolled edges.

B. Top to be constructed of a 14-gauge 304 stainless steel with S/S channel edge construction. “C” channel bracing cylindrical gussets and mastic sound deadening. 10” Back Splash at 45 degree & ¾ turn down with enclosed back and ends. Provide cut out for dish machine table limit switch provided by this contractor. Finished edges at all walls.

4.37 Item 34 -Mobile Warming Cabinet (Existing Item #E11 – Relocate)-One (1)

4.38 Item 35 -Hot Entrée Station – One (1) Required

A. Custom Model by R & D Design size and shape as shown on drawing # 46739 Approximately 36” Wide X 111-3/4" Long X 33 ¼” High. . Cabinet to be made of metal frame construction (unless the counter has a radial curve) all counters to have angle iron in all corners of the cabinet base for added structure Wood paneling to be a ¾” marine grade plywood with black laminated interior and back (operators’ side) provide a 4” base with plastic matching color toe kick for easy cleaning. Cabinet base to have a 3” overhang from toe kick. All cabinets to have dry storage compartments with locking hinged doors. All customer side openings will have a 4’ deep trim strip

on base for step protection. Customer side (all exposed) laminate color to be The Royal Burgundy SP401-SD by Pionite FEC to verify color selection prior to ordering . Operators side (all exposed) laminate to be color black. Provide a ½" inch solid surface top with color selection by Architect and coordinated by the FEC. Countertop to have a 1- ½" inch turn down on all sides. (PROVIDE SPLASH AT WALL AND COLUMN) Color selection to be Corian Ash Aggregate FEC to verify selection prior to ordering.

B. Provide coordinated trim strips at field joints and exposed corners (ends). As well as Inside cabinet bases provide a 4" deep stainless-steel protectors on the base of all cabinets.

C. A 4 CM Tray slides are to be solid surface material 12" wide by 34" high and the length of cabinet. (see layout drawings for shape) Provide tray slide with stainless steel runners (if needed at field joints provide a 1" break on either side to accommodate for field seaming of the tray slide) and custom brushed stainless-steel brackets (ADD IF NEED MITERED). Color selection to be Corian Ash Aggerate FEC to verify selection prior to ordering.

D. Counters to be shipped in a maximin of 120" field verify number of pieces required. FEC to provide field seaming for countertops.

E. All drop-in equipment Item 37 (4) well hot food unit to be shipped to R & D Designs by the FEC for factory installation. R & D Designs to provide proper insulation and ventilation using an insulated gasket and a coordinated color ventilation grill. Any controls behind ventilation grills to be hinged. All controls for drop-in equipment are to be mounted in cabinet back and easily accessible to operator. Drop in equipment to be wired to a junction box indicated on custom drawings. Drains will be accommodated by plumbing to floor.

F. Breath guards to Item 37 to be shipped to R & D Design for factory installation any heat and light controls to be located so that it will be easily accessible to operator.

G. R & D Designs to provide custom shop drawings for approval these drawings to include an equipment schedule, junction box and any drain locations for coordination. R & D Design and FEC to coordinate any required field joints. FEC to be responsible for any field seaming that may be required. Field joint/Seaming to be completed by experienced seaming employee.

H. All cabinets to be fully assembled in the factory to include any drop in food service equipment & breath protectors. All equipment to be inter-wired and inter-plumbed for final connections on site. The FEC will be responsible to fully seal any field MEP penetrations where rough ins do not coordinate with millwork.

I. All cabinets to be fully assembled in the factory to include any drop in food service equipment and breath guards.

1. R & D Designs will provide detailed step by step instructions and hardware on securing all cabinet field joints together. Cabinets at field joints must be completely secured prior to preforming seaming of counter tops.

2. All field joint seaming will be the responsibility of the FEC and will be performed by personnel that is experienced in the techniques and procedures to do so. The FEC will be required to conduct a site visit prior to release of this counter to determine the amount of field seams that will be required to place unit in location. FEC will need to minimize the number of field seams needed. The maximum length of counters by R & D Design will be 120". Any counters larger than 120" will need to be shipped disassembled and will be the responsibility of the FEC to assemble in the field.

3. CKC nor R & D **will not allow any field penetrations** in the base of their cabinet any field penetrations will void manufacture warranty. It will be the sole responsibility for the FEC to provide this warranty per contract documents. The FEC must field verify and coordinate with trades on site the pre engineer penetration locations provided by the manufacture will be used for all rough ins to final connections any adjustments required will need to be done Prior to manufacturing

4. All millwork cabinets are required to be completely level prior to bolting units together and seaming. Leveling to be done with the minimum amount of shimming possible. Excess shimming by the FEC can cause cracking in laminate and counter tops. If this is to be determined it will be the responsibility of the FEC to correct/repair these issues. All cove bases are not to be installed until after the punch list has been completed by CKC. FEC to adjust during installation any door cabinet that are not line up due to the shipping process, in not doing so could cause laminate to crack due to pinch point from door to cabinet, if this is determined to be the cause of any laminate issues it will be the responsibility of the FEC to correct not the manufacture.

4.39 Item 36 -Spare Number

4.40 Item 37 -4 Well Hot/Cold Unit – One (1) Required

A. Duke Manufacturing Model HCF-4 Dimensions: 25.94(h) x 64.5(w) x 25.5(d)Hot/Cold/Freeze Drop-In Food Well Unit, heated & refrigerated, 65" long, (4) 12" x 20" individual pans, 300 series stainless steel top rim, 5" deep 300 series stainless steel interior liners, steel exterior housing, individual wired remote digital controls for hot or cold operation, air-cooled condensing unit, individual drains manifolded to a valve, 6' cord & plug, UL, cULus, NSF #4 & 7. Provide with the following:

1. 1 ea. Model HCF-4-208 120/208v/60/1-ph, 16.0 amps, NEMA L14-20P

2. FEC to ship to R & D for factory installation

4.41 Item 38 -Breath Protector – One (1) Required

A. Premier Metal & Glass Model TM2N-A -EXT – Per drawing # 54373 1" OD Gearless Adjustable Full Service Food Shield, Top Shelf And Rear Supports; 3/8" Clear Tempered Glass With Polished Edges AND RADIUS Corners; Both End Panels Included (USP); 644B-3/1 Surface Mounting Option; Hatco GRNM Narrow Heat Lamp And Ultraslim Led Light In Complementary Colored Housing; Brushed Stainless Finish; Approx 68" CL Length; Height 21-1/8" Approx 162 Lbs. Ea. (2 End Supports) BOXED end panels to protect item 37

1. FEC to ship to R & D for factory installation
2. Warmer strip is 208/1

4.42 Item 39 -Mobile Tay Lowerators – One Lot (1 Lot) Required

A. Piper Products/Servolift Eastern Model PT/1014MO Dimensions: 36.13(h) x 14.94(w) x 18.5(d) Mobile Tray Dispenser, solid bottom, self-leveling, single stack, holds (150) 10-3/4" x 15-1/8" trays, with corner bumpers, stainless steel all tubular frame, NSF. Provide each with the following:

1. 1 year warranty parts and labor
2. 1 set Model -WB Wheel brakes (set of 2)
3. FEC to verify tray size prior to ordering

4.43 Item 40 -Refrigerated Merchandisers – Two (2) Required

A. Structural Concepts Model B37R Dimensions: 82.25(h) x 35.62(w) x 34.25(d) Oasis® Refrigerated Self-Service Case, 35-5/8"W x 34-1/4"D x 82-1/4"H, Warmest average product temperature of 40°F or less, LED top light, (4) metal shelves, Breeze with self-contained refrigeration, condensate pan, magnetic air filter, non-locking casters with levelers, end panels with mirrored stainless interior, black exterior, R290 Hydrocarbon refrigerant, cETLus, ETL-Sanitation Provide each with the following:

1. 1 ea. NOTE: If GFCI is required, a GFCI breaker MUST be used in lieu of a GFCI receptacle
2. 1 ea. Warranty: 1 year parts & labor warranty, 5 year compressor warranty

3. 1 ea. Exterior Color: Laminate (non-stock colors) The Royal Burgundy SP401-SD by Pionite FEC to verify color selections with Architect prior to ordering

4. 1 ea. Model GRAIN DIRECTION Standard laminate grain directions (when applicable):
   a. - Front Panels (Upper Header and Lower Panels): Horizontal grain direction
   b. - End Panels: Vertical grain direction
   c. - Blend & Reveal Cases Only: Horizontal grain direction on front and end panels

5. 1 ea. Interior Color: Stainless steel

6. 1 ea. Lower Front Panel Color: Powder coated SCC Standard Silversan Black (FDA compliant), standard

7. 1 ea. Rear Exterior Color: Powder coated SCC Standard Silversan Black (FDA compliant), standard

8. 1 ea. Base support: Casters (non-locking) w/ levelers

9. 1 ea. End Panel Left: Full with stainless steel mirror interior, standard

10. 1 ea. End Panel Right: Full with stainless steel mirror interior, standard

11. 1ea Cover/Curtain: Roll-down security cover, locking (Requires two end panels (full or cutaway) per case)

12. 1 ea. Price Tag Molding: None

13. 1 ea. Shelving: Metal shelves (4), lighted (LED 4000K)

14. 1 ea. Top Light: LED 4000K, standard

15. 1 ea. Clean Sweep: Clean Sweep®, automatic condenser coil cleaner (self-cont.)

16. 1 ea. Refrigeration: Breeze-E (Type II) self-contained refrigeration, standard

17. 1 ea. Refrigerant: Hydrocarbon refrigerant (R290)

18. 1 ea. Electrical Connection: 6' Straight blade power cord, standard

19. 1 ea. Thermometer: Spirit filled thermometer, standard

20. 1 ea. Heat Treated Crating: None, standard

21. 1 ea. Vinyl Graphics: None, standard

4.44 Item 41 -Milk Coolers – One Lot (1 Lot) Required

A. Continental Refrigerator Model MC3NSSS Dimensions: 47(h) x 34(w) x 33(d) Milk Cooler, 34" long, single access, forced air cooling, (8) 13" x 13" x 11" or (4) 19" x 13" x 11" crate capacity, door cylinder security lock, electronic control with digital display, hi-low alarm, hi/low temperature alarm, stainless steel interior & exterior, floor drain, (4) 5" swivel casters with front locking brakes, R290 Hydrocarbon refrigerant, 1/4 HP, cETLus, NSF. Provide each with the following:

1. 1 ea. warranty 6-year parts and labor; additional 1 year compressor part
2. 1 ea. 115v/60/1-ph, 5.7 amps, cord, NEMA 5-15P, standard
3. 1 ea. Custom laminate finish: The Royal Burgundy SP401-SD by Pionite FEC to verify color selections with Architect prior to ordering
4. Low profile evaporator for rear loading

4.45 Item 42 – Ice Cream Merchandisers – One Lot (1) Required

A. Master-Bilt Products Model MSC-31AA Dimensions: 33.5(h) x 31.5(w) x 27.38(d) COLDIN-3™ Display Freezer, 7.2 gross cu. ft., curved tempered glass sliding lids, (3) standard baskets, (3) basket dividers, external analog thermometer and lock, white zinc-coated enamel steel exterior, painted white steel interior with LED lighting, defrost water drain, temperature range -18° to 10°F (-27° to -12° C), self-contained refrigeration, heavy duty 3" casters, R290 Hydrocarbon refrigerant, 1/3 hp, 115v/60/1-ph, 1.3 amps, 6-1/2' cord, NEMA 5-15P, cETLus, ETL-Sanitation. Provide each with the following:

1. 1 year parts and labor warranty

4.46 Item 43 – Cashier Station – One (1) Required

A. Custom Model by R & D Design size and shape as shown on drawing # 54373. Approximately 36” Wide X 60" Long X 33 ¼” High. (Cabinet to be made of metal frame construction all counters to have angle iron in all corners of the cabinet base for added structure Wood paneling to be a ¾” marine grade plywood with black laminated interior and back (operators’ side) provide a 4” base with plastic matching color toe kick for easy cleaning. Cabinet base to have a 3” overhang from toe kick. All cabinets to have dry storage compartments with locking hinged doors. All customer side openings will have a 4’ deep trim strip on base for step protection. Customer side (all exposed) laminate color to be The Royal Burgundy SP401-SD by Pionite selected by Architect and verified by the FEC. Operators side (all exposed) laminate to be color black. Provide a ½” inch solid surface top with color selection by Architect of Corian Ash Aggregate and verified by the FEC prior to ordering. Countertop to have a 1- ½” inch turn down on all sides.

B. Provide coordinated trim strips at field joints and exposed corners (ends). As well as Inside cabinet bases provide a 4” deep stainless-steel protectors on the base of all cabinets.

C. A DBL Tray slides are to be solid surface material 12” wide by 34” high and the length of cabinet. (see layout drawings for shape) Provide tray slide with stainless steel runners (if needed at field joints provide a 1” break on either side to accommodate for field seaming of the tray slide) and custom brushed stainless-steel brackets (ADD IF NEED MITERED). Color selection by Architect to be Corian Ash Aggerate and verified by FEC prior to ordering. Counters to be shipped in a maximin of 120” field verify number of pieces required. FEC to provide field seaming for countertops.

D. Cashier station to be provided with a tubular footrest and lockable cash drawer. Exterior cabinet receptacle (FOR ITEM # 42 ice cream merchandiser to be provided as shown on drawing. To be wired to a junction box.

E. All cabinets to be fully assembled in the factory to include any drop in food service equipment & breath protectors. All equipment to be inter-wired and inter-plumbed for final connections on site. The FEC will be responsible to fully seal any field MEP penetrations where rough ins do not coordinate with millwork.

1. All cabinets to be fully assembled in the factory to include any drop in food service equipment and breath guards.

2. R & D Designs will provide detailed step by step instructions and hardware on securing all cabinet field joints together. Cabinets at field joints must be completely secured prior to preforming seaming of counter tops.

3. All field joint seaming will be the responsibility of the FEC and will be performed by personnel that is experienced in the techniques and procedures to do so. The FEC will be required to conduct a site visit prior to release of this counter to determine the amount of field seams that will be required to place unit in location. FEC will need to minimize the number of field seams needed. The maximum length of counters by R & D Design will be 120”. Any counters larger than 120” will need to be shipped disassembled and will be the responsibility of the FEC to assemble in the field.

4. CKC nor R & D will not allow any field penetrations in the base of their cabinet any field penetrations will void manufacture warranty. It will be the sole responsibility for the FEC to provide this warranty per contract documents. The FEC must field verify and coordinate with trades on site the pre engineer penetration locations provided by the manufacture will be used for all rough ins to final connections any adjustments required will need to be done Prior to manufacturing

5. All millwork cabinets are required to be completely level prior to bolting units together and seaming. Leveling to be done with the minimum amount of shimming possible. Excess shimming by the FEC can cause cracking in laminate and counter tops. If this is to be determined it will be the responsibility of the FEC to correct/repair these issues. All cove bases are not to be installed until after the punch list has been completed by CKC. FEC to adjust during installation any door cabinet that are not line up due to the shipping process, in not doing so could cause laminate to crack due to pinch point from door to cabinet, if this is determined to be the cause of any laminate issues it will be the responsibility of the FEC to correct not the manufacture

4.47 Item 44 – Cash Registers (Existing Item #E59 – Relocate) – Two (2)

4.48 Item 45 – Spare Number

4.49 Item 46 – Transa Barriers – One Lot (1 Lot) Required

A. Tansator crowd control

1. 3 ea. Tensator Model 896HC-MAX-C Tensabarrier® Heavy Duty Wall Unit, 13'L belt, for restricting areas without taking up floor space, SlowRetract™ braking mechanism, steel construction, Category C finish (10 each minimum order)

2. 3 ea. Tensator 2 year warranty, standard

3. 3 ea. Tensator Custom powder coat finish, contact factory for details (NET)

4. 3 ea. Tensator Pre-printed messages, double sided

5. 3 ea. Tensator Message to be specified

6. 3 ea. Tensator (STE) Standard

7. 3 ea. Tensator (S) Standard

8. COLOR TO MATCH MILLWORK COUNTER. FSC TO COORDINATE COLOR SELECTIONS WITH ARCHITECT. MESSAGE ON BELT TO BE SELECTED FROM STANDARD OPTIONS FSC TO COORDINATE LENGTH AND LAYOUT WITH SITE CONDITIONS

9. 3 ea. Tensator Model 898 CLIP Wall Receiver, 2", for connecting wall unit with standard belt end, zinc, black

10. FEC to verify size/ length to site conditions

4.50 Item 47 – Cashier Station – One (1) Required

A. Custom Model by R & D Design size and shape as shown on drawing # 54373. Approximately 36” Wide X 60" Long X 33 ¼” High. (Cabinet to be made of metal frame construction all counters to have angle iron in all corners of the cabinet base for added structure Wood paneling to be a ¾” marine grade plywood with black laminated interior and back (operators’ side) provide a 4” base with plastic matching color toe kick for easy cleaning. Cabinet base to have a 3” overhang from toe kick. All cabinets to have dry storage compartments with locking hinged doors. All customer side openings will have a 4’ deep trim strip on base for step protection. Customer side (all exposed) laminate color selected by Architect The Royal Burgundy SP401-SD by Pionite and Verified by the FEC prior to ordering Operators side (all exposed) laminate to be color black. Provide a ½” inch solid surface top with color selection by Architect to be Corian Ash Aggregate and verified by the FEC prior to ordering. Countertop to have a 1- ½” inch turn down on all sides.

B. Provide coordinated trim strips at field joints and exposed corners (ends). As well as Inside cabinet bases provide a 4” deep stainless-steel protectors on the base of all cabinets.

C. A DBL Tray slides are to be solid surface material 12” wide by 34” high and the length of cabinet. (see layout drawings for shape) Provide tray slide with stainless steel runners (if needed at field joints provide a 1” break on either side to accommodate for field seaming of the tray slide) and custom brushed stainless-steel brackets (ADD IF NEED MITERED). (Color selection by Architect to be Corian Ash Aggregate and verified by FEC prior to ordering. Counters to be shipped in a maximin of 120” field verify number of pieces required. FEC to provide field seaming for countertops.

D. Cashier station to be provided with a tubular footrest and lockable cash drawer. Exterior cabinet receptacle (FOR ITEM # 42 ice cream merchandiser to be provided as shown on drawing. To be wired to a junction box.

E. All cabinets to be fully assembled in the factory to include any drop in food service equipment & breath protectors. All equipment to be inter-wired and inter-plumbed for final connections on site. The FEC will be responsible to fully seal any field MEP penetrations where rough ins do not coordinate with millwork.

F. All cabinets to be fully assembled in the factory to include any drop in food service equipment and breath guards.

1. R & D Designs will provide detailed step by step instructions and hardware on securing all cabinet field joints together. Cabinets at field joints must be completely secured prior to preforming seaming of counter tops.

2. All field joint seaming will be the responsibility of the FEC and will be performed by personnel that is experienced in the techniques and procedures to do so. The FEC will be required to conduct a site visit prior to release of this counter to determine the amount of field seams that will be required to place unit in location. FEC will need to minimize the number of field seams needed. The maximum length of counters by R & D Design will be 120". Any counters larger than 120" will need to be shipped disassembled and will be the responsibility of the FEC to assemble in the field.

3. CKC nor R & D will not allow any field penetrations in the base of their cabinet any field penetrations will void manufacture warranty. It will be the sole responsibility for the FEC to provide this warranty per contract documents. The FEC must field verify and coordinate with trades on site the pre engineer penetration locations provided by the manufacture will be used for all rough ins to final connections any adjustments required will need to be done Prior to manufacturing

4. All millwork cabinets are required to be completely level prior to bolting units together and seaming. Leveling to be done with the minimum amount of shimming possible. Excess shimming by the FEC can cause cracking in laminate and counter tops. If this is to be determined it will be the responsibility of the FEC to correct/repair these issues. All cove bases are not to be installed until after the punch list has been completed by CKC. FEC to adjust during installation any door cabinet that are not line up due to the shipping process, in not doing so could cause laminate to crack due to pinch point from door to cabinet, if this is determined to be the cause of any laminate issues it will be the responsibility of the FEC to correct not the manufacture

4.51 Item 48 – Panini Rapid Toasters (Future Item) – Two (2)

A. FUTURE ITEM Model TurboChef (Middleby) Model EL BANDIDO (I1 SOTA W/ PANINI PRESS) i1-9500-938 El Bandido Panini Press Oven, Rapid Cook, electric, countertop, externally actuated panini press mechanism, top-launched microwave system, external air filtration, LED timer, smart menu system, One Touch Controls, single or dual-temperature, built-in self diagnostics, smart voltage sensor technology (US only), includes: TurboChef Cleaner and Guard Starter Kit, includes (1) cleaner packet, (1) 24oz bottle, (1) aluminum paddle, (1) oven cleaner, (1) oven guard, (1) rear air filter, die-cast aluminum front panel, stainless steel interior, 4" adjustable legs, 6.2kW, cULus, CE, UL EPH Classified, TUV . Provide each with the following:

1. 1 ea. TurboChef (Middleby) Model MDD-1001 Open Kitchen bundle, includes - 1 x ConnectWare module, 1 x Secure Access Point (SAP), 3-year subscription for Open Kitchen (NET price displays when item is added to quote)

2. 1 ea. TurboChef (Middleby) One year parts and labor warranty

3. 1 ea. TurboChef (Middleby) 208/240v/60/1-ph, 30.0 amps, 6-foot cord (nominal), NEMA 6-30P, standard

4. 1 ea. TurboChef (Middleby) Color to be specified

4.52 Item 49 – Conveyor Toaster (Existing Item #E53 – Relocate) – One (1)

4.53 Item 50 – Sandwich Station – One (1) Required

A. Custom Model by R & D Design size and shape as shown on drawing # 46739 Approximately 36” Wide X 94-1/8" Long X 33 ¼” High.. Cabinet to be made of metal frame construction) all counters to have angle iron in all corners of the cabinet base for added structure Wood paneling to be a ¾” marine grade plywood with black laminated interior and back (operators’ side) provide a 4” base with plastic matching color toe kick for easy cleaning. Cabinet base to have a 3” overhang from toe kick. All cabinets to have dry storage compartments with locking hinged doors. All customer side openings will have a 4’ deep trim strip on base for step protection. Customer side (all exposed) laminate color to be selected by Architect to be The Royal Burgundy SP401-SD by Pionite and verified by the FEC prior to ordering. Operators side (all exposed) laminate to be color black. Provide a ½” inch solid surface top with color selection by Architect and coordinated by the FEC. Countertop to have a 1- ½” inch turn down on all sides. PROVIDE SIDE SPLASH WHERE COUNTER MEETS WALL/COUMN

B. Provide coordinated trim strips at field joints and exposed corners (ends). As well as Inside cabinet bases provide a 4” deep stainless-steel protectors on the base of all cabinets.

C. A 4 CM Tray slides are to be solid surface material 12” wide by 34” high and the length of cabinet. (see layout drawings for shape) Provide tray slide with stainless steel runners (if needed at field joints provide a 1” break on either side to accommodate for field seaming of the tray slide) and custom brushed stainless-steel brackets (ADD IF NEED MITERED). (Color selection by Architect to be Corian Ash Aggregate and verified by FEC prior to ordering. Counters to be shipped in a maximin of 120” field verify number of pieces required. FEC to provide field seaming for countertops.

D. Coordinate counter and countertop to surround sandwich prep unit Item #51, sandwich unit, 49 toaster & 48 future panni oven Provide receptacle in millwork wired to a junction box. All back and sides of surround to be fully enclosed using operator side color laminate finish.

E. Installation notes:

1. R & D to provide the following notes (starting w/design drawings)

2. R & D Designs to provide custom shop drawings for approval these drawings to include an equipment schedule, junction box and any drain locations for coordination. R & D Design and FEC to coordinate any required field joints. FEC to be responsible for any field seaming that may be required. Field joint/Seaming to be completed by experienced seaming employee.

3. All cabinets to be fully assembled in the factory to include any drop in food service equipment & breath protectors. All equipment to be inter-wired and inter-plumbed for final connections on site. The FEC will be responsible to fully seal any field MEP penetrations where rough ins do not coordinate with millwork.

4. All cabinets to be fully assembled in the factory to include any drop in food service equipment and breath guards.

5. R & D Designs will provide detailed step by step instructions and hardware on securing all cabinet field joints together. Cabinets at field joints must be completely secured prior to preforming seaming of counter tops.

6. All field joint seaming will be the responsibility of the FEC and will be performed by personnel that is experienced in the techniques and procedures to do so. The FEC will be required to conduct a site visit prior to release of this counter to determine the amount of field seams that will be required to place unit in location. FEC will need to minimize the number of field seams needed. The maximum length of counters by R & D Design will be 120". Any counters larger than 120" will need to be shipped disassembled and will be the responsibility of the FEC to assemble in the field.

7. CKC nor R & D will not allow any field penetrations in the base of their cabinet any field penetrations will void manufacture warranty. It will be the sole responsibility for the FEC to provide this warranty per contract documents. The FEC must field verify and coordinate with trades on site the pre engineer penetration locations provided by the manufacture will be used for all rough ins to final connections any adjustments required will need to be done Prior to manufacturing

8. All millwork cabinets are required to be completely level prior to bolting units together and seaming. Leveling to be done with the minimum amount of shimming possible. Excess shimming by the FEC can cause cracking in laminate and counter tops. If this is to be determined it will be the responsibility of the FEC to correct/repair these issues. All cove bases are not to be installed until after the punch list has been completed by CKC. FEC to adjust during installation any door cabinet that are not line up due to the shipping process, in not doing so could cause laminate to crack due to pinch point from door to cabinet, if this is determined to be the cause of any laminate issues it will be the responsibility of the FEC to correct not the manufacture.

4.54 Item 51 -Sandwich Make Up Unit – One (1) Required

A. Continental Refrigerator Model SW36N15M-FB Dimensions: 40.88(h) x 36(w) x 35(d) Mighty Top Sandwich Unit, front Breather, 36" W, two-section, (15) 1/6 size x 4" deep pans with 8" cutting board, (2) field rehingeable doors, stainless steel top, front & end panels, aluminum back & interior, 3-3/4" casters, rear mounted self-contained refrigeration, automatic hot gas condensate evaporator, R290 hydrocarbon refrigerant, 1/5 hp, cETLus, NSF. Provide with the following:

1. 1 ea. warranty 6-year parts and labor; additional 1 year compressor part
2. 1 ea. 115v/60/1-ph, 2.46 amps, cord, NEMA 5-15P, standard
3. 1 ea. Left Door hinged on left & right door hinged on right, standard
4. 1 ea. (00VL) Hood & lid with vision panel
5. 1 ea. Crumb catcher
6. 1 lot Cylinder lock (per door/drawer)

4.55 Item 52 – Heated Sandwich Slide – One (1) Required

A. Hatco Model HXMS-36D Dimensions: 32.71(h) x 39.9(w) x 28.13(d) Slant Heated Merchandiser with LED Lighting Warmer, 36" W, countertop, dual shelf, (14) divider rods, (3) bulbs per shelf, thermostat, infrared heat, hardcoat aluminum base, tempered side glass hinged to post. Provide with the following:

1. 1 ea. NOTE: Includes 24/7 parts & service assistance, call 414-671-6350
2. 1 ea. One-year on-site parts & labor warranty, plus one additional year parts only warranty on all Glo-Ray metal sheathed elements
3. 1 ea. 120/208v/60/1-ph, 2200 watts, 9.2 amps, NEMA L14-20P (domestic voltage), standard
4. 1 ea. Model BLACK Black, designer color (available at time of purchase only)
5. 1 ea. NOTE: Flip door not available for both front & rear configurations
6. 1 ea. NOTE: Flip door not available for both front & rear configurations
7. 6 ea. Model HZM-DIV Additional stainless steel divider rods

4.56 Item 53 -Breath Protector – One (1) Required

A. Premier Metal & Glass Model TM2N-A – Per Drawing # 54373 1" OD Gearless Adjustable Full Service Food Shield , Top Shelf And Rear Supports; 3/8" Clear Tempered Glass With Polished Edges And Radius Corners; Both End Panels Included (USP); 644b-3/1 Surface Mounting Option; Hatco GRNM Narrow Heat Lamp And Ultraslim Led Light In Complementary Colored Housing; Brushed Stainless Finish; Approx 59" Cl Length; Height 21-1/8" Approx 162 Lbs. Ea. (2 End Supports) BOXED end panel to protect item 55

1. FEC to ship unit to R & D Design for factory installation

4.57 Item 54 - Spare Number

4.58 Item 55 – Heated Pizza Shelf – One (1) Required

A. Hatco Model GRSB-54-I Dimensions: 2.88(h) x 55.5(w) x 21(d) Glo-Ray® Drop In Heated Shelf with Recessed Top, 55-1/2" x 21", 1/2" deep recessed surface area, hardcoat aluminum top, control thermostat, illuminated on/off switch & mounting bracket, NSF, CE, cUL, UL, UL EPH Classified, CSA. Provide with the following:

1. 1 ea. NOTE: Includes 24/7 parts & service assistance, call 414-671-6350

2. 1 ea. 1-Yr Warranty on Blanket Heating Elements against burnout, standard

3. 1 ea. 120v/60/1-ph, 1110 watts, 9.3 amps, NEMA 5-15P (domestic voltage), standard

4. 1 ea. NOTE: Recommended for use in metallic countertop, verify that the material is suitable for temperatures up to 200-degree F

5. 1 ea. Thermostat control with lighted rocker switch (available at time of purchase only), standard

6. FEC to ship unit to R & D Design for factory installation

4.59 Item 56 -Two Tier Hot/Cold Frost Top Unit – One (1) Required

A. Duke Manufacturing Model HF48-2-HFL-HFL Dimensions: 45.25(h) x 48.25(w) x 32(d) HotFrost™ Hot Frost Shelf Merchandiser, 2-tier hot/cold switchable food display, drop-in unit, 48"W x 32"D, fits (2) 18 x 13" pan per tier, individually controlled tiers, programmable color touch screen control, stainless steel body and shelves, self-contained refrigeration, 120-208v/60/1 phase, 1997 watts, 8.2 amps, NEMA L14-20P

1. FEC to ship unit to R & D Design for factory installation

4.60 Item 57 – Breath Protector – One (1) Required

A. Premier Metal & Glass Model TM2N-A - 1" OD Per Drawing #54373 Gearless Adjustable Full Service Food Shield , Top Shelf And Rear Supports; 3/8" Clear Tempered Glass With Polished Edges And Radius Corners; Both End Panels Included (USP); 644B-3/1 Surface Mounting Option; Hatco GRNM Narrow Heat Lamp And Ultraslim Led Light In Complementary Colored Housing; Brushed Stainless Finish; Approx 52" Cl Length; Height 21-1/8" Approx 162 Lbs. Ea. (2 End Supports)B OXED style end panels to protect item 58

1. FEC to ship to R & D for factory installation

4.61 Item 58 – 3 Well Hot/Cold Unit – One (1) Required

A. Duke Manufacturing Model HCF-3 Dimensions: 25.94(h) x 48.82(w) x 25.5(d) Hot/Cold/Freeze Drop-In Food Well Unit, heated & refrigerated, 49" long, (3) 12" x 20" individual pans, 300 series stainless steel top rim, 5" deep 300 series stainless steel interior liners, steel exterior housing, individual wired remote digital controls for hot or cold operation, air-cooled condensing unit, individual drains manifolded to a valve, 10" cord & plug, UL, cULus, NSF #4 & 7.

1. 1 ea. Model HCF-3-208 120/208v/60/1-ph, 11.0 amps, NEMA L14-20P

2. FEC to ship to R & D for factory installation

4.62 Item 59 – Hot/Cold Self-Service Station – One (1) Required

A. Custom Model by R & D Design size and shape as shown on drawing # 46739 Approximately 36” Wide X 216" Long X 33 ¼” High.. Cabinet to be made of metal frame construction all counters to have angle iron in all corners of the cabinet base for added structure Wood paneling to be a ¾” marine grade plywood with black laminated interior and back (operators’ side) provide a 4” base with plastic matching color toe kick for easy cleaning. Cabinet base to have a 3” overhang from toe kick. All cabinets to have dry storage compartments with locking hinged doors. All customer side openings will have a 4’ deep trim strip on base for step protection. Customer side (all exposed) laminate color to be selected by Architect to be The Royal Burgundy SP401-SD by Pionite and verified by the FEC prior to ordering. Operators side (all exposed) laminate to be color black. Provide a ½” inch solid surface top with color selection by Architect to be Corian Ash Aggregate and verified by the FEC prior to ordering . Countertop to have a 1- ½” inch turn down on all sides. Provide coordinated trim strips at field joints and exposed corners (ends). As well as Inside cabinet bases provide a 4” deep stainless-steel protectors on the base of all

cabinets.

B. A 4 CM Tray slides are to be solid surface material 12” wide by 34” high and the length of cabinet. (see layout drawings for shape) Provide tray slide with stainless steel runners (if needed at field joints provide a 1” break on either side to accommodate for field seaming of the tray slide) and custom brushed stainless-steel brackets (ADD IF NEED MITERED). (Color selection by Architect to be Corian Ash Aggerate and verified by FEC prior to ordering. Counters to be shipped in a maximin of 120” field verify number of pieces required. FEC to provide field seaming for countertops.

C. All drop-in equipment item 55 heated pizza shelf, item 56 hot cold unit item 58 hot cold unit to be shipped to R & D Designs by the FEC for factory installation. R & D Designs to provide proper insulation and ventilation using an insulated gasket and a coordinated color ventilation grill. Any controls behind ventilation grills to be hinged. All controls for drop-in equipment are to be mounted in cabinet back and easily accessible to operator. Drop in equipment to be wired to a junction box indicated on custom drawings. Drains will be accommodated by plumbing to floor.

D. Countertop equipment item 52 sandwich slide will be coordinated with R & D Design cord and plug penetration and grommet provided at solid surface as well as receptacle within cabinet base. Wired to junction box.

E. Breath guards to item 53 & 57 to be shipped to R & D Design for factory installation any heat and light controls to be located so that it will be easily accessible to operator.

F. R & D Designs to provide custom shop drawings for approval these drawings to include an equipment schedule, junction box and any drain locations for coordination. R & D Design and FEC to coordinate any required field joints. FEC to be responsible for any field seaming that may be required. Field joint/Seaming to be completed by experienced seaming employee.

G. All cabinets to be fully assembled in the factory to include any drop in food service equipment & breath protectors. All equipment to be inter-wired and inter-plumbed for final connections on site. The FEC will be responsible to fully seal any field MEP penetrations where rough ins do not coordinate with millwork.

H. All cabinets to be fully assembled in the factory to include any drop in food service equipment and breath guards.

1. R & D Designs will provide detailed step by step instructions and hardware on securing all cabinet field joints together. Cabinets at field joints must be completely secured prior to preforming seaming of counter tops.

2. All field joint seaming will be the responsibility of the FEC and will be performed by personnel that is experienced in the techniques and procedures to do so. The FEC will be required to conduct a site visit prior to

release of this counter to determine the amount of field seams that will be required to place unit in location. FEC will need to minimize the number of field seams needed. The maximum length of counters by R & D Design will be 120". Any counters larger than 120" will need to be shipped disassembled and will be the responsibility of the FEC to assemble in the field.

3. CKC nor R & D will not allow any field penetrations in the base of their cabinet any field penetrations will void manufacture warranty. It will be the sole responsibility for the FEC to provide this warranty per contract documents. The FEC must field verify and coordinate with trades on site the pre engineer penetration locations provided by the manufacture will be used for all rough ins to final connections any adjustments required will need to be done Prior to manufacturing

4. All millwork cabinets are required to be completely level prior to bolting units together and seaming. Leveling to be done with the minimum amount of shimming possible. Excess shimming by the FEC can cause cracking in laminate and counter tops. If this is to be determined it will be the responsibility of the FEC to correct/repair these issues. All cove bases are not to be installed until after the punch list has been completed by CKC. FEC to adjust during installation any door cabinet that are not line up due to the shipping process, in not doing so could cause laminate to crack due to pinch point from door to cabinet, if this is determined to be the cause of any laminate issues it will be the responsibility of the FEC to correct not the manufacture.

4.63 Item 60 -Two Door Victory Refrigerators (Existing Item #E12 & E27 – Relocate) – Two (2)

4.64 Item 61 – Food Processor (Existing Item #E36 – Relocate) – One (1)

4.65 Item 62 – Island Worktable – One (1) Required

A. Custom Model by Marlo/EMI size and shape as shown on drawing#24OS01. Approximately 60" X 138" X 34" high. Top to be constructed of a 14-gauge 304 stainless steel with S/S channel edge construction. "C" channel bracing cylindrical gussets and mastic sound deadening. 1 5/8" OD stainless legs adjustable s/s flanged front feet. 16-gauge under shelf the length of the table. Under Shelf to be welded to legs 10" AFF with S/S "C" Channel bracing.

B. Provide five (5) 20" X 20" stainless steel drawers as seen on drawing. Drawers to be double pan construction with HD S/S rollers bearing, integral pull handle, lock and cutting boards.

C. Provide THREE (3) GFI doghouse outlets mounted with in the back splash for Item # 67 & two convenience. 18-gauge S/S chase to run from tabletop connection to floor. Chase to have (2) removable access panels to provide access for connections. ID to be approximately 2" x 4" provide 4" x 6" end flanges at floor and table top connections. FEC to seal chase to floor

4.66 Item 63 – Spare Number

4.67 Item 64 – Worktable – One (1) Required

A. Custom Model by Marlo/EMI size and shape as shown on drawing#24OS01 Approximately 30" X 138" X 34" high. Top to be constructed of a 14-gauge 304 stainless steel with S/S channel edge construction. "C" channel bracing cylindrical gussets and mastic sound deadening. 6" back splash at 90 degree and ¾ turn down enclosed back and ends. 1 5/8" OD stainless legs adjustable s/s flanged front feet. 16-gauge under shelf the length of the table. Under Shelf to be welded to legs 10" AFF with S/S "C" Channel bracing. (excluding sink section)

B. Provide three (2) 20" X 20" stainless steel drawers as seen on drawing. Drawers to be double pan construction with HD S/S rollers bearing, integral pull handle, lock and cutting boards.

C. Provide 3 (three) GFI convenience outlets mounted with in the back splash for item #65 remaining for convenance. 18-gauge S/S chase to run from tabletop connection to floor. Chase to have (2) removable access panels to provide access for connections. ID to be approximately 2" x 4" provide 4" x 6" end flanges at floor and table top connections. FEC to seal chase to floor

D. Back-to-back tables to be provided with S/S back splash cap. Cap is to cover both splashes from 2 ½" radius to top on both sides and cover the end cap. Make cap in one piece. Coordinate with worktable #68

4.68 Item 65 – Coffee Maker – One (1) Required

A. BUNN Model 12950.0212 Dimensions: 17(h) x 16.5(w) x 17.7(d) 12950.0212 CWTF15-3 Coffee Brewer, automatic, with 3 lower warmers, brews 3.9 gallons per hour, hot water faucet, plastic funnel, pourover feature, stainless decor, 120v/60/1-ph, 13.9 amps, 1670 watts, cord attached, UL, NSF. Provide with the following:

1. 1 ea. Model 56000.0024 56000.0024 System, WEQ-10(1.5)5L
2. 1 ea. Model 56000.0121 56000.0121 Cartridge, WEQ-10(1.5)5L
3. 2 ea. Model 42400.0101 42400.0101 Decanter, 64 oz., glass, black handle (call for pricing on orders over 239 decanters)

4. 1 ea. Model 42401.0101 42401.0101 Decanter, 64 oz., glass, orange handle (call for pricing on orders over 239 decanters)

4.69 Item 66 – Spare Number

4.70 Item 67 – Microwave Oven (Existing Item #E25 – Relocate) – One (1)

4.71 Item 68 – Chef's Worktable w/Sink – One (1) Required

A. Custom Model by Marlo/EMI size and shape as shown on drawing#24OS01 Approximately 30" X 138" X 34" high. Top to be constructed of a 14-gauge 304 stainless steel with S/S channel edge construction. "C" channel bracing cylindrical gussets and mastic sound deadening. 6" back splash at 90 degree and ¾ turn down enclosed back and ends. 1 5/8" OD stainless legs adjustable s/s flanged front feet. 16-gauge under shelf the length of the table. Under Shelf to be welded to legs 10" AFF with S/S "C" Channel bracing. (excluding sink section)

B. Provide two (2) 20" X 20" stainless steel drawers as seen on drawing. Drawers to be double pan construction with HD S/S rollers bearing, integral pull handle, lock and cutting boards.

C. One (1) 20" x 20" X 10" deep coved construction prep sink with twist handle waste with bracket and overflow. S/S flanged feet at front legs. No under shelf at sink area.

D. Over prep sink area provide approximately 36" single line overhead pot/pan rack. 2" x 3/16" S/S flat bar welded to 1 5/8" OD S/S Tubular sleeves. Provide (6) six corrosion resistant s/s type pot hooks. For the remaining length of the table provide a single over shelf Mounted on 1 5/8" OD tubular uprights and cantilever brackets with concealed fasteners.

E. Single over shelf for the entire length of the table 12" wide X length of the table. 2" x 3/16" S/S flat bar welded to 1 5/8" OD S/S Tubular sleeves. To be constructed of a 16-gauge stainless.2" turn up at rear, 2" down bends at sides and front. Mounted on 1 5/8" OD tubular uprights and cantilever brackets with concealed fasteners. Extend over shelf to accommodate microwave item #67

F. Provide three (3) GFI convenience outlets mounted with in the back splash for item #67 & for convenience. 18-gauge S/S chase to run from tabletop connection to floor. Chase to have (2) removable access panels to provide access for connections. ID to be approximately 2" x 4" provide 4" x 6" end flanges at floor and table top connections. FEC to seal chase to floor

G. Back-to-back tables to be provided with S/S back splash cap. Cap is to cover both splashes from 2 ½" radius to top on both sides and cover the end cap. Make cap in one piece. Coordinate with worktable #64. Supply with the following:

1. 1 ea. T&S Brass Model B-0221-CR-KIT Pantry Faucet, double, deck mount, 8" deck mount mixing faucet with polished chrome plated brass body, 12" swing nozzle with stream regulator outlet, ceramic cartridges with check valves, lever handles, and 1/2" NPT female inlets, certified to ASME A112.18.1/CSA B125.1, NSF 61-Section 9 and NSF 372. Meets ADA ANSI/ICC A117.1 requirements

4.72 Item 69 – Exhaust Hood W/Supply Air – One (1) Required

A. Dimensions: As shown on Halton's Drawings# U24 - 660 (two section) with a typical hanging height of 6'-8" above finished floor. Hood controls to be remote and are to ship loose for installation in the field. FEC to coordinate location with Architect

1. Furnish and install a complete kitchen exhaust canopy with supply plenum. The hood shall be the "Capture-Jet" System #Q KVE-PSP SJ.

2. The installation shall be in accordance with the manufacturer's recommendations and the canopy exposed areas and inner liner shall be 18-gauge stainless steel with a #4 brushed finish, double shell end walls and face construction. Single wall construction will not be permitted. Hood shall be UL Listed and labeled for "zero clearance" at the end(s) of the hood as shown on drawings when mounted against a wall. Unexposed surfaces are 18-gauge stainless steel. The installation shall be in accordance with the manufacturer's recommendations and conform to NFPA-96 guidelines and all applicable local codes. The hood height shall not exceed 24"H. The overall lengths of the hoods shall be as indicated on drawings and/or equipment schedule. Use of Capture Walls to create a seal between cooking equipment and wall shall not be used as they require cooking equipment to be located further from wall reducing isle space. Bottom edge of hood front panels to be square, chamfered front shall not be allowed as they reduce front overhang and jeopardize capture and containment over tall cooking equipment. The use of S/S end panels or the installation of a s/s rear seal installed behind the cooking equipment shall not be permitted.

3. The hood shall be provided with a 24" wide PSP-Perforated Supply Plenum the entire length of the hood front as shown on drawings with a white powder coat finish to match the drop ceiling tiles in the kitchen. It shall provide a laminar flow down discharge through a perforated stainless steel plenum for introduction of makeup air at low velocity in front of the hood, as shown on plans. Discharge velocity shall not exceed 135 fpm through 28% perforated panel, nor affect the hood capture and containment.

4. The KVE hood combines Capture Jet technology, T.A.B. ports and KSA grease filters.

5. Hood will include an active internal “Capture-Jet” System that will allow for Capture and Containment of thermal plume at specified air volumes. The Capture Jet air shall be pulled into a 1” air plenum with the Capture-Jet fan and discharged through Capture-Jet ports that are located along the inside front, side and bottom edge of the hood at discharge velocity of 1800 FPM. Slot type, passive devices or “Short-Cycle” discharge is not acceptable. Include 12”W S/S Fire cabinet full depth of hood on the end of the hood as shown on drawings.

6. The hood shall be equipped with model KSA multi-cyclone stainless steel grease extractors. The grease extraction efficiency is 93% on particles with a diameter of 5 microns and 98% on particles with a diameter of 15 microns or larger, based upon ASTM F-2519-05 method of test. Sound levels shall be between 40 and 55 NC.

7. The air flows through the KSA extractors and the Capture Jet air chamber are to be determined through the integral T.A.B. (Testing and Balancing) ports mounted in the hood. It is the responsibility of the air balancer to adjust the exhaust volumes after installation with a Magnahelic Gauge or Shortridge Digital Anemometer and the hood TAB ports.

8. Each hood shall be equipped with Halton Culinary LED Lights (HCL). Constructed from stainless steel frame and Aluminum hosing, the light fitting comprises flush mounted broad beam spots with a diffusion angle of at least 80°. Each light is comprised of a patented mixing chamber and a specific reflector. Both shall provide a good balance between direct and diffuse light components without dazzling the staff to mitigate eye fatigue. The shielding angle shall exceed DIN 12464-1 requirement and be at least 30°. The illuminance on the working surfaces shall be 50-foot candles with a CRI Color Rendering Index greater than 80. The wattage per fixture will be 14W, and provide code required 50-foot candles at the cooking surface. The LED’s lifetime shall be 50,000 hours. The internal power supplies shall have at least the same lifetime. They shall enable switching on/off or dimming the light (0-100%) with one or several switches. The lights shall be supplied with vapor proof, grease proof, and heat proof UL-listed designed specifically for commercial kitchen hood application. All light fixtures shall be wired in a concealed manner to a junction box on top of the hood for connection to the remote wall mounted light switch. All wiring is in accordance with the National Electric Code (NFPA 70).

9. The Exhaust fan(s) will be controlled by the remote wall mounted fan switch panel that includes the light switch.

10. The exhaust airflow will be based on the convective heat generated by the appliances underneath each canopy. Submittal shall include convective heat calculations base on the input power of the appliance served as defined by ASTM Standards F-1704-05 Capture & Containment and F-2474-05 Heat Gain to Space. Final air volume calculations shall comply with the hood listing. The use of end panels or rear seals to achieve required airflows, are not acceptable.

11. Performance Criterion: Other manufacturers wishing to offer an alternate to the specified manufacturer must apply for permission to do so, in writing, from the office of the specifying consultant. The consultant must receive application at least ten working days prior to the bid date. Any alternate system must meet construction and performance requirements and efficiencies as outlined in this specification. Requests for approval must include grease filtration performance data (micron size vs. extraction) for mechanical extractor and manufacturer's own exhaust airflow calculations based on convective heat load of cooking equipment beneath the hood. Efficiency comparison data to be performed in accordance with ASTM Standard F1704-96 and include results for exhaust rate for capture and containment of convective plume, Temperature rise of exhaust air and Heat Gain to the space (kBtu/h). Make up air will be calculated so that the same amount of air will be taken from the zone as is required by the specified system. An additional load cannot be placed on the kitchen HVAC system. Manufacturer must provide a written guarantee of performance, ensuring the specifying consultant that the system will perform to the consultant's satisfaction when installed and balanced according to design airflows and results of ASTM Standard F1704-96 test. (As determined by TAB ports and pressure vs. air flow curves). Consultant reserves the right to reject any system which, when installed, does not perform to ASTM Standard F1704-96 for heat gain according to the specification. Rejected system must be replaced with specified system, with all replacement costs paid by manufacturer of rejected system. Any changes in the specified sizing of power wiring or gas lines due to the use of any system other than that which is specified is the responsibility of the alternate hood manufacturer and must be coordinated by the hood manufacturer and contractors involved.

12. Supply and install S/S closure panels around perimeter of hood to finished ceiling.

13. KSA Filter Removal Tool. FEC to mount in convenient location using wall bracket included

14. Pre-pipe fire suppression system.

15. Please Note: Field verify all collar locations with structure above prior to releasing the hood for fabrication.

16. Remote control panel (verify location)

4.73 Item 70 -Double Deck Half Size Combination Oven W/Water Filter – One (1) Required

A. RATIONAL Model ICP 6-HALF ON 6-HALF E 208/240V 3 PH-QS (Quick Ship) Two (2) (CB1ERRA.0000212) iCombi Pro® 6-Half Size Combi Ovens, double stack, electric, (12) 13" x 18" sheet pan or (12) 12" x 20" steam pan or (12) 1/1 GN pan capacity, intelligent cooking system with (4) assistants; iDensityControl,

iCookingSuite, iProductionManager, & iCareSystem, (6) operating modes, (5) cooking methods, (3) manual operating modes, 85° to 572°F temperature range, quick clean, care control, eco mode, 6-point core temperature probe, retractable hand shower, Ethernet interface, Wi-Fi enabled, 208/240v/60Hz/3-ph, 10.8 kW each, CE, IPX5, UL, cULus, NSF, ENERGY STAR-®. Provide with the following:

1. 1 ea. Model 60.73.991 Stacking Kit for Combi-Duo, iCombi 6-half size (electric or gas) on iCombi 6- or 10-half size (electric only)

2. 1 ea. 2 years parts and labor, 5 years steam generator warranty

3. 1 ea. Model CAP Chef Assistance Program, a RATIONAL certified Chef conducts 4 hours/location specialized application training with personnel, no charge. REQUIRED FEC TO COORDINATE

4. 2 ea. Model 9999.2252 RCI RATIONAL Certified Installation, new certified installation for each table-top iCombi of a combi-duo, 100 miles (200 round-trip) included. (See attached installation flyer for details) THIS ITEM IS NON-DISCOUNTABLE, USA ONLY (NET) REQUIRED FEC TO COORDINATE

5. 2 ea. Model 9999.2100 Commissioning iCombi Electric – for one(1) electric iCombi when not installed and commissioned by trained technicians. Includes 100 miles (200 miles round-trip). REQUIRED FEC TO COORDINATE

6. 2 ea. Model 8720.1551US Installation Kit, electric iCombi/SCC/CMP 102 (440/60Hz/3ph & 480/60Hz/3ph); electric iCombi/SCC/CMP 201 (440/60Hz/3pm & 480/60Hz/3ph); electric iCombi/SCC/CMP 61 (208/60Hz/1ph & 240/60Hz/1ph); electric iCombi/SCC/CMP 101 (208/60Hz/3ph & 240/6/3ph)

7. 2 ea. Model 1900.1159US Water Filtration Single Cartridge System, for any iVario, single Combi model, or XS or half-size Combi-Duos, includes: (1) single head with pressure gauge, R95-CLX filter & (1) filter installation kit

8. 1 ea. Model 9999.2271 RCI RATIONAL Certified Installation, additional installation cost for a RATIONAL Water Filter System is available when purchased with Certified Installation of RATIONAL unit

9. 1 ea. Note: The RATIONAL Water Filtration Systems helps provide consistent high-quality water to your RATIONAL cooking systems. The patented carbon block technology reduces the effects of sediment, chloramines, and chlorine while delivering the required flow rates.

10. 2 ea. Model 1900.1155US Water Filtration Cartridge, replacement or add on with additional Modular Head to Double Cartridge System, includes: (1) R95-CL filter. FEC is required to mount head so that staff can easily have access to filter change out

11. 2 ea. CDF Model DTV120-SV 3/4" Inlet Drain Tempering Valve Kit with brass fittings and double check valve 120 degree F set Point. Standard volume to be used to temper water below 140 degree at less than 25 GPH.

12. 2 ea. Model ICARESYSTEM AUTODOSE iCareSystem AutoDose, Integrated autonomous cleaning and storage system for iCombi Pro tabletop units. Uses RATIONAL Active Green and Care cartridges

13. 2 ea. Model 56.01.912 Active Green Cleaner Cartridges, iCombi Pro Table Top units with AutoDose option /6 cartridges per box (NET)

14. 2 ea. Model 56.01.914 Care Cartridges, iCombi Pro Table Top units with AutoDose option /6 cartridges per box (NET)

15. *FREE with 2024 RATIONAL K-12 School Promotion* FEC to order with oven NO charge to customer.
    a. 2 ea. Model 6010.1101 Gastronorm Grid Shelf, 1/1 size, 12-3/4" x 20-7/8", stainless steel
    b. 4 ea. Model 6019.1150 CombiFry Basket, 1/1 GN, 12-3/4" x 20-7/8"

4.74 Item 71 – Double Deck Convection Oven – One (1) Required

A. Blodgett (Middleby) Model MARK V-200 DBL Dimensions: 64.25(h) x 38.25(w) x 36.88(d) Convection Oven, electric, double-deck, bakery depth, capacity (5) 18" x 26" pans per compartment, (SSD) solid state digital controls, 2-speed fan, interior light, simultaneous operated doors with glass, stainless steel front, sides & top, vent connector, 6" stainless steel legs, vent connector, 11.0 kw each, 1/3 hp, cETL, CE, NSF, ENERGY STAR® Provide with the following:

1. 1 ea. 3 year parts, 2 year labor and 2 additional year door warranty (parts only),

2. 1 ea. Start-Up to be provided by authorized service agent

3. 2 ea. 208v/60/3-ph, 11.0 kW, 31.0 amps, direct (per deck),

4. 1 ea. Model SSD Top Oven: Solid State digital with Pulse Plus® and Cook & Hold

5. 1 ea. Model SSD Bottom Oven: Solid State digital with Pulse Plus® and Cook & Hold

6. 1 set 4" low profile plate casters (set)

7. 1 ea. NOTE: DO NOT deduct cost of standard legs

8. *FREE with 2024 RATIONAL K-12 School Promotion*

4.75 Item 72 – Spare Number

4.76 Item 73 – 2 Burner Range – One (1) Required

A. Vulcan Model EV12-2FP208 Dimensions: 37(h) x 12(w) x 34(d) Expando Range, electric, 12", (2) 2.0 kW 9-1/2" French plates, round, infinite controls, enclosed base, stainless steel front, sides, 10" riser, 6" legs, 208v, NSF, cULus. Provide with the following:

1. 1 ea. 1-year limited parts & labor warranty
2. 1 ea. K-12 School Nutrition extended warranty extends the warranty for 12 months beyond the 12-month Original Equipment Warranty, not to exceed 24 months from date of installation
3. 1 ea. 208v/50-60/3-ph, 4kW, 17.3 amps**, direct wire**, standard

4.77 Item 74 – Floor Trough – One (1) Required

A. IMC/Teddy Model ASFT-3030-SG Dimensions: 12.25(h) x 30(w) x 30(d)ASFT Anti-Spill Floor Trough, 30"W x 30"D, 6" deep receptacle, (1) 4" OD tailpiece, stainless steel beehive strainer, 14/304 stainless steel, brushed satin finish, (SG) subway grating, NSF, Made in USA

1. FEC is required to work with the PC in setting trough to hit the pour path for item 75 kettle

4.78 Item 75 – 40 Gallon Tilting Kettle – One (1) Required

A. Cleveland Range Model KEL40TSH Dimensions: 45(w) x 41.13(d) Short Series™ Steam Jacketed Kettle, electric, manual tilting, 40-gallon capacity, full steam jacket design, 316 stainless steel interior, 35" rim height, solid state water level control, open tri-leg base, 304 stainless steel construction, flanged feet, 50 psi rating, IPX6. Provide with the following:

1. 1 ea. 1-year parts & labor warranty, standard
2. 1 ea. Extended Warranty, not to exceed 36 months from date of installation (K-12 Schools only)
3. 1 ea. 10-Year Hemispheric Bottom Warranty (K-12 Schools only)
4. 1 ea. Performance start-up included FEC to coordinate
5. 1 ea. Standard wattage

6. 1 ea. 208v/60/3-ph, 14.7kW, 40.9 amps, standard

7. 1 ea. Standard Control Panel includes LED indicator for heat cycle & low water, Power ON/OFF Dial with 1-10 Temperature Dial Setting

8. 1 ea. Model TD2A90 2" tangent draw-off valve with ACME thread, 90° elbow, 8' length of 2" ID hose, hose clamp

9. 1 ea. NOTE: TD2A must be configured on kettle at time of purchase. It cannot be replaced, installed or retrofitted in the field.

10. 1 ea. Model CHS40ETSH Spring-assisted cover (40 gallon)

11. 1 ea. Model FS40SH Food Strainer, 40 gallon, for direct steam & electric short series kettles, stainless steel

12. 1 ea. Model PCK Pan Carrier, for all floor model kettles 25 gal & larger except KDM-25-T

13. 1 ea. Model KAK Kettle Accessory Kit, includes clean up brush, paddle, stainless steel whip, brush, draw-off brush, ladle

14. 1 ea. T&S Brass Model B-0176-ER Spray Assembly, single hole base, deck mount, 18" add-on swing faucet, spray valve, swivel adapter arm, vacuum breaker, quarter-turn Eterna cartridges, low lead

15. FEC TO COORDINATE THE MOUNTING OF THE T & S SPRAY HOSE WITH CLEVELAND

16. Training is required FEC to coordinate

4.79 Item 76 – Refrigerated Equipment Stand – One (1) Required

A. Continental Refrigerator Model D36GN Dimensions: 26.38(h) x 36(w) x 34.75(d) Refrigerator Griddle Stand, one-section, (2) drawers - accommodates (1) 12" x 20" x 6" & (1) 6" x 20" x 6", stainless steel top with drip guard marine edge, stainless steel exterior & interior, electronic control with digital display, hi-low alarm, high/low temperature alarm, self-contained refrigeration, R290 hydrocarbon refrigerant, 1/5 HP, 10' cord, cETLus, NSF, ENERGY STAR®. Provide with the following:

1. 1 ea. warranty 6-year parts and labor; additional 1 year compressor part

2. 1 ea. 115v/60/1-ph, 2.5 amps, cord, NEMA 5-15P, standard

3. 1 ea. Condensing unit on the right, s

4. 4 ea. Cylinder lock (per door/drawer)

5. 1 ea. Casters, 3" diameter, 4"H overall

6. 1 ea. Integral heat shield

4.80 Item 77 – 36” Griddle – One (1) Required

A. Vulcan Model HEG36E Dimensions: 15.3(h) x 36(w) x 31.5(d) Heavy Duty Griddle, electric, countertop, 36" W x 24" D cooking surface, 1/2" thick polished steel griddle plate, bottom mounted snap action thermostat every 12", low-profile, stainless-steel front, sides, front top ledge with "Cool Bullnose", front grease trough, 4" back & tapered side splashes, 4" adjustable legs, cCSAus, NSF. Provide with the following:

1. 1 ea. 1-year limited parts & labor warranty

2. 1 ea. K-12 School Nutrition extended warranty extends the warranty for 12 months beyond the 12-month Original Equipment Warranty, not to exceed 24 months from date of installation

3. 1 ea. 208v/60/3-ph, 16.2 kW, 45.0 amps

4.81 Item 78 – Pizza Conveyor Oven – One (1) Required

A. Lincoln Impinger Model 2500/1353 Dimensions: 18(h) x 35.4(w) x 31.4(d) Digital Countertop Impinger® (DCTI) Oven, electric, single stack, 20"W baking chamber, 31” conveyor (standard), adjustable conveyor speed from 30 seconds to 30 minutes, 200°F (93°C) to 600°F (316°C) temperature range, stainless steel exterior, 208/240/60/1-ph, 6.0kW, 27 amps, NEMA 6-50P, cULus, UL EPH Classified, CE. Provide with the following:

1. 1 ea. 18-month standard warranty, per oven

2. 1 ea. Model 1341 Exit Shelf, 12" length, removable (for Lincoln Impinger® Countertop Ovens)

3. 1 ea. Model 4805 Stand with bottom shelf & casters, for single & double stacking

4. FEC to coordinate training on unit by authorized service agent

4.82 Item 79 – Mobile Warming Cabinet (Existing From Elementary School – Relocate) – One (1)

4.83 Item 80 – Milk Cooler (existing from Elementary School – Relocate) – One (1)

4.84 Item 81 – Spare Number

4.85 Item 82 – 2 Well Coild Food Unit – One (1) Required

A. Piper Products/Servolift Eastern Model 2-BCM Per Drawing #7756 Dimensions: 36(h) x 32(w) x 28(d) Elite Cold Food Serving Counter, 32"L x 36"H, (2) pan size, 9-7/16" DP, mechanically cooled, mobile modular design with interlocking mech., 14 ga. stainless steel top, cabinet base, stainless steel front, end panels, louvered panel, undershelf & hinged doors, 5" casters, NSF, UL. MODIFIED TO 30" H. Provide with the following:

1. 1 ea. 1 year warranty parts and labor
2. 1 ea. All Elite 500 units, available in "Petite Elite" 30" high in lieu of standard height
3. 1 ea. 120v/60/1ph, 6.3 amps, NEMA 5-15P
4. 1 ea. Model FLP Filler Strips, for Elite systems
5. 1 ea. Model FRMAD-32 Formica laminate with doors, for Elite systems. The Royal Burgundy SP401-SD by Pionite FEC to verify color selection with Architect prior to ordering.
6. 1 ea. Model SCB-8-32 Cutting Board for Elite system, 8", for (2) openings - 32"W, stainless
7. 1 ea. Model SRTS-32-28" AFF Tray slide for Elite system, 12" solid ribbed, heavy gauge stainless steel, for (2) openings - 32"W. MOUNTED 28" AFF.
8. 1 ea. Model ME Mitered end for tray slide for Elite system
9. 1 ea. Model JC Unit to include 14 gauge stainless steel "J" channel cord chase to keep cords for interconnected wired units (IWU) off the floor
10. 1 ea. Model PG MOUNT Mounting of other manufacturer's sneeze guard.
11. ***ELECTRICAL TO EXIT OPERATOR RIGHT BACK LEG.***
12. Item 83 Premier guard to be provided by others and installed by Piper.

4.86 Item 83 – Breath Protector – One (1) Required

A. Premier Metal & Glass Model TMT2N-A - Per Drawing 54373- 1" OD Two Tier Gearless Adjustable Food Shield With Top Shelf, Rear Supports ; 3/8" Clear Tempered Glass With Polished Edges And Radius Corners; Both End Panels Included (Squared); 644b-3/1 Surface Mounting Option; No Heat/Light Included; Brushed Stainless Finish; Approx 29" Cl Length; Total Height 21" ; Approx 110 Lbs. Ea. (2 End Supports) BOXED end panels to protect item 82.

1. FEC to ship to Piper for factory installation

4.87 Item 84 – 4 Well Hot Food Unit – One (1) Required

A. Piper Products/Servolift Eastern Model 4-HF Per drawing #7756 Dimensions: 36(h) x 60(w) x 28(d) Elite 500 Hot Food Unit, electric, 60"L x 36"H, (4) sealed wells with 1000w element with thermostatically controlled each, mobile, modular design with interlocking mechanism, 14 gauge stainless steel top, 20 gauge stainless steel front & end panels, 18 gauge stainless steel bottom shelf, manifold drains standard, 5" swivel plate casters (2 with brakes), 4kW, NSF, UL. Provide with the following:

1. 1 ea. 1 year warranty parts and labor
2. 1 ea. 120v/60/1-ph, 33.3 amps, 4000 watts, NEMA 5-50P
3. 1 ea. Manifold drains, standard
4. 1 ea. Model FLP Filler Strips, for Elite systems
5. 1 ea. Model HD-60 Hinged doors for (4) openings Elite system
6. 1 ea. Model LD Locks, for doors for Elite system
7. 1 ea. Model FRMAD-60 Formica laminate with doors, for Elite systems The Royal Burgundy SP401-SD by Pionite FEC to verify color selection with Architect
8. 1 ea. Model SCB-8-60 Cutting Board for Elite system, 8", for (4) openings - 60"W, stainless
9. 1 ea. Model SRTS-60-28" AFF Tray slide for Elite system, 12" solid ribbed, heavy gauge stainless steel, for (4) openings - 60"W. MOUNTED AT 28" AFF.
10. 1 ea. Model JC Unit to include 14 gauge stainless steel "J" channel cord chase to keep cords for interconnected wired units (IWU) off the floor
11. 1 ea. Model PG MOUNT Mounting of other manufacturer's sneeze guard.
12. ***ELECTRICAL TO EXIT OPERATOR RIGHT BACK LEG.***
13. Item 85 Premier guard to be provided by FEC and installed by Piper.
14. 2 ea. Model TURN DOWN Modified turn down with special interlocks to connect 2 different height counters.

4.88 Item 85 – Breath Protector – One (1) Required

A. F. Premier Metal & Glass Model TM2N-A - Per Drawing 54373 1" OD Gearless Adjustable Food Shield With Top Shelf, Rear Supports; 3/8" Clear Tempered Glass With Polished Edges And Radius Corners; Both End Panels Included (USP); 644b-3/1 Surface Mounting Option; No Heat/Light Included; Brushed Stainless Finish; Approx 57" Cl Length; Approx 164 Lbs. Ea. (2 End Supports) BOXED end panels to protect item 84.

1. FEC to ship to Piper for factory installation

4.89 Item 86 – Solid Top Unit – One (1) Required

A. Piper Products/Servolift Eastern Model 6-ST-MOD Per Drawing #7756 Dimensions: 36(h) x 88(w) x 28(d) Elite Utility Serving Counter, 88"L x 30"H, mobile modular design with interlocking mech., 14-gauge stainless steel top, 20 gauge stainless steel front & end panels, 18 gauge stainless steel undershelf, 5" casters, NSF. MODIFIED TO 30"W TO ACCOMMODATE DROP-IN. Provide with the following:

1. 1 ea. 1 year warranty parts and labor
2. 1 ea. "Petite Elite" 30" high in lieu of standard height
3. 1 ea. Model FLP Filler Strips, for Elite systems
4. 1 ea. Model HD-88 Hinged doors for (6) openings Elite system
5. 1 ea. Model LD Locks, for doors for Elite system
6. 1 ea. Model FRMAD-88 Formica laminate with doors, for Elite systems. The Royal Burgundy SP401-SD by Pionite FEC to verify color selection with Architect prior to ordering
7. 1 ea. Model SCB-8-88 Cutting Board for Elite system, 8", for (6) openings - 88"W, stainless
8. 1 ea. Model SRTS-88-28" AFF Tray slide for Elite system, 12" solid ribbed, heavy gauge stainless steel, for (6) openings - 88"W. MOUNTED AT 28" AFF.
9. 1 ea. Model JC Unit to include 14-gauge stainless steel "J" channel cord chase to keep cords for interconnected wired units (IWU) off the floor
10. 1 ea. Model INSTALL PACKAGE INSTALL PACKAGE - to include cut-out in the countertop, install for the drop-in provided by others, electrical hook-up, reinforced top, and louvered panels if required. ***Drop-in to be provided by this contractor.***
11. Item 87 Hatco FTBP-2 to be provided by FEC and installed by Piper.

12. 1 ea. Model PG MOUNT Mounting of other manufacturer's sneeze guard.

13. ***ELECTRICAL TO EXIT OPERATOR RIGHT BACK LEG.***

14. Item 88 Premier guard to be provided by FEC and installed by Piper.

4.90 Item 87 – Frost Top – One (1) Required

A. Hatco Model FTBP-2 Dimensions: 17.21(h) x 39(w) x 28.94(d) Drop-In Frost Top, 39"L, accommodates (2) full size sheet pan, lighted on/off rocker switch, electronic adjustable temperature control can be mounted to either side of condensing unit or remotely up to 4' from unit, auto-defrost, self-contained refrigeration, R-290, 1/4 HP, cULus, Made in USA . Provide with the following:

1. 1 ea. NOTE: Includes 24/7 parts & service assistance, call 414-671-6350

2. 1 ea. One-year parts only warranty, standard

3. 1 ea. 120v/60/1-ph, 345 watts, 1/5 HP (domestic voltage) standard

4. FEC to ship to Piper for factory installation

4.91 Item 88 – Breath Protector – One (1) Required

A. Premier Metal & Glass Model TMT2N-A - Per Drawing 5437311" OD Two Tier Gearless Adjustable Food Shield With Top Shelf, Rear Supports ; 3/8" Clear Tempered Glass With Polished Edges And Radius Corners; Both End Panels Included (Squared); 644b Surface Mounting Option; No Heat/Light Included; Brushed Stainless Finish; Approx 43" Cl Length; Total Height 21" ; Approx 110 Lbs. Ea. (2 End Supports) BOXED end panels to protect item 87

1. FEC to ship to Piper for factory installation

4.92 Item 89 – Heated Shelf (Existing Item #E45 – Relocate) – One (1)

4.93 Item 90 – Spare Number

4.94 Item 91 - Solid Top Unit – One (1) Required

A. Piper Products/Servolift Eastern Model 3-ST Per drawing #7756 Dimensions: 36(h) x 46(w) x 28(d) Elite Utility Serving Counter, 46"L x 30"H, mobile modular design with interlocking mech., 14-gauge stainless steel top, 20 gauge stainless steel front & end panels, 18 gauge stainless steel undershelf, 5" casters, NSF. Provide with the following:

1. 1 ea. 1 year warranty parts and labor
2. 1 ea. "Petite Elite" 30" high in lieu of standard height
3. 1 ea. Model FLP Filler Strips, for Elite systems
4. 1 ea. Model HD-46 Hinged doors for (3) openings Elite system
5. 1 ea. Model LD Locks, for doors for Elite system
6. 1 ea. Model FRMA-46 Formica laminate without doors, for Elite systems. The Royal Burgundy SP401-SD by Pionite. FEC to verify color selection with Architect prior to ordering
7. 1 ea. Model SRTS-46-28" AFF Tray slide for Elite system, 12" solid ribbed, heavy gauge stainless steel, for (3) openings - 46"W. MOUNTED AT 28" AFF.
8. 1 ea. Model JC Unit to include 14-gauge stainless steel "J" channel cord chase to keep cords for interconnected wired units (IWU) off the floor
9. provide power for item 89 and penetration with grommet

4.95 Item 92- Spare Number

4.96 Item 93 - Cash Register (Existing From Elementary School – Relocate) – One (1)

4.97 Item 94 – Cashier Station - One (1) Required

A. Piper Products/Servolift Eastern Model 2-CD Per drawing # 7756 Dimensions: 36(h) x 30(w) x 28(d) Elite Cashier's Serving Counter, 30"L x 36"H, mobile modular design with interlocking mech., 14-gauge stainless steel top with register cord hole, locking drawer, 20 gauge stainless steel front & end panels, 5" casters. Provide with the following:

1. 1 ea. 1 year warranty parts and labor
2. 1 ea. Model FLP Filler Strips, for Elite systems

3. 1 ea. Model TFR Tubular foot rest-cashier unit, Elite systems

4. 1 ea. Model FRMA-30 Formica laminate without doors, for Elite systems The Royal Burgundy SP401-SD by Pionite. FEC to verify color selection with Architect prior to ordering

5. 1 ea. Model SRTS-30-28" AFF Tray slide for Elite system, 12" solid ribbed, heavy gauge stainless steel, for (2) openings - 30"W. MOUNTED AT 28" AFF.

6. 1 ea. Model JC Unit to include 14 gauge stainless steel "J" channel cord chase to keep cords for interconnected wired units (IWU) off the floor

7. 1 ea. Model TURN DOWN Modified turn down with special interlocks to connect 2 different height counters.

4.98 Item 95 – Railing (By GC) – One Lot (1 Lot)

4.99 EXISTING EQUIPMENT REMOVALS:

A. It is the responsibility of this contractor to fully remove existing equipment being replaced with new. Including exhaust hoods, walk-ins and refrigeration components. Refer to 3.3 of this specification for existing equipment requirements.

1. **FEC will be required to remove and reinstall all existing equipment due to new floors, walls and ceilings be replaced on this project. It will be this contractor's responsibility to store all existing equipment to be reused in a safe location so that no damage occurs to this equipment. To be coordinated with CM/GC on site.**

2. FEC to provide list to owner for sign off on all equipment being removed and disposed of prior to removing from building.

3. It is the responsibility of this contractor to fully remove existing walk-ins and all /any refrigeration systems not listed as existing and remains on contract documents and written specifications.

4.100 Existing Conditions:

A. It is the responsibility of this contractor to fully review the existing conditions of the building and the new kitchen location. This contractor shall be familiar with access to the kitchen location, including equipment access by elevators, stairwells, corridors, openings, including access around the exterior of the building for a crane or hoisting equipment (if required). It will be the responsibility of this contractor to coordinate equipment installation with the owner, CM, GC, etc.

4.101 Reused Existing Equipment

A. This Kitchen Equipment Contractor (KEC) shall be responsible for identifying, tagging and/or removing all existing equipment, which will be reused. Verify and coordinate specific equipment with these plans and specifications, and the Owner. This shall include items existing, and the associated work necessary, at the time of the signing of the Contract for the Foodservice Equipment section; and shall not include any item(s) added, changed, or damaged (by other than the Kitchen Equipment Contractor (KEC)) after the signing; except to the extent of work which would have been included with the original existing item(s).

B. Remove from existing locations, clean and renovate as noted below, store and re-install existing equipment to be reused, in the new locations as shown on plans; ready for utility connections, as appropriate. Existing equipment to be reused, with utility connections, shall be removed after disconnection as noted in below paragraph.

C. Do work in cooperation with Owner, so that normal functioning of services is minimally interrupted. Coordinate all removal and replacement scheduling with the Construction Scheduling Manager (or similar responsible party), to ensure adequate time to complete the necessary work. If adequate time to properly relocate and reset the existing items and complete all cleaning and repair will not be available, due to continuing use of the existing item(s), or the allotted construction time; contact the Owner and obtain a written agreement as to what work is to be deleted or delayed; such as cleaning, repainting, or repairs.

D. All surface dirt, grease, oil, food residues, ingredients, extraneous matter and other soiling materials shall be removed in order to obtain minimum acceptable sanitation and food service standards. Thorough, final rinsing of all cleaning agents shall be at a minimum temperature of 180 degrees F where possible without damage to equipment or controls. Otherwise, use USDA approved cleaning agents and/or cleaning agents, which are acceptable for use with commercial food service equipment. This shall include all exterior surfaces of the existing equipment to be reused, and interior work surfaces such as inside oven compartments, fryer vats, ware washers, etc.

E. All painted items with major paint blemishes shall be sanded, primed, and repainted to match the original color and type paint. Primer and paint shall be of a type approved for use with commercial food service equipment. All controls, lights, view windows, non-painted parts, etc. shall be protected as recommended by the Manufacturer. Minor paint blemishes shall be touched-up in a professional manner. This work shall be included in the Bid Submittal, as a separate line cost, at the end of the Bid Submittal.

F. Replace or repair minor broken parts to produce a cleanable and functional item, where possible. Repairs and/or parts shall be for minor required items such as control knobs, handles, pilot lamps, belts, oil changes, minor adjustments and recalibrations, etc. This shall not include addition or replacement of any wearing components such as cutters, blades, etc.; or any accessory components such as mixer beaters, hooks, whips, etc., except for presently existing accessory components which are broken and nonfunctional, or as noted in the itemized specifications.

4.102 Plumbing of Equipment

A. The plumbing and food service equipment contractors are to comply with 1370-a and 1110, Subpart 67-4 of Title 10 (Health) of the Official Compilation of Codes, Rules and Regulations of the State of New York. All outlet fixtures used for drinking or cooking shall be tested by Owner prior to being put into service. All test results in exceedance of the action level shall require the fixture to be replaced until satisfactory test results are obtained at no additional cost to Owner."

PART 5 - DETAILS OF CONSTRUCTION

5.1 DETAIL DRAWINGS

A. The following details are a part of these specifications and shall be referred to for additional design requirements:

HH-FS100, FS101, FS102, FS103, FS104, FS105, FS106, FS107, FS108 & FS109

END OF SECTION

DIVISION 12 - FURNISHINGS

SECTION 12 24 94

ROLLER SHADES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Manually operated shades.

1.2 SUBMITTALS

A. Product Data: Provide description of shade material, construction, and function.

B. Shop Drawings: Show location and extent of roller shades. Include elevations, sections, details and dimensions not shown in Product Data.

C. Samples: Submit two fabric samples, 4 x 4 inch in size, illustrating material and color.

D. Maintenance Data: For roller shade to include in maintenance manuals. Include the following:

1. Methods for maintaining roller shades and finishes.

2. Operating hardware

1.3 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed installation of roller shades in similar extent to that indicated for this project and whose work has resulted in a successful in-service performance.

B. Mockups

1. Provide one mock-up, standard classroom window size, illustrating operation and light blocking capability.

2. Locate where directed.

3. Approved mock-up may remain as part of the Work.

C. Source Limitations: Obtain Roller shades through one source from a single manufacturer.

D. Fire-Test-Response Characteristics; Provide roller shade band materials with the fire- test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:

1. Flame-Resistance Rating: Passes NFPA 701.

1.4 DELIVERY, STORAGE, AND PROTECTION

A. Deliver shades to project site in manufacturer's standard protective shipping containers.

B. Store shades under cover and elevated above grade.

1.5 PROJECT CONDITIONS

A. Environmental Limitations: Do not install roller shades until construction and wet and dirty finish work is spaces, including painting, is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearance for operable glazed units' operation hardware throughout the entire operating range. Notify Architect of discrepancies. Coordinate fabrication schedule with construction progress to avoid delaying the work.

1.6 EXTRA MATERIALS

A. Supply one shade of each size for Owner's use in maintenance of project.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Shades:

1. Clutch Operated FlexShade by Draper.
   a. Fabric: SunBloc Series SB9000/9100 Opaque

2. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 SHADE MATERIALS

A. Shade Material –Opaque: Close-woven fiberglass between two layers of flexible vinyl.

1. Composition 25% fiberglass; 75% PVC coating.

2. Weight/su. Yar: 12 oz.

3. Color: As selected by Architect from manufacturer's full range.

4. Openness: Opaque.

5. Fire Rating: NFPA-701-1999 TM#1 (small scale) NFPA 101 (Class A Rating), UBC (Class 1), ASTM-G21 and STTM-G22.

6. Bacterial and Fungal Resistance: ASTM G 21 and ASTM 1428 Certified

7. VOC Emissions: GREENGUARD Children & Schools certified as a low emitting fabric. Manufacturer to supply GREENGUARD Children & Schools certificate.

8. Sizes available: 72" and 120" roll widths.

9. Product: Basis of Design- Sunbloc series SB9000/ SB9100 (duopak / duplex)

2.3 FABRICATION ROLLER SHADE

A. Product Description: Manually Operated Window Shades with Independent Control: Manually operated, vertical roll-up, fabric window shade with components necessary for complete installation.

1. Provide Manual Clutch-Operated FlexShade by Draper or equal.

B. Components: Noncorrosive, self-lubricating materials.

C. Rollers Tube: Fabricated from extruded aluminum, galvanized steel, or enameled steel. Diameter, wall thickness, and material selected by manufacturer to accommodate shade type and size. Fabric connected to the roller tube with LSE (low surface energy) double sided adhesive specifically developed to attach coated textiles to metal. Adhesive attachment to eliminate horizontal impressions in fabric.

D. Direction of Roll: Regular, from back of roller.

E. Shade units installed above ceiling: Provide extruded aluminum pocket-style headbox with endcaps and mounting hardware.

1. Mounting Brackets: Galvanized or zinc-plated steel, style for ceiling recessed mounting unless otherwise indicated.

2. Endcaps: Stamped steel with universal. Endcap covers: To match fascia or head box color.

F. Bottom Bar: Steel or extruded aluminum, with plastic or metal capped ends. Provide concealed, by pocket of shade material, internal-type bottom bar with concealed weight bar as required for smooth, properly balanced shade operation.

G. Shade Operation: Manual; with continuous loop bead chain, clutch, and cord tensioner hold down device and bracket lift operator.

1. Position of Clutch Operator: Right side of roller, as determined by hand of user facing shade from inside, unless otherwise indicated on Drawings.

2. Clutch mechanism: Fabricated from high carbon steel and molded fiberglass reinforced polyester or injected molded nylon. White or Black color as selected by Architect

3. Loop Length: Length required to make operation convenient from floor level

4. Bead Chain: Stainless steel. Manually operated bead chain/clutch system.

H. Shade Units: Obtain units fabricated in sizes to fill window and other openings as follows, measured at 74 degrees F (23 degrees C):

1. Edge of shade shall not be more than 1/4 inch (6 mm) from face of jamb. Length equal to head to sill dimension of opening in which each shade is installed.

I. Installation Fasteners: Fabricated from metal that is noncorrosive to shade hardware and adjoining construction and to support shades as required by manufacturer's written instructions.

J. Color-Coated Finish: For metal components exposed to view, apply manufacturer's standard baked finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness.

K. Colors of Metal and Plastic Components Exposed to View: As selected by Architect from manufacturer's full range unless otherwise indicated.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that areas are completed and ready for shades.

B. Verify that openings are ready to receive the Work.

C. Ensure structural blocking and supports are correctly placed.

3.2 INSTALLATION

A. Install shades in accordance with manufacturer's instructions.

B. Size each unit to fit window, and seal against light.

C. Attach Rescue Window Label to each unit that is located at a Rescue Window.

1. Sticker to have black lettering on bright yellow background.

2. Sticker size to be 5” wide x 3” high.

D. Locate space at multiple unit assemblies to occur at window mullions.

E. Refer to floorplans for installation locations.

3.3 ADJUSTING

A. Adjust units for smooth operation free from binding throughout entire operational range.

3.4 CLEANING

A. Clean as recommended by manufacturer.

B. Do not permit use of shades or blinds prior to Substantial Completion.

END OF SECTION

SECTION 12 34 00

PLASTIC LAMINATE-FACED CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Countertops.

B. Cabinet hardware.

C. Prefinished surfaces.

D. Preparation for installing utilities.

E. Furnish and install high-pressure laminate casework and accessories as shown and listed on drawings and specified herein. Include all countertops, sink cutouts, splashes, supports, shelving, and filler panels necessary for a complete casework installation.

F. The Casework Contractor shall verify all critical building dimensions prior to fabrication of casework. The Casework Manufacturer shall re-engineer the casework arrangements to dimensions requiring 2-1/2" or less of filler at each end of wall to wall elevations, and to ensure a complete and satisfactory installation.

G. Provide all labor for unloading, distribution, and installation of casework and related items as specified.

1.02 REFERENCES

A. AWI (Architectural Woodwork Institute) - Quality Standards. Section 1600 “Modular Casework.”

B. BHMA A156.9 - Cabinet Hardware.

C. FS MMM-A-130 - Adhesive, Contact.

D. HPMA (Hardwood Plywood Manufacturer's Association) HP - American Standard for Hardwood and Decorative Plywood.

E. NEMA (National Electric Manufacturers Association) LD3 - High Pressure Decorative Laminates.

F. NHLA (National Hardwood Lumber Association).

G. PS 1 - Construction and Industrial Plywood.

H. PS 20 - American Softwood Lumber Standard.

I. ANSI-A135: for all hardboard.

J. ANSI-A161.2-1998: for performance of fabricated high-pressure decorative laminate countertops.

K. ANSI-A208.1-2016: for grade M-3i mat-formed wood particleboard.

L. SEFA 8PL Recommended Practices: for cabinet construction.

M. AWS: American Woodworking Standards, Edition 2.

1.03 RELATED REQUIREMENTS PERFOMED BY OTHERS

A. Division 06 Section: “Miscellaneous Rough Carpentry” for blocking within walls to adequately support casework.

B. Division 07 Section: “Joint Sealants” for caulking of casework and/or countertops to abutting walls.

C. Division 08 Section: “Door Hardware” for cabinet locks keyed or master keyed to building locks.

D. Division 09 Section: “Resilient Flooring” for resilient base applied to manufactured casework.

E. Division 22 Section: “Plumbing” for furnishing, installation, and hook-up of sinks, fixtures, outlets, strainers, tailpieces, traps, vacuum breakers, and stops shall be performed by the plumbing contractor to state and local codes. In all cases, sink cutouts shall be by the casework contractor.

F. Division 23 Section: “Heating, Ventilating, and Air-Conditioning” for furnishings, installation, and final connections of all ductwork to range hoods shall be by the HVAC contractor.

G. Division 26 Section: “Electrical” for the electrical contractor to state and local codes shall perform electrical furnishing, installation, and final connections of wiring, conduit, and/or electrical items within casework.

1.04 SUBMITTALS FOR REVIEW

A. Section 01 30 00 - Submittals: Procedures for submittals.

B. Product data for each type of product and process specified and incorporated into items of architectural woodwork during fabrication, finishing, and installation.

C. Shop drawings showing location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

1. Show details full size.

2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcing specified in other Sections.

3. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, and other items installed in architectural woodwork.

D. Samples for initial selection of the following in the form of manufacturer's color charts consisting of actual units or sections of units showing the full range of colors, textures, and patterns available for each type of material indicated.

1. Plastic laminates.

E. Samples for verification of the following:

1. Laminate-clad panel products, 8 by 10 inches (200 by 250 mm), for each type, color, pattern, and surface finish, with separate samples of unfaced panel product used for core.

2. Corner pieces as follows:
   a. Cabinet joinery same showing details and style of joinery between end panels and horizontal members.

3. Exposed cabinet hardware, two units for each type and finish.

F. Product certificates signed by casework fabricator certifying that products comply with specified requirements.

G. 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.

1.05 QUALITY ASSURANCE

A. Fabricator Qualifications: Firm experienced in producing manufactured casework similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units without delaying the Work.

B. Installer Qualifications: Arrange for manufactured casework installation by a firm that can demonstrate successful experience in installing architectural woodwork items similar in type and quality to those required for this Project.

C. Single-Source Responsibility for Fabrication and Installation: Engage a qualified casework manufacturing firm to assume undivided responsibility for fabricating, finishing, and installing casework specified in this Section.

D. Quality Standard: Except as otherwise indicated, comply with the following standard:

1. AWI Quality Standard: "Architectural Woodwork Quality Standards" of the Architectural Woodwork Institute Section 1600 for grades, construction, finishes, and other requirements.
   a. Provide AWI Certification Labels or Certificates of Compliance indicating that casework meets requirements of grade 1600 specified.
   b. Provide AWI Certified Compliance Certificate for Installation.
   c. Mark one unit of each elevation of casework and plastic-laminate countertop with AWI Certified Compliance Label indicating quality grade required.

2. The Contract Documents contain selections chosen from options in the Quality Standard as well as additional requirements beyond those of the Quality Standard. Comply with such selections and requirements in addition to the Quality Standard.

1.06 REQUIREMENTS FOR PLASTIC LAMINATES AND PLASTICS

A. Plastic laminate utilized in components of this section shall meet the following requirements:

1. Class A or B Finish for all high pressure decorative laminate to be utilized in kitchens, storerooms, maintenance or repair areas, places of assembly or on a stage; flame spread of 0-25, for Class A Finish, flame spread of 25-75 for Class B Finish, per ASTM E-84, NFPA-255 or UL-723.

2. Class C Finish shall be used in all other spaces; flame spread of 76-200 per ASTM E-84, NFPA-255 or UL-723.

3. Under no circumstances shall any material having a smoke developed rating of 450 or more be utilized anywhere in the building. Smoke developed ratings shall be determined per ASTM E-84.

B. Plastics utilized in components of this section shall meet the following requirements:

1. Flame spread rating of any plastic components shall be 0 – 25 per ASTM E84.

2. Smoke developed rating of any plastic components shall be less than or equal to 450 per ASTM E84.

3. Smoke density rating of any plastic components shall be less than or equal to 75 per ASTM D2843.

4. The burning rate of any plastic components shall be less than or equal to 2.5 CM/Min per ASTM D635.

5. The self-ignition temperature for any plastic components shall be less than or equal to 600ºF per ASTM D1229.

C. Fire rated plastic laminate and backer board. For use in corridors. Fire-Rated Laminate shall offer a Class I or A fire rating. Fire-retardant adhesives and substrates must be used.

1. General Fire Code Compliance Test data for code compliance is from the UL 723 Tunnel Test method. This procedure has been cataloged under the following designations: American Society for Testing Materials ASTM E 84 American Society for Testing Materials ASTM E 162 American Society for Testing Materials ASTM E 662 American National Standards Institute ANSI No. 2.5 National Fire Protection Agency NFPA No. 255 Underwriters Laboratories, Inc. UL No. 723

1.07 DELIVERY, STORAGE, AND PROTECTION

A. Section 01 60 00 – Product Requirements: Transport, handle, store, and protect products.

B. Protect casework during transit, delivery, storage, and handling to prevent damage, spoilage, and deterioration.

C. Do not deliver casework until painting and similar operations that could damage, soil, or deteriorate casework have been completed in installation areas. If casework must be stored in other than installation areas, store only in areas whose environmental conditions meet requirements specified in "Project Conditions."

1.08 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 – Product Requirements: Environmental conditions affecting products on site.

B. Environmental Limitations: Do not deliver or install casework until building is enclosed, wet-work is completed, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

C. Environmental Limitations: Obtain and comply with casework fabricator's and Installer's coordinated advice for optimum temperature and humidity conditions for casework during its storage and installation. Do not install casework until these conditions have been attained and stabilized so that casework will be within plus or minus 1.0 percent of optimum moisture content from date of installation through remainder of construction period.

D. Field Measurements: Where casework is indicated to be fitted to other construction, check actual dimensions of other construction by accurate field measurements before fabrication, and show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Verify locations of concealed framing, blocking, reinforcements, and furring that support casework by accurate field measurements before being enclosed. Record measurements on final shop drawings.

2. Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabricating casework without field measurements. Provide allowance for fillers at site and coordinate construction to ensure that actual dimensions correspond to guaranteed dimensions.

1.09 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that manufactured casework can be supported and installed as indicated.

B. Coordinate with electrical and plumbing contractors to ensure accurate location of services.

1.10 WARRANTY

A. The casework manufacturer and contractor shall guarantee casework materials and workmanship for three years from the date of installation. Defects reported within the guarantee period shall be corrected without charge and shall be warranted against structural failure (of the cabinet body) for a period of ten years from the date of installation. Accessories provided as part of this work shall be guaranteed for one year from the date of installation (sinks, fittings, apparatus, countertops, etc.).

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers:

1. Case Systems, Case System I.

2. Equivalents: Refer to Document 00 21 13.

2.02 MATERIALS

A. Exterior Vertical Surfaces:

1. All door and drawer fronts, finished end panels, and exposed exterior backs shall be surfaces with .028 inch thick high-pressure decorative laminate conforming to NEMA Standard LD3-1995, GP-28.

2. High Pressure Laminate is available in non-premium, non-specialty and manufacturers' standard suede finishes from our select laminate manufacturers, including:

3. Standard: Wilsonart® in a "60" or "38" matte finish and Standard: Nevamar® in a "T" textured finish and Standard: Formica in a "58" finish and Standard: Pionite in an "SD" finish. Other manufacturer finishes are available with additional cost and longer lead times.

4. Color: Up to (4) cabinet and (4) Countertop colors per building.

5. All exterior vertical high-pressure laminate panels shall be balanced with textured .020 inch thick high-pressure cabinet liner conforming to NEMA Standard LD3-1985, CL-20.

6. All exterior vertical panels to be laminated using a PVA adhesive and a cold press method, resulting in a rigid glue line. Contact method of laminating shall not be allowed.

B. Exposed Interior and Semi-exposed Exterior Surfaces:

1. Interior surfaces behind doors, drawer boxes, backs, and unfinished ends shall be laminated with a Light Beige, Greystone, or White thermally fused laminate that meets rob exceeds the performance standards for NEMA LD3-1995 for GP-28. All panels shall be of "BALANCED" construction. Fast cycle thermally fused, melamine foil or polyester surfaced panels or other surface types that do not meet these requirements are not acceptable.

2. High Pressure Laminate at all open interiors, underside of wall cabinet bottoms, interiors of glazed door cabinets shall be considered exposed and finished in Decorative High-Pressure GP-28 laminate.

C. Writable / Magnetic Finish on Doors:

1. Required on doors that are shaded and noted on the elevations as requiring marker board laminate doors.

2. Product: Formica Magnetic Markerboard Laminate.
   a. Durable, high gloss, magnetic dry-erase surface.

D. Edges:

1. All doors and drawer edging shall be machine applied color through 3mm PVC. The edge shall be applied utilizing hot melt adhesive and radiused on both sides by automatic trimmers. No hand trimming shall be allowed. 3mm PVC to be available on a minimum of twenty-two (22) standard colors.

2. Exposed cabinet body edges shall be machine hot melt applied color through .020 inch PVC. Color of edge shall match the door/drawer edge color selection. The leading edge of shelves, except when exposed, shall be edged with .020 inch PVC matching the interior color. Use on all cabinet body edges except cubbies.

E. Particleboard:

1. All particleboard, unless noted otherwise, shall be industrial grade according to the American National Standard for Mat-Formed Wood Particleboard, ANSI A208-1, Grade 1-M-3, and meet or exceed the following:
   a. Density 47 lbs./cu. ft.
   b. Moisture Content 6%
   c. Modulus of Rupture 2400 psi
   d. Modulus of Elasticity 450,000 psi
   e. Internal Bond 80 psi
   f. Hardness 900 pounds
   g. Linear Expansion .030%
   h. Thickness Tolerance .005% +/-
   i. Face Screw Holding 325 pounds
   j. Edge Screw Holding 275 pounds

F. Hardware:

1. Pulls: One pull shall be located at the centerline of the drawer, regardless of width, to ensure ease of operation and maximize drawer slide life. The following pulls shall be available at no cost difference:
   a. 8mm diameter, 96mm o/c clear anodized aluminum wire pull.
   b. Contour plastic pull with three color options.
   c. 10mm diameter 96mm o/c rod pull with eighteen (18) color options.

2. Hinges: (See 2.04.C for test criteria) Hinges shall be .95" steel five-knuckle hospital-tip institutional grade quality with .187" diameter tight pin. Residential, kitchen type, pivot, plain butt or hinges with removable pins "SHALL NOT BE ACCEPTABLE". Each hinge shall be secured with a minimum of eight no.8 screws. Hinge shall permit door to swing 270 degrees without binding. Doors less the 48" in height shall have two hinges. Doors over 48" in height shall have three hinges. Finish shall be Greystone, Light Beige, or P.C. Chrome.

3. Drawer Slides:
   a. Drawers: Self closing, bottom mount epoxy coated with captive roller and positive in stop. Slide shall have 100# rating, must be self-closing within last 3” of travel and must prevent fronts from contacting the cabinet body.
   b. File Drawers: Full extension, bottom mount, epoxy coated with captive roller and positive instep. Slide shall have 100# rating, must be self-closing within last 3” of travel and must prevent fronts from contacting the cabinet body.
   c. File drawers shall be equipped with “Pendaflex” file frames.

4. Door Catches:
   a. Base and Wall Cabinets: 7 pound magnetic catch.
   b. Tall Cabinets: Heavy duty spring loaded roller catch with molded plastic bumper/strike, at top and bottom of door.

5. Adjustable Shelf Support:
   a. Shelf supports shall be injected molded plastic, with a double pin engagement 32 mm on center. Shelf supports shall have molded locking tabs for both 1" and 3/4" shelves to prevent shelves from tipping.

6. Locks shall be installed on all doors and drawers.
   a. National Lock five disc tumbler cam locks in chrome finish.
   b. Keyed alike, or keyed differently and master keyed.
   c. Lock core is removable with a control key, permitting Owner to easily change lock arrangements without tools.
   d. Inactive door of base and wall cabinets shall secure using an elbow catch or a chain bolt for tall cabinets.
   e. Provide eight pin locks.

7. Wardrobe Hanger Rod:
   a. 1 inch diameter plated steel with captive sockets.

8. Garment Hooks:
   a. Single prong and double prong clear-anodized aluminum as manufactured by Ives.

9. Mirrors:
   a. Teachers wardrobe mirrors to be 8” x 10” and attached with plastic mirror clips and plate screws.

10. Aluminum pencil proof grilles, as noted on drawings.

11. Toe kick vents, as noted on drawings.

2.03 CONSTRUCTION

A. All cabinet body components shall be secured utilizing concealed interlocking mechanical fasteners as approved by Architectural Woodwork Quality Standards 6th Edition - 1994 Sections 1600A-S-10 and AWI 1600B-S-9. Also, as approved by the Woodwork Institute of California's "Manual of Millwork" Section 15.IX.A.e and shall be especially designed for use in joining particleboard panels.

B. All joints are tight fitting and will not rupture or loosen due to:

1. Dimensional changes in the particleboard.

2. Racking of casework during shipment and installation.

3. Normal use.

4. Seismic shock as tested and approved by the Woodwork Institute of California for casework used in schools and hospitals.

C. All fastening devices and screws shall be treated to deter or resist corrosion.

D. Construction Features:

1. All Cabinets:
   a. All structural components shall be 3/4 inch and 1 inch thick particleboard with balanced surfaces.
   b. All back panels shall be 1/2" thick particleboard surfaced both sides for balanced construction. Backs shall be routed into end panels. Stapled backs or backs not routed in will not be accepted.
   c. All drawer components shall be 1/2 inch thick particleboard with balanced construction.
   d. Back stretchers are 3/4 inch thick structural components mechanically fastened to end panels, and are concealed behind the back panel to:
      1) Provide a means of securely anchoring cabinets to walls.
      2) Provide additional strength by tying the end panels together behind the back.
      3) Plastic back stretchers or hanging strips are not acceptable.
   e. When cabinets are exposed; a full 3/4 inch thick decorative laminate panel shall be substituted for stretchers.

f. Individually attached exterior grade plywood bases for base cabinets and tall cabinets shall support and carry the load of the end panels, and the cabinet bottoms, directly to the floor. The base shall be let in from the sides and back of the cabinet to allow cabinets to be installed tightly together against a wall, and to conceal the top edge of the applied vinyl base molding. There shall be an intermediate support for all bases 30 inches and wider. End panels continuous to the floor will not be accepted. All bases to be 3/4 inch exterior grade plywood.
g. Horizontal parting rails between drawers shall be 3/4 inch particleboard with balanced surfaces, secured to and further reinforcing cabinet ends. When drawer stacks are keyed individually the parting rail shall run full depth of the cabinet to prevent pilfer.
h. A 5mm diameter row hole pattern 32 mm, (1-1/4"), on center shall be bored in cabinet ends for adjustable shelves. This row hole pattern shall also serve for hardware mounting and locating to create ease of replacement and/or relocation of cabinet components.
i. All door and drawer fronts and finished ends shall be balanced construction with "high-pressure" laminate bonded to both sides of a M-3, 47# particleboard core.
j. Adjustable shelves shall be particleboard core, balanced surfaces and have a .020 inch thick PVC front edge matching the shelf.
    1) Adjustable shelves over 30 inches wide shall be 1 inch thick.
    2) All adjustable shelves in open cabinets shall be 1 inch thick.
    3) All other shelves shall be 3/4 inch thick.
k. Fixed interior components such as fixed shelves, dividers, and cubicle compartments shall be full 3/4 inch thick particleboard attached with concealed interlocking mechanical fasteners.
    1) All doors shall be a maximum of 24 inches wide.

E. Wall Cabinets:

1. Each end panel to be secured with a minimum of seven interlocking mechanical fasteners for a total tensile strength of 2,450 pounds.

2. All wall cabinet bottoms shall be of 1 inch thick particleboard core mechanically fastened to end panels and secured to the bottom back stretcher.

3. An upper 3/4 inch thick stretcher shall be located behind the back panel with two interlocking mechanical fasteners per end and secured to the cabinet top with #8 x 2 inch plated flat head screws. Plastic stretchers or hanging strips are not acceptable.

4. A lower 3/4 inch thick stretcher shall be located behind the back panel and attached to the end panels with interlocking mechanical fasteners. Plastic stretchers or hanging strips are not acceptable.

F. Base Cabinets:

1. Each end panel to be secured with a minimum of seven interlocking mechanical fasteners for a total tensile strength of 2,450 pounds.

2. All base cabinets, except sink cabinets, shall have a solid 3/4 inch thick sub-top fastened to the ends with interlocking mechanical fasteners.

3. All sink cabinets shall have a vertical front stretcher panel above the door/s to support the countertop, a split removable back panel, and four steel corner gussets used to secure the countertop to the sink cabinet.

4. An upper 3/4 inch thick stretcher shall be located behind the back panel and attached to the end panels with interlocking mechanical fasteners. This stretcher is also fastened to the full sub-top thus capturing the back panel. Plastic stretchers or hanging strips are not acceptable.

G. Drawers:

1. Drawer box shall be constructed with a full 1/2 inch thick non-racking, non-deflecting platform which is carried directly by “L” shaped, bottom mount drawer glides. Sides shall be secured with 1-1/2 inch long screws directly into platform and into the sides.

2. Sides, back, sub-front, and bottom shall be 1/2 inch thick 47 pound density particleboard surfaced both faces with White, Light Beige, or Grey Stone thermafused melamine per 2.02.B.1. The top edge shall be banded with .020 inch PVC, matching the drawer color.

3. Joints at all four corners shall be with fluted wood dowels and glue, minimum 32 mm o/c.

4. Drawer fronts shall be removable and attached to drawer box sub-front with screws from inside of drawer.

H. Tall Cabinets:

1. Each end panel to be secured with a minimum of eleven interlocking mechanical fasteners for a total tensile strength of 3,850 pounds.

2. An intermediate fixed shelf shall be provided on all general storage cabinets to maintain internal dimensional stability under heavy loading conditions.

3. A ¾” top and intermediate stretcher shall be located behind the back panels and attached to the end panels with interlocking mechanical fasteners.

4. The intermediate stretcher is secured to the intermediate shelf, thus capturing the back panel, with #8 x 2” plated flat head screws.

5. Plastic back stretchers or hanging strips are not acceptable.

2.04 PERFORMANCE

A. Laminates:

1. "High Pressure Laminates" shall meet the definition and performance requirements of NEMA LD3-1995. Vertical grade laminate shall be GP-28 balanced with a minimum grade of CL-20. Countertops shall be GP-50.

B. Hinges:

1. ANSI 156.9.4.1 through .4: Two hinges mounted 23 inches on center on a 23-7/16 inch wide x 19-11/16 inch high cabinet door shall be capable of supporting a 100 pound test load located 1 inch from the outside edge of the door.
   a. Cycle, open and close, from 5 degrees open through 95 degrees open with no failure to hinges, door, or cabinet end panel.
   b. The maximum horizontal permanent hinge set shall not exceed .030".

C. Drawers:

1. ANSI 156.4.11: A production drawer box 21-5/16 inch wide x 20-3/4 inch deep x 3-7/8 inch high with an applied finished front 6-7/16 inch high x 23-1/8 inch wide with 20 inch drawer slides shall be tested as follows:
   a. When uniformly loaded with 100 pounds and tested through 100,000 opening and closing cycles, the drawer shall operate freely.
   b. When the drawer is fully extended, a 100 pound load shall be supplied to the drawer front at a point on the centerline of the drawer for one minute. No permanent damage or distortion shall occur.

2. ANSI/BHMA A156.9-88, Section 4.11: A production drawer box 21-5/16 inch wide x 20-3/4 inch deep x 3-7/8 inch high with an applied finished front 6-7/16 inch high x 23-1/8 inch wide with 20 inch drawer slides shall be tested as follows:
   a. Cycle Test: When uniformly loaded with 50 pounds and tested through 50,000 opening to two thirds of total travel length and completely closing cycles, the drawer shall operate freely.
   b. Edge Load Test: After completion of Cycle Test, drawer to be opened to one half of the total travel length and apply 75 pounds to edge of drawer for one minute. No permanent damage or distortion shall occur.

D. Door Catches:

1. ANSI A156.9.5: Holding power and cycle test: Catches shall retain at least 50% of the rated minimum pull at test completion.
   a. Heavy Duty Magnetic or Heavy Duty Roller-100,000 cycles of full engagement and disengagement.

E. Adjustable Shelving:

1. When supported only at the ends, shelving shall not deflect in excess of 1/4 inch when loaded as follows:
   a. Standard Shelving - 25 pounds/square foot.
   b. Library Shelving - 40 pounds/square foot.

2. ANSI A156.9.4.10 place a 3/4 inch x 10-1/4 inch x 34-1/8 inch shelf on four shelf supports in a 36 inches wide wall cabinet. A 300 pound uniformly applied load without bridging effect shall be sustained without failure or damage to the shelf, shelf supports, or cabinet end panels.

F. Wall Hung Cabinet Load Test:

1. Earthquake test procedure developed by the "Woodwork Institute of California" for casework used in California schools and hospitals.
   a. A 48 inch high x 12 inch deep x 48 inch wide wall hung cabinet using interlocking mechanical fastening devices shall support a 2,000 pound dead load concurrently with a 982 pound lateral pull out load. Test complies with loads specified in Title 17 with a safety factor of two.

2.05 COUNTERTOPS

A. High-Pressure Decorative Laminate:

1. General Purpose Grade, GP-50 high-pressure laminate on horizontal surface and edges, conforming to NEMA Standard LD3-1995. Exposed edges of countertops to have 3mm PVC edge styling available in same 22 colors as cabinet 3mmPVC.

2. Laminates bonded to 1-1/8 inch thick 47# particleboard. Core shall be balanced with HPL backer. All countertops to be laminated with PVA adhesive and a cold press method resulting in a rigid glue line. Contact adhesive method of laminating will not be allowed. Countertops to have .020 PVC edging on back-concealed edge applied with hot melt adhesive. No exposed particle board surfaces whether concealed or not will be permitted.

3. All joints shall be secured with adhesives and tight joint fasteners and shall be located no closer than 4' from sinks.

4. Provide 4 inch high splashes as required. Bottom of back and end splashes to have .020 PVC edge hot melted to prevent water absorption. Seal joint between splash and countertop with silicone. Splashes to have backer sheet on surface against wall.

5. Countertops shall conform to ANSI A161.2-1979 "Performance Standards for Fabricated High-Pressure Decorative Laminate Countertops"

B. Solid Surface Countertops: Refer to Specification Section 12 36 61.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify adequacy of backing and support framing.

B. Verify location and sizes of utility rough-in associated with work of this section.

3.02 INSTALLATION

A. Casework shall not be delivered to or stored at the job site until building has become adequately dry and secure. The ambient relative humidity must be maintained between 25% and 55% prior to delivery.

B. Installation shall be by manufacturer's authorized representative.

C. Casework shall be installed plumb and true, and securely anchored in place. Scribe casework fillers as required to form a tight fit.

D. Wall cabinets shall be securely fastened to horizontal blocking, not to plaster, lath or gypsum board. Reinforcement of stud walls shall be provided by appropriate trade during erection of walls. Casework manufacturer shall accurately locate blocking requirements on shop drawings.

E. Use fixture attachments in concealed locations for wall mounted components.

F. Use concealed joint fasteners to align and secure adjoining cabinet units, counter tops and cubbies.

G. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.

H. Secure cabinet and counter bases to floor using appropriate angles and anchorages.

I. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

J. Install wall cabinets with fasteners @ 1'-0" O.C., min. of four fasteners per cabinet.

K. Install service fixtures in accordance with manufacturer's instructions.

L. Install in accordance with standards required by authority having jurisdiction.

M. Anchor equipment securely in place.

N. Sequence installation of service and electrical fixtures to insure utility connections are achieved in an orderly and expeditious manner.

O. Laboratory equipment contractor shall securely set in place all sinks and fixtures supplied under this section. Plumbing contractor shall be responsible for all piping, traps, and final connections of utilities.

3.03 ADJUSTING AND CLEANING

A. Repair damaged and defective woodwork where possible to eliminate functional and visual defects; where not possible to repair, replace. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware.

C. Clean woodwork on exposed and semi-exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

D. Empty drawers of dirt and dust. Wipe out cabinets' interiors to remove dirt and dust. Remove pencil or other marks, excess adhesive, etc. from cabinets and countertops. Remove all packaging, scraps, and debris resulting from casework installation activities.

E. Make final adjustments to doors and drawers. Doors shall swing freely, catches shall hold securely, and all other doors shall be aligned both vertically and horizontally. Drawers shall open and close smoothly, without binding and without excessive slide play. All locks should work, smoothly and freely without binding or catching.

F. Keys shall be appropriately labeled and turned over to the Owner.

3.04 CABINET SCHEDULE

A. Base Units:

1. Type PB-1 - Open Base Storage: Furnish with two adjustable shelves. Height, depth and width as indicated on drawings. Similar to Case Systems Model #B0000.

2. Type PB-2 - Base Storage with Door: Furnish with one adjustable shelf and one hinged doors. Height, depth and width as indicated on drawings. Similar to Case Systems Model #B0110.

3. Type PB-3 - Base Storage with Doors: Furnish with one adjustable shelf and two hinged doors. Height, depth and width as indicated on drawings. Similar to Case Systems Model #B0100.

4. Type PB-6.2 – Base storage with Doors and Drawers: Furnish with one adjustable shelf, two hinged doors, and two half-width drawer at top. Height, depth and width as indicated on drawings. Similar to Case Systems Model #B3100

5. Type PB-8.1a – Base storage with Drawers: Furnish with, and three full-width drawers. Height, depth and width as indicated on drawings. Similar to Case Systems Model #B4030

6. Type PB-8.3 – Base storage with Drawers: Furnish with, and five full-width drawers. Height, depth and width as indicated on drawings. Similar to Case Systems Model #B4050.

7. Type PB-9.5 – Lateral File Storage: Furnish with two file-size drawings. Height, depth, and width as indicated on drawings. Similar to Case Systems Model #B7500.

8. Type PB-14 - Wheelchair Accessible Sink Cabinet: Furnish with two hinged doors, and no bottom. Height = 34", depth and width as indicated on drawings. Similar to Model #B2800. Refer to drawings for additional information on accessibility requirements.

9. Type PB-14.1 - Wheelchair Accessible Sink Vanity: Furnish with two hinged doors, and no bottom. Height = 34", Depth = 24” and width as indicated on drawings. Similar to Model #D1000. Refer to drawings for additional information on accessibility requirements.

10. Type PB-15 – Open Knee Space with Drawer: Furnish with one full-width drawer. Height, depth and width as indicated on drawings. Similar to Case Systems Model #B4740.

B. Wall Units:

1. Type PW-1 – Open Wall Storage: Furnish with one adjustable shelf in cabinets 30”H or under and two adjustable shelves in cabinets over 30”H. Height, depth and width as indicated on drawings. Similar to Case Systems Model #W0000.

2. Type PW-2 - Wall storage with Door: Furnish with one adjustable shelf in cabinets 30”H or under and two adjustable shelves in cabinets over 30”H. Height, depth and width as indicated on drawings. Similar to Case Systems Model #W0110.

3. Type PW-3 - Wall storage with Doors: Furnish with one adjustable shelf in cabinets 30”H or under and two adjustable shelves in cabinets over 30”H. Height, depth and width as indicated on drawings. Similar to Case Systems Model #W0100.

4. Type PW-5 -– Diagonal Corner Storage: Furnish with two shelves and one hinged door. Height, depth, and width as indicated on drawings. Similar to Case Systems Model #Y1210.

C. Tall Units:

1. Type PT-1: Tall Open Storage: Furnish with four adjustable shelves, and one fixed centered shelf. Height, depth and width as indicated on drawings. Similar to Case Systems Model #T0000.

2. Type PT-2: Tall Storage with Door: Furnish with four adjustable shelves, one fixed centered shelf and two hinged doors. Height, depth and width as indicated on drawings. Similar to Case Systems Model #T0110.

3. Type PT-3 - Tall Storage with Doors: Furnish with four adjustable shelves, one fixed centered shelf and two hinged doors. Height, depth and width as indicated on drawings. Similar to Case Systems Model #T0100.

4. Type PT-10 - Teacher's Wardrobe Unit: Furnish with four (4) adjustable shelves, one hanger rod, one pin tray, one mirror mounted on door, and one hinged door. Height, depth and width as indicated on drawings. Similar to Case Systems Model #T2710.

5. Type PT-10.1 – Teacher’s Wardrobe Unit (double): Furnish with four (4) adjustable shelves, two fixed shelves, one centered partition, one hanger rod, one mirror mounted on door, and two hinged doors. Height, depth and width as indicated on drawings. Similar to Case Systems Model #T2640.

6. Type PT-10.2 – Teacher’s Wardrobe Unit (with drawers): Furnish with four (1) adjustable shelf, one hanger rod, one mirror mounted on door, and drawers at the bottom. Height, depth and width as indicated on drawings. Similar to Case Systems Model #T2920.

7. Type PT-11 – Two Student Cubby: Furnish with two ¾” fixed shelves and four square safety hooks similar to Bobrick model #B-6717. Refer to drawings for additional requirements and dimensions.

END OF SECTION

SECTION 12 36 61

SOLID SURFACING COUNTERTOPS

1 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. Solid surface material countertops

2. Solid surface material backsplashes.

3. Solid Surface material end splashes.

1.3 SUBMITTALS

A. Product Data: For countertop materials.

B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.

1. Show locations and details of joints.

2. Show direction of directional pattern, if any.

C. Samples for Initial Selection: For each type of material exposed to view.

D. Samples for Verification: For the following products:

1. Countertop material, 4 inches square.

E. Maintenance Data: For solid surface material countertops to include in maintenance manuals. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

1.4 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate countertops similar to that required for this Project, and whose products have a record of successful in-service performance.

B. Installer Qualifications: Fabricator of countertops.

1.5 FIELD CONDITIONS

A. Field Measurements: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop fabrication is complete.

1.6 COORDINATION

A. Coordinate locations of utilities that will penetrate countertops or backsplashes.

2 PART 2 PRODUCTS

2.1 SOLID SURFACE COUNTERTOP MATERIALS

A. Solid Surface Material: Homogeneous-filled plastic resin complying with ICPA SS-1.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
   a. Wilsonart Corporation
   b. Formica Corporation.
   c. Corian by DuPont

2. Type: Provide Standard type unless Special Purpose type is indicated.

3. Colors and Patterns: As selected by Architect from manufacturer's full range, all price groups, up to 4 different colors.

4. Performance Characteristics:
   a. Solid Surface Based Products:

Property	Requirement (min or max)	Test Procedure
Tensile Strength	6000 psi min	ASTM D638
Tensile Modulus	1.5×10^6 psi min	ASTM D638
Tensile Elongation	0.4% min.	ASTM D638
Flexural Strength	10000 psi min	ASTM D790
Flexural Modulus	1.2×10^6 psi min	ASTM D790
Hardness	60	ASTM D 2583
Thermal Expansion	1.37×10^{-5} in./in./°F	ASTM D 696
Fungi and Bacteria	Does not support microbial growth.	ASTM G21 & G22
Microbial Resistance	Highly resistant to mold growth	UL 2824
Ball Impact	No fracture – ½ lb. Ball: 6 mm slab – 36” drop; 12 mm slab – 144” drop	NEMA LD 3, Method 3.8
Weatherability	AE*94<5 in 1,000 hrs.	ASTM G155
Flammability	Class 1 and Class A	ASTM E84, NFPA 255 & UL 723

	All Colors		
Property	**6 mm**	**12 mm**	**Test Performance**
Flame Spread	<25	<25	
Smoke Developed	<25	<25	
Class	A	A	NFPA 101®, Life Safety Code

B. Solid Surface Material: Non-porous, homogeneous material maintaining the same composition throughout the part with a composition of acrylic polymer, aluminum trihydrate filler and pigment; not coated, laminated or of composite construction; meeting following criteria:

1. Flammability: Class 1 and A when tested to UL 723.

C. Particleboard: ANSI A208.1, Grade M-2.

D. Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.

2.2 COUNTERTOP FABRICATION

A. Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards."

B. Configuration:

1. Front: Straight, slightly eased at top.

2. Backsplash: Straight, slightly eased at corner

3. End Splash: Matching backsplash.

C. Countertops: 1/2-inch- thick, solid surface material with front edge built up with same material.

D. Backsplashes: 1/2-inch-thick, solid surface material.

E. Fabricate tops with shop-applied edges and backsplashes unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.

1. Fabricate with loose backsplashes for field assembly.

2. Install integral sink bowls in countertops in the shop.

F. Joints: Fabricate countertops without joints.

G. Joints: Fabricate countertops in sections for joining in field, with joints at locations indicated.

1. Joint Locations: Not within 18 inches of a sink or cooktop and not where a countertop section less than 36 inches long would result, unless unavoidable.

2. Splined Joints: Accurately cut kerfs in edges at joints for insertion of metal splines to maintain alignment of surfaces at joints where indicated. Make width of cuts slightly more than thickness of splines to provide snug fit. Provide at least three splines in each joint.

H. Cutouts and Holes:

1. Undercounter Plumbing Fixtures: Make cutouts for fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.
   a. Provide vertical edges, slightly eased at juncture of cutout edges with top and bottom surfaces of countertop and projecting 3/16 inch into fixture opening.
   b. Provide vertical edges, rounded to 3/8-inch radius at juncture of cutout edges with top surface of countertop, slightly eased at bottom, and projecting 3/16 inch into fixture opening.
   c. Provide vertical edges, rounded to 3/8-inch radius at juncture of cutout edges with top surface of countertop, slightly eased at bottom, and projecting 3/16 inch into fixture opening.

2. Counter-Mounted Plumbing Fixtures: Prepare countertops in shop for field cutting openings for counter-mounted fixtures. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.

3. Fittings: Drill countertops in shop for plumbing fittings, undercounter soap dispensers, and similar items.

2.3 INSTALLATION MATERIALS

A. Adhesive: Product recommended by solid surface material manufacturer.

1. Adhesives shall have a VOC content of 70 g/L or less.

B. Sealant for Countertops: Comply with applicable requirements in Section 07 92 00 "Joint Sealants."

3 PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates to receive solid surface material countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install countertops level to a tolerance of 1/8 inch in 8 feet, 1/4 inch maximum. Do not exceed 1/64-inch difference between planes of adjacent units.

B. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Predrill holes for screws as recommended by manufacturer. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

C. Fasten subtops to cabinets by screwing through subtops into corner blocks of base cabinets. Shim as needed to align subtops in a level plane.

D. Fasten subtops to cabinets by screwing through subtops into corner blocks of base cabinets. Shim as needed to align subtops in a level plane.

E. Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears

1. Install metal splines in kerfs in countertop edges at joints. Fill kerfs with adhesive before inserting splines and remove excess immediately after adjoining units are drawn into position.

2. Clamp units to temporary bracing, supports, or each other to ensure that countertops are properly aligned and joints are of specified width.

F. Install backsplashes and end splashes by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.

G. Install aprons to backing and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears. Fasten by screwing through backing. Predrill holes for screws as recommended by manufacturer.

H. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.

1. Seal edges of cutouts in particleboard subtops by saturating with varnish.

I. Apply sealant to gaps at walls; comply with Section 07 92 00 "Joint Sealants."

END OF SECTION

DIVISION 13-21 – NOT USED

DIVISION 22 - PLUMBING

SECTION 22 05 27

PIPE SLEEVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install pipe sleeves, other wall pieces, and escutcheons complete with accessories.

B. Coordination:

1. Review installation procedures under this and other Sections and coordinate the installation of items that must be installed with, or before, the pipe sleeves Work.

2. Notify other contractors in advance of the installation of the pipe sleeves system to provide them with sufficient time for the installation of items included in their contracts that must be installed with, or before, the pipe sleeves Work.

C. Related Sections:

1. Section 03 01 00, Maintenance of Concrete.

2. Section 07 92 00, Joint Sealants.

3. Section 22 11 16, Domestic Water Piping.

4. Section 22 13 16, Sanitary Waste and Vent Piping.

1.2 REFERENCES

A. Standards referenced in this Section are listed below:

1. American National Standards Institute, (ANSI).
   a. ANSI A21.4, Cement-Mortar Lining for Cast-Iron and Ductile Iron Pipe and Fittings.
   b. ANSI A21.6, Cast-Iron Pipe Centrifugally Cast in Metal Molds.
   c. ANSI A21.10, Cast-Iron and Ductile Iron Fittings, 2 thru 48-inches in Water.
   d. ANSI A21.11, Rubber Gasket Joints for Cast-Iron and Ductile Iron Pressure Pipe.
   e. ANSI A21.15, Flanged Cast-Iron and Ductile Iron.

f. ANSI A21.51, Ductile Iron Pipe Centrifugally Cast in Metal Molds.
g. ANSI B16.1, Cast Iron Pipe Flanges and Flanged Fittings.

2. American Water Works Association, (AWWA).
   a. AWWA C104, Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
   b. AWWA C106, Cast-Iron Pipe Centrifugally Cast in Metal Molds.
   c. AWWA C110, Ductile-Iron and Gray-Iron Fittings for Water.
   d. AWWA C111, Rubber Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
   e. AWWA C115, Flanged Ductile-Iron Pipe or Gray-Iron Threaded Flanges.
   f. AWWA C151, Ductile-Iron Pipe, Centrifugally Cast for Water.

1.3 QUALITY ASSURANCE

A. Installers' Qualifications:

1. Engage a single installer regularly engaged in pipe sleeves and mechanical seals installation and with experience in the installation of the types of materials required; and who agrees to employ only tradesmen with specific skill and experience in this type of Work. Submit names and qualifications to ENGINEER.

2. Engage a single installer for the entire pipe sleeves and mechanical seals system with undivided responsibility for performance and other requirements.

B. Component Supply and Compatibility:

1. Obtain all products included in this Section regardless of the component manufacturer from a single pipe sleeves and mechanical seal manufacturers.

2. The pipe sleeves and mechanical seal manufacturers to review and approve or to prepare all Shop Drawings and other submittals for all components furnished under this Section.

3. All components shall be specifically constructed for the specified service conditions and shall be integrated into the overall assembly by the pipe sleeves and mechanical seal manufacturers.

C. Regulatory Requirements: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

1. Local and State Building Codes and Ordinances.

1.4 SUBMITTALS

A. Shop Drawings: Submit the following:

1. Manufacturer's literature, illustrations, specifications and engineering data.

2. Details of installation.

3. Detailed drawings showing all pipe sleeves and mechanical seals for each piping system. Drawings shall show location, installation and material of all pipe sleeves and mechanical seals.

4. Other technical data related to the specified material and equipment as requested by ENGINEER.

5. Installer's Qualifications.

6. Deviations from Contract Documents.

1.5 DELIVERY, STORAGE AND HANDLING

A. Packing, Shipping, Handling and Unloading:

1. Deliver materials to the Site to ensure uninterrupted progress of the Work. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete, in ample time to prevent delay of the Work.

B. Storage and Protection:

1. Store materials to permit easy access for inspection and identification. Keep all material off the ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.

C. Acceptance at Site:

1. All boxes, crates and packages shall be inspected by CONTRACTOR upon delivery to the Site. CONTRACTOR shall notify ENGINEER, in writing, if any loss or damage exists to equipment or components. Replace lost equipment or components and repair damage to new condition, in accordance with manufacturer’s instructions.

1.6 GENERAL REQUIREMENTS

A. The Contract Documents show the general arrangement and extent of the Work to be completed. The exact location and arrangement of all parts shall be determined as the Work progresses. The exact location of all parts of the Work must be governed by the general building plans and the actual building conditions.

B. The Drawings show an indication of the arrangement of equipment, piping, valves, etc., and are as nearly correct as can be determined in advance of the actual construction of the Work. Piping, equipment, piping, etc. found to interfere with the construction of the building, plumbing apparatus and piping, electrical wiring or other obstructions, etc., must be changed in location to clear such obstructions.

C. The connections shown to the various units are intended as an indication only. The actual connections at the time of installation to be made and arranged to suit the requirements of each case, adequately provide for expansion and circulation and minimize the amount of space required for the same.

D. The Drawings show the general arrangement of all systems. Should local conditions necessitate rearrangement of one or more of the systems, CONTRACTOR, before proceeding with the Work, shall prepare and submit complete drawings showing all details of the proposed rearrangement for written approval by the ENGINEER.

E. The Drawings do not show all offsets, fittings, accessories and details, which may be required. CONTRACTOR shall carefully examine all of the General Construction, Electrical, Mechanical, Structural and other Drawings and the respective Specifications for conditions which may affect the installation of the Work, and shall arrange the Work accordingly, furnishing all required items to meet such conditions which are not specified as work "by others", to complete the systems to the true extent of the Contract Documents.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Pipe Sleeves:

1. Ferrous and Plastic Pipe: Use standard weight galvanized steel pipe, unless otherwise shown.

2. Copper Pipe: Use standard weight galvanized steel pipe with mechanical link seals as spacers, unless otherwise shown.

B. Cast Wall Sleeves:

1. Material: Cast-iron furnished with integral wall collar.

2. Dimensions: As required for mechanical joint or calked joint pipe to pass through sleeve. Length as required.

C. Mechanical Seals: Provide link type mechanical seals with adjusting bolts suitable for 20 psi working pressure where shown or required.

1. Manufacturers: Provide products of one of the following:
   a. Advance Products & Systems, Inc., Innerlynx.
   b. GPT Division of Enpro Industries, Link-Seal.
   c. The Metraflex Company, Metraseal.
   d. Or equal.

2. Materials: Mechanical seals through non-fire rated walls or floors:
   a. Pressure Plate: Glass reinforced nylon plastic.
   b. Bolt and Nut: 18-8 stainless steel.
   c. Sealing Element: EPDM rubber.
   d. Fire Rating: None.
   e. Listing: UL

3. Materials: Mechanical seals through fire rated walls or floors; two independent mechanical seal assemblies required for each penetration:
   a. Pressure Plate: Low carbon steel, zinc galvanized plated or stainless steel.
   b. Bolt and Nut: Low carbon steel zinc galvanized or stainless steel.
   c. Sealing Element: Silicone rubber.
   d. Fire rating: Three-hour.
   e. Listing: UL.

D. Wall, Floor and Ceiling Escutcheon Plates:

1. Manufacturers: Provide products of one of the following:
   a. McGuire Manufacturing, Inc.
   b. Pegasus Manufacturing, Incorporated.
   c. Or equal.

2. Bare Pipes Passing Through Walls, Floors and Ceilings in any Room: Provide escutcheon plates of cast brass or stamped steel, chrome plated, hinged with setscrews.

3. Insulated Pipes Passing Through Walls, Floors and Ceilings in Finished Rooms: Provide plated escutcheon plates of stamped steel or cast brass, chrome plated, hinged with setscrews.

E. Exterior Walls or Floors: Below grade:

1. Manufacturers: Provide products of one of the following:
   a. GPT Division of Enpro Industries, Century-Line.
   b. SIGMA Corporation, Omni-Sleeve.
   c. Or equal.

2. Type: Thermoplastic sleeve for use in new construction where sleeves are exposed to liquid or on exterior walls or floors exposed to backfill only.

3. Integral reinforcing ribs, anchor and waterstop collar textured surface for adhesion to concrete.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Install all items as shown, specified, and as recommended by the manufacturer.

2. Request instructions from ENGINEER, in writing, when there is a conflict between the manufacturer's recommendations and the Contract Documents.

3. Present conflicts to ENGINEER, in writing, who will determine corrective measures to be taken.

4. Do not modify structures to facilitate installation of pipe sleeves, mechanical seals, and accessories, unless specifically approved by ENGINEER.

5. Installation to conform to requirements of all local and state codes.

6. Protection: Equipment shall be tightly covered and protected against dirt, water, and chemical or mechanical damage.

B. Pipe Sleeves:

1. Use sleeves wherever pipes pass through walls, partitions, floors and roofs, unless otherwise shown.

2. All sleeves through floor slabs in finished areas shall extend a maximum of 1/4-inch above finished floor.

3. Anchor sleeves to concrete and masonry walls as shown or otherwise accepted.

4. Sleeves through walls shall be flush with wall face.

5. Calk and seal annular space between pipe and sleeve.

6. All pipe joints and annular spaces in exterior walls or walls subjected to hydrostatic pressure shall be completely watertight.

7. All vertical pipes through sleeves shall be installed with Link Seal "Pyro-Pacs" to maintain 2-hour fire rating between the two fire areas.

8. Size Sleeves to provide annular space as recommended by the mechanical seal manufacturer and as follows:

Pipe Size	Sleeve ID Minus Pipe or Insulation OD
Less than 2-in.	1/2-in. to 3/4-in.
2-in. to 4-in.	3/4-in. to 1-1/4-in.
6-in. to 12-in.	1-1/4-in. to 2-in.

9. For mechanical link seals, size sleeves to provide space required to suit link type seals provided.

10. Do not install sleeves and pipes through structural members unless specifically required due to coordination or obstructions, each sleeve condition shall be submitted for approval.

3.2 FIELD QUALITY CONTROL

A. Inspection:

1. Examine areas to receive pipe sleeves, mechanical seals, escutcheons and accessories for:
   a. Defects that adversely affect execution and quality of the Work.
   b. Deviations beyond allowable tolerances for pipe sleeves, mechanical seals, escutcheons and accessories.
   c. Start the Work only when conditions are satisfactory.

2. The ENGINEER reserves the right to reject or authorize replacement of pipe sleeves, mechanical seals, escutcheons and accessories found to be defective.

3.3 ADJUSTING AND CLEANING

A. Adjusting:

1. Adjust all materials for proper settings.

B. Cleaning:

1. Thoroughly clean all pipe sleeves, mechanical seals, escutcheons and accessories prior to installation.

2. Remove all dirt, rust, dust, etc. from all pipe sleeves, mechanical seals and escutcheons in preparation for required painting.

3. Remove and dispose of all debris and waste from the Site resulting from installation.

END OF SECTION

SECTION 22 05 29

HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified, and required to furnish and install hangers and supports complete with accessories for plumbing piping and equipment.

B. Coordination:

1. Review installation procedures under this and other Sections and coordinate the installation of items that must be installed with, or before, the hangers and supports for plumbing piping and equipment Work.

2. Notify other contractors in advance of the installation of the plumbing pipe and equipment hangers and supports to provide them with sufficient time for the installation of items included in their contracts that must be installed with, or before, the plumbing piping and equipment hangers and supports Work.

C. Related Sections:

1. Section 05 50 00, Metal Fabrications.

2. Section 09 90 00, Painting.

1.2 REFERENCES

A. Standards referenced in this Section are listed below:

1. American National Standards Institute, (ANSI).
   a. ANSI B1.1, Unified Inch Screw Threads. (ASME B1.1).

2. American Society for Testing and Materials, (ASTM).
   a. ASTM A 36/A 36M, Specification for Carbon Structural Steel.
   b. ASTM A 47/A 47M, Specification for Ferritic Malleable Iron Castings.
   c. ASTM A 307, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

d. ASTM A 575, Specification for Steel Bars, Carbon, Merchant Quality, M-Grades.
e. ASTM A 668/A 668M, Specification for Steel Forgings, Carbon and Alloy, for General Industrial Use.

3. Federal Specifications, (FS).
   a. FS WW-H-171, Hangers and Supports, Pipe.

4. Manufacturer's Standardization Society, (MSS).
   a. MSS SP 58, Pipe Hangers and Supports - Materials, Design and Manufacture.
   b. MSS SP 69, Pipe Hangers and Supports - Selection and Application.
   c. MSS SP 89, Pipe Hangers and Supports - Fabrication and Installation Practices.
   d. MSS SP 90, Guidelines on Terminology for Pipe Hangers and Supports.

1.3 QUALITY ASSURANCE

A. Installer's Qualifications:

1. Engage a single installer regularly engaged in hangers and supports installation and with experience in the installation of the types of materials required; and who agrees to employ only tradesmen with specific skill and experience in this type of Work. Submit name and qualifications to ENGINEER.

2. Engage a single installer for the entire plumbing pipe and equipment hangers and supports system with undivided responsibility for performance and other requirements.

B. Regulatory Requirements: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

1. Local and State Building Codes and Ordinances.

2. Permits: CONTRACTOR shall obtain and pay for all required permits, fees and inspections.

C. Component Supply and Compatibility:

1. Obtain all products included in this Section regardless of the component manufacturer from a single plumbing pipe and equipment hangers and supports manufacturer.

2. The plumbing piping and equipment hangers and supports manufacturer shall review and approve all Shop Drawings and other submittals for all components furnished under this Section.

3. All components shall be specifically constructed for the specified service conditions and shall be integrated into the overall assembly by the plumbing piping and equipment hangers and supports manufacturer.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:

1. Shop Drawings:
   a. Details of installation.
   b. Detailed drawings showing all hangers and supports for each piping system. Drawings shall show location, installation, material, loads, forces, stresses and deflections of all hangers and supports.

2. Product Data:
   a. Manufacturer's literature, illustrations, specifications and engineering data.
   b. Other technical data related to the specified material and equipment as requested by ENGINEER.

B. Informational Submittals: Submit the following:

1. Qualifications Statements:
   a. Installer's Qualifications.

1.5 DELIVERY, STORAGE AND HANDLING

A. Packing, Shipping, Handling and Unloading:

1. Deliver materials to the Site to ensure uninterrupted progress of the Work. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete, in ample time to prevent delay of the Work.

B. Storage and Protection:

1. Store materials to permit easy access for inspection and identification. Keep all material off the ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.

2. Store all equipment in covered storage off the ground and prevent condensation and in accordance with the manufacturer’s recommendations for long-term storage.

C. Acceptance at Site:

1. All boxes, crates and packages shall be inspected by CONTRACTOR upon delivery to the Site. CONTRACTOR shall notify ENGINEER, in writing, if any loss or damage exists to equipment or components. Replace lost equipment or components and repair damage to new condition, in accordance with manufacturer's instructions.

1.6 GENERAL REQUIREMENTS

A. The Contract Documents show the general arrangement and extent of the Work to be completed. The exact location and arrangement of all parts shall be determined as the Work progresses. The exact location of all parts of the Work must be governed by the general building plans and the actual building conditions.

B. The Drawings show an indication of the arrangement of equipment, piping, valves, etc., and are as nearly correct as can be determined in advance of the actual construction of the Work. Piping, equipment, etc. found to interfere with the construction of the building, plumbing apparatus and piping, electrical wiring or other obstructions, etc., must be changed in location to clear such obstructions.

C. The connections shown to the various units are intended as an indication only. The actual connections at the time of installation to be made and arranged to suit the requirements of each case, adequately provide for expansion and circulation and minimize the amount of space required for the same.

D. The Drawings show the general arrangement of all systems. Should local conditions necessitate rearrangement of one or more of the systems, CONTRACTOR, before proceeding with the Work, shall prepare and submit complete drawings showing all details of the proposed rearrangement for written approval by the ENGINEER.

E. The Drawings do not show all offsets, fittings, accessories and details, which may be required. CONTRACTOR shall carefully examine all of the General Construction, Electrical, Mechanical, Structural and other Drawings and the respective Specifications for conditions which may affect the installation of the Work, and shall arrange the Work accordingly, furnishing all required items to meet such conditions which are not specified as work "by others", to complete the systems to the true extent of the Contract Documents.

PART 2 - PRODUCTS

2.1 GENERAL

A. Components of hangers and supports shall conform to the following:
   a. Materials:
   b. Bolts: ASTM A 307, Grade A, unless otherwise specified below.
   c. Forgings: ASTM A 668/A 668M.
   d. Malleable Iron: ASTM A 47/A 47M.
   e. Rods and Bars: ASTM A 575.
   f. Threads: Unified Screw Threads, Class 2A and 2B, ANSI B1.1.
   g. Structural Steel: ASTM A 36/A 36M.

   2. Finish:
      a. Steel or Malleable Iron Items: Galvanized, unless otherwise specified or as shown.
      b. Steel or Malleable Iron Materials Used for the Support of Uninsulated Copper Piping: Copper plated.
      c. Framing Members and Fittings: Dip painted with corrosion resistive primer as specified in Section 09 90 00, Painting.
      d. All hangers, rods, bolts, nuts, inserts, washers located in the corrosive areas shall be Type 316 stainless steel.

B. Pipe Attachments: The following types of pipe attachments shall be considered acceptable:

   1. Adjustable Steel Clevis: FS WW-H-171E, Type 1.

   2. Steel Double Bolt Pipe Clamp: FS WW-H-171E, Type 3.

   3. Steel Pipe Clamp: FS WW-H-171E, Type 4.

   4. Adjustable Swivel Pipe Ring: FS WW-H-171E, Type 6.

   5. Adjustable Steel Band Hanger: FS WW-H-171E, Type 7.

   6. Riser Clamp: FS WW-H-171E, Type 8.

   7. Light-Duty Cleves Hanger: FS WW-H-171E, Type 12.

   8. Long Clips: FS WW-H-171E, Type 26.

   9. Offset J-Hooks: FS WW-H-171E, Type 27.

   10. Steel Pipe Covering Protection Saddle: FS WW-H-171E, Type 40A.

   11. Insulation Protection Shield: FS WW-H-171E, Type 41.

   12. Pipe Saddle Support: FS WW-H-171E, Type 37.

13. Pipe Stanchion Saddle: FS WW-H-171E, Type 38.

14. Pipe Saddle Support with Base: FS WW-H-171E, Type 36.

15. Adjustable Roller Hanger: FS WW-H-171E, Type 42.

C. Structural Attachments: The following types of structural attachments shall be considered acceptable:

1. Side Beam Clamp: FS WW-H-171E, Type 20.

2. Center I-Beam Clamp: FS WW-H-171E, Type 21.

3. Welded Steel Bracket: FS WW-H-171E, Types 32 and 33.

4. Side Beam Bracket: FS WW-H-171E, Type 35.

5. Malleable Iron with Galvanized Finish Concrete Insert: FS WW-H-171E, Type 18. The use of steel concrete inserts is prohibited and NOT acceptable.

D. Hanger Rod Attachments: Use as required to complete assembly:

1. Forged Steel Clevis: FS WW-H-171E, Type 14.

2. Adjustable Turnbuckle: FS WW-H-171E, Type 15.

3. Forged Steel Welders Eye Nut: FS WW-H-171E, Type 17.

E. Alignment Guides:

1. Type: Semi-steel spider with four guiding fingers and guilding cylinder with base.

2. Manufacturers: Provide products of one of the following:
   a. Flex-Hose Co., Inc.
   b. The Metraflex Company
   c. Or equal.

F. Connection Bolts: Materials shall be as specified in other Sections of these Specifications or as shown. Where materials are not specified or shown, they shall be of Type 304 stainless steel with Monel nuts.

G. Toggle Bolts:

1. Provide zinc plated spring wing toggle bolts of the size required for secure anchorage of individual items, but not less than 1/4-inch diameter, of length required.

2. Products and Manufacturers: Provide products by one of the following:
    a. Cooper B-Line Division of Eaton Corp.
    b. Powers Fasteners
    c. Or equal.

H. CONTRACTOR shall furnish and install all necessary supports, angle iron stands, miscellaneous steel, inserts, anchor bolts and hangers required for all equipment furnished under this Contract, unless otherwise noted. All supports shall meet the requirements of the applicable Sections of Division 05, Metals.

2.2 PAINTING

A. All pipe hangers, supports and restraints shall be painted as required in accordance with the requirements of Section 09 90 00, Painting.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Install all items as shown, specified, and as recommended by the manufacturer.

2. Request instructions from ENGINEER, in writing, when there is a conflict between the manufacturer's recommendations and the Contract Documents.

3. Present conflicts to ENGINEER, in writing, who will determine corrective measures to be taken.

4. Do not modify structures to facilitate installation of pipe hangers, supports and restraints, unless specifically approved by ENGINEER.

5. Installation to conform to requirements of all local and state codes.

6. Protection: Equipment shall be tightly covered and protected against dirt, water, and chemical or mechanical damage.

3.2 FIELD QUALITY CONTROL

A. Inspection:

1. Examine areas to receive plumbing piping and equipment hangers and supports and accessories for:
   a. Defects that adversely affect execution and quality of the Work.
   b. Deviations beyond allowable tolerances for pipe hangers, supports and restraints and accessories.
   c. Start the Work only when conditions are satisfactory.

2. The ENGINEER reserves the right to reject or authorize replacement of pipe hangers, supports and restraints and accessories found to defective.

3.3 ADJUSTING AND CLEANING

A. Adjusting:

1. Adjust all materials for proper settings.

B. Cleaning:

1. Thoroughly clean all pipe hangers, supports and restraints and accessories prior to installation.

2. Remove all dirt, rust, dust, etc. from all pipe hangers, supports and restraints in preparation for required painting.

3. Remove and dispose of all debris and waste from the Site resulting from installation.

3.4 MATERIAL SCHEDULES

A. Hangers, Supports and Restraints for Horizontal Piping:

1. Space supports and hangers for all piping no farther apart than shown below, unless otherwise shown:
   a. Copper Tube:
      1) All Pipes: 6 feet-0 inch on center.
   b. Steel Pipe:
      1) Pipes up to 1-inch: 6 feet-0 inch on center.
      2) Pipes 1-1/4-inch to 6-inch: 8 feet-0 inch on center.
   c. Cast-Iron Pipe:
      1) Two supports per length, maximum 5 feet-0 inches on center.

d. Plastic Pipe:
   1) 3 feet-0 inch on center for all sizes, unless otherwise recommended by manufacturer for 100°F ambient temperature.

2. Additional supports are to be provided at all changes of direction, at all no-hub fittings and couplings for cast iron pipe, and at all valves or other in-line devices installed in piping.

3. Rigid support sway bracing shall be provided at all changes of direction for piping 4" diameter and larger.

4. Mechanical restraints shall be installed at all fittings for changes of direction in drainage piping 4" and larger in accordance with the CISPI installation guidelines.

B. Hanger Rods: Size hanger rods according to the schedule below, unless noted otherwise.

Nominal Pipe (Inches)	Rod Diameter (Inches)
1/2 through 2	3/8
2-1/2 through 3-1/2	1/2
4 through 5	5/8
6	3/4

C. Supports for Vertical Piping:

1. Provide riser clamp placed under hub, fitting or coupling with approved solid bearing on steel sleeve at each floor level.

2. Where riser clamps are used with plastic piping they shall be modified so as not to exert any compressive forces on the pipe.

3. Support spacing shall not exceed code requirements.

4. Piping support intervals shall not exceed those listed in Paragraph 3.4.A., above.

5. Additional supports shall be placed immediately adjacent to any change in piping direction, and on both sides of valves and couplings.

6. Accurately locate inserts for hanger rods in forms before concrete is placed.

7. Use Type 304 stainless steel expansion anchor assemblies of the capsule polyester resin adhesive type and only to support rods, hangers and brackets for piping 1-inch and smaller no other type will be considered and only if the expansion anchors are designed to carry 100 percent of the full load, hanger, and/or bracket and pipe load.

D. Structural members shall conform to Section 05 50 00, Metal Fabrications.

E. Allow clearances for expansion and contraction of piping.

F. Anchors shall be designed to prevent any pipe movement at pipe anchorage points. Anchors shall be securely fastened to the construction directly or indirectly through structural framing:

1. Piping 2-1/2-inches and Smaller: Anchor horizontal runs over 50 feet to midpoint to allow expansion toward expansion compensators (anchor intervals shall not exceed 30 feet) or elbows.

2. Piping 3-inches and Larger: Anchor horizontal runs over 100 feet at mid-points to force expansion toward expansion compensators.

3. Provide alignment guides in accordance with expansion compensator manufacturer recommendations.

G. Locate first set of alignment guides within four pipe diameters of the anchor or expansion compensator, the second set of pipe alignment guides shall be located within fourteen pipe diameters of the first guides.

END OF SECTION

SECTION 22 05 53

IDENTIFICATION OF PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install pipe labels, stencils, valve tags, equipment plates, and other identification specified herein.

B. Related Sections:

1. Section 22 07 19, Plumbing Piping Insulation.
2. Section 22 11 16, Domestic Water Piping.
3. Section 22 11 23, Domestic Water Pumps.
4. Section 22 13 16, Sanitary Waste and Vent Piping.
5. Section 22 18 00, Natural Gas Piping System.
6. Section 22 33 00, Domestic Water Heaters.

1.2 REFERENCES

A. Standards referenced in this Section are listed below:

1. American National Standards Institute (ANSI):
   a. ANSI Z535.1, Safety Color Code
2. American Society of Mechanical Engineers (ASME):
   a. ASME A13.1, Scheme for the Identification of Piping Systems.

1.3 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Company specializing in manufacturing products specified in this section with minimum five years documented experience. Submit names and qualifications to ENGINEER.

B. Installer's Qualifications: Contractor specializing in performing work of this section with minimum five years documented experience. Submit names and qualifications to ENGINEER.

C. Regulatory Requirements: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

1. Local and State Building Codes and Ordinances.

1.4 SUBMITTALS

A. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.

2. Storage and handling requirements and recommendations.

3. Installation methods.

B. Provide the following project specific information:

1. Shop Drawings: Submit list of wording, symbols, letter size, and color coding for plumbing equipment, piping and valve identification.

2. Equipment Label Schedule: Provide a schedule of all equipment to be labeled with the proposed content for each label.

3. Pipe Label Schedule: Provide a schedule of each piping systems indicating a proposed nomenclature and location of all pipe markers.

4. Valve Tag Schedule: Provide a proposed valve numbering scheme and schedule for each piping system. Tabulate valve number, piping system, system abbreviation as shown on tag, room or space location of valve, normal-operating position (open, closed, or modulating), and variations for identification. Mark valves intended for emergency shut-off and similar special uses.

C. Closeout Submittals: Record actual as built locations of valve tags and update schedules accordingly.

1.5 DELIVERY, STORAGE AND HANDLING

A. Packing, Shipping, Handling and Unloading:

1. Deliver materials to the Site to ensure uninterrupted progress of the Work.

B. Storage and Protection:

1. Store materials to permit easy access for inspection and identification. Keep all material off the ground, using pallets, platforms, or other supports. Protect packaged materials from corrosion and deterioration.

C. Acceptance at Site:

1. All boxes, crates and packages shall be inspected by CONTRACTOR upon delivery to the Site. CONTRACTOR shall notify ENGINEER, in writing, if any loss or damage exists to equipment or components. Replace lost equipment or components and repair damage to new condition, in accordance with manufacturer's instructions.

1.6 GENERAL REQUIREMENTS

A. The Contract Documents show the general arrangement and extent of the Work to be completed. The exact location and arrangement of all parts shall be determined as the Work progresses. The exact location of all parts of the Work must be governed by the general building plans and the actual building conditions.

B. The Drawings show an indication of the arrangement of equipment, piping, valves, etc., and are as nearly correct as can be determined in advance of the actual construction of the Work. Piping, equipment, piping, etc. found to interfere with the construction of the building, plumbing apparatus and piping, electrical wiring or other obstructions, etc., must be changed in location to clear such obstructions.

C. The Drawings show the general arrangement of all systems. Should local conditions necessitate rearrangement of one or more of the systems, CONTRACTOR, before proceeding with the Work, shall prepare and submit complete drawings showing all details of the proposed rearrangement for written approval by the ENGINEER.

D. The Drawings do not show all offsets, fittings, accessories and details, which may be required. CONTRACTOR shall carefully examine all of the General Construction, Electrical, Mechanical, Structural and other Drawings and the respective Specifications for conditions which may affect the installation of the Work, and shall arrange the Work accordingly, furnishing all required items to meet such conditions which are not specified as work "by others", to complete the systems to the true extent of the Contract Documents.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Provide products of one of the following:

1. Brady North America
2. Brimar Industries, Inc.
3. Marking Services, Inc.

2.2 PIPE MARKERS

A. General:

1. Vinyl or vinyl cloth with permanent, pressure-sensitive adhesive.
2. Provide labels and adhesives of long lasting materials, resistant to moisture, oils, solvents, and weathering.
3. Provide separate flow directional arrows that conform with the above criteria.

B. Piping Labels: Include the full service identifier.

2.3 VALVE TAGS

A. Construction:

1. Material: Brass.
2. Size: 1-1/2-inch diameter.
3. Chain: Brass.
4. Lettering Size: 1/4-inch black filled letters over 1/2-inch high black filled numbers.

B. Legend:

1. C.W. - Cold Water.
2. G - Gas.
3. H.W. - Hot Water.
4. H.W.R. – Hot Water Return

5. B.H.W.S. – Boiler Hot Water Supply

6. B.H.W.R. - Boiler Hot Water Reterun

7. T.W. – Tempered Water

2.4 VALVE CHARTS

A. General:

1. Two required; 1/8-inch sheet acrylic in 8-1/2 by 11-inch extruded aluminum frame.

2. Charts: Typed or inked on mylar with the following information for each valve.
   a. Valve identification number.
   b. Valve location.
   c. Valve use.
   d. Valve size.
   e. Manufacturer's name and model number.

3. Submit sample valve tag with lettering.

2.5 EQUIPMENT NAMEPLATES

A. General: Equipment and motors to be furnished with stainless steel engraved nameplate by manufacturer. In addition, provide an engraved multi-layered plastic laminated nameplate for all plumbing equipment purchased for this project. Provide an additional engraved nameplate for each disconnect and controller connected to the plumbing equipment.

B. Mechanical Equipment: Provide a 1/16” thick black nameplate with white letters for all mechanical equipment. The nameplate shall be a minimum of 3” high x 6” wide. The nameplate shall be engraved with the Equipment Tag as shown on the mechanical drawings and schedules. The minimum letter height shall be 3/4”. If necessary, enlarge the size of the plate to accommodate the ¾” characters. Do not reduce the letter height. The nameplate shall be installed with either double faced adhesive or with stainless steel screws.

C. Disconnects and Controllers: Provide a 1/16” thick black nameplate with white letters for each disconnect or controller connected to the mechanical equipment. The nameplate shall be a minimum of 2” high x 4” wide. Coordinate the information to be engraved on each plate so that it exactly matches the nameplate on the equipment. The minimum letter height shall be ½”. Install these nameplates with 2 mil. Permanent double-faced acrylic adhesive covering the entire surface of the nameplate.

D. Access Panels: Provide a 1/16” thick white nameplate with black letters to identify access to concealed valves or equipment such as those found above acoustical ceilings tiles. The nameplate shall be ¾” high x 2 ½” wide. Coordinate the information to be engraved on each plate so that it exactly matches the valve tag or equipment nameplate. The minimum letter height shall be ¼”. Install these nameplates on the ceiling support to the right of the tile that would provide access. Nameplates should be installed using double faced 2 mil. permanent acrylic adhesive.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Install all items as shown, specified, and as recommended by the manufacturer.

2. Clean and prepare all surfaces for attachment of identification and apply adhesive appropriate to the environment.

3. Pipe labels are to be installed over insulation in a visible location for insulated piping.

4. Attach labels on horizontal runs to lower quarter of piping. Labels are to be visible when viewed from below.

5. Install separate flow directional arrows with each pipe label.

6. Identify piping where it is not permanently concealed by the structure:
   a. At each valve.
   b. On both sides of wall, floor, and ceiling penetrations.
   c. On each riser.
   d. On each leg of a tee.
   e. At connections to equipment.
   f. At least every 30-feet along continuous runs of exposed piping. and piping in ceiling spaces that are is accessible through ceiling tiles shall be identified every 10 feet. The distance shall be measured center to center.
   g. At least every 20-feet along continuous runs of compressed gas piping systems. Compressed gas piping systems in ceiling spaces that are accessible through ceiling tiles shall be identified every 10 feet. The distance measured shall be center to center.

7. Securely attach valve tags with brass chain at each valve.

8. Install equipment nameplate at each piece of equipment and at all panels.

3.2 FIELD QUALITY CONTROL

A. Inspection:

1. Examine all runs of piping, all valves, and all equipment to ensure that all piping, valves and equipment are provided with identification described herein.

2. Wherever identification is damaged, defective, or illegible, it is to be repaired or replaced.

3.3 CLEANING

A. Cleaning:

1. Thoroughly clean all labels, tags, and nameplates prior to completion of work.

2. Remove and dispose of all debris and waste from the Site resulting from installation.

END OF SECTION

SECTION 22 07 19

PLUMBING PIPING INSULATION

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install plumbing piping insulation complete with accessories.

2. The Contract Documents show the general arrangement and extent of the Work under this Section. Exact location and arrangement of all parts of the Work under this Section will be determined as the Work progresses. Exact location of the Work under this Section will be governed in part by building layout and conditions at the Site.

3. The Drawings do not show all offsets, fittings, accessories and details, for which insulation Work may be required. After examining the Contract Documents and conditions at the Site for conditions that affect the plumbing piping insulation Work, shall arrange the Work accordingly, providing all items required for such conditions that are not included under other Sections or other contracts to complete the systems.

B. Coordination:

1. Review installation procedures under this and other Sections and coordinate installation of items that must be installed with or before plumbing piping insulation Work.

2. Notify other contractors in advance of the installation of plumbing piping insulation to provide them with sufficient time for installing items included in their contracts that must be installed with or before plumbing piping insulation Work.

C. Related Sections:

1. Section 22 05 53 - Identification of Plumbing Piping and Equipment.

2. Section 22 11 16 – Domestic Water Piping.

1.2 REFERENCES

1. ANSI A117.1, Guidelines for Accessible and Usable Buildings and Facilities.

2. ASTM C449/C449M, Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finish Cement.

3. ASTM D1784, Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.

4. Federal Specification (FS) SS-C-160, Cement, Insulation, Thermal.

1.3 QUALITY ASSURANCE

A. Qualifications:

1. Installer:
   a. Engage installer regularly engaged in plumbing piping insulation installation and with experience installing the types of materials required; and employ only tradesmen with specific skill and experience in this type of Work. Submit name and qualifications to ENGINEER.
   b. Engage a single plumbing piping insulation installer for entire piping insulation system, with undivided responsibility for performance and other requirements.

B. Component Supply and Compatibility:

1. Obtain all products included in this Section regardless of component manufacturer, from a single piping insulation Supplier.

2. Plumbing piping insulation Supplier shall review and approve or prepare all Shop Drawings and other submittals for components furnished under this Section.

3. Components shall be suitable for specified service conditions and shall be integrated into overall assembly by plumbing piping insulation Supplier.

C. Regulatory Requirements: Comply with the following.

1. Americans with Disabilities Act (ADA).

2. State and Local building codes and ordinances

1.4 SUBMITTALS

A. Action Submittals: Submit the following:

1. Product Data:
   a. Manufacturer’s literature, illustrations, specifications, and engineering data.

b. Other technical data related to specified materials as requested by ENGINEER.

B. Informational Submittals: Submit the following:

1. Manufacturer's Instructions:
   a. Manufacturer's recommended installation instructions.

2. Qualifications Statements:
   a. Installer.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packing, Shipping, Handling, and Unloading:

1. Deliver products to Site to ensure uninterrupted progress of the Work.

2. Inspect all boxes, crates, and packages upon delivery to Site and notify ENGINEER in writing of loss or damage to products. Promptly remedy loss and damage to new condition per manufacturer's instructions.

3. Conform to Section 01 65 00, Product Delivery Requirements.

B. Storage and Protection:

1. Keep all products off ground using pallets, platforms, or other supports, in covered storage. Protect materials from damage and deterioration.

2. Prevent condensation in materials and packaging in accordance with manufacturer's recommendations for long-term storage

3. Conform to Section 01 66 00, Product Storage and Handling Requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Fiberglass Insulation:

1. Products and Manufacturers: Provide one of the following:
   a. Owens-Corning Fiberglass Corporation, Fiberglass SSL II with ASJ Max Fiberglass.
   b. Johns Manville Division of Berkshire Hathaway, Micro-Lok HP
   c. Or equal.

2. Type: Heavy-density pre-formed fiberglass sectional pipe insulation with factory-applied indoor foil or polymer jacketing with self-sealing lap.

3. Thermal Conductivity: 0.25-0.29 Btu-inch per hour per square foot per degree F at 125 degrees F mean temperature. Insulation thicknesses shall be as indicated in manufacturer's installation guidelines, except that in no case shall insulation thicknesses be less than required by ASHRAE 90.1.

4. Fire Hazard Classification:
   a. Flame Spread: 25.
   b. Fuel Contributed: 50.
   c. Smoke Developed: 50.

5. Density: Three pounds per cubic foot (pcf) minimum.

6. Fittings: Molded fiberglass.

7. Jointing Materials: Manufacturer's recommended adhesives and tape.

8. Valve Insulation: Miter cut nesting size covering segments of same thickness as pipeline, for insulation of valves.

B. PVC Pipe Jacketing,Valve and Fitting Covers:

1. Manufacturers: Provide products of one of the following:
   a. Proto Corporation
   b. Speedline Corporation.
   c. Zeston by Johns Manville.
   d. Or equal.

2. Type: PVC Jacketing (for insulated piping and appurtenances located indoors, unless otherwise shown or indicated):
   a. 25/50 PVC, conforming to ASTM D1784, Class 16354-C and C-585
   b. Thickness: 20 mils.
   c. Color: White.
   d. Finish: Glossy.
   e. Temperature: Suitable for 150 degrees F, minimum.
   f. Provide insulation adhesive of other means of sealing jacketing per manufacturer insulation instructions.

C. Handicapped Lavatory Trim Insulation:

1. Products and Manufacturers: Provide one of the following:
   a. Lav Guard 2 by Truebro, Inc.
   b. Pro Wrap, by McGuire Manufacturing Company, Inc.
   c. Or equal.

2. Type: Flexible vinyl insulation for waste, traps, hot and cold water supplies.

3. References:
   a. ADA Article 4.19.4.
   b. ANSI A117.1.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine conditions under which materials are to be installed and notify ENGINEER in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General:

1. Piping systems to be insulated and associated insulation thicknesses are specified in the schedule at the end of this Section.

2. Thoroughly clean all piping, insulation, and accessories prior to installation.

3. Remove from piping all dirt, rust, dust, and other materials detrimental to proper installation of insulation.

4. Install items as shown, specified, and as recommended by manufacturer.

5. Request interpretation from ENGINEER if there is conflict between manufacturer's recommendations and the Contract Documents.

6. Do not modify structures to facilitate installation of piping insulation unless approved by ENGINEER.

7. Installation of plumbing piping insulation shall conform to Laws and Regulations.

8. Surfaces of piping, valves, and fittings shall be clean and dry before applying insulation.

9. Install piping insulation after associated piping system has been successfully tested.

10. Provide high-density insulation pipe support inserts at each hanger and shield extending halfway up the pipe insulation cover and extending along pipe at least six inches on each side of hanger. Securely fasten shield with pipe straps at each end. Insulate pipe anchors adequately to prevent moisture condensation problems.

11. Cover insulated surfaces of outdoor piping with stainless steel jacketing neatly fitted and firmly secured. Lap the seams at least two inches. Apply over vapor barrier, where applicable.

12. Protection: Piping insulation materials applied each day shall have vapor barrier applied the same day and exposed ends shall be temporarily protected with moisture barrier and sealed to pipe.

3.3 ADJUSTING

A. Adjusting:

1. Adjust or replace, as required, poorly-fitted joints.

3.4 SCHEDULES

A. Piping Insulation Schedule: Insulate plumbing piping as specified below, unless otherwise specified or shown:

1. All hot, cold and recirculation piping 2.5-inch diameter and smaller: Insulation thickness shall be one-inch minimum.

2. All hot, cold and recirculation piping three-inch diameter and larger: Insulation thickness shall be 1.5-inch minimum.

3. Insulate plumbing piping below handicapped lavatories. Thickness to be manufacturer's standard thickness as specified in Part 2 of this Section.

END OF SECTION

SECTION 22 10 53

INSTALLATION OF PLUMBING PIPING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified, and required to furnish and install plumbing piping systems complete with accessories.

B. Coordination:

1. Review installation procedures under this and other Sections and coordinate the installation of items that must be installed with, or before, the installation of plumbing piping Work.

2. Notify other contractors in advance of the installation of the installation of plumbing piping to provide them with sufficient time for the installation of items included in their contracts that must be installed with, or before, the installation of plumbing piping Work.

C. Related Sections:

1. Section 09 90 00, Painting.

1.2 REFERENCES

A. Standards referenced in this Section are listed below:

1. American National Standards Institute, (ANSI).
   a. ANSI B13.1, Code for Pressure Piping.
   b. ANSI B31.1, Power Piping.

2. American Society for Testing and Materials, (ASTM).

3. American Welding Society, (AWS).
   a. AWS D10.9, Welding Procedures and Welders for Piping and Tubing.

4. Institute of Electrical and Electronic Engineers, (IEEE).

5. National Electrical Code, (NEC).

6. National Electrical Manufacturers' Association, (NEMA).

7. National Fire Protection Association, (NFPA).

8. Underwriters' Laboratories, Incorporated, (UL).

1.3 QUALITY ASSURANCE

A. Installer’s Qualifications:

1. Engage a single installer regularly engaged in plumbing piping installation and with experience in the installation of the types of materials required; and who agrees to employ only tradesmen with specific skill and experience in this type of Work. Submit name and qualifications to ENGINEER.

2. Engage a single installer for the entire plumbing piping system with undivided responsibility for performance and other requirements.

B. Regulatory Requirements: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

1. Local and State Building Codes and Ordinances.

2. Permits: CONTRACTOR shall obtain and pay for all required permits, fees and inspections.

C. Component Supply and Compatibility:

1. Obtain all equipment included in this Section regardless of the component manufacturer from a single installation of plumbing piping manufacturer.

2. The installation of plumbing piping manufacturer to review and approve or to prepare all Shop Drawings and other submittals for all components furnished under this Section.

3. All components shall be specifically constructed for the specified service conditions and shall be integrated into the overall assembly by the installation of plumbing piping manufacturer.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:

1. Shop Drawings:
   a. 1/4-inch scale piping layouts, dimensioned to show length of piping runs, pipe sizes, support spacing and expansion provisions.
   b. Details of installation, including piping supports.

c. Submit pipe schedule with laminate construction, sizes, thickness, vacuum pressure, weight per foot pressure, spans, joint type and flange data.

2. Product Data:
   a. Manufacturer's literature, illustrations, specifications and engineering data.
   b. Flexible connections.
   c. Other technical data related to the specified material and equipment as requested by ENGINEER.
   d. Gasket material.

B. Informational Submittals: Submit the following:

1. Qualifications Statements:
   a. Installer’s qualifications.

C. Closeout Submittals: Submit the following:

1. Record Drawings:
   a. During progress of the Work keep an up-to-date set of the Drawings showing field and Shop Drawing modifications. Immediately upon completion of the piping Work submit CADD drawings showing the actual in-place installation of all piping and equipment installed under this Section at a scale satisfactory to the OWNER. The Record Drawings shall show all piping on plans and in sections, with all reference dimensions and elevations required for complete Record Drawings of the piping systems. Two paper prints shall also be furnished. The prints and electronic copies of the CADD files shall be furnished no later than 30 days after completion of the Contract and prior to final payment.

1.5 DELIVERY, STORAGE AND HANDLING

A. Packing, Shipping, Handling and Unloading:

1. Deliver materials to the Site to ensure uninterrupted progress of the Work. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete, in ample time to prevent delay of the Work.

B. Storage and Protection:

1. Store materials to permit easy access for inspection and identification. Keep all material off the ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.

2. Store all equipment in covered storage off the ground and prevent condensation and in accordance with the manufacturer's recommendations for long-term storage.

C. Acceptance at Site:

1. All boxes, crates and packages shall be inspected by CONTRACTOR upon delivery to the Site. CONTRACTOR shall notify ENGINEER, in writing, if any loss or damage exists to equipment or components. Replace lost equipment or components and repair damage to new condition, in accordance with manufacturer's instructions.

1.6 GENERAL REQUIREMENTS

A. The Contract Documents show the general arrangement and extent of the Work to be completed. The exact location and arrangement of all parts shall be determined as the Work progresses. The exact location of all parts of the Work must be governed by the general building plans and the actual building conditions.

B. The Drawings show an indication of the arrangement of equipment, piping, valves, etc., and are as nearly correct as can be determined in advance of the actual construction of the Work. The piping, equipment, ducts, etc. found to interfere with the construction of the building, plumbing apparatus and piping, electrical wiring or other obstructions, etc., must be changed in location to clear such obstructions.

C. The connections shown to the various units are intended as an indication only. The actual connections at the time of installation to be made and arranged as to fully and best suit the requirements of each particular case, adequately provide for expansion and perfect circulation and minimize the amount of space required for the same.

D. The Drawings show the general arrangement of all systems. Should local conditions necessitate rearrangement of one or more of the systems, CONTRACTOR, before proceeding with the Work, shall prepare and submit complete drawings showing all details of the proposed rearrangement for written approval by ENGINEER.

E. The Drawings do not show all offsets, fittings, accessories and details, which may be required. CONTRACTOR shall carefully examine all of the General Construction, Electrical, Mechanical, Structural and other Drawings and the respective Specifications for conditions which may affect the installation of the Work, and shall arrange the Work accordingly, furnishing all required items to meet such conditions which are not specified as work "by others," to complete the systems to the true extent of the Contract Documents.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Materials for piping system shall be specified under applicable Sections of Division 40, Process Integration.

2.2 PAINTING

A. All equipment and accessories shall be painted in accordance with the requirements of Section 09 90 00, Painting.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Install all items as shown, specified, and as recommended by the manufacturer.

2. Request instructions from ENGINEER, in writing, when there is a conflict between the manufacturer's recommendations and the Contract Documents.

3. Present conflicts to ENGINEER, in writing, who will determine corrective measures to be taken.

4. Do not modify structures to facilitate installation of piping, unless specifically approved by ENGINEER.

5. Installation to conform to requirements of all local and state codes.

6. Properly plug or cap the open ends of all piping at the end of each day's Work or other stopping point through construction. Equipment shall be tightly covered and protected against dirt, water, and chemical or mechanical damage.

3.2 FIELD QUALITY CONTROL

A. Field Tests:

1. Fill all systems and fully test all equipment, valves, piping, etc. in operation.

2. Check for excessive vibration while all systems are operating.

3. Installed systems and components will not be released to OWNER unless all systems have been tested and approved by the ENGINEER.

B. Inspection:

1. Examine areas to receive piping, valves and accessories for:
   a. Defects that adversely affect execution and quality of the Work.
   b. Deviations beyond allowable tolerances for piping, valves and accessories.
   c. Start the Work only when conditions are satisfactory.

2. The ENGINEER reserves the right to reject or authorize replacement of piping and accessories found to be defective.

3.3 ADJUSTING AND CLEANING

A. Adjusting:

1. While system is operable, balance all equipment, valves, etc. to achieve design conditions.

B. Cleaning:

1. Thoroughly clean all piping, fittings, valves, and accessories prior to installation.

2. Remove all dirt, rust, dust, etc. from piping in preparation for painting.

3. Remove and dispose of all debris and waste from the Site resulting from installation.

END OF SECTION

SECTION 22 10 63

TESTING OF PLUMBING PIPING SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified, and required to complete all testing of the plumbing piping systems.

B. Coordination:

1. Review installation procedures under this and other Sections and coordinate the installation of items that must be installed with, or before, the testing of plumbing piping systems Work.

2. Notify other contractors in advance of the installation of the testing of plumbing piping systems to provide them with sufficient time for the installation of items included in their contracts that must be installed with, or before, the testing of plumbing piping systems Work.

C. Related Sections:

1. Section 09 90 00, Painting.

1.2 REFERENCES

A. Standards referenced in this Section are listed below:

1. American National Standards Institute, (ANSI).

2. American Society for Testing and Materials, (ASTM).

3. Institute of Electrical and Electronics Engineers, (IEEE).

4. National Electrical Manufacturers' Association, (NEMA).

5. National Fire Protection Association, (NFPA).
   a. NFPA 99, Standard for Health Care Facilities.

6. Underwriters' Laboratories, Incorporated, (UL).

1.3 QUALITY ASSURANCE

A. Installer's Qualifications:

1. Contractor regularly engaged in testing of plumbing piping systems and who agrees to employ only tradesmen with specific skill and experience in this type of Work. Submit name and qualifications to ENGINEER.

B. Regulatory Requirements: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

1. Local and State Building Codes and Ordinances.

2. Permits: CONTRACTOR shall obtain and pay for all required permits, fees and inspections.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:

1. Product Data:
   a. Submit manufacturer's literature and samples for the valve tags.

2. Testing Plans, Procedures, and Testing Limitations:
   a. Description of proposed testing method, procedures, and apparatus to the ENGINEER for approval at least 48 hours in advance of testing.

B. Informational Submittals: Submit the following:

1. Site Quality Control Submittals:
   a. Submit a test report for each test to the ENGINEER certifying the test pressure, duration of test, and test performance of all installed piping.

2. Qualifications Statements:
   a. Installer's qualifications.

PART 2 - PRODUCTS

2.1 GENERAL

A. Provide all necessary equipment and materials, including gages and pumps, to perform the testing operations.

PART 3 - EXECUTION

3.1 GENERAL

A. Conduct water, air and smoke tests as required, on all piping systems as specified below.

B. Conduct all tests in the presence of, and in a manner approved by ENGINEER, all state and local authorities having jurisdiction. Repeat test for these authorities if requested by them.

C. Repair and retest all lines, which do not pass the tests as specified herein.

D. Inspect all valves, joints, and specialties for tightness and for proper operation while under test pressure.

E. Properly plug or cap the open ends of all piping at the end of each day's Work or other stopping point through the testing. Piping shall be tightly covered and protected against contamination.

3.2 FIELD QUALITY CONTROL

A. Water Tests:

1. Drainage and Vent system piping:
    a. Perform tests either on the entire system or on successive sections of the system.
    b. Tightly close all openings, except the highest opening of the system or section to be tested.
    c. Fill the system or section with water to the point of overflow.
    d. Test with a head of at least ten feet of water, except for the uppermost ten feet of the system.
    e. Allow water to stand in the system for at least 15 minutes before inspecting.
    f. Inspect the system or section for leaks, and repair any leaks found.

2. Water Piping:
    a. Water piping shall be tested and proved tight under a pressure not less than 1-1/2 times the working pressure under which it is to be used, but not less than 100 psig for 30 minutes with no loss of pressure.
    b. Potable water shall be used for testing potable water systems. Non-potable water shall be used for testing non-potable water systems.

B. Air Tests:

1. Attach air compressor testing apparatus to any suitable opening after closing all other inlets and outlets. Force dehydrated oil-less compressed air, pressure dew point -40ºF, into system until there is a uniform gage pressure without the introduction of additional air. Below is a list of required gage pressures:
   a. Drainage and Vent Piping (substitute for water test): Five psi for 15 minutes.

C. Smoke Tests:

1. Finished Plumbing: Final test for water tightness of the completed drainage and vent system:
   a. Fill all traps with water.
   b. Introduce a pungent thick smoke, produced by one or more smoke machines, into the system.
   c. When the smoke appears at stack openings on the roof, close the system.
   d. Maintain a pressure in the system equivalent to a 1-inch water column for the period of the inspection.
   e. Inspect the system for leaks and repair any leaks found.

END OF SECTION

SECTION 22 11 16

DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified, and required to furnish and install domestic water piping systems complete with accessories.

B. Coordination:

1. Review installation procedures under this and other Sections and coordinate the installation of items that must be installed with, or before, the domestic water piping systems Work.

2. Notify other contractors in advance of the installation of the domestic water piping systems to provide them with sufficient time for the installation of items included in their contracts that must be installed with, or before, the domestic water piping systems Work.

C. Related Sections:

1. Section 09 90 00, Painting.

2. Section 22 05 27, Pipe Sleeves for Plumbing

3. Section 22 05 29, Hangers and Supports for Plumbing Piping

4. Section 22 05 53, Identification of Plumbing Piping and Equipment.

5. Section 22 05 93, Disinfection of Plumbing Piping

6. Section 22 07 19, Plumbing Piping Insulation

7. Section 22 10 53, Installation of Plumbing Piping

8. Section 22 10 63, Testing of Plumbing Piping

1.2 REFERENCES

A. Standards referenced in this Section are listed below:

1. ADA Accessibility Guidelines (ADAAG)

2. ANSI A13.1, Scheme for Identification of Piping Systems.

3. ANSI A21.1, Practice Manual, Computation Strength, Thickness.

4. ANSI A21.10, Cast-Iron and Ductile Iron Fittings, 2-inches through 48-inches, for Water (AWWA C110).

5. ANSI A21.51, Ductile-Iron Pipe Centrifugally Cast, in Metal Molds (AWWA C151).

6. ANSI A112.1.2, Air Gaps in Plumbing System.

7. ANSI B16.1, Cast-Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 150 and 800.

8. ANSI B16.18, Cast Copper Alloy Solder Joint Pressure Fittings.

9. ANSI B16.22, Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings (ASME B16.22).

10. ANSI B16.24, Cast Copper Alloy Pipe Flanges and Flanged Fittings, 150 and 300 lbs (ASME B16.24).

11. ANSI B16.26, Cast Copper Alloy Fittings for Flared Copper Tubes.

12. ANSI B16.39, Malleable Iron Threaded Pipe Unions.

13. ANSI B16.42, Ductile Iron Pipe Flanges and Flanged Fittings.

14. ANSI B40.1, Gages - Pressure Indicating Dial - Elastic Element.

15. ANSI H 23.1, Seamless Copper Water Tube, (ASTM B 88).

16. American Society of Sanitary Engineers (ASSE), ASSE 1001, Performance Requirements for Atmospheric Type Vacuum Breakers.

17. ASSE 1018, Trap Seal Primer Valves – Water Supply Fed.

18. ASTM A 126, Specification for Gray Iron Casting for Valves, Flanges and Pipe Fittings.

19. ASTM A 307, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

20. ASTM B 32, Specification for Solder Metal.

21. ASTM B 62, Specification for Composition Bronze or Ounce Metal Castings.

22. ASTM B 88, Specification for Seamless Copper Water Tube.

23. ASTM D 1330, Specification for Rubber-Sheet Gaskets.

24. FS O-F-506, Flux, Soldering: Paste and Liquid.

25. FS WW-U-516, Unions, Brass or Bronze, Threaded Pipe Connections and Solder-Joint Tube Connections.

26. Plumbing and Drainage Institute (PDI), PDI WH 201, Water Hammer Arresters.

27. NSF 61: Drinking Water System Components – Health Effects

28. NSF 372: Drinking Water System Components – Lead Content

29. The United States Safe Drinking Water Act

1.3 QUALITY ASSURANCE

A. Installer's Qualifications:

1. Engage a single installer regularly engaged in domestic water piping installation and with experience in the installation of the types of materials required; and who agrees to employ only tradesmen with specific skill and experience in this type of Work. Submit name and qualifications to ENGINEER.

2. Engage a single installer for the entire domestic water piping system with undivided responsibility for performance and other requirements.

B. Regulatory Requirements: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

1. Local and State Building Codes and Ordinances.

C. Component Supply and Compatibility:

1. Obtain all equipment included in this Section regardless of the component manufacturer from a single domestic water piping systems manufacturer.

2. The domestic water piping systems manufacturer to review and approve or to prepare all Shop Drawings and other submittals for all components furnished under this Section.

3. All components shall be specifically constructed for the specified service conditions and shall be integrated into the overall assembly by the domestic water piping systems manufacturer.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:

1. Shop Drawings:
   a. 1/4-inch scale piping layouts, dimensioned to show length of piping runs, pipe sizes, support spacing and expansion provisions.
   b. Details of installation, including piping supports.
   c. Submit pipe schedule with laminate construction, sizes, thickness, vacuum pressure, weight per foot pressure, spans, joint type and flange data.

2. Product Data:
   a. Manufacturer's literature, illustrations, specifications and engineering data.
   b. Flexible connections.
   c. Other technical data related to the specified material and equipment as requested by ENGINEER.
   d. Gasket material.

B. Informational Submittals: Submit the following:

1. Qualifications Statements:
   a. Installer’s qualifications.

C. Project Closeout Submittals: Submit the following:

1. Record Documentation:
   a. During progress of the Work keep an up-to-date set of the Drawings showing field and Shop Drawing modifications. Immediately upon completion of piping Work, submit CADD drawings showing the actual in place installation of all piping and equipment installed under this Section at a scale satisfactory to the OWNER. The drawings shall reflect all of the piping Work on plans and in sections, with all reference dimensions and elevations required for complete Record Drawings of the piping systems. Two paper prints shall also be furnished. The prints and electronic copies of the CADD files shall be furnished no later than 30 days after completion of the Contract and prior to final payment.

1.5 DELIVERY, STORAGE AND HANDLING

A. Packing, Shipping Handling and Unloading:

1. Deliver materials to the Site to ensure uninterrupted progress of the Work. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete, in ample time to prevent delay of the Work.

B. Storage and Protection:

1. Store materials to permit easy access for inspection and identification. Keep all material off the ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.

2. Store all equipment in covered storage off the ground and prevent condensation and in accordance with the manufacturer's recommendations for long-term storage.

C. Acceptance at Site:

1. All boxes, crates and packages shall be inspected by CONTRACTOR upon delivery to the Site. CONTRACTOR shall notify ENGINEER, in writing, if any loss or damage exists to equipment or components. Replace lost equipment or components and repair damage to new condition, in accordance with manufacturer's instructions.

1.6 GENERAL REQUIREMENTS

A. The Contract Documents show the general arrangement and extent of the Work to be completed. The exact location and arrangement of all parts shall be determined as the Work progresses. The exact location of all parts of the Work must be governed by the general building plans and the actual building conditions.

B. The Drawings show an indication of the arrangement of equipment, ducts, valves, etc., and are as nearly correct as can be determined in advance of the actual construction of the Work. Piping, equipment, ducts, etc. found to interfere with the construction of the building, plumbing apparatus and piping, electrical wiring or other obstructions, etc., must be changed in location to clear such obstructions, without additional cost to the OWNER.

C. The connections shown to the various units are intended as an indication only. The actual connections at the time of installation to be made and arranged to suit the requirements of each case, adequately provide for expansion and perfect circulation and minimize the amount of space required for the same.

D. The Drawings show the general arrangement of all systems. Should local conditions necessitate rearrangement of one or more of the systems, CONTRACTOR, before proceeding with the Work, shall prepare and submit complete drawings showing all details of the proposed rearrangement for written approval by the ENGINEER.

E. The Drawings do not show, all offsets, fittings, accessories and details, which may be required. CONTRACTOR shall carefully examine all of the General Construction, Electrical, Mechanical, Structural and other Drawings and the respective Specifications for conditions which may affect the installation of the Work, and shall arrange the Work accordingly, furnishing all required items to meet such conditions which are not specified as work "by others", to complete the systems to the true extent of the Contract Documents.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. General Requirements:

1. All piping, couplings and fittings to be used in the potable domestic water distribution system shall be certified NSF 61 Annex G/NSF 372 lead-free.

2. All piping and fittings to be used for domestic water shall comply with the current requirements of the United States Safe Drinking Water Act.

B. Copper Water Tube:

1. Tube:
   a. Reference: ANSI H23.1, ASTM B 88.
   b. Type: K or L.
   c. Temper: Hard-drawn or soft-annealed.

2. Fittings:
   a. Reference: ANSI B16.22.
   b. Reference: ANSI B16.26.
   c. Reference: ANSI B16.18.

3. Joints:
   a. Sweat:
      1) Solder Metal: ASTM B 32, Type 95-5TA.
      2) Flux: FS O-F-506, Type 1.
   b. Flanged:
      1) Flanges: ANSI B16.24, 150 lb. class.
      2) Gaskets: Red rubber, ASTM D 1330, Grade 1, 1/8-inch thick.
      3) Nuts and Bolts: ASTM A 307.

4. Unions:
    a. Reference: FS WW-U-516.
    b. Material: Bronze.
    c. Rating: 250 lb. W.O.G.

C. Dielectric Couplings:

1. Manufacturers: Provide products of one of the following:
    a. Hart Industrial Unions, LLC
    b. SSP Corporation
    c. Watts
    d. Mueller Industries.
    e. Or equal.

2. Type: Union or flange.

3. Ratings:
    a. Unions: 250 psi, ANSI B16.39.
    b. Flanges: 175 psi, ANSI B16.42 (Iron), ANSI B16.24 (Bronze).

4. Reference: NSF/ANSI 61-G.

2.2 VALVES

A. General Valves Requirements:

1. All valves and appurtenances to be used in the potable domestic water distribution system shall be certified NSF 61 Annex G/NSF 372 lead-free. Where specified products are third-party certified lead-free, uncertified products shall not be acceptable equals for substitution.

2. All valves, and appurtenances to be used for domestic water shall comply with the current requirements of the United States Safe Drinking Water Act.

B. Bronze Body Globe Valves:

1. Products and Manufacturers: Provide one of the following:
    a. Apollo Valves, 120S-LF Series
    b. Milwaukee Valve, Fig. No. UP1502
    c. Or equal.

2. Type: Composition disc, screwed bonnet.

3. Materials: Lead-free Brass and bronze.

4. Rating: 150 lb. SWP.

5. End Connections: Solder joint.

C. Bronze Body Check Valves:

1. Products and Manufacturers: Provide one of the following:
   a. Apollo Valves., 161S-LF Series
   b. Milwaukee Valve, Fig. No. UP1502
   c. Or equal.

2. Type: Swing, bronze disc, screw-in cap.

3. Materials: Lead-free Brass and bronze.

4. Rating: 200 PSI CWP

5. End Connections: Solder joint.

D. Bronze Body Ball Valves:

1. Products and Manufacturers: Provide one of the following:
   a. Apollo Valves, 77FLF-200 Series
   b. Milwaukee Valve, Fig. No. UPBA150S
   c. Or equal.

2. Type: Non-blowout stem, two-piece, quarter turn, full port ball valve.

3. Materials:
   a. Body: Lead-free bronze or brass.
   b. Ball: Chrome plated brass.
   c. Packing and Seats: Teflon.

4. Rating: 200 PSI CWP.

5. End Connections: Soldered End.

E. Mechanical Master Mixing Valve (Tempering Valve):

1. Manufacturers: Provide products of one of the following:
   a. Powers, Series LFLM490-10.
   b. Wilkins, Model No. ZW1017XL.
   c. Or equal.

2. Type: Thermostatically operated water-blending device.

3. Materials:
   a. Body: Brass.
   b. Vanes: Brass.

4. Thermostatic element to be located in main body of valve.

5. Minimum Flow: 0.5 gpm.

6. Low outlet temperature type valve shall be adjustable from 60 to 110°F.

7. Test Pressure: 300 psi.

8. Reference: NSF/ANSI 61-G.

F. Point-of-Use Thermostatic Anti-Scalding Valve:

1. Products and Manufacturers: Provide products of one of the following:
   a. Watts, Series LFMMV
   b. Zurn, ZW-1070XL
   c. Or equal

2. Type: Thermostatically operated point-of-use anti-scalding with integral supply checks.

3. End Connection: Soldered-end.

4. Maximum Supply Pressure: 150 PSI

5. Maximum Supply Temperature: 180º F

6. Approvals: ASSE 1070, NSF 61/372

2.3 EQUIPMENT

A. Washing Machine Valve:

1. Products and Manufacturers: Provide one of the following:
   a. Watts 2-M2
   b. Zurn WM-2960
   c. Or equal.

2. Description:
   a. Single lever for Shutoff on both hot and cold water supply.
   b. Ball type construction for water to flow when valve is on.
   c. Throttling to minimize the effect of quick closing washing machine solenoid valves.
   d. Prevents flooding due to burst washing machine hoses
   e. Materials: Brass body, with copper ell dual adapters for 1/2” solder or 5/8” compression.

B. Water Hammer Arresters:

1. Products and Manufacturers: Provide one of the following:
   a. Zurn-Wilkins Division of Zurn Industries, 1260XL Series
   b. Watts, LF15 Series
   c. Or equal.

2. Materials:
    a. Casing: Copper Tube
    b. Piston: Polycarbonate
    c. Tailpiece: Low-lead brass

3. Connection: Male NPT thread.

4. Maximum Working Pressure: 250 PSIG.

5. Sizing and Certification: PDI WH 201.

6. References: ASSE 1010, NSF 61 / NSF372

C. Pipe Labels:

1. Type: Self-adhering, temperature resistant, waterproof, corrosion resistant.

2. Marker size, marker color, legend size, and legend color shall conform to ANSI A13.1.

D. Automatic Air Vents:

1. Manufacturers: Provide products of one of the following:
    a. Armstrong Fluid Technologies.
    b. Bell and Gossett.
    c. Or equal.

2. Type: Automatic vent air eliminator with built-in air chamber.

3. Construction:
    a. Body: Bronze.
    b. Finish: Chrome plated exterior.
    c. Overflow Connector: Provide connection for 1/4-inch OD copper tubing.

4. Ratings: 75 psig working pressure.

5. References: NSF 61/NSF 372

E. Thermometers:

1. Manufacturers: Provide products of one of the following:
    a. H.O. Trerice Company.
    b. Weksler Instruments Division of Ashcroft, Inc.
    c. Or equal.

2. Range: 30°F to 240°F temperature range in maximum of 2°F increments.

3. Type: Adjustable Angle Column Type Thermometer.
    a. Construction:
        1) Scales and Lens: Nine-inch high satin finish aluminum scales, black numerals, front reading tubes for non-mercury fluid.
        2) Wells: Insertion well with brass separable sockets.
        3) Neck: 2-1/2-inch extension neck.
        4) Case: Cast aluminum.
        5) Window: Glass or clear acrylic plastic.

F. Pressure Gages:

1. Manufacturers: Provide products of one of the following:
    a. H.O. Trerice Company.
    b. Weksler Instruments Division of Ashcroft, Inc.
    c. Or equal.

2. Reference ANSI B40.1 for Grade AA gages.

3. Type: Direct mounted, dial type pressure gage.

4. Construction:
    a. Case: Six-inch diameter cast aluminum, flangeless with black finish and bottom 1/4-inch N.P.T.
    b. Ring: Chrome plated close type.
    c. Dial: White face, black numbers and graduations.
    d. Window: Glass or clear acrylic plastic.
    e. Pointer: Micrometer type, black finish, red tip.
    f. Movement: Stainless steel, rotary type, delrin sector and bushings.
    g. Bourdon Tube: Type 316 stainless steel
    h. Socket and Tip: Forged brass, alloy steel and Type 316 stainless steel.

5. Accuracy: One percent minimum.

6. Gage Cocks: Provide brass tee handle isolation cock before each gage.

7. All gauges are to be filled with non-mercury organic fluids.

G. Vacuum Breakers:

1. Atmospheric Type: AVB:
    a. Products and Manufacturers: Provide one of the following:
        1) Apollo Valves, Series38LF-100
        2) Watts, Series LF288A.
        3) Or equal.
    b. Type: An assembly containing an air inlet valve, a check seat and an air inlet port to prevent reverse flow of water and allow air into the water line to break a siphon.

c. Materials:
   1) Hood: Polished Chrome Finish
   2) Body: Lead-Free Bronze.
   3) Vent Disc: Silicone.
   4) Disc Holder Float: Polyethylene.
   5) Body: Lead-Free Bronze.
d. Reference: ASSE 1001.
e. Working Pressure: 210°F at 125°F.
f. Installation: Vertical, minimum 6-inches above fixture vacuum breaker serves.

H. Aquastats:

1. Manufacturers: Provide products of one of the following:
   a. Honeywell.
   b. Johnson Controls.
   c. Or equal.

2. Type: Immersion type for regulating water temperature in hot water piping, , or hot water storage tanks.

3. Electrical Rating: 120 VAC.

4. Set point Range:
   a. Domestic Hot Water: Make contacts on temperature drop below 112°F; break contacts on temperature rise above 120°F.
   b. Tepid Water: Make contacts on temperature drop below 70°F; break contacts on temperature rise above 90°F.

5. Adjustment: Adjustable setpoint through knob on cover.

6. Differential: Adjustable 3°F to 10°F.

7. Accessories: Provide immersion well.

I. Trap Primer Valve:

1. Manufacturers: Provide products of one of the following:
   a. MIFAB series M-500
   b. Watts series LFTP300.
   c. Or equal.

2. Construction:
   a. Body: Brass.
   b. Seals: O-ring 40°F to 450°F.
   c. Inlet and Outlet Size: 1/2-inch.
   d. Integral backflow preventer.
   e. Provide multiple outlet distribution units, as required.
   f. Reference: ASSE 1018, NSF 61/NSF 372
   g. Accessories: Floor drain trap primer distribution unit.

2.4 PAINTING

A. Piping and accessories shall be painted in accordance with Section 09 90 00, Painting.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Install all items as shown, specified, and as recommended by the manufacturers.

2. Request instructions from ENGINEER, in writing, when there is a conflict between the manufacturer's recommendations and the Contract Documents.

3. Present conflicts between piping systems and/or equipment and/or structures to ENGINEER, in writing, who will determine corrective measures to be taken.

4. Do not modify structures to facilitate installation of piping, unless specifically approved by ENGINEER.

5. Installation shall conform to requirements of all local and state codes.

6. Properly plug or cap the open ends of all piping at the end of each day's Work or other stopping point through construction. Equipment shall be tightly covered and protected against dirt, water, and chemical or mechanical damage.

7. Unless otherwise required by the tubing manufacturer or AHJ, copper tubing, fittings, couplings, and soldered joints shall be installed according to methods and procedures described in "The Copper Tube Handbook" reference publication by the Copper Development Association.

8. All valves and equipment are to be installed perfectly plumb and level, in horizontal runs of piping (except where specifically indicated for vertical piping installation).

9. All required access shall be provided for valves and equipment. Where valves or equipment are installed behind walls, above ceilings, or in otherwise inaccessible locations,

10. All fixtures are to be installed perfectly plumb and level with finished walls and floors and are to be in perfect working condition.

11. All workmanship is to be neat, clean, and free of any visible defect or damage.

3.2 FIELD QUALITY CONTROL

A. Field Tests:

1. Fill all systems and fully test all equipment, valves, dampers, etc. in operation.

2. Check for excessive vibration while all systems are operating.

3. Installed systems and components will not be released to OWNER, unless all systems have been tested and approved by the ENGINEER.

B. Inspection:

1. Examine areas to receive piping, valves and accessories for:
   a. Defects that adversely affect execution and quality of the Work.
   b. Deviations beyond allowable tolerances for piping, valves and accessories.
   c. Start the Work only when conditions are satisfactory.

2. The ENGINEER reserves the right to reject or authorize replacement of piping and accessories found to defective.

3.3 ADJUSTING AND CLEANING

A. Adjusting:

1. Adjust all controls for proper settings.

2. While system is operable balance all equipment, valves, dampers, etc. to achieve design conditions.

B. Cleaning:

1. Thoroughly clean all piping, fittings, valves, and accessories prior to installation.

2. Remove all dirt, rust, dust, etc. from piping in preparation for painting.

3. Remove and dispose of all debris and waste from the Site resulting from installation.

3.4 MATERIAL SCHEDULES

A. Piping:

1. Use types of pipe and fittings as specified below, unless otherwise specified or shown.

2. All potable water supply, hot, cold and hot water circulation piping 2-1/2-inches and smaller, run within the interior of a building, shall be hard-drawn copper Type “L” with solder joints and connections.

3. All water piping 3-inches and larger run above ground within the interior of a building, shall be Type “L” hard-drawn copper tubing with soldered joints and fittings.

4. All exposed water piping and valves to plumbing fixtures shall be chrome-plated brass.

5. All valves for copper tubing less than 3 inches diameter shall be bronze bodied, unless otherwise specified.

6. All valves for copper tubing 3-inches diameter and larger shall be iron valves with di-electric flange adaptors.

7. Use “wrought copper” fittings for copper tubing.

END OF SECTION

SECTION 22 13 16

SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified, and required to furnish and install sanitary waste and vent piping systems complete with accessories.

B. Coordination:

1. Review installation procedures under this and other Sections and coordinate the installation of items that must be installed with, or before, the sanitary waste and vent piping systems Work.

C. Related Sections:

1. Section 09 90 00, Painting.

2. Section 22 05 27, Pipe Sleeves for Plumbing.

3. Section 22 05 29, Hangers and Supports for Plumbing Piping.

4. Section 22 05 53, Identification of Plumbing Piping and Equipment.

5. Section 22 10 53, Installation of Plumbing Piping.

6. Section 22 10 63, Testing of Plumbing Piping Systems.

1.2 REFERENCES

A. Standards referenced in this Section are listed below:

1. American Society of Sanitary Engineering, (ASSE).

2. The American Society of Mechanical Engineers (ASME).
   a. ASME A112.14.1, Backwater Valves
   b. ASME B16.29, Standard for Wrought Copper and Wrought Copper Alloy Solder-Joint Drainage Fittings – DWV.

3. American Society for Testing and Materials, (ASTM).
   a. ASTM A 74, Specification for Cast-Iron Soil Pipe and Fittings.
   b. ASTM A 518/A 518M, Specification for Corrosion-Resistant High-Silicon Iron Castings.

c. ASTM A 861, Specification for High-Silicon Iron Pipe and Fittings.
d. ASTM A 888, Specification for Hubless Cast-Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste and Vent Piping Applications.
e. ASTM B 306, Standard Specification for Copper Drainage Tube (DWV)
f. ASTM C 564, Specification for Rubber Gaskets for Cast-Iron Soil Pipe and Fittings.
g. ASTM D1784, Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds
h. ASTM D 1785, Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80 and 120.
i. ASTM D 2665, Specification for Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste and Vent Pipe and Fittings.
j. ASTM F441/441M, Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80.
k. ASTM F 493, Standard Specification for Solvent Cements for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe and Fittings.
l. ASTM F 656, Standard Specification for Primers for Use in Solvent Cement Joints of Poly(Vinyl Chloride) (PVC) Plastic Pipe and Fittings.
m. ASTM F 2618 Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Fittings for Chemical Waste Drainage Systems.

4. Cast-Iron Soil Pipe Institute, (CISPI).
   a. CISPI 310 Specification for Couplings for Use in Connection with Hubless Cast-Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste and Vent Piping Applications.
   b. CISPI HSN, Specification for Neoprene Rubber Gaskets for Hub and Spigot Cast-Iron Soil Pipe and Fittings.

5. Federal Specifications, (FS).
   a. FS QQ-C-40, Calking Lead Wool and Lead Pig.

6. National Sanitation Foundation (NSF).
   a. NSF 14: Plastic Piping System Components and Related Materials

1.3 QUALITY ASSURANCE

A. Installer's Qualifications:

1. Engage a single installer regularly engaged in sanitary piping installation and with experience in the installation of the types of materials required; and who agrees to employ only tradesmen with specific skill and experience in this type of Work. Submit name and qualifications to ENGINEER.

2. Engage a single installer for the entire sanitary waste and vent piping system with undivided responsibility for performance and other requirements.

B. Regulatory Requirements: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

1. Local and State Building Codes and Ordinances.

2. Permits: CONTRACTOR shall obtain and pay for all required permits, fees and inspections.

C. Component Supply and Compatibility:

1. Obtain all equipment included in this Section regardless of the component manufacturer from a single sanitary waste and vent piping systems manufacturer.

2. The waste and vent piping systems manufacturer to review and approve or to prepare all Shop Drawings and other submittals for all components furnished under this Section.

3. All components shall be specifically constructed for the specified service conditions and shall be integrated into the overall assembly by the sanitary waste and vent piping systems manufacturer.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:

1. Shop Drawings:
   a. 1/4-inch scale piping layouts, dimensioned to show length of piping runs, pipe sizes, support spacing and expansion provisions.
   b. Details of installation, including piping supports.
   c. Submit pipe schedule with laminate construction, sizes, thickness, vacuum pressure, weight per foot pressure, spans, joint type and flange data.

2. Product Data:
   a. Manufacturer's literature, illustrations, specifications and engineering data.
   b. Flexible connections.
   c. Other technical data related to the specified material and equipment as requested by ENGINEER.
   d. Gasket material.

B. Informational Submittals: Submit the following:

1. Qualifications Statements:
   a. Installer’s Qualifications

C. Record Documentation: Submit the following:

1. Record Drawings:
   a. During progress of the Work keep an up-to-date set of the Drawings showing field and Shop Drawing modifications. Immediately upon completion of piping Work, submit CADD drawings showing the actual in place installation of all piping and equipment installed under this Section at a scale satisfactory to the OWNER. The drawings shall reflect all of the piping Work on plans and in sections, with all reference dimensions and elevations required for complete Record Drawings of the piping systems. Two paper prints shall also be furnished. The prints and electronic copies of the CADD files shall be furnished no later than 30 days after completion of the Contract and prior to final payment.

1.5 DELIVERY, STORAGE AND HANDLING

A. Packing, Shipping, Handling and Unloading:

1. Deliver materials to the Site to ensure uninterrupted progress of the Work. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete, in ample time to prevent delay of the Work.

B. Storage of Materials:

1. Store materials to permit easy access for inspection and identification. Keep all material off the ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.

2. Store all equipment in covered storage off the ground and prevent condensation and in accordance with the manufacturer's recommendations for long-term storage.

C. Acceptance at Site:

1. All boxes, crates and packages shall be inspected by CONTRACTOR upon delivery to the Site. CONTRACTOR shall notify ENGINEER, in writing, if any loss or damage exists to equipment or components. Replace lost equipment or components and repair damage to new condition, in accordance with manufacturer's instructions.

1.6 GENERAL REQUIREMENTS

A. The Contract Documents show the general arrangement and extent of the Work to be completed. The exact location and arrangement of all parts shall be determined as the Work progresses. The exact location of all parts of the Work must be governed by the general building plans and the actual building conditions.

B. The Drawings show an indication of the arrangement of equipment, piping, valves, etc., and are as nearly correct as can be determined in advance of the actual construction of the Work. Piping, equipment, etc., found to interfere with the construction of the building, plumbing apparatus and piping, electrical wiring or other obstructions, etc., must be changed in location to clear such obstructions.

C. The connections shown to the various units are intended as an indication only. The actual connections at the time of installation to be made and arranged to suit the requirements of each case and adequately provide for expansion and perfect circulation and minimize the amount of space required for the same.

D. The Drawings show the general arrangement of all systems. Should local conditions necessitate rearrangement of one or more of the systems, CONTRACTOR, before proceeding with the Work, shall prepare and submit complete drawings showing all details of the proposed rearrangement for written approval by the ENGINEER.

E. The Drawings do not show all offsets, fittings, accessories and details, which may be required. CONTRACTOR shall carefully examine all of the General Construction, Electrical, Mechanical, Structural and other Drawings and the respective Specifications for conditions which may affect the installation of the Work, and shall arrange the Work accordingly, furnishing all required items to meet such conditions which are not specified as work “by others”, to complete the systems to the true extent of the Contract Documents.

PART 2 - PRODUCTS

2.1 PIPING

A. Cast-Iron Soil Pipe and Fittings:

1. Pipe and Fittings: ASTM A 74.

2. Weight: Service Weight.

3. Joints:
   a. Compression:
      1) Gasket: Neoprene Rubber, ASTM C 564, CISPI HSN.
      2) Lubricant: As recommended by pipe manufacturer.

b. Calked:
   1) Lead: FS QQ-C-40, Type I, Grade AA.
   2) Jute Packing: FS HH-P-117, Type I.

B. Hubless Cast-Iron:

1. No-Hub Pipe and Fittings: ASTM A 888.

2. Joints: CISPI 310.

2.2 DRAINS AND CLEANOUTS

A. Drain:

1. Floor Drain and Shower Drain, General Use: (FD-1)
   a. Products and manufacturers: Provide one of the following:
      1) Jay R Smith, Fig. No. 2010-U-PB-P050.
      2) Zurn Industries, Fig. No. ZB-415S-P-VP.
      3) Or equal.
   b. Materials:
      1) Body: Factory coated cast iron.
      2) Collar: Cast-iron, reversible, threaded for strainer heads.
      3) Strainer Head: Square 8-inch by 8-inch polished bronze grate with bronze body, heel-proof grate, and vandal-proof screws.
   c. Outlet Connection: Bottom outlet, calk or no-hub.
   d. ½" Trap Primer Connection Fitting on Drain.

2. Floor Sink, General Use: (FS-1)
   a. Products and manufacturers: Provide one of the following:
      1) Zurn Industries, Fig. No. Z1910
      2) Josam, Fig. No FS-100
      3) Or equal
   b. Materials:
      1) Body: Factory coated cast iron. Square 8-inch by 8-inch by 6-inch deep.
      2) Grate: Square, vandal-proof medium-duty grate with slotted openings.
      3) Strainer Head: Interior bottom dome strainer
   c. Outlet Connection: Bottom outlet, caulk or no-hub
   d. ½" Trap Primer Connection Fitting on Floor Sink

B. Cleanouts:

1. Cleanout Deck Plates (FCO-1) :
   a. Products and Manufacturers: Provide one of the following:
      1) Jay R. Smith, Fig. 4043S.
      2) Zurn Industries, Fig. No. Z-1400-K-BP.
      3) Or equal.
   b. Materials: Cast-iron body and adjustable nickel bronze top.
   c. Outlet Connection: Standard spigot.

d. Accessories:
    1) Square nickel bronze top.
    2) Cast bronze taper thread plug.

2. Wall Cleanout Plate (WCO-1):
    a. Products and Manufacturers: Provide one of the following:
        1) Jay R. Smith, Fig. 4402-BP.
        2) Josam Company, 58600-C Series.
        3) Or equal.
    b. Materials: Cast bronze taper thread plug.
    c. Accessories:
        1) Stainless steel round shallow wall plate.
        2) Cast-iron calked ferrule.

2.3 PAINTING

A. All piping and accessories shall be painted in accordance with the requirements of Section 09 90 00, Painting.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Install all items as shown, specified, and as recommended by the manufacturer.

2. Request instructions from ENGINEER, in writing, when there is a conflict between the manufacturer's recommendations and the Contract Documents.

3. Present conflicts to Engineer, in writing, who will determine corrective measures to be taken.

4. Do not modify structures to facilitate installation of piping, unless specifically approved by ENGINEER.

5. Installation shall conform to requirements of all local and state codes.

6. Installation of piping shall be in accordance with Section 22 10 53, Installation of Plumbing Piping.

7. Installation of hangers and supports shall be in accordance with Section 22 05 29, Hangers and Supports for Plumbing and Piping Equipment.

8. Protection: Properly plug or cap the open ends of all piping at the end of each day's Work or other stopping point through construction. Equipment shall be tightly covered and protected against dirt, water, and chemical or mechanical damage.

3.2 FIELD QUALITY CONTROL

A. Field Tests:

1. Tests: Water or smoke test piping in accordance with Section 22 10 63, Testing of Plumbing Piping Systems.

2. Fill all systems and fully test all equipment, valves, etc. in operation.

3. Check for excessive vibration while all systems are operating.

4. Installed systems and components will not be released to OWNER, unless all systems have been tested and approved by the ENGINEER.

B. Inspection:

1. Examine areas to receive piping, valves and accessories for:
   a. Defects that adversely affect execution and quality of the Work.
   b. Deviations beyond allowable tolerances for piping, valves and accessories.
   c. Start the Work only when conditions are satisfactory.

2. The ENGINEER reserves the right to reject or authorize replacement of piping and accessories found to defective, blistered, cracked or deviated from allowable tolerances as described above.

3.3 ADJUSTING AND CLEANING

A. Adjusting:

1. While system is operable, balance all equipment, valves, etc. to achieve design conditions.

B. Cleaning:

1. Thoroughly clean all piping, fittings, valves, and accessories prior to installation.

2. Remove all dirt, rust, dust, etc. from piping in preparation for painting.

3. Remove and dispose of all debris and waste from the Site resulting from installation.

3.4 MATERIAL SCHEDULES

A. Piping:

1. Use types of pipe and fittings as specified below, unless otherwise specified or shown.

2. All exposed gravity sanitary waste and vent piping 1-1/2-inches and larger run within the interior of a building shall be no-hub cast-iron.

3. All gravity sanitary waste and vent piping 1-1/2-inches and larger located in concrete slabs or underground to exterior limits as shown shall be service-weight cast-iron soil pipe with hub-and-spigot fittings.

END OF SECTION

SECTION 22 13 23

SANITARY WASTE INTERCEPTORS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope

1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified, and required to furnish and install sanitary waste interceptors complete with accessories.

B. Coordination

1. Review installation procedures under this and other Sections and coordinate the installation of items that must be installed with, or before, the Sanitary Waste Interceptor.

C. Related Sections:

1. Section 22 05 27, Pipe Sleeves for Plumbing.

2. Section 22 05 53, Identification of Plumbing Piping and Equipment.

3. Section 22 10 53, Installation of Plumbing Piping.

4. Section 22 10 63, Testing of Plumbing Piping.

5. Section 22 13 16, Sanitary Waste and Vent Piping.

1.2 REFRENCES

A. Standards referenced in this section are listed below:

1. American Society of Mechanical Engineers (ASME):
   a. A112.14.3-2018, Hydromechanical Grease Interceptors

2. American Society for Testing and Materials (ASTM):
   a. A48/A48M, Standards specification for Gray Iron Castings
   b. A536, Standard Specification for Ductile Iron Castings

B. Plumbing and Drainage Institute (PDI):

C. PDI-G101, Testing and Rating Procedure for Hydro Mechanical Grease Interceptors

1.3 QUALITY ASSURANCE

A. Installer's Qualifications:

1. Engage a single installer regularly engaged in sanitary piping installation and with experience in the installation of the types of materials required; and who agrees to employ only tradesmen with specific skill and experience in this type of Work. Submit name and qualifications to ENGINEER.

2. Engage a single installer for the entire sanitary waste and vent piping system with undivided responsibility for performance and other requirements.

B. Regulatory Requirements: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

1. Local and State Building Codes and Ordinances.

2. Permits: CONTRACTOR shall obtain and pay for all required permits, fees and inspections.

C. Component Supply and Compatibility:

1. Obtain all equipment included in this Section regardless of the component manufacturer from a single sanitary waste and vent piping systems manufacturer.

2. The waste and vent piping systems manufacturer to review and approve or to prepare all Shop Drawings and other submittals for all components furnished under this Section.

3. All components shall be specifically constructed for the specified service conditions and shall be integrated into the overall assembly by the sanitary waste and vent piping systems manufacturer.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:

1. Shop Drawings:
   a. 1/4-inch scale piping layouts, dimensioned to show length of piping runs, pipe sizes, support spacing and expansion provisions.
   b. Details of installation, including piping supports.
   c. Submit pipe schedule with laminate construction, sizes, thickness, vacuum pressure, weight per foot pressure, spans, joint type and flange data.

2. Product Data:
    a. Manufacturer's literature, illustrations, specifications and engineering data.
    b. Flexible connections.
    c. Other technical data related to the specified material and equipment as requested by ENGINEER.
    d. Gasket material.

B. Informational Submittals: Submit the following:

1. Qualifications Statements:
    a. Installer’s Qualifications

C. Record Documentation: Submit the following:

1. Record Drawings:
    a. During progress of the Work keep an up-to-date set of the Drawings showing field and Shop Drawing modifications. Immediately upon completion of piping Work, submit CADD drawings showing the actual in place installation of all piping and equipment installed under this Section at a scale satisfactory to the OWNER. The drawings shall reflect all of the piping Work on plans and in sections, with all reference dimensions and elevations required for complete Record Drawings of the piping systems. Two paper prints shall also be furnished. The prints and electronic copies of the CADD files shall be furnished no later than 30 days after completion of the Contract and prior to final payment.

1.5 DELIVERY, STORAGE AND HANDLING

A. Packing, Shipping, Handling and Unloading:

1. Deliver materials to the Site to ensure uninterrupted progress of the Work. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete, in ample time to prevent delay of the Work.

B. Storage of Materials:

1. Store materials to permit easy access for inspection and identification. Keep all material off the ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.

2. Store all equipment in covered storage off the ground and prevent condensation and in accordance with the manufacturer’s recommendations for long-term storage.

C. Acceptance at Site:

1. All boxes, crates and packages shall be inspected by CONTRACTOR upon delivery to the Site. CONTRACTOR shall notify ENGINEER, in writing, if any loss or damage exists to equipment or components. Replace lost equipment or components and repair damage to new condition, in accordance with manufacturer's instructions.

1.6 GENERAL REQUIREMENTS

A. The Contract Documents show the general arrangement and extent of the Work to be completed. The exact location and arrangement of all parts shall be determined as the Work progresses. The exact location of all parts of the Work must be governed by the general building plans and the actual building conditions.

B. The Drawings show an indication of the arrangement of equipment, piping, valves, etc., and are as nearly correct as can be determined in advance of the actual construction of the Work. Piping, equipment, etc., found to interfere with the construction of the building, plumbing apparatus and piping, electrical wiring or other obstructions, etc., must be changed in location to clear such obstructions.

C. The connections shown to the various units are intended as an indication only. The actual connections at the time of installation to be made and arranged to suit the requirements of each case and adequately provide for expansion and perfect circulation and minimize the amount of space required for the same.

D. The Drawings show the general arrangement of all systems. Should local conditions necessitate rearrangement of one or more of the systems, CONTRACTOR, before proceeding with the Work, shall prepare and submit complete drawings showing all details of the proposed rearrangement for written approval by the ENGINEER.

E. The Drawings do not show all offsets, fittings, accessories and details, which may be required. CONTRACTOR shall carefully examine all of the General Construction, Electrical, Mechanical, Structural and other Drawings and the respective Specifications for conditions which may affect the installation of the Work, and shall arrange the Work accordingly, furnishing all required items to meet such conditions which are not specified as work "by others", to complete the systems to the true extent of the Contract Documents.

PART 2 - PRODUCTS

2.1 GREASE INTERCEPTOR

A. Cast-Iron or Steel Grease Interceptors:

1. Products and Manufacturers: Refer to grease interceptor schedule on design drawings. Provide one of the following:
   a. Zurn Industries
   b. Watts Corporation
   c. Or equal.

2. Description: Acid Resistant interior/exterior steel grease interceptor with flow control fitting.

3. Standard: ASME A112.14.3 and PDI-G101, for intercepting and retaining fats, oils, and greases from food-preparation or processing wastewater.

4. Cover: Gasketed epoxy coated steel skid-proof cover with removable lift handles

5. Internal air relief bypass

6. Seal Trap: Double Wall.

7. Cleanout: Bronze cleanout plug.

8. Body Extension: Required.

9. Signage:
   a. Mounted in a conspicuous location in the vicinity of any cover or covers that provide access to the grease interceptor.
   b. Made of non-fading, rigid, weather-resistant material suitable for the installation location.
   c. Shall be in substantial compliance with 19NYCRR-PART 1229-2 and figure 1003.3.9.3 in the 2024 Plumbing Code of New York State.
   d. Minimum width of 14-inches and a minimum nominal height of 10-inches.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Interceptors shall be set level and plumb.

B. Install interceptor unit, including trapping, venting, and flow-control fittings according to the manufacture's installation instructions and with recommended service clearances.

C. Install interceptor unit with cleanout immediately downstream from unit that do not have integral cleanout on the unit.

D. Interceptor unit covers shall be set flush with finished surface in the floor and the tops shall be traffic-rated.

E. If an installation is unsatisfactory to the ENGINEER, the Contractor shall correct the installation at no cost or time to the OWNER.

3.2 CONNECTIONS

A. Pipe installation requirements are specified in Section 22 13 00, SANITARY AND VENT PIPING.

B. Piping connections shall be made between interceptor/grease/oil removal units and piping systems in accordance with manufacturer's written guidelines.

3.3 WARNING TAPE

A. Warning tape shall be placed over ferrous piping.

B. Detectable warning tape shall be used over nonferrous pipe and over the edges of underground structures.

3.4 STARTUP AND TESTING

A. Perform tests as recommended by product manufacturer and listed standards and under actual or simulated operating conditions and prove full compliance with design and specified requirements. Tests of the various items of equipment shall be performed simultaneously with the system of which each item is an integral part.

B. The tests shall include system capacity, control function, and alarm functions.

C. When any defects are detected, correct defects and repeat test at no additional cost or time to the Government.

D. The OWNER and ENGINEER will observe startup and contractor testing of selected equipment. Coordinate the startup and contractor testing schedules with the OWNER and ENGINEER. Provide a minimum notice of 10 working days prior to startup and testing.

3.5 DEMONSTRATION AND TRAINING

A. Provide services of manufacturer's technical representative for 4 hours to instruct Personnel responsible in operation and maintenance of the system.

END OF SECTION

SECTION 22 40 00

PLUMBING FIXTURES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install plumbing fixtures complete with accessories.

B. Coordination:

1. Review installation procedures under this and other Sections and coordinate installation of items to be installed with or before plumbing fixtures Work.

2. Notify other contractors in advance of installing plumbing fixtures to provide other contractors with sufficient time for installing items included in their contracts to be installed with or before plumbing fixtures.

C. Related Sections:

1. Section 09 90 00, Painting.

2. Section 22 11 16, Domestic Water Piping

3. Section 22 13 16, Sanitary Waste and Vent Piping.

4. Section 22 07 19, Plumbing Piping Insulation.

5. Section 22 05 93, Disinfection of Plumbing Systems.

1.2 REFERENCES

A. Standards referenced in this Section are:

1. ANSI/ASME A112.19.1, Enameled Cast Iron and Enameled Steel Plumbing Fixtures.

2. ANSI/ASME A112.19.2, Vitreous China Plumbing Fixtures and Hydraulic Requirements for Water Closets and Urinals.

3. ANSI/ICC A117.1, Accessible and Usable Buildings and Facilities.

4. ASHRAE 18, Methods of Testing for Rating Drinking-Water Coolers with Self-Contained Mechanical Refrigeration.

5. ASME A112.6.1M, Floor-affixed Supports for Off-the-floor Plumbing Fixtures for Public Use.

6. ASME A112.18.1, Plumbing Supply Fittings.

7. ASME A112.18.2, Plumbing Waste Fittings.

8. ASME A112.19.3, Stainless Steel Plumbing Fixtures.

9. ASSE 1016, Performance Requirements for Individual Thermostatic, Pressure Balancing, and Combination Control Valves for Individual Fixture Fittings.

10. ASSE 1037, Performance Requirements for Pressurized Flushing Devices for Plumbing Fixtures.

11. ASSE 1070, Performance Requirements for Water-temperature Limiting Devices.

12. AWWA C651, Disinfecting Water Mains.

13. FS WW-P-541/1, Plumbing Fixtures (Water Closets).

14. FS WW-P-541/8, Plumbing Fixtures-Land Use.

15. NSF 61: Drinking Water System Components – Health Effects.

16. NSF 372: Drinking Water System Components – Lead Content.

17. UL 399, Standard for Drinking-Water Coolers

18. US EPA WaterSense Program Certification and Labeling.

1.3 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer: Shall have minimum of five years experience producing equipment substantially similar to that required, and shall be able to document evidence of at least five installations in satisfactory operation for at least five years each.

B. Component Supply and Compatibility:

1. Obtain each type of plumbing fixture included in this Section, regardless of component manufacturer, from one plumbing fixtures and trim manufacturer.

2. Each plumbing fixtures and trim manufacturer shall review and approve, or shall prepare, all Shop Drawings and other submittals for components furnished under this Section for the particular fixture type.

3. Materials and equipment shall be suitable for the required service conditions and shall be integrated into each assembly by the associated plumbing fixtures and trim manufacturer.

C. Regulatory Requirements: Comply with Laws and Regulations, including the following.

1. Local and State Codes and Ordinances.

2. ADAAG, Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:

1. Shop Drawings:
   a. Schedule of plumbing fixtures and trim for the Project, indicating for each the installation location, model or type, and other distinguishing information.
   b. Drawings showing fabrication methods, assembly, accessories, installation details and wiring diagrams.
   c. Detailed installation drawings of each individual components showing:
      1) Mounting requirements.
      2) Piping and roughing connections, labeled and coded.
      3) Instructions.
      4) Materials of construction.
      5) Data sheets.
   d. Detailed description of each component.

2. Product Data:
   a. Manufacturer's literature, illustrations, specifications, weight, dimensions, required clearances, materials of construction, and performance data for all equipment.

B. Informational Submittals: Submit the following:

1. Manufacturer's Instructions:
   a. Special shipping, storage and protection, and handling instructions.
   b. Installation data for the equipment, including setting drawings, templates, and directions for installing anchorage devices.

2. Field Quality Control:
   a. Submit results of bacteriological testing.

3. Qualifications Statements:
   a. Manufacturer, when submittal of qualifications is required by ENGINEER.

C. Closeout Submittals: Submit the following:

1. Operations and Maintenance Data:
   a. Submit in accordance with Section 01 78 23, Operations and Maintenance Data.
   b. Include maintenance data and schedules, description of operation, wiring diagrams, and list of spare parts recommended for one year of operation with current price list.

1.5 DELIVERY, STORAGE AND HANDLING

A. Packing, Shipping, Handling, and Unloading:

1. Deliver materials and equipment to Site to ensure uninterrupted progress of the Work. Deliver anchorage materials to be embedded in concrete in ample time to prevent delaying the Work.

2. Comply with Section 01 65 00, Product Delivery Requirements.

B. Storage and Protection:

1. Store materials and equipment in covered storage off the ground and prevent condensation and in accordance with the manufacturer's recommendations for long-term storage.

2. Comply with Section 01 66 00, Product Storage and Handling Requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General:

1. Exposed valves and escutcheons shall be chrome plated.

2. Where applicable, materials and equipment furnished shall comply with FS WW-541/8.

3. Provide materials and equipment with USEPA WaterSense label, when products with label are available from at least one manufacturer.

4. All faucets, supply kits, stop valves, and other components to be installed in the domestic water system are to be certified NSF 61/NSF 372 lead-free.

5. All tempered water supplies for lavatory faucets or other handwashing fixtures are to be provided with anti-scalding valves conforming to ASSE 1070. Anti-scalding valves to be as specified in section 22 11 16, Domestic Water Piping, except that faucets with integral ASSE 1070 compliant temperature limiting devices do not require a valve to be installed on the fixture supply.

B. Water Closet – Type WC-1:

1. Products and Manufacturers: Provide one of the following:
   a. American Standard 2257.101.
   b. Zurn, Fig. No. Z5615.
   c. Kohler K-84325.
   d. Or equal.

2. Type: Flush-valve, siphon jet, high efficiency type, 1.28 gallons per flush.

3. Style: Wall-hung, elongated bowl.

4. Standards: Comply with ANSI A112.19.2 and ANSI/ICC A117.1.

5. Accessories:
   a. Flush Valve and Vacuum Breaker:
      1) Products and Manufacturers: Provide one of the following:
         a) Sloan, “Royal” Model No. 111-1.28.
         b) Zurn Z-6000 Series.
         c) Or equal.
      2) ASME A112.19.2, ASSE 1037, US EPA WaterSense Certified.
   b. Seat and Cover:
      1) Products and Manufacturers: Provide one of the following:
         a) Church Division of Bemis Manufacturing, #9500C.
         b) Kohler, Fig. No. K-4666-C.
         c) Or equal.
      2) Standards: Comply with FS WW-P-541/1, Type IV, Class 2.
      3) Type: Solid plastic, elongated, open front.
      4) Color: White.

6. Closet Supports:
   a. Products and Manufacturers: Provide one of the following:
      1) Jay R. Smith, Fig. 0200Y Series, as required.
      2) Zurn Industries, ZR-1200 Series, as required.
      3) Or equal.
   b. Provide one support for each water closet complete with required hardware and gaskets, suitable for floor construction.
   c. Standards: ASME A112.6.1M.

C. Lavatory – Type L-1:

1. Products and Manufacturers: Provide one of the following:
   a. Zurn Z5318.
   b. Kohler
   c. Zurn Industries.
   d. Or equal.

2. Type: Flat slab, drilled for concealed arm support.

3. Material: Vitreous china.

4. Size: 20-inch wide by 18-inch deep.

5. Standards: ASME A112.19.2, ANSI A117.1.

6. Faucets:
   a. Products and Manufacturers: Provide one of the following:
      1) Kohler K-2028-8.
      2) American Standard.
      3) Zurn.
      4) Or equal.
   b. Type: Two Handle Widespread Lavatory Faucet, with metal pop-up drain and ceramic disc valves.
   c. Material: Chrome plated brass.
   d. Standards: ANSI A117.1, ASSE 1070, ASME A112.18.1, NSF 61/NSF 372.

7. Supplies:
   a. Products and Manufacturers: Provide one of the following:
      1) BrassCraft Part No. KTSCS400AX C.
      2) McGuire Manufacturing Model LF172LK.
      3) Or equal.
   b. Description: Lead-free ½" Sweat x 3/8" compression rigid riser supply kit with escutcheon flange and loose-key angle stops, to be installed on hot and cold water supplies.
   c. Material: Chrome plated brass.
   d. Standards: ASME A112.18.1, NSF 61/NSF 372.

8. Drain :
   a. Products and Manufacturers: Provide one of the following:
      1) Kohler, Model K-7715.
      2) McGuire Manufacturing, Model 155A.
      3) Or equal.
   b. Description: Cast grid strainer with 1.25-inch tailpiece assembly, chrome-plated.
   c. Standards: ASME A112.18.2.

9. Trap:
   a. Products and Manufacturers: Provide one of the following:
      1) Kohler, Model K-8999.
      2) McGuire Manufacturing, Model 8902C.

3) Or equal.

b. Description: Adjustable cast brass “P” trap with cleanout. Slip joint inlet and 17-gage tubing outlet to wall with escutcheon, 1.25-inch inlet by 1.5-inch outlet, chrome finish.

c. Standards: ASME A112.18.2.

10. Carrier:
    a. Products and Manufacturers: Provide one of the following:
        1) Jay R. Smith, Fig. No. 700.
        2) Zurn Industries.
        3) Or equal.
    b. Description: Floor-mounted concealed arm carrier for flat slab lavatories with chrome-plated escutcheons.
    c. Standards: ASME A112.6.1M.

11. Insulation: As specified in Section 22 07 19, Plumbing Piping Insulation.

D. Sinks - S-1:

1. Products and Manufacturers: Provide one of the following:
    a. Elkay Model # LRAD 312265
    b. Just Manufacturing
    c. Or equal.

2. Type: Single Compartment Bowl. Self rimming and undercoated, with ledge back drilled for trim, ADA compliant.

3. Material: 18 gage, Type 304 stainless steel with Lustertone finish.

4. Size: 31" x 22 x 6-1/2" outside dimensions .

5. Faucets:
    a. Products and Manufacturers: Provide one of the following:
        1) Elkay LK406GN05L2.
        2) Chicago Faucets.
        3) Or equal.
    b. Type: 4" Center-set with Exposed Deck Faucet with 5" Wrist-blade Chrome Handles.
    c. Flow rate of 1.5 GPM, and, with a Quarter Turn Ceramic Disc valve. 1/2" NPS male connection.
    d. Standards: ANSI A117.1, ASSE 1070, ASME A112.18.1, NSF 61/NSF 372.

6. Point of use thermostatic mixing valve: 3/8' inlet and outlet, lead free bronze body, locked temperature adjustment cap, vandal resistant, copper thermostat assembly with polymer thermoplastic shuttle, stainless steel springs, integral check valves on hot and cold-water inlets, compression fittings.

7. Trap:
    a. Products and Manufacturers: Provide one of the following:
        1) Kohler, Model K-8999.
        2) McGuire Manufacturing, Model 8902C.
        3) Or equal.
    b. Description: Adjustable cast brass “P” trap with cleanout. Slip joint inlet and 17-gage tubing outlet to wall with escutcheon, 1.25-inch inlet by 1.5-inch outlet, chrome finish.
    c. Standards: ASME A112.18.2.

E. Wash Fountain – Type WF-1:

1. Products and Manufacturers: Provide one of the following:
    a. Bradley Corporation Series TDB3103.
    b. Sloane Valve Company
    c. Or equal.

2. Type: One Piece Wall mount wash station including touch-free soap, and tepid water.

3. Material: Densified Solid Surface composed of bio-based resin.

4. Size: 36-inch semi-circular.

5. Standards: ASME A112.18.1, ANSI A117.1.

6. Water Supplies: Thermostatic Mixing Valve Assembly.

7. Faucet: Included.

8. Soap Dispenser: Included.

9. Trap:
    a. Products and Manufacturers: Provide one of the following:
        1) Kohler, Model K-8999.
        2) McGuire Manufacturing, Model 8902C.
        3) Or equal.
    b. Description: Adjustable cast brass “P” trap with cleanout. Slip joint inlet and 17-gage tubing outlet to wall with escutcheon, 1.25-inch inlet by 1.5-inch outlet, chrome finish.
    c. Standards: ASME A112.18.2.

10. Carrier:
    a. Products and Manufacturers: Provide one of the following:
        1) Jay R. Smith, Fig. No. 700.
        2) Zurn Industries.
        3) Or equal.
    b. Description: Floor-mounted concealed arm carrier for flat slab lavatories with chrome-plated escutcheons.
    c. Standards: ASME A112.6.1M.

11. Insulation: As specified in Section 22 07 19, Plumbing Piping Insulation.

F. Bottle Filler - BF-1:

1. Products and Manufacturers: Provide one of the following:
   a. Elkay Manufacturing Company, Model LZWSM8K with replacement filter WSK6000R.
   b. Halsey Taylor, Model HTHBSM-WF with filter WSF6000R and remote chiller SJ8.
   c. Or equal.

2. Style:
   a. Wheelchair type Surface Mounted.
   b. Touchless, sensor operated.

3. Materials:
   a. Satin-finish stainless steel.

4. Fixture mounting:
   a. Surface Mounted.

5. Standards: ANSI/NSF 61/372, ADA and ICC A117.1, UL399

G. Mop Sink - MS-1:

1. Products and Manufacturers: Provide one of the following:
   a. Acorn, Model TSH
   b. Stern-Williams MTB-2424
   c. Or equal.

2. Type: Floor mounted mop sink.

3. Material: Precast Terrazzo.

4. Size: 24" x 24 x 12".

5. Accessories
   a. Faucets:
      1) Products and Manufacturers: Provide one of the following:
         a) Acorn model KFC.
         b) Stern-Williams T-15-VB.
         c) Or equal.
   b. Type: Integral stops, lever handles and integral backflow check valves.
   c. Flow rate: 2.5 GPM.
   d. 3/4” hose thread on spout with bucket hooks 8” on center
   e. Standards: ASSE A112.18.1-201/CSA B125.1

6. Drain:
   a. Integral 3-inch drain with stainless steel strainer

7. Hose and Wall Bracket

8. Mop Hanger

9. Stainless steel shelf.

10. Trap:
    a. Products and Manufacturers: Provide one of the following:
        1) Kohler, Model K-8999.
        2) McGuire Manufacturing, Model 8902C.
        3) Or equal.
    b. Description: Adjustable cast brass “P” trap with cleanout. Slip joint inlet and 17-gage tubing outlet to wall with escutcheon, 1.25-inch inlet by 1.5-inch outlet, chrome finish.
    c. Standards: ASME A112.18.2.

2.2 FINISHING

A. Factory-paint ferrous surfaces in accordance with Section 09 90 00, Painting. Do not paint porcelain, china, enameled surfaces, stainless steel, brass, chrome-plated, and other finished surfaces.

2.3 SOURCE QUALITY CONTROL

A. Factory Tests:

1. Factory-test equipment ensure that entire equipment system is properly fabricated and assembled, that all controls function as specified in accordance with the Contract Documents, and that equipment complies with the Contract Documents and approved Shop Drawings and approved CONTRACTOR’s other submittals.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine conditions under which materials and equipment will be installed and notify ENGINEER in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. General:

1. Thoroughly clean materials, equipment, and accessories prior to installation.

2. Install items as in accordance with the Contract Documents, Laws and Regulations, manufacturer's recommendations, and good practice. Obtain interpretation from ENGINEER if manufacturer's instructions or Laws or Regulations conflict with the Contract Documents.

3. Do not modify structures or facilities to facilitate installation of fixtures without approval of ENGINEER.

4. Provide each fixture with shut off valves or stops for required water supplies.

5. All fixtures are to be provided with all required mounting hardware for a complete installation as described in the manufacturer installation instructions or as otherwise required.

6. All fixtures are to be installed in perfect working condition at the completion of work.

B. Installation of Specific Fixture Types:

1. Handicap Fixtures:
   a. Provide insulation for all plumbing piping under handicapped lavatories.
   b. Install the following with vertical distance of 1.5 feet from floor to top of seat:
      1) Water Closet, Handicapped – Type WC-2
      2) Water Closet, Handicapped – Type WC-1W
   c. Urinals – UR-1: For handicap application, mount urinal so that top of urinal rim is 17 inches above finish floor.

3.3 FIELD QUALITY CONTROL

A. Field Tests:

1. ENGINEER shall witness field tests.

2. Operating Tests:
   a. Fill all systems and verify that equipment, fixtures, valves, and appurtenances operate successfully.
   b. Load-test in accordance with manufacturer recommendations each wall-hung fixture after installation.

3. For materials and equipment that do not successfully pass field tests, make repairs or modifications and retest until acceptable results are achieved.

4. Bacteriological Testing: Perform bacteriological testing on water samples obtained following disinfection of fixtures and trim. Obtain samples in accordance with AWWA C651. Pay for testing at laboratory certified by authority having jurisdiction for potable water system bacteriological testing. Criteria for acceptance shall be in accordance with AWWA C651.

3.4 ADJUSTING AND CLEANING

A. Adjusting:

1. Adjust all controls for proper settings.

2. While system is operable, balance all equipment, including valves, appurtenances, and similar equipment, to achieve design conditions.

B. Cleaning:

1. Upon completion of the Work, remove all labels, and remove dirt, grease, markings, and other objectionable matter from fixtures and trim.

2. In preparation for painting, remove dirt, rust, dust, and objectionable materials from materials and equipment.

3.5 DISINFECTING

A. Prior to placing potable water system into service, disinfect equipment, piping, and accessories in accordance with Section 22 05 93, Disinfection of Plumbing Systems.

B. Prior to placing potable water system into service, disinfect equipment, piping and accessories in accordance with AWWA C651, Laws, and Regulations, and requirements of authorities having jurisdiction. Perform bacteriological testing in accordance with Article 3.3 of this Section.

END OF SECTION

DIVISION 23 – HEATING, VENTILATING, AND AIR CONDITIONING

SECTION 23 01 00

BASIC MECHANICAL REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Basic Mechanical Requirements specifically applicable to Division 23 sections, in addition to Division 01 - General Requirements.

1.2 PERFORMANCE

A. All work shall be performed in cooperation with the Owner, Architect, and all other contractors. The Mechanical Contractor shall coordinate all work with the construction schedule established by the Owner and Architect and shall immediately report any delays in materials receipt including circumstances causing the delays.

1.3 INSTALLATIONS

A. Layout of equipment, ductwork, piping, etc. is diagrammatic. Check project drawings prior to making installations for interferences with other trades. Should the contractor find such interferences, he shall be responsible for coordinating his work with the other responsible trades. Owner reserves the right to make reasonable changes prior to "roughing-in" without added expense. Dimensions shown are subject to verification of exact site conditions. Do not scale the drawings.

B. If larger access openings are required to install new equipment, it is this contractor's responsibility to make access (cut) in the building and repair/replace (patch) access to match existing. Packaged equipment disassembly and reassembly for same is also the responsibility of this contractor.

C. Minimum pipe size for all piping systems is ¾". ½" piping will not be accepted.

1.4 REMOVALS/DEMOLITION

A. Equipment shall remain unless indicated for removal on the drawings; if in question do not remove until verified by Architect/Engineer.

B. Equipment indicated to be removed shall be offered to the owner prior to disposal. The equipment shall be relocated to the location designated by the owner when required. All removals include associated brackets, hangers and supports whether specifically mentioned or not.

C. If larger access openings are required to remove existing equipment, it is this contractor's responsibility to make access (cut) in the building and repair/replace (patch) access to match existing.

1.5 MATERIALS

A. Furnish all new equipment and materials as described herein. Any material, operation, method, or device mentioned, listed or noted within this specification shall be furnished and installed by the Mechanical Contractor, unless specifically mentioned as being furnished or installed by others.

B. When equipment other than design make manufacturer is used the Contractor accepts full responsibility for any or all dimensional, performance or electrical differences and associated changes.

1.6 STRUCTURAL SUPPORTS

A. Furnish and install all brackets, supports and/or reinforcements for installation of mechanical equipment in excess of building structure and applicable structural design where required or as shown on drawings, including equipment hung from steel joists (reinforce at panel points). Where detail is not shown, submit drawings of intended construction for approval.

B. In renovation projects where existing structural steel cross-bridging interferes with duct removal or new duct installation, the Mechanical Contractor is responsible for removal and re-installation. Notify the Architect/Engineer prior to removal for review and approval.

1.7 FIRE AND SMOKE STOPPING

A. Mechanical Contractor is responsible for fire and smoke stopping for all pipe and duct penetrations of fire and smoke rated partitions.

1.8 COORDINATION

A. Refer to Division 01 for coordination requirements.

B. Refer to reflected ceiling plans, structural drawings and all architectural plan and elevation drawings and coordinate all mechanical installations with ceiling patterns, lighting layouts, building structural members, etc. Coordinate the mechanical installations with the work of others engaged in the installation to preclude the possibility of interference with mechanical installations shown on the drawings.

C. Duct Smoke Detectors are furnished and wired by the Electrical Contractor, installed in the duct by the Mechanical Contractor.

D. Access doors required for access to mechanical equipment (volume dampers, smoke dampers, fire dampers, valves, etc.) through building walls, floors, ceilings, soffits, chases, etc. shall be provided by this contractor for installation by others, unless noted otherwise on the drawings. Coordinate locations.

E. When gas or fuel oil piping is provided for Mechanical Units by other contractors or trades, the final connection to the Mechanical Unit is the responsibility of the Mechanical Contractor. Coordinate locations.

F. It is the general intent that all electrical power wiring, motor starters and/or power disconnects be provided and installed by the Electrical Contractor. Some mechanical equipment is specified to have factory-installed integral starters and/or power disconnects and as such, are to be provided by the Mechanical Contractor.

G. Coordinate compatibility between the variable speed drive manufacturer and fan motors (prior to shop drawing submission) connected to VSD's for those applications. Mechanical Contractor is responsible for final systems performance and any changes required in the field.

H. Contractor is to coordinate piping and duct installation with devices installed under Division 26 including distribution panels, disconnects and starters in conformance with National Electric Code requirements for clear space around and over the devices.

1.9 SYSTEMS

A. The Mechanical Contractor shall be responsible to provide complete and operable systems, including operational properties to the extent necessary to link multiple components of a system together and to interface with other systems.

1.10 AIR FILTERS

A. The Mechanical Contractor shall clean all air units that utilize filters of all dust and debris before turning unit over to the owner. Replace all air filters after equipment start-up.

1.11 CODES, REGULATIONS AND STANDARDS

A. Materials furnished and installations made under this specification shall conform with applicable requirements of the codes, regulations and standards described herein, unless specifically described otherwise.

B. If any codes, standards, or regulations conflict, the most stringent shall apply.

C. All materials and equipment installations shall comply with standards of:

1. National Fire Protection Agency (NFPA).

2. Local Utilities.

3. Owner's Insurance Underwriters.

4. Applicable Government Agencies and Departments.

5. Underwriters Laboratory (UL).

6. Federal and State Occupational Safety and Health Act (OSHA).

7. Local Municipality.

8. Local Fire Department.

9. American Gas Association (AGA).

10. ANSI - American National Standards Institute.

11. ASTM Regulations and Standards for pipe, fittings, pressure vessels, testing and insulation.

12. Conformance with the applicable Codes, Rules, and Regulations of the State of New York, NYCRR, Code Rule 4 and Code Rule 14, pertaining to boilers, gas and oil burners, controls, and protective devices.

13. AWWA American Water Works Association.

14. New York State Energy Conservation Construction Code.

15. Electrically powered equipment shall comply with the National Electric Code (NEC) and shall be UL listed for the intended usage.

16. The American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE).

17. New York State Education Department, Manual of Planning Standards.

1.12 MATERIALS FOR REVIEW

A. Consistent with the project schedule, the Mechanical Contractor shall submit for review the complete list including descriptive dimensions and rating data of equipment and materials.

B. All materials and equipment furnished shall be in accordance with manufacturer's catalog numbers listed herein.

C. Submittals for these materials shall be made as soon as practical for purpose of dimension verification and record.

D. The Mechanical Contractor shall submit the quantity of equipment catalog cuts or descriptive literature as required by Division 01.

E. For the items so listed, cuts or literature shall be clearly marked to indicate the following:

1. Function of the equipment to be furnished.

2. Picture of the unit.

3. Ratings, dimensions, and service clearances.

4. Arrangement to be furnished.

5. Electrical or other power characteristics.

6. Data sheets of accessories to be furnished.

7. Operating weight of each equipment unit.

8. Designation of item as shown on the drawings.

F. In addition, the submittal shall bear the project name, the contractor's name, the date reviewed by the contractor, the contractor's control number (if applicable), and a stamp with the contractor's signature certifying that the item has been reviewed and it complies with the requirements of the contract documents.

G. Any submittals not clearly marked as indicated above will be returned to the Mechanical Contractor for resubmission.

1.13 SUBSTITUTIONS

A. Submittal of substitute equipment performance data shall be made in strict adherence to the requirements set forth in Division 26.

1.14 EQUIPMENT SUPPLIER QUALIFICATIONS

A. Company specializing in manufacturing the products specified in this Division with minimum five years documented experience.

1.15 DELIVERY, STORAGE AND HANDLING

A. Deliver products to site under provisions of Division 01.

B. Store and protect products under provisions of Division 01.

C. Protect units from physical damage by storing in protected areas and leaving factory covers in place.

1.16 SEQUENCING AND SCHEDULING

A. Sequence work under the provisions of Division 01.

B. Schedule work under the provisions of Division 01.

1.17 CLOSE OUT REQUIREMENTS

A. In addition to any or all requirements listed in Division 01 specifications, the following are required to be submitted to the Architect/Engineer:

B. Copy of all Valve Charts.

C. Letter attesting to the completion of owner instruction of water system chemical treatment procedure.

D. Letter attesting to the completion of all temperature control work.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.1 INSPECTIONS

A. The Mechanical Contractor shall have:

1. Required local or municipal inspection processed and presented to the Owner with certificate indicating approval of such governing bodies.

END OF SECTION

SECTION 23 05 29

HANGERS AND SUPPORTS FOR HVAC DUCTWORK, PIPING, AND EQUIPMENT

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. Contractor shall provide all labor, materials, tools, equipment and incidentals as shown, specified and required to furnish and install hangers and supports complete with required appurtenances for HVAC ductwork, piping, and equipment. Product specific requirements are contained herein; Section 23 01 00, Basic Mechanical Requirements, shall be referred to for general requirements.

B. This section includes:

1. Hangers and supports for HVAC ductwork, piping, and equipment.
   a. Materials
   b. Components
   c. Attachments

C. Coordination:

1. Review installation procedures under this and other Sections and coordinate the installation of items that must be installed with, or before, the hangers and supports for HVAC ductwork, piping, and equipment Work.

2. Notify other Contractors in advance of the installation of hangers and supports for HVAC ductwork, piping, and equipment to provide other contractors with sufficient time for the installation of items included in their contracts that must be installed with, or before, the hangers and supports for HVAC ductwork, piping, and equipment Work.

1.2 REFERENCES

A. American National Standards Institute (ANSI).

1. ANSI B1.1 – Unified Inch Screw Threads (ASME B1.1).

B. American Society for Testing and Materials (ASTM).

1. ASTM A36/A36M – Standard Specification for Carbon Structural Steel.

2. ASTM A47/A47M – Standard Specification for Ferritic Malleable Iron Castings.

3. ASTM A123/A123M – Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

4. ASTM A153/A153M – Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

5. ASTM A307 – Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

6. ASTM A575 – Standard Specification for Steel Bars, Carbon, Merchant Quality, M-Grades.

7. ASTM A668/A688M – Standard Specification for Steel Forgings, Carbon and Alloy, for General Industrial Use.

C. American Welding Society (AWS).

1. AWS B2.1 – Specification for Welding Procedure and Performance Qualification.

D. Manufacturers Standardization Society (MSS).

1. MSS SP 58 – Pipe Hangers and Supports-Materials, Design and Manufacture.

2. MSS SP 69 – Pipe Hangers and Supports - Selection and Application.

E. National Fire Protection Association (NFPA).

1. NFPA 90A – Standard for the Installation of Air-Conditioning and Ventilating Systems.

F. Sheet Metal and Air Conditioning Contractors National Association (SMACNA).

1. HVAC Duct Construction Standards – Metal and Flexible.

2. Seismic Restraint Manual: Guidelines for Mechanical Systems.

3. Thermoset FRP Duct Construction Manual.

1.3 QUALITY ASSURANCE

A. Qualifications:

1. Installer:
   a. Engage an experienced installer to perform the work of this Section who has specialized in installing hangers and supports for HVAC ductwork, piping, and equipment similar to that required for this Project and who is acceptable to manufacturer.

B. Component Supply and Compatibility:

1. Obtain all equipment included in this Section regardless of the component manufacturer from a single hangers and supports for HVAC ductwork, piping, and equipment manufacturer.

2. Require the hangers and supports for HVAC ductwork, piping, and equipment manufacturer to review and approve or to prepare all Shop Drawings and other submittals for all components furnished under this Section.

3. All components shall be specifically constructed for the specified service conditions and shall be integrated into the overall equipment assembly by the hangers and supports for HVAC ductwork, piping, and equipment manufacturer.

C. Regulatory Requirements:

1. International Building Code (IBC).

2. National Fire Protection Association (NFPA).

3. Local and State Building Codes and Ordinances.

4. Permits: Contractor shall obtain and pay for all required permits, fees and inspections.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:

1. Shop Drawings:
   a. Drawings showing fabrication methods, assembly, accessories, and installation details.
   b. Setting drawings, templates, and directions for the installation of anchor bolts and other anchorages.
   c. Drawings showing floor supported components and installation arrangement.

2. Product Data:
    a. Manufacturer's literature, illustrations, specifications, weight, dimensions, required clearances, materials of construction, and performance data for all equipment.
    b. Complete component list.
    c. Detailed description of each component.
    d. Catalog cut sheets for each component.
    e. Deviations from Contract Documents. Any exceptions to the Contract Documents must be clearly defined. Contractor shall be responsible for any additional expenses that may occur due to any exception made.
    f. Other technical data related to specified material and equipment as requested by Engineer.

B. Informational Submittals: Submit the following:

1. Certificates:
    a. Independent certification reports.

2. Manufacturer Instructions:
    a. Instructions and recommendations for handling, storing, protecting the equipment.
    b. Installation Data.

3. Source Quality Control Submittals:
    a. Factory test reports.

4. Qualifications Statements:
    a. Manufacturer, when requested by Engineer.
    b. Installer, when requested by Engineer.

1.5 DELIVERY, STORAGE AND HANDLING

A. Packing, Shipping, Handling and Unloading:

1. Deliver materials to the Site to ensure uninterrupted progress of the Work.

2. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete, in ample time to prevent delay of that Work.

3. Comply with manufacturer's recommendations for rigging of equipment.

B. Storage and Protection:

1. Store materials to permit easy access for inspection and identification. Keep all material off the ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.

2. Store all equipment in covered storage off the ground and prevent condensation and in accordance with the manufacturer's recommendations for long-term storage.

C. Acceptance at Site:

1. All boxes, crates and packages shall be inspected by Contractor upon delivery to the Site. Contractor shall notify Engineer, in writing, if any loss or damage exists to equipment or components. Replace lost equipment or components and repair damage to new condition, in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.1 SYSTEM PERFORMANCE

A. Design Criteria:

1. Designs generally accepted as exemplifying good engineering practice and using stock or production parts shall be utilized wherever possible.

2. Accurate weight balance calculations shall be made to determine the required force at each hanger and support location and the weight load at each force concentration point.

3. Hangers and supports shall be capable of supporting and restraining HVAC ductwork, piping, and equipment in all conditions of operation. They shall allow free expansion and contraction, and prevent excessive stress resulting from transferred weight being induced into the HVAC ductwork, piping, and equipment.

4. Hangers and supports shall be designed so that they cannot become disengaged by movements of the supported HVAC ductwork, piping, and equipment.

5. Rod length shall be limited to a maximum length of eight linear feet.

6. HVAC ductwork, piping, and equipment that cannot be hung by rod and hanger arrangement shall be floor or wall supported.

7. All structural components shall be designed based on static and dynamic loads imposed by the supported HVAC ductwork, piping, and equipment and shall include a safety factor of 2 for the yield strength. Minimum angle sizes shall be 2-inch x 2-inch x1/4-inch.

8. Load ratings, materials and installation shall be consistent with the recommendations from the latest edition of MSS SP 58, MSS SP 69, and FS WW-H-171.

2.2 MANUFACTURERS

A. Manufacturer: Provide product of one of the following:

1. Erico International Corporation.

2. Anvil International.

3. Or equal.

2.3 DETAILS OF CONSTRUCTION

A. Materials:

1. Hangers, supports, restraints, and appurtenances located in non-corrosive or dusty areas shall be hot dipped galvanized steel in accordance with ASTM A123/A123M and ASTM A153/A153M.

2. Hangers, supports, restraints, and appurtenances located outdoors shall be Type 316 stainless steel.

3. Steel used for the support of uninsulated copper piping or plastic piping shall be PVC coated.

B. Components of hangers and supports shall conform to the following:

1. Bolts: ASTM A307, Grade A, unless otherwise specified below.

2. Forgings: ASTM A668/A688M.

3. Malleable Iron: ASTM A47/A47M.

4. Rods and Bars: ASTM A575.

5. Threads: Unified Screw Threads, Class 2A and 2B, ANSI B1.1.

6. Structural Steel: ASTM A36/A36M.

C. Hanger Attachments: The following types of attachments shall be considered acceptable:

1. Adjustable Steel Clevis: FS WW-H-171E, Type 1.

2. Steel Double Bolt Pipe Clamp: FS WW-H-171E, Type 3.

3. Steel Pipe Clamp: FS WW-H-171E, Type 4.

4. Adjustable Swivel Pipe Ring: FS WW-H-171E, Type 6.

5. Adjustable Steel Band Hanger: FS WW-H-171E, Type 7.

6. Riser Clamp: FS WW-H-171E, Type 8.

7. Light-Duty Clevis Hanger: FS WW-H-171E, Type 12.

8. Long Clips: FS WW-H-171E, Type 26.

9. Offset J-Hooks: FS WW-H-171E, Type 27.

10. Steel Pipe Covering Protection Saddle: FS WW-H-171E, Type 40A.

11. Insulation Protection Shield: FS WW-H-171E, Type 41.

12. Pipe Saddle Support: FS WW-H-171E, Type 37.

13. Pipe Stanchion Saddle: FS WW-H-171E, Type 38.

14. Pipe Saddle Support with Base: FS WW-H-171E, Type 36.

15. Adjustable Roller Hanger: FS WW-H-171E, Type 42.

D. Structural Attachments: The following types of attachments shall be considered acceptable:

1. Side Beam Clamp: FS WW-H-171E, Type 20.

2. Center I-Beam Clamp: FS WW-H-171E, Type 21.

3. Welded Steel Bracket: FS WW-H-171E, Types 32 and 33.

4. Side Beam Bracket: FS WW-H-171E, Type 35.

E. Hanger Rod Attachments: Use as required to complete assembly:

1. Forged Steel Clevis: FS WW-H-171E, Type 14.

2. Adjustable Turnbuckle: FS WW-H-171E, Type 15.

3. Forged Steel Welders Eye Nut: FS WW-H-171E, Type 17.

F. Cable Hanging Systems (Gripple): Cable Hanging Systems with adjustable mechanical devices compliant with SMACNA HVAC Duct Construction Standards Third Edition-2005 shall consist of ready-to-use factory tested kit comprising of cable and cable end options. Crimps shall be Factory installed. All cable hanger products shall be certified as SMACNA and UL listed. All cable hangers shall have a minimum of 4:1 safety margin over the listed Safe Working Load (SWL).

2.4 SOURCE QUALITY CONTROL

A. Shop Tests:

1. Equipment shall be completely manufactured and pre-assembled in accordance with Reference Standards. Perform the following tests and inspections at factory before shipment:
   a. Tested and inspected for approval as a unit by Underwriters Laboratories Inc., UL Label or equal.
   b. Factory test equipment to ensure that the entire package has been properly fabricated and assembled, that the package meets the specified performance requirements including manufacturer's data report.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine conditions under which materials and equipment will be installed and notify Engineer in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected.

B. Take field measurements where required prior to installation to ensure proper fitting of Work.

3.2 PREPARATION

A. Surface Preparation:

1. Attachment to hollow core slabs or double tee slabs shall be provided in accordance with details shown on the structural drawings to prevent damage to pre-stressing strands.

3.3 INSTALLATION

A. General:

1. Install the equipment in accordance with the Contract Documents and by manufacturer's instructions and recommendations. Obtain written interpretation from Engineer in the event of conflict between manufacturer's instructions and recommendations and the Contract Documents.

2. Install in accordance with Laws and Regulations.

3. Do not modify structures to facilitate installation of equipment, unless approved in writing by Engineer.

4. Installation to conform to requirements of all local and state codes.

B. Ductwork:

1. The construction and installation of hangers and supports for ductwork shall conform to the recommendations given in the SMACNA HVAC Duct Construction Standards except as specified.

2. Hanger rods shall have threaded ends.

3. Secure upper hanger attachments to structural steel or steel bar joists wherever possible.

4. Do not attach hangers to steel decks.

5. Metallic fasteners installed with electrically operated or powder driven tools may be used as hanger attachments in accordance with the SMACNA HVAC Duct Construction Standards.

6. Attachment to Cast-in-Place Concrete:
   a. Secure hangers to overhead construction with expansion bolts.
   b. Secure hanger attachments required to be supported from wall or floor construction with single unit expansion bolts.

7. All ductwork shall be supported from trapeze type hangers. No sheet metal duct hangers or straps will be allowed. Gripple cable hanging systems shall be allowed as replacement for threaded rod for both upper and lower attachments when the expansion bolt fasteners used with the Gripple cable hangers are certified by ICC for use in cracked concrete. Cable Hangers (Gripple) may be used to suspend all the ductwork. Select hangers for the type of structure and suspension. All parts (including the cable) shall be supplied, warranted and proof tested by the manufacturer. Follow recommended factory installation guidelines, do not exceed working loads.

8. A pair of rods shall be provided at each duct support point.

C. Piping:

1. Provide all necessary pipe hanger material needed to safely and securely support or hang all piping. Pipe hanger loads shall be determined by accurate weight balance calculations to prevent transferring loads and forces to any equipment and terminal connections. Piping shall be supported at distances not exceeding the spacing specified in MC Table 305.4 or in accordance with ANSI/MSS SP-58.

2. Install building attachments at required locations within concrete or on structural steel for proper piping support. Install additional concentrated loads at valves, flanges, guides, strainers, expansion joints, and changes in direction of piping. Install concrete inserts before concrete is poured; fasten insert securely to forms. Where concrete with compressive strength less than 2500 psi is indicated, install reinforcing bars through openings at top of inserts. For composite metal decks, inserts shall be of the type that is supported entirely by the concrete slab, not by the metal deck. Expansion bolts shall be installed so that the load acts on the bolts in shear and withdrawal. Expansion bolts shall be carefully located in order to eliminate the risk of damage to concrete, steel reinforcement, electrical conduits and any other embedded items.

3. Install hangers, supports, clamps and attachments to support piping properly from building structure. Arrange for grouping of parallel runs of horizontal piping to be supported together on trapeze type hangers where possible. Where piping of various sizes is to be supported together by trapeze hangers, space hangers for smallest pipe size or install intermediate supports for smaller diameter pipe. Do not use wire or perforated metal to support piping, and do not support piping from other piping.

4. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers and all other items and accessories. Except as otherwise indicated for exposed continuous pipe runs, install hangers and supports of same type and style as installed for adjacent similar piping.

5. Prevent electrolysis in support of copper tubing by use of hangers and supports which are copper plated or by other recognized industry methods.

6. Provisions for Movement
    a. Install hangers and supports to allow controlled movement of piping systems, to permit freedom of movement between pipe anchors and to facilitate action of expansion joints, expansion loops, expansion bends and similar units.
    b. Load Distribution: Install hangers and supports so that piping live and dead loading and stresses from movement will not be transmitted to connected equipment.
    c. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so that maximum pipe deflections allowed by ANSI B31 Pressure Piping Codes are not exceeded.

7. Pipe Supports
    a. Mains located near floors shall be supported on roller type pipe stands bedded in cement base. When mains are installed before concrete floor is laid, the mains shall be supported from overhead construction until the pipe stands can be put in place.

b. Horizontal piping connections (near floor) to convectors and all other items and accessories located more than 4' from risers shall be supported on adjustable iron pipe stands. Pipe stand shall consist of a split ring extension hanger mounted on a hanger flange, which shall be secured to the floor.

8. Insulated Piping: Comply with the following installation requirements.
   a. Clamps: Attach clamps, including spacers (if any), to piping with clamps projecting through insulation; do not exceed pipe stresses allowed by ANSI B31.
   b. Shields: Where low-compressive-strength insulation or vapor barriers are indicated on chilled/dual temperature water piping, install coated protective shields. For pipe 8" and over, install wood insulation saddles.
   c. Saddles: Where insulation without vapor barrier is indicated, install protection saddles.

   d. Insulation Saddle System, the equal of Anvil Fig 260 ISS can be used instead of shields and/or saddles when proper insulating techniques are employed including the use of mastic and caulk on all insulation edges and final taping. Position the pipe on the saddle, notch section of the insulation to fit around the saddle, square cut the adjoining insulation section and butt the mating end to the notched section, finish taping according to standard methods, no metal shield is required between the hanger and pipe insulation.

9. Install anchors at proper locations to prevent stresses from exceeding those permitted by ANSI B31 and to prevent transfer of loading and stresses to connected equipment.

10. Fabricate and install anchor by welding steel shapes plates and bars to piping and to structure. Comply with AWS standards.

11. Where expansion compensators are indicated, install anchors in accordance with expansion unit manufacturer's written instructions and to limit movement of piping and forces to maximum recommended by manufacturer for each unit.

12. Anchor Spacings: where not otherwise indicated, install anchors at ends of principal pipe-runs, at intermediate points in pipe-runs between expansion loops and bends. Make provisions for preset of anchors as required to accommodate both expansion and contraction of piping.

13. Piping passing under concrete areas shall be supported by hangers secured by means of beam clamps fastened to the beams. Where pipe support spacing is excessive between steel, beam clamps shall be fastened to structural members that are approved by the Engineer of Record. Removed fireproofing around beams shall be replaced to original condition. No hangers or supports shall be attached to hung ceilings, concrete, ductwork or work of other trades.

D. Anchorages and Base Plates:

1. Provide anchorages in new or existing concrete, as applicable, in accordance with equipment manufacturer's recommendations and the Contract Documents.

3.4 ADJUSTING

A. Adjust all equipment for proper settings.

3.5 CLEANING

A. Thoroughly clean all equipment and accessories prior to installation.

B. Remove all dirt, rust, dust, etc. from equipment and accessories after installation.

C. Remove and dispose of all debris and waste from the Site resulting from installation.

3.6 SCHEDULES

A. Hangers and Supports for Ductwork:

1. Spacing:
    a. Ductwork shall be supported at distances not exceeding the spacing specified below:
        1) Metal Ductwork:
            a) Maximum Spacing: 10 feet.
        2) Flexible and Other Factory-Made Ductwork:
            a) Maximum Spacing: In accordance with the manufacturer's installation instructions.

2. Hanger Rod Sizes:
    a. Hanger rods shall be sized based on static and dynamic loads imposed by the supported ductwork and shall include a safety factor of 2 for the yield strength.
    b. Rod load shall not exceed rod manufacturer's recommended capacity.

B. Hangers and Supports for Piping:

1. Spacing:
   a. Piping shall be supported at distances not exceeding the spacing specified below or in accordance with MC Table 305.4 or in accordance with ANSI/MSS SP-58:
      1) Copper Tube:
         a) Maximum Horizontal Spacing: 6 feet.
         b) Maximum Vertical Spacing: 10 feet.
      2) Copper Pipe:
         a) Maximum Horizontal Spacing: 12 feet.
         b) Maximum Vertical Spacing: 10 feet.
      3) Steel Pipe:
         a) Maximum Horizontal Spacing: 12 feet.
         b) Maximum Vertical Spacing: 15 feet.

2. Hanger Rod Sizes:
   a. Hanger rods shall be sized based on static and dynamic loads imposed by the supported piping and shall include a safety factor of 2 for the yield strength.
   b. Rod load shall not exceed rod manufacturer's recommended capacity.

C. Hangers and Supports for HVAC Equipment:

1. Provide spacing and hanger rod sizes in accordance with equipment manufacturer's installation instructions.

END OF SECTION

SECTION 23 05 53

IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. Contractor shall provide all labor, materials, tools, equipment, and incidentals as shown, specified and required to furnish identification nameplates, tags, pipe markers and labels for identification of HVAC piping ductwork and equipment in the scope of work. Product specific requirements are contained herein; Section 23 01 00, Basic Mechanical Requirements, shall be referred to for general requirements.

B. This section includes:

1. Nameplates.

2. Tags.

3. Pipe markers.

4. Plastic labels.

1.2 SUBMITTALS

A. Action Submittals: Submit the following:

1. Product data: Copies of manufacturer's technical data, including catalog information and specifications, for each product specified.

1.3 SUPPLEMENTAL QUALITY ASSURANCE

A. Codes and Standards

1. Per Section MC 301.3, Identification, each length of pipe and tubing and each pipe fitting utilized in a mechanical system shall bear the identification of the manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS AND MANUFACTURERS

A. Provide manufacturer's standard products of categories and types required for each application as referenced in other Division 23 Sections, shown on the Drawings and/or Schedules. Where more than single type is specified for application, provide single selection for each product category.

B. Indoor/Outdoor Self-Adhesive Vinyl Markers

1. Self-sticking high gloss flexible vinyl pipe markers shall meet the requirements of ASME/ANSI A13.1 standard for identifying piping system contents. Tape shall have directional flow arrows.

2. Makers shall be 0.004” thick durable vinyl material for indoor and outdoor environments with weather resistance ink.

3. Acrylic adhesive shall have a 15-minute dwell time to stainless steel, polypropylene and powder coated metal with ultimate dwell time of 72 hours.

4. Minimum application temperature shall be 0ºF with a service temperature range of -40ºF to 180ºF.

C. Pipe Identification Schedule - Color Coding

1. All color schemes, minimum length of marker color field and minimum letter height shall be in accordance with ANSI/ASME Standard A13.1-2015, “Scheme for the Identification of Piping Systems”.

D. Self-Adhesive Duct Markers

1. Color-coded duct markers. Conform to the following color code:
   a. Green: Cold air.
   b. Yellow: Hot air.
   c. Yellow/Green: Supply air.
   d. Blue: Exhaust, outside, return, and mixed air.

2. Nomenclature: Include the following:
   a. Direction of air flow
   b. Duct service (supply, return, exhaust)
   c. Duct origin (from)
   d. Duct destination (to)

E. Valve Tags

1. Brass Valve Tags: 19-gage polished brass valve tags with stamp-engraved piping system abbreviation in 1/4" high letters and sequenced valve numbers 1/2" high, and with 5/32" hole for fastener.

a. Provide 2" sq tags.
b. Numbers and letters shall be block type, indented and filled with durable black compound.

2. Valve Tag Fasteners: solid brass chain (wire link or beaded type), or solid brass S-hooks of the size required for proper attachment of tags to valves, and manufactured specifically for that purpose.

F. Equipment Nameplates

1. Provide equipment engraved nameplate marker with adhesive backing for each equipment item furnished under the Contract, and for other equipment items indicated to receive nameplates. Equipment nameplates specified in this Article are in addition to equipment manufacturer's standard nameplate with manufacturer name, model number, serial number, and similar information.

2. Color-coded equipment markers. Conform to the following color code:
   a. Green: Cooling equipment and components.
   b. Yellow: Heating equipment and components.
   c. Yellow/Green: Combination cooling and heating equipment and components.
   d. Blue: Equipment and components that do not meet any of the above criteria.

3. Nomenclature: Include matching terminology on schedules and Drawings as closely as possible.

4. Equipment nameplates shall have text as large as possible to fit on nameplate; text shall be not less than 1/2-inch high. All text on a given nameplate shall be one size.

G. Plastic Labels

1. Printed labels created with label printer/maker similar to Brother P-Touch for marking:
   a. White iron of ceiling grid for equipment and access concealed by the hung ceiling. Labels shall be 1/2" high black letters on clear background.
   b. Access Doors: Provide plastic labels on each access door indicating purpose of access (to what equipment) and other maintenance and operating instructions, and appropriate safety and procedural information. Labels shall be 1/2" high black letters on clear background.

H. Key Identification Tag: Provide identification tag on every key provided as part of the maintenance materials specified in their respective sections. Tags shall be plastic stamped or engraved with 1/4" high letter for abbreviated name of unit and/or equipment and 1/2" for the number and with 5/32" hole for fastener. The tag shall be of the same color as the equipment with black lettering. Provide 2" square or round tags. Tag Fasteners: solid brass chain (wire link or beaded type), or solid brass S-hooks of the size required for proper attachment of tags to valves, and manufactured specifically for that purpose.

I. Lettering and Graphics

1. Coordinate names, abbreviations and other designations used in the identification work with corresponding designations shown on the Drawings or Schedules, or specified. Provide numbers, lettering and wording as indicated or, if not otherwise indicated, as recommended by manufacturers or as required for proper identification and operation/maintenance of systems and equipment.

J. Approved Manufacturers

1. Brady (W.H.) Co.; Signmark Div.

2. Industrial Safety Supply Co., Inc.

3. Seton Name Plate Corp.

4. Brimar Industries, Inc.

5. Marking Services Inc.

6. EMED Co., Inc.

7. Graphic Products Inc.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Coordination: Where identification is to be applied to surfaces that require insulation, painting or other covering or finish, including valve tags in finished mechanical spaces, install identification after completion of covering and painting. Install identification prior to installation of acoustical ceilings and similar removable concealment.

B. Ductwork Identification

1. Identify air supply, return, exhaust and intake ductwork with duct self-adhesive tape markers and provide arrows showing ductwork service and direction of flow, in black or white (whichever provides most contrast with ductwork color).

2. Location: In each space where ductwork is exposed, or concealed only by removable ceiling system, locate signs near points where ductwork originates or continues into concealed enclosures (shaft, underground or similar concealment), and at 50' spacings along exposed runs.

C. Piping System Identification: Install pipe markers and color bands and include arrows to show direction wherever piping is exposed to view in occupied spaces, machine rooms, accessible maintenance spaces (shafts, tunnels, plenums) and exterior non-concealed locations.

1. Near each valve and control device

2. Near each branch, excluding short take-offs for terminal units; mark each pipe at branch, where there could be question of flow pattern.

3. Near locations where pipes pass through walls or floors/ceilings, or enter non-accessible enclosures.

4. Near major equipment items and other points of origination and termination.

5. Spaced intermediately at maximum spacing of 50' along each piping run, except reduce spacing to 25' in congested areas of piping and equipment.

6. On piping above removable acoustical ceilings except omit intermediately spaced markers.

D. Valve Identification: Provide valve tag on every valve, cock and control device in each piping system; exclude check valves, valves within factory-fabricated equipment units, and shut-off valves at HVAC terminal devices and similar rough-in connections of units. List each tagged valve in valve schedule for each piping system.

E. Mechanical Equipment Identification: Provide:

1. A permanent factory-applied name-plate(s) shall be affixed to appliances (reference Section MC 301.3) on which shall appear in legible lettering, the manufacturer’s name or trademark, the model number, serial number and the seal or mark of the approved agency.

2. Equipment engraved nameplate marker with adhesive backing for each equipment item furnished under the Contract, and for other equipment items indicated to receive nameplates. Equipment nameplates specified in this Article are in addition to equipment manufacturer’s standard nameplate with manufacturer name, model number, serial number, and similar information.

3. Install self-adhesive tape equipment marker near each major item of mechanical equipment and each operational device, as specified herein if not otherwise specified for each item or device in their respective sections.

END OF SECTION

SECTION 23 05 93

TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. Contractor shall provide all labor, materials, tools, equipment and incidentals as shown, specified, and required to perform the testing, adjusting, and balancing for HVAC as specified herein.

2. This section specifies the requirements for the testing, adjusting and balancing of air and hydronic fluid distribution systems, including the equipment and devices associated with each system to produce the design objectives.

3. Pre-test existing equipment removed prior to demolition and existing equipment to remain that are part of systems to be demolished with the purpose of documenting the existing HVAC system's baseline performance and any issues or deficiencies, ensuring equipment new / existing being installed or re-installed will produce the design objectives.

4. The Work shall include checking installations for conformity to design, setting final flow and fan speed, adjusting equipment and devices, recording data, preparing and submitting final balancing reports, and recommending modifications to the mechanical installations.

5. Retain the services of an independent testing, adjusting, and balancing firm meeting the qualifications specified to be the single source of responsibility to test, adjust, and perform a final balance of the building mechanical systems specified and identified in this Project.

6. Contractor shall have the balancing specialist review all the work with the respective manufacturers of the equipment and devices involved and shall coordinate all the Work. The balancing specialist shall examine the Drawings and Specifications to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper adjusting and balancing of systems and equipment.

7. Provide balancing dampers, pressure taps, gauges, valves, and any other items and components as required for a properly balanced system, whether or not specified herein or shown on the Drawings, all at no additional cost to the Owner. Adjustment or replacement of parts recommended by the balancing specialist shall be made in strict accordance with the respective manufacturer's recommendations.

8. Temperature Control Contractor shall set the adjustment of the automatically operated dampers, control valves and all the other items and accessories to operate as required by the balancing contractor.

B. Coordination:

1. Review installation procedures under this and other Sections and coordinate the installation of items that must be installed with, or before, the testing, adjusting, and balancing for HVAC Work.

2. Notify other Contractors in advance of the testing, adjusting, and balancing for HVAC to provide other contractors with sufficient time for the installation of items included in their contracts that must be installed with, or before, the testing, adjusting, and balancing for HVAC Work.

3. BC Cate Elementary: Sequence of System Interdisciplinary/Functional Performance Tests, Balancing and Operational Tests shall be as follows:
   a. Contractor shall start up all systems and do an initial (rough) balance.
   b. After the ATC Contractor’s successful testing of the BMS the Contractor shall Commission/Demonstrate to the Commissioning Authority all equipment controls and verify that the sequence of operations as defined in Section 23 09 23 - Direct-Digital Control System For HVAC, is achieved. The Interdisciplinary/Functional Performance Test forms for correctly functioning systems will be signed by the Commissioning Authority.
   c. Following successful completion of Steps “a” and “b”, the Contractor shall perform a Final Balance as defined herein.

C. Related Sections:

1. Section 23 09 23, Direct-Digital Control System For HVAC.

1.2 REFERENCES

A. Associated Air Balance Council (AABC).

1. AABC National Standards for Total System Balance.

B. American National Standards Institute/American Industrial Hygiene Association (ANSI/AIHA).

1. ANSI/AIHA Z9.5 – Laboratory Ventilation.

C. American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).

1. ASHRAE Handbook – Fundamentals.

D. National Environmental Balancing Bureau (NEBB).

1. NEBB Procedural Standards for Testing Adjusting Balancing of Environmental Systems.

E. Sheet Metal and Air Conditioning Contractors National Association (SMACNA).

1. SMACNA HVAC Systems – Testing, Adjusting & Balancing Handbook.

1.3 QUALITY ASSURANCE

A. Qualifications:

1. Balancer:
   a. Engage an experienced balancer to perform the work of this Section who has specialized in testing, adjusting, and balancing for HVAC systems similar to that required for this Project.
   b. Minimum of five years of experience in testing, adjusting, and balancing substantially similar equipment and able to show evidence of at least five installations in satisfactory operation for at least five years in the continental United States.
   c. Submit name and qualifications to Engineer along with the following information on a minimum of five successful projects:
      1) Names and telephone numbers of owners, architects or engineers responsible for projects.
      2) Approximate contract cost of the testing, adjusting, and balancing for HVAC Work.
      3) Amount of area tested, adjusted, and balanced.
      4) Biographical information on employee proposed to directly supervise the testing, adjusting, and balancing Work.

B. Regulatory Requirements:

1. Associated Air Balance Council (AABC).

2. National Electrical Code (NEC).

3. National Environmental Balancing Bureau (NEBB).

4. National Fire Protection Association (NFPA).

5. Underwriters Laboratories Inc. (UL).

6. New York State Construction Codes.

7. Local Codes and Ordinances.

8. Permits: Contractor shall obtain and pay for all required permits, fees and inspections.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:

1. Product Data:
   a. Data sheets with name of devices, manufacturer's name, model number, latest date of calibration, and correction factors for each testing, adjusting, and balancing instruments.
   b. Other technical data related to specified material and equipment as requested by Engineer.

B. Informational Submittals: Submit the following:

1. Certificates:
   a. Certification by National Environmental Balancing Bureau (NEBB), Association Air Balance Council (AABC), or equal.

2. Source Quality Control Submittals:
   a. Specimen copies of report forms for Engineer's review and approval.
      1) Forms shall be 8-1/2 by 11-inch paper for loose-leaf binding, with blanks for certification of report and listing all required testing, adjusting, and balancing requirements and ratings.

3. Field Quality Control Submittals:
   a. Written startup and field test reports presenting results of required field testing, adjusting, and balancing.
      1) Certified reports shall be in typed format on approved forms imprinted with the company's name.
      2) Reports shall include procedure outline used to test, adjust, and balance the systems and the types of instruments used.
      3) Minimum three certified copies of testing, adjusting, and balancing reports to the Engineer for review.
      4) Reports must be submitted to Engineer and Owner for approval prior to Owner's acceptance for responsibility.

4. Qualifications Statements:
   a. Balancer, when requested by Engineer.

1.5 SITE CONDITIONS

A. Environmental Requirements:

1. Testing, adjusting, and balancing for HVAC shall be performed when outside ambient conditions are approximate to the design heating and cooling criteria indicated in drawings for all heating and cooling functions.

PART 2 - PRODUCTS

2.1 EQUIPMENT PERFORMANCE

A. Equipment Description:

1. Air Balance Instruments:
   a. Provide all velometers, anemometers, pitot tubes, differential air pressure gages, manometers, hook gages, static pressure probe units, and all other instruments and accessories as required to perform all air balance tests of HVAC equipment, ducts, registers, grilles, etc.
   b. Flow-measuring hoods (manufactured, not fabricated) shall be acceptable for measurement of ceiling diffuser performance only.

2. Hydronic Balance Instruments:
   a. Provide manometers, pressure gages, and all other instruments and accessories as required to perform all hydronic balance tests of HVAC equipment, piping, etc.

3. System Performance Measuring Instruments:
   a. Provide insertion thermometers, sling psychrometers, tachometers, revolution counters, clamp-on volt-ammeter recorders, and other instruments as required to measure all facets of the complete HVAC system performance.

B. Performance Criteria:

1. Instrumentation shall be in accordance with NEBB, AABC, or SMACNA requirements and shall be calibrated to the accuracy standards demanded by these organizations.

2.2 ACCESSORIES

A. Balancing Sheaves and Belts:

1. Balancing sheaves and belts shall be provided for all belt driven equipment.

2. Sheaves and belts shall be provided to match construction and duty provided by the equipment manufacturer.

3. Equipment sheaves and belts replaced or not required to achieve balancing shall be submitted to the Owner as spare parts.

PART 3 - EXECUTION

3.1 INSPECTION

A. Heating, ventilating and air conditioning equipment and components shall be completely installed and in continuous operation, as required, to accomplish the testing, adjusting and balancing Work specified.

B. Inspect all HVAC equipment and components for proper operation prior to testing, adjusting and balancing.

1. Fan Belt Deflection: Not less than 1/4-inch or more than 1/2-inch.

C. Pre-Startup Inspection:

1. Verify proper equipment mounting and setting.

2. Verify that control, interlock and power wiring is complete.

3. Verify alignment of motors and drives.

4. Verify proper piping connections and accessories.

5. Verify that lubrication is completed.

D. First Run Observations:

1. Verify direction of rotation.

2. Verify setting of safety controls.

3. Monitor heat build-up in bearings.

4. Check motor loads against nameplate data.

E. Equipment Check:

1. Verify proper overload heater sizes.

2. Verify function of safety and operating controls.

3. Verify proper operation of equipment.

4. Report on inspection, observation and checking procedures.

F. Promptly report defects which may affect the Work to Engineer.

G. Should corrective measures caused by faulty installation require re-testing, adjusting and balancing, such Work shall be at no additional cost to the Owner.

3.2 APPLICATION

A. General:

1. Test, adjust, and balance all systems, ductwork, piping, etc. and their control systems in accordance with the AABC National Standards for Total System Balance, NEBB Procedural Standards for Testing Adjusting Balancing of Environmental Systems, SMACNA HVAC Systems - Testing, Adjusting & Balancing Handbook, or in compliance with the standard procedure manual published by the testing, adjusting, and balancing organization affiliated with Contractor. Contractor shall submit one copy of the standard procedure manual to the Engineer for their records.

2. Contractor shall provide all necessary instruments, tools, ladders, etc. to complete all testing, adjusting, and balancing Work.

3. Contractor shall assume full responsibility for safe keeping of all instruments, tools, ladders, etc. during the course of the Work.

4. Contractor shall be solely responsible for the protection and safeguarding of the Work and shall provide every protection against accidents, injury, and damage to persons and property.

5. Contractor shall keep dust, dirt, and debris to an absolute minimum and reinstall all removed ceiling components to their original positions at the end of each day's Work.

6. Contractor shall be fully responsible for removal and reinstallation of ceiling system and replacement of any component damaged.

7. Contractor shall install additional access panels at no extra cost to the Owner, as is required to gain access to equipment concealed above ceilings, behind walls, or any other concealed space.

8. Systems shall be tested, adjusted, and balanced with clean filters and strainers.

9. Where equipment is provided with a variable speed controller (VSC) or variable frequency drive (VFD), balance the equipment first with the VSC or VFD and then with balancing dampers (air systems) or valves (hydronic systems). All systems shall be optimized through the VSC or VFD by balancing with the minimum static pressure needed to meet design flow conditions.

B. Air Systems:

1. Preliminary:
   a. Identify and list size, type and manufacturer of all equipment to be tested, including air terminals.

2. Central Systems:
   a. Test rpm for all equipment, including adjusting of each fan, air handling unit, and air conditioning unit to design requirements within the limits of mechanical equipment provided.
   b. Test and record motor voltages and running amperes including motor nameplate data, and starter heater ratings for each unit as listed above.
   c. Make pitot tube traverse of main supply, exhaust and return ducts, determine airflow at all fans and units and adjust fans and units to within five percent of design requirements.
   d. Test and record system static pressure, suction and discharge.
   e. Test and adjust system for design outside air, (cfm).
   f. Test and adjust system for design recirculated air, (cfm).
   g. Test and record heating apparatus entering air temperatures, (dry bulb).
   h. Test and record cooling apparatus entering air temperatures, (dry bulb and wet bulb).
   i. Test and record heating apparatus leaving air temperatures, (dry bulb).
   j. Test and record cooling apparatus leaving air temperatures, (dry bulb and wet bulb).
   k. Record all fan and air handling unit speeds.
   l. Record air quantity delivered by each fan and air-handling unit.

3. Distribution:
   a. Sheave and belt replacement shall be provided as the first means of accomplishing the balancing Work before volume dampers are adjusted from their initial open positions.
   b. Adjust volume dampers, control dampers, splitter dampers, etc., to proper design airflow in main ducts, branch ducts, and zones.

4. Air Terminals:
   a. Identify each air terminal as to location and determine required flow reading.
   b. Test and adjust each air terminal to within tolerance of design requirements as listed below.
      1) Positive Zones:
         a) Diffusers and Supply Air Terminals: 0 percent to +10 percent.
         b) Exhaust and Return Air Terminals: 0 percent to -10 percent.

2) Negative Zones:
   a) Diffusers and Supply Air Terminals: 0 percent to -10 percent.
   b) Exhaust and Return Air Terminals: 0 percent to +10 percent.
3) Neutral Zones:
   a) All Air Terminals: -10 percent to +10 percent.

c. Test procedure on air terminals shall include recording comparison of required airflow and observed airflow, adjustment of terminal, and recording of final airflow.
d. Adjust flow patterns from air terminal units to minimize drafts to the extent that the design and equipment permits.

5. Verification:
   a. Prepare summation of readings of observed airflow for each system, compare with required airflow, and verify that duct losses are within specified allowable range.
   b. Verify design airflow at fans as described above.
   c. If determined that the air system has not been properly balanced, Contractor shall rebalance and recheck all equipment and components in the presence of the Engineer and as accepted by the Engineer.

C. Hydronic Systems:

1. Preliminary:
   a. List all mechanical specifications of tested equipment and verify against the Contract Documents.
   b. Open all valves in all lines to full open position.
   c. For each pump, verify rotation, test and record pump shut-off head, and test and record pump wide-open head.
   d. Verify proper water level in the system.
   e. Verify that air vents at high points of water systems are installed and operating freely.

2. Central Equipment:
   a. Set pumps to provide proper flow quantity.
   b. Observe leaving water temperatures and return water temperatures. Reset to correct design temperatures.
   c. Record pump operating suction and discharge pressures, pump manufacturer, model number, nameplate horsepower, rpm. Determine final dynamic head and indicate flow rate (gpm) plotted on the proper curve for pump.

3. Distribution:
   a. Adjust balance valves, control valves, etc., to proper design flow rates (gpm) in main piping, branch piping, and terminal units.

4. Terminal Units:
   a. Upon completion of flow readings and adjustments at equipment and coils, mark all settings and record following data:
      1) Area that item of equipment serves.
      2) Equipment number corresponding to that as shown.

3) Manufacturer and model number.
4) Inlet water temperatures.
5) Outlet water temperatures.

b. Observe and record pressure drop through units at set flow rate on call for full heating or cooling.
c. Record calculated flow rates and design flow rates through each piece of equipment.

5. Flow Balancing Devices:
   a. Upon completion of adjustments mark all settings and record the following for each device:
      1) Upstream and downstream pressure.
      2) Fluid temperature.
      3) Specified fluid temperature.
      4) Calculated or measured flow rate.
   b. If determined that the hydronic system has not been properly balanced, Contractor shall rebalance and recheck all equipment and components in the presence of the Engineer and as accepted by the Engineer.

D. Automatic Temperature Control System:

1. In cooperation with Section 23 09 23, Direct-Digital Control System For HVAC, and the control manufacturer's representative, set and adjust automatically operated devices to achieve required sequence of operations.

2. Testing organization shall verify all controls for proper calibration and list those controls requiring adjustment by control system installer.

3.3 SCHEDULES

A. Test, adjust, and balance the air terminal devices, ductwork, hydronic distribution and terminal devices and their control systems associated with the following HVAC equipment:

1. Refer to HVAC Equipment Schedules.

END OF SECTION

SECTION 23 07 13

DUCT INSULATION

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. Contractor shall provide all labor, materials, tools, equipment and incidentals as shown, specified and required to furnish and install duct insulation complete with accessories. Product specific requirements are contained herein; Section 23 01 00, Basic Mechanical Requirements, shall be referred to for general requirements.

2. This Work also includes:
   a. Repairing all existing duct insulation in all areas that is damaged or displaced due to new construction by Contractor with materials and procedures identical to the existing duct insulation.

B. Coordination:

1. Duct insulation shall not be installed until ductwork has been field tested and approved by Engineer.

2. Review installation procedures under this and other Sections and coordinate the installation of items that must be installed with, or before, the duct insulation Work.

3. Notify other Contractors in advance of the installation of duct insulation to provide other contractors with sufficient time for the installation of items included in their contracts that must be installed with, or before, the duct insulation Work.

C. Related Sections:

1. Section 23 31 00, HVAC Ducts and Casings.

2. Section 23 05 53, Identification for HVAC Piping and Equipment.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM).

1. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.

2. ASTM C411 – Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.

B. National Fire Protection Association (NFPA).

1. NFPA 90A – Standard for the Installation of Air-Conditioning and Ventilating Systems.

2. NFPA 90B – Standard for the Installation of Warm Air Heating and Air-Conditioning Systems.

3. NFPA 255 – Standard Method of Test of Surface Burning Characteristics of Building Materials.

C. Underwriters Laboratories Inc. (UL).

1. UL 181 – Factory-Made Air Ducts and Air Connectors.

2. UL 723 – Test for Surface Burning Characteristics of Building Materials.

1.3 DEFINITIONS

A. Concealed spaces – spaces in which ductwork are installed and are withdrawn or removed from observation or kept from plain sight. Spaces above hung ceiling are examples of concealed spaces.

B. Exposed spaces – spaces in which ductwork are installed and laid open to view; unconcealed. All outdoor locations shall be considered exposed spaces.

1.4 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer:
   a. Minimum of five years of experience producing substantially similar material and able to show evidence of at least five installations in satisfactory operation for at least five years in the continental United States.
2. Installer:
   a. Engage an experienced installer to perform the work of this Section who has specialized in installing duct insulation similar to that required for this Project and who is acceptable to manufacturer.

B. Regulatory Requirements:

1. National Fire Protection Association (NFPA).

2. Underwriters Laboratories Inc. (UL).

3. Local and State Building Codes and Ordinances.

4. Permits: Contractor shall obtain and pay for all required permits, fees and inspections.

1.5 SUBMITTALS

A. Action Submittals: Submit the following:

1. Shop Drawings:
   a. Drawings showing fabrication methods, assembly, accessories, and installation details.

2. Product Data - General:
   a. Manufacturer's literature, illustrations, specifications, weight, dimensions, required clearances, materials of construction, and performance data for all material.
   b. Deviations from Contract Documents. Any exceptions to the Contract Documents must be clearly defined. Contractor shall be responsible for any additional expenses that may occur due to any exception made.
   c. Other technical data related to specified material and equipment as requested by Engineer.

3. Product Data – Insulation:
   a. Submit schedule showing manufacturer's product number, k-value, thickness and furnished accessories for each duct system requiring insulation.

B. Informational Submittals: Submit the following:

1. Certificates:
   a. Independent certification reports:
      1) UL Label.

2. Manufacturer Instructions:
   a. Instructions and recommendations for handling, storing, protecting the material.
   b. Installation Data.

3. Source Quality Control Submittals:
   a. Factory test reports.

4. Qualifications Statements:
   a. Manufacturer, when requested by Engineer.
   b. Installer, when requested by Engineer.

1.6 DELIVERY, STORAGE AND HANDLING

A. Packing, Shipping, Handling and Unloading:

1. Deliver materials to the Site to ensure uninterrupted progress of the Work.

B. Storage and Protection:

1. Store materials to permit easy access for inspection and identification. Keep all material off the ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.

2. Store all material in covered storage off the ground and prevent condensation and in accordance with the manufacturer's recommendations for long-term storage.

C. Acceptance at Site:

1. All boxes, crates and packages shall be inspected by Contractor upon delivery to the Site. Contractor shall notify Engineer, in writing, if any loss or damage exists to material or components. Replace lost material or components and repair damage to new condition, in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.1 SYSTEM PERFORMANCE

A. Design Criteria:

1. All insulation systems including covering, mastics, adhesives, sealers and facings shall have the following Fire Hazard Classifications in accordance with ASTM E84 or UL 723:
   a. Flame Spread Index: 25 maximum.
   b. Smoke Developed Index: 50 maximum.

2. All insulation systems shall not flame, glow, smolder or smoke when tested in accordance ASTM C411 at service temperature of 250 degrees F.

3. All insulation systems shall meet fire safety standards NFPA 90A, 90B, and 255 where applicable.

B. Performance Criteria:

1. Acoustical thermal insulation used as internal insulation and exposed to the airstream in ducts shall be shown to be durable when tested in accordance with UL 181.

2.2 MANUFACTURERS

A. Manufacturer: Provide product of one of the following:

1. CertainTeed.
2. Johns Manville.
3. Owens Corning.
4. Or equal.

2.3 DETAILS OF MATERIALS

A. Flexible Thermal Insulation:

1. Type: Flexible fiberglass blanket with vapor barrier facing.
2. Density: Minimum one pound per cubic foot.
3. Facing: Foil-Scrim-Kraft (FSK).
4. Thermal Conductivity: Maximum 0.27 Btu-in/hr-ft^2-degree F at 75 degrees F mean temperature.
5. Water Vapor Transmission: Maximum 0.05 perm.

B. Rigid Thermal Insulation:

1. Type: Rigid fiberglass board with vapor barrier facing.
2. Density: Minimum three pound per cubic foot.
3. Facing: Foil-Scrim-Kraft (FSK).
4. Maximum Thermal Conductivity: 0.23 Btu-in/hr-ft^2-degree F at 75 degrees F mean temperature.
5. Water Vapor Transmission: Maximum 0.05 perm.

C. Acoustical Thermal Insulation:

1. Type: Rigid fiberglass duct liner board with black mat surface and antimicrobial coating.
2. Density: Minimum three pound per cubic foot.
3. Thermal Conductivity: Maximum 0.23 Btu-in/hr-ft^2-degree F at 75 degrees F mean temperature.

2.4 ACCESSORIES

A. Provide staples, bands, wires, tape, anchors, corner angles and all other items and accessories recommended by insulation manufacturer for applications indicated.

B. Ductwork Insulation Compounds: Provide cements, adhesives, coatings, sealers, protective finishes and all other items and compounds recommended by insulation manufacturer for applications indicated.

2.5 IDENTIFICATION

A. All external duct insulation shall be legibly printed or identified at intervals not greater than 36 inches with the name of the manufacturer, the thermal resistance R-value at the specified thickness and the flame spread and smoke-developed indexes of the composite materials.

B. All duct insulation identification shall be provided in accordance with Section 23 05 53, Identification for HVAC Piping and Equipment.

2.6 SOURCE QUALITY CONTROL

A. Shop Tests:

1. Material shall be completely manufactured and pre-assembled in accordance with Reference Standards. Perform the following tests and inspections at factory before shipment:
   a. Tested and inspected for approval as a unit by Underwriters Laboratories Inc., UL Label.
   b. Factory test material to ensure that the entire package has been properly fabricated and assembled, and that the package meets the specified performance requirements including manufacturer's data report.
   c. Flame Spread.
   d. Smoke Developed.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine conditions under which materials and equipment will be installed and notify Engineer in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected.

B. All ductwork leaks shall be repaired prior to installation of duct insulation.

C. Take field measurements where required prior to installation to ensure proper fitting of Work.

3.2 INSTALLATION

A. General:

1. Install the material in accordance with the Contract Documents and by manufacturer's instructions and recommendations. Obtain written interpretation from Engineer in the event of conflict between manufacturer's instructions and recommendations and the Contract Documents.

2. Install in accordance with Laws and Regulations.

3. Do not modify structures to facilitate installation of material, unless approved in writing by Engineer.

4. Installation to conform to requirements of all local and state codes.

B. Duct insulation shall be continuous through walls and floor openings except where walls or floors are required to be firestopped or required to have a fire resisting rating.

C. Install insulation so as to make surfaces smooth, even, substantially flush with adjacent insulation and installed in a manner to maintain the integrity of the vapor barrier.

D. Fiberglass board shall be used to insulate ductwork that is exposed in fan or equipment rooms or is outdoors.

E. Flexible type duct insulation shall be used to insulate ductwork that is installed in concealed spaces (hung ceilings, furred spaces, pipe and duct spaces, crawl spaces and tunnels).

F. Facing and Finishing

1. Exposed Ducts: Insulation on ductwork exposed to view shall have facing or finish as specified herein: Facing or finish shall be reinforced with metal corner beads and shall have a glass cloth finish installed in the following manner: Brush a full coat of lagging adhesive/vapor retardant coating on all surfaces of the ductwork insulation. Imbed glass cloth in the wet coating, smoothing to avoid wrinkles. Overlap cloth seams 4", locating seams so as to be hidden from view, wherever practicable. Apply a second coat of lagging adhesive.

2. Concealed Ducts: Insulation on warm air ductwork installed within pipe and duct spaces, storerooms, hung ceilings, furred spaces, or pipe tunnels shall have no additional finishing, other than the foil- reinforced-kraft facing. All cold air ductwork for the above spaces shall be provided with two coats of a vapor retardant coating at least 1/16” thick with a layer of glass cloth in between or self-adhesive vapor barrier jacket.

G. Installation of Board Type Insulation

1. Insulation shall be applied with edges tightly butted. It shall be impaled on pins welded to the duct and secured with speed clips impaled over the pins. Pins shall be cut off close to speed clips. On horizontal ducts, pins shall be spaced not less than one per square foot for the bottom surface, and not less than one per two square feet on the sides and top surface. On vertical ducts, the pins shall be spaced not less than one clip per two square feet of duct surface. For faced insulation cold air ductwork, point all joints and cracks with vapor barrier coating, and seal all joints and speed clips with a 3" wide strip of foil-reinforced-kraft facing adhered with vapor barrier/insulation adhesive. The use of pressure sensitive tape of the same facing material also is acceptable for this purpose. For cold air ductwork, the laminated self-adhesive vapor barrier jacket will be accepted.

2. Where the welded pin method cannot be used because of space or size restriction, the use of stick clips will be approved, and the insulation shall be additionally secured to the duct with insulation adhesive. The adhesive shall cover the entire surface of the sheet metal when applied to underside of horizontal duct, but may be applied in strips for application to top and sides with a minimum of 50% coverage. Insulation shall be additionally secured with No. 16 gage soft annealed or galvanized steel wire on not more than 12" centers. Continuous metal, corner angles shall be used to protect edges of the insulation.

H. Installation of Flexible Type Insulation:

1. Flexible type insulation shall be cut slightly longer than the perimeter of the duct to insure full thickness at corners. Insulation shall be applied with edges tightly butted, and seams stapled approximately 6" on centers with outward clinching staples. Insulation shall be additionally secured with No. 16 gage soft annealed or galvanized steel wire on not more than 12-inch centers. When the width of a horizontal duct is 24" or more, the insulation shall also be fastened with welded pins or stick clips spaced on 18-inch centers on the bottom surface of the duct. All joints and clips shall be taped and sealed with 3" wide strips of foil-reinforced-kraft facing applied with insulation adhesive. The use of pressure sensitive tape of the same facing material also is acceptable for this purpose. For cold air ductwork, vapor barrier coating or laminated self-adhesive vapor barrier jacket will be accepted.

I. Clean and dry ductwork prior to insulating. Butt insulation joints firmly together to ensure complete and tight fit over surfaces to be covered.

J. Maintain integrity of vapor-barrier on ductwork insulation and protect it to prevent puncture and other damage.

K. Extend ductwork insulation without interruption through walls, floors and similar ductwork penetrations, except where otherwise indicated such as rated penetrations.

3.3 EXISTING INSULATION REPAIR

A. Repair damaged or removed sections of existing duct insulation, both previously damaged/removed and damaged/removed during construction. Use insulation of same type and thickness as existing insulation, install new jacket lapping and sealed over existing.

3.4 PROTECTION AND REPLACEMENT

A. Replace damaged insulation that cannot be repaired satisfactorily, including units with vapor barrier damage and moisture saturated units.

B. Protection: Insulation Worker shall advise Contractor of required protection for insulation work during remainder of construction period, to avoid damage and deterioration.

3.5 CLEANING

A. Thoroughly clean all exterior and interior surfaces of ductwork and accessories prior to installation and prior to putting into service.

B. Remove all dirt, rust, dust, etc. from material after installation.

C. Remove and dispose of all debris and waste from the Site resulting from installation.

3.6 SCHEDULES

A. Insulation Omitted - Do not insulate the following:

1. Access door, test hole fittings, damper quadrants, except as otherwise specified. The adjoining insulation shall be neatly finished around such devices.

2. Exhaust ductwork need not be thermally insulated, except the portion of the duct between motorized spill damper and spill louver.

3. Exposed supply and return ductwork in conditioned spaces.

4. Omit insulation on ductwork where shown on the Drawings.

B. Exposed Ducts/Plenums in Mechanical Rooms

1. Insulate
   a. All outside air intake/mixing plenums.
   b. Outdoor air intake ducts in their entirety.
   c. Exhaust duct from motorized spill damper to spill louver.
   d. Supply and return ducts.

2. Insulate the above with rigid fiberglass board, 2” thick.

C. Insulation Thicknesses:

1. Insulation for outside air intake ductwork shall be minimum 2 inches thick with a minimum installed thermal resistance value of R-8.

2. Supply and Return ductwork shall be minimum 2 inches thick with a minimum installed thermal resistance value of R-6.

3. Insulation for all other ductwork shall be minimum 1-1/2 inches thick with a minimum installed thermal resistance value of R-5.

D. Insulation Types:

1. Flexible thermal insulation shall be used on ductwork in concealed spaces.

2. Rigid thermal insulation shall be used on ductwork in exposed spaces.

3. Acoustical thermal insulation shall be used on ductwork shown on the Drawings

E. Insulation Locations:

1. All supply, return, and exhaust ductwork and plenums including appurtenances (e.g., , volume dampers, diffusers, grilles, etc.) associated with air conditioning units (except those located within air conditioned spaces).

2. All outside air intake ducts and plenums from the outside air intake louver, outside air intake shaft, or roof mounted intake up to the point where the duct or plenum is connected to the unit in heated or air conditioned spaces.

3. All heated or air conditioned ductwork located outdoors or in unheated spaces.

4. Any additional ductwork and plenums including appurtenances where condensation may occur due to contact with surrounding atmosphere.

END OF SECTION

SECTION 23 07 19

HVAC PIPING INSULATION

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. Contractor shall provide all labor, materials, tools, equipment and incidentals as shown, specified and required to furnish and install HVAC piping insulation complete with accessories. Product specific requirements are contained herein; Section 23 01 00, Basic Mechanical Requirements, shall be referred to for general requirements.

B. This section includes:

1. HVAC Piping Insulation:
   a. Fiberglass Thermal Insulation (for hydronic piping)
   b. Flexible-Elastomeric Thermal Insulation (for refrigerant piping)
   c. Protective Jacketing

C. Coordination:

1. HVAC piping insulation shall not be installed until piping has been field tested and approved by Engineer.

2. Review installation procedures under this and other Sections and coordinate the installation of items that must be installed with, or before, the HVAC piping insulation Work.

3. Notify other Contractors in advance of the installation of HVAC piping insulation to provide other contractors with sufficient time for the installation of items included in their contracts that must be installed with, or before, the HVAC piping insulation Work.

D. Related Sections:

1. Section 23 05 29, Hangers and Supports for HVAC Ductwork, Piping, and Equipment

2. Section 23 05 53, Identification for HVAC Piping and Equipment.

3. Section 23 21 13, Hydronic Piping.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM).

1. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.

2. ASTM C411 – Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.

3. ASTM C449 – Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement.

B. National Fire Protection Association (NFPA).

1. NFPA 90A – Standard for the Installation of Air-Conditioning and Ventilating Systems.

2. NFPA 90B – Standard for the Installation of Warm Air Heating and Air-Conditioning Systems.

3. NFPA 255 – Standard Method of Test of Surface Burning Characteristics of Building Materials.

C. Underwriters Laboratories Inc. (UL).

1. UL 723 – Test for Surface Burning Characteristics of Building Materials.

1.3 QUALITY ASSURANCE

A. Qualifications:

1. Installer:
   a. Engage an experienced installer to perform the work of this Section who has specialized in installing HVAC piping insulation similar to that required for this Project and who is acceptable to manufacturer.

B. Regulatory Requirements:

1. National Fire Protection Association (NFPA).

2. Underwriters Laboratories Inc. (UL).

3. Local and State Building Codes and Ordinances.

4. Permits: Contractor shall obtain and pay for all required permits, fees and inspections.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:

1. Shop Drawings:
   a. Drawings showing fabrication methods, assembly, accessories, and installation details.

2. Product Data:
   a. Manufacturer's literature, illustrations, specifications, weight, dimensions, required clearances, materials of construction, and performance data for all material.
   b. Deviations from Contract Documents. Any exceptions to the Contract Documents must be clearly defined. Contractor shall be responsible for any additional expenses that may occur due to any exception made.
   c. Other technical data related to specified material and equipment as requested by Engineer.

B. Informational Submittals: Submit the following:

1. Certificates:
   a. Independent certification reports:
      1) UL Label.

2. Manufacturer Instructions:
   a. Instructions and recommendations for handling, storing, protecting the material.
   b. Installation Data.

3. Source Quality Control Submittals:
   a. Factory test reports.

4. Qualifications Statements:
   a. Manufacturer, when requested by Engineer.
   b. Installer, when requested by Engineer.

1.5 DELIVERY, STORAGE AND HANDLING

A. Packing, Shipping, Handling and Unloading:

1. Deliver materials to the Site to ensure uninterrupted progress of the Work.

B. Storage and Protection:

1. Store materials to permit easy access for inspection and identification. Keep all material off the ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.

2. Store all material in covered storage off the ground and prevent condensation and in accordance with the manufacturer's recommendations for long-term storage.

C. Acceptance at Site:

1. All boxes, crates and packages shall be inspected by Contractor upon delivery to the Site. Contractor shall notify Engineer, in writing, if any loss or damage exists to material or components. Replace lost material or components and repair damage to new condition, in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.1 SYSTEM PERFORMANCE

A. Design Criteria:

1. All insulation systems including covering, mastics, adhesives, sealers and facings shall have the following Fire Hazard Classifications in accordance with ASTM E84 or UL 723:
   a. Flame Spread Index: 25 maximum.
   b. Smoke Developed Index: 50 maximum.

2. All insulation systems shall not flame, glow, smolder or smoke when tested in accordance ASTM C411 at service temperature of 220 degrees F.

3. All insulation systems shall meet fire safety standards NFPA 90A, 90B, and 255 where applicable.

2.2 DETAILS OF MATERIALS

A. Fiberglass Thermal Insulation:

1. Product and Manufacturer: Provide one of the following:
   a. Model FIBERGLAS SSL II – ASJ, as manufactured by Owens Corning.
   b. Model Micro-Lok HP, as manufactured by Johns Manville.
   c. Or equal.

2. Type: Heavy density sectional pipe insulation with a smooth, reinforced, wrinkle resistant all-service vapor retarder jacket and self-sealing adhesive lap.

3. Density: Minimum three pound per cubic foot.

4. Thermal Conductivity: Maximum 0.23 Btu-in/hr-ft2-degree F at 75 degrees F mean temperature.

5. Water Vapor Transmission: Maximum 0.02 perm.

6. Fittings: Molded fiberglass, or pre-cut fiberglass inserts.

7. Fittings Covers: PVC Plastic: Zeston or Proto, one-piece molded type fitting covers and jacketing material, gloss white. Connections: Tacks, pressure sensitive color matching vinyl tape.

8. Jointing Materials: Manufacturer's recommended adhesives and tape.

9. Valve Insulation: Miter cut nesting size covering segments of same thickness as pipeline, for insulation of valves.

B. Flexible-Elastomeric Thermal Insulation:

1. Product and Manufacturer: Provide one of the following:
   a. Model Armaflex Tube Insulation, as manufactured by Armacell.
   b. Model Insul-Tube Insulation, as manufactured by K-Flex USA.
   c. Or equal.

2. Type: Expanded close cell structure elastomeric thermal insulation.

3. Density: Minimum three pound per cubic foot.

4. Thermal Conductivity: Maximum 0.25 Btu-in/hr-ft2-degree F at 75 degrees F mean temperature.

5. Water Vapor Transmission: Maximum 0.05 perm.

6. Provide manufacturer's approved contact adhesive for sealing seams and butt joints.

C. Accessories:

1. Aluminum Protective Jacketing (for outdoor pipe insulation application):
   a. Product and Manufacturer: Provide one of the following:
      1) Model Strap-On, as manufactured by Pabco-Childers Metals.
      2) Model Insul-Mate, as manufactured by RPR Products, Inc.
      3) Or equal.
   b. Material: Smooth aluminum (Alloy 3003 – H-14).
   c. Thickness: 0.016-inch.
   d. Moisture Retarder: 3-mil thick coextrusion of polyethylene and DuPont's Surlyn.
   e. Fastening: Continuous modified Pittsburgh Z-lock longitudinal seam with self-gauging 2-inch built-in overlap.
   f. Bands: 1/2-inch stainless steel bands with wing seals.
   g. Fittings:
      1) Type: Pre-fabricated aluminum (Alloy 3003 – H-14) fittings.
      2) Thickness: 0.016-inch.

2.3 IDENTIFICATION

A. All HVAC piping insulation identification shall be provided in accordance with Section 23 05 53, Identification for HVAC Piping and Equipment.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine conditions under which materials and equipment will be installed and notify Engineer in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected.

B. All HVAC piping leaks shall be repaired prior to installation of HVAC piping insulation.

C. Take field measurements where required prior to installation to ensure proper fitting of Work.

3.2 INSTALLATION

A. General:

1. Install the material in accordance with the Contract Documents and by manufacturer's instructions and recommendations. Obtain written interpretation from Engineer in the event of conflict between manufacturer's instructions and recommendations and the Contract Documents.

2. Install in accordance with Laws and Regulations.

3. Do not modify structures to facilitate installation of material, unless approved in writing by Engineer.

4. Installation to conform to requirements of all local and state codes.

B. HVAC piping insulation shall be continuous through walls and floor openings except where walls or floors are required to be firestopped or required to have a fire resisting rating.

C. Fire Seal Application: Where pipes pass through fire walls, fire partitions, fire rated pipe chase walls or floors above grade, insulation shall pass through and a UL classified assembly shall be provided. Refer to Section 07 84 00 - Firestopping.

D. Install insulation materials with smooth and even surfaces. Insulate each continuous run of piping with full-length units of insulation, with single cut piece to complete run. Do not use cut pieces or scraps abutting each other.

E. Clean and dry pipe surfaces prior to insulating. Butt insulation joints firmly together to ensure complete and tight fit over surfaces to be covered.

F. Maintain integrity of vapor-barrier jackets on pipe insulation and protect to prevent puncture or other damage.

G. Valves shall be insulated up to packing unit.

H. Fiberglass insulation joints shall be sealed with butt strips that are compatible with the required facing. Stapling shall not be required to complete the closure. Manufacturer's data regarding thickness constraints in relation to operating temperature shall be followed. On cold systems, vapor barrier shall be provided. All penetrations and exposed ends of insulation shall be sealed with mold resistant vapor barrier mastic.

I. Insulation on all cold surfaces shall be applied with a continuous, unbroken vapor seal. Hangers, supports, anchors etc., that are secured directly to cold surfaces must be adequately insulated and vapor sealed to prevent condensation.

J. All surface finishes are to be extended to protect all surfaces, ends and raw edges of insulation.

K. General valves, fittings, etc. shall be insulated as follows:

1. Preformed PVC fitting covers with factory precut Hi-Lo Temp insulation insert of the same thickness as adjoining pipe insulation will be accepted. Valves, fittings, etc. shall be insulated by applying the proper factory precut Hi-Lo Temp insulation insert to the pipe fitting, valve, etc. The ends of the Hi-Lo Temp insulation insert shall be tucked snugly into the throat of the fitting, valve etc. and the edges adjacent to the pipe covering tufted and tucked in, fully insulating the pipe fitting, valve, etc. Vapor barrier mastic compatible with the PVC shall be applied around the edges of the adjoining pipe insulation and on the fitting cover throat overlap seam. The PVC fitting cover shall then be applied and shall be secured with pressure sensitive tape along the circumferential edges. The tape shall extend over the adjacent pipe insulation and have an overlap on itself at least 2" on the downward side.

L. Where hangers are in direct contact with low temperature piping the hanger and supporting rod shall be wrapped with foil-faced blanket insulation and vapor sealed. Hanger rod insulation and vapor barrier shall extend up to the rod a minimum distance equal to the diameter of the pipe.

M. Install insulation so as to make surfaces smooth, even, substantially flush with adjacent insulation and installed in a manner to maintain the integrity of the vapor barrier.

N. Provide insulation protection shields for insulated piping supported by pipe hangers. Refer to Specification 23 05 29.

O. Outdoor Piping:

1. All outdoor exposed pipes shall be insulated as required and shall further be protected with a weatherproof finish. Install aluminum jacketing/cladding. Lap longitudinal and transverse circumferential joints with a minimum of 2 inches overlap. Secure jacketing in place with one-half inch by 0.020-inch thick strapping bands and wing seats on maximum 12 inch centers. Installation shall be completely weatherproof.

2. Fitting and valves shall be insulated with segments of the molded insulation and shall be covered using preformed aluminum fittings identical in composition to the jacket. All joints shall overlap 1" and shall be completely weatherproof.

3.3 CLEANING

A. Thoroughly clean and dry all exterior surfaces of HVAC piping and accessories prior to installation.

B. Remove all dirt, rust, dust, etc. from HVAC piping insulation after installation.

C. Remove and dispose of all debris and waste from the Site resulting from installation.

3.4 PROTECTION AND REPLACEMENT

A. All insulation applied in one day shall have the vapor barrier applied the same day and any exposed ends shall be temporarily protected with a moisture barrier and sealed to the piping.

B. Replace damaged insulation during construction that cannot be repaired satisfactorily, including units with vapor barrier damage and moisture saturated units.

C. Protection: Insulation worker shall advise Contractor of required protection for insulation work during construction period, to avoid damage and deterioration.

3.5 SCHEDULE OF PIPE INSULATION

A. The following piping systems shall be insulated:

1. Hot Water Piping

2. Condensate Drain from Fan Coil Units

3. Refrigerant Piping

4. Boiler Make-up Water

B. Insulation Omitted: Omit insulation on hot piping within radiation enclosures or unit cabinets.

C. Required Thickness (per Table C403.11.3 of the 2020 NYSECC and Tables 6.8.3-1 and 6.8.3-2 of ASHRAE 90.1-2016)

Fluid Operating Temperature Range and Usage (ºF)	Insulation Conductivity BTUin/hrft^{2}ºF	Insulation Conductivity Mean Rating Temperature ºF	Nom Dia <1”	Nom Dia 1” to < 1.5”	NomDia 1.5” to < 4”
141-200	0.25-0.29	125	1.5	1.5	2.0
105-140	0.22-0.28	100	1.0	1.0	1.5
40-60	0.21-0.27	75	0.5	0.5	1.0
<40	0.20-0.26	50	0.5	1.0	1.0

END OF SECTION

SECTION 23 08 00

COMMISSIONING OF HVAC

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. HVAC commissioning description.

B. HVAC commissioning responsibilities.

1.2 RELATED SECTIONS

A. Section 23 05 93 - Testing, Adjusting, and Balancing for HVAC: For requirements and procedures concerning testing, adjusting, and balancing of mechanical systems.

B. Section 23 09 00 - Instrumentation and Control for HVAC: Submittal and training requirements.

C. Section 23 09 23 - Direct-Digital Control System for HVAC: Submittal, training, and programming requirements.

1.3 REFERENCES

A. American Society of Heating, Refrigerating and Air-Conditioning Engineers:

1. ASHRAE Guideline 1 - The HVAC Commissioning Process.

B. Building Commissioning Association:

1. BCA - Commissioning Handbook.

C. National Environmental Balancing Bureau:

1. NEBB - Procedural Standards for Building Systems Commissioning.

D. Testing Adjusting and Balancing Bureau:

1. TABB - Commissioning Manual.

1.4 COMMISSIONING DESCRIPTION

A. HVAC commissioning process includes the following tasks:

1. Testing and startup of HVAC equipment and systems.

2. Equipment and system verification checks.

3. Assistance in functional performance testing to verify testing and balancing, and equipment and system performance.

4. Provide qualified personnel to assist in commissioning tests, including seasonal testing.

5. Complete and endorse functional performance test checklists provided by Commissioning Authority to assure equipment and systems are fully operational and ready for functional performance testing.

6. Provide equipment, materials, and labor necessary to correct deficiencies found during commissioning process to fulfill contract and warranty requirements.

7. Provide operation and maintenance information and record drawings to Commissioning Authority for review verification and organization, prior to distribution.

8. Provide assistance to Commissioning Authority to develop, edit, and document system operation descriptions.

9. Provide training for systems specified in this Section with coordination by Commissioning Authority.

B. Equipment and Systems to Be Commissioned:

1. New HVAC systems that were installed under this Contract.

2. The following is a partial list of equipment that are included in this HVAC Commissioning:
   a. Piping systems.
   b. Ductwork.
   c. Variable frequency drives.
   d. Rooftop Units.
   e. Heat Pump/Split system air conditioning units.
   f. Air handling units.
   g. Unit Ventilators.
   h. Fan Coil Units.
   i. Unit heaters.
   j. Fans.
   k. Indoor air quality.
   l. BMS controls.
   m. Testing, Adjusting and Balancing work.

C. Perform seasonal function performance tests for the following equipment and systems:

1. Heating equipment during heating season.

2. Cooling equipment during cooling season.

1.5 COMMISSIONING SUBMITTALS

A. Draft Forms: Submit draft of functional performance test checklist.

B. Test Reports: Indicate data on system verification form for each piece of equipment and system as specified. Use AABC forms as guidelines.

C. Field Reports: Indicate deficiencies preventing completion of equipment or system verification checks equipment or system to achieve specified performance.

1.6 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution Requirements: Requirements for submittals.

B. Project Record Documents: Record revisions to equipment and system documentation necessitated by commissioning.

C. Operation and Maintenance Data: Submit revisions to operation and maintenance manuals when necessary revisions are discovered during commissioning.

1.7 QUALITY ASSURANCE

A. Perform Work in accordance with NEBB requirements.

1.8 COMMISSIONING RESPONSIBILITIES

A. Equipment or System Installer Commissioning Responsibilities:

1. Attend commissioning meetings.

2. Ensure temperature controls installer performs assigned commissioning responsibilities as specified below.

3. Ensure testing, adjusting, and balancing agency performs assigned commissioning responsibilities as specified.

4. Provide instructions and demonstrations for Owner's personnel.

5. Ensure subcontractors perform assigned commissioning responsibilities.

6. Ensure participation of equipment manufacturers in appropriate startup, testing, and training activities when required by individual equipment specifications.

7. Develop startup and initial checkout plan using manufacturer's startup procedures and functional performance checklists for equipment and systems to be commissioned.

8. During verification check and startup process, execute HVAC related portions of checklists for equipment and systems to be commissioned.

9. Perform and document completed startup and system operational checkout procedures, providing copy to Commissioning Authority.

10. Provide manufacturer's representatives to execute starting of equipment. Ensure representatives are available and present during agreed upon schedules and are in attendance for duration to complete tests, adjustments and problem-solving.

11. Coordinate with equipment manufacturers to determine specific requirements to maintain validity of warranties.

12. Provide personnel to assist Commissioning Authority during equipment or system verification checks and functional performance tests.

13. Prior to functional performance tests, review test procedures to ensure feasibility, safety and equipment protection and provide necessary written alarm limits to be used during tests.

14. Prior to startup, inspect, check, and verify correct and complete installation of equipment and system components for verification checks included in commissioning plan. When deficient or incomplete work is discovered, ensure corrective action is taken and re-check until equipment or system is ready for startup.

15. Work with manufacturer and Commissioning Authority.

16. Perform verification checks and startup on equipment and systems as specified.

17. Assist Commissioning Authority in performing functional performance tests on equipment and systems as specified.

18. Perform operation and maintenance training sessions scheduled by Commissioning Authority.

19. Conduct HVAC system orientation and inspection.

B. Temperature Controls Installer Commissioning Responsibilities:

1. Attend commissioning meetings.

2. Review design for ability of systems to be controlled including the following:
    a. Confirm proper hardware requirements exists to perform functional performance testing.
    b. Confirm proper safeties and interlocks are included in design.
    c. Confirm proper sizing of system control valves and actuators and control valve operation will result capacity control identified in Contract Documents.
    d. Confirm proper sizing of system control dampers and actuators and damper operation will result in proper damper positioning.
    e. Confirm sensors selected are within device ranges.
    f. Review sequences of operation and obtain clarification from Architect/Engineer.
    g. Indicate delineation of control between packaged controls and building automation system, listing BAS monitor points and BAS adjustable control points.
    h. Provide written sequences of operation for packaged controlled equipment. Equipment manufacturers' stock sequences may be included, when accompanied by additional narrative to reflect Project conditions.

3. Inspect, check, and confirm proper operation and performance of control hardware and software provided in other HVAC sections.

4. Submit proposed procedures for performing automatic temperature control system point-to-point checks to Commissioning Authority and Architect/Engineer.

5. Inspect check and confirm correct installation and operation of automatic temperature control system input and output device operation through point-to-point checks.

6. Demonstrate system performance and operation to Commissioning Authority during functional performance tests including each mode of operation.

7. Provide control system technician to assist during Commissioning Authority verification check and functional performance testing.

8. Provide control system technician to assist testing, adjusting, and balancing agency during performance of testing, adjusting, and balancing work.

9. Assist in performing operation and maintenance training sessions scheduled by Commissioning Authority.

C. Testing, Adjusting, and Balancing Agency Commissioning Responsibilities:

1. Attend commissioning meetings.

2. Participate in verification of testing, adjusting, and balancing report for verification or diagnostic purposes. Repeat sample of 20 percent of measurements contained in testing, adjusting, and balancing report.

3. Assist in performing operation and maintenance training sessions scheduled by Commissioning Authority.

1.9 COMMISSIONING MEETINGS

A. Attend initial commissioning meeting and progress commissioning meetings as required by Commissioning Authority.

1.10 SCHEDULING

A. Prepare schedule indicating anticipated start dates for the following:

1. Piping system pressure testing.
2. Piping system flushing and cleaning.
3. Ductwork cleaning.
4. Ductwork pressure testing.
5. Equipment and system startups.
6. Automatic temperature control system checkout.
7. Testing, adjusting, and balancing.
8. HVAC system orientation and inspections.
9. Operation and maintenance manual submittals.
10. Training sessions.

B. Schedule seasonal tests of equipment and systems during peak weather conditions to observe full-load performance.

C. Schedule occupancy sensitive tests of equipment and systems during conditions of both minimum and maximum occupancy or use.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install additional balancing dampers, balancing valves, access doors, test ports, and pressure and temperature taps required to meet performance requirements.

B. Place HVAC systems and equipment into full operation and continue operation during each working day of commissioning.

C. Install replacement sheaves and belts to obtain system performance, as requested by Commissioning Authority.

D. Install test holes in ductwork and plenums as requested by Commissioning Authority for taking air measurements.

E. Prior to start of functional performance test, install replacement filters in equipment

3.2 FIELD TESTS AND INSPECTIONS

A. Seasonal Sensitive Functional Performance Tests:

1. Test heating equipment at winter design temperatures.

2. Test cooling equipment at summer design temperatures

B. Be responsible to participate in initial and alternate peak season test of systems required to demonstrate performance.

C. Occupancy Sensitive Functional Performance Tests:

1. Test equipment and systems affected by occupancy variations at minimum and peak loads to observe system performance.

END OF SECTION

SECTION 23 09 23

DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. Contractor shall provide all labor, material, equipment, related services, supervision and incidentals required, including, but not limited to, specified products and required to furnish, install, configure a Direct-Digital Control System (DDCS) for HVAC systems, including all necessary hardware and all operating and applications software as required for the complete performance of the Work as shown on the Drawings and as specified herein. Product specific requirements are contained herein; Section 23 01 00, Basic Mechanical Requirements, shall be referred to for general requirements.

B. Section includes:

1. System Description.
2. Controllers.
3. Hard-wired Devices
4. Electronic Input/Output Devices
5. Switches
6. Air Flow Measuring Stations
7. Control Valves
8. Electrical Control Power and Low Voltage Wiring
9. Panels and Enclosures
10. DDC Hardware Identification.
11. Controller software.
12. HVAC control programs.
13. Sequence Of Operations.

C. Description

1. The scope intent is to maintain continuity with the existing Building Automation System (BAS) infrastructure by engaging the incumbent BAS provider, Automated Logic representative. However, the Mechanical Contractor may solicit proposals from other qualified Automatic Temperature Control (ATC) contractors, as long as they partner with an authorized Automated Logic dealer. Any chosen contractor must be able to demonstrate seamless integration of all new controllers into the existing Alerton-based BAS architecture.

2. Automatic temperature control field monitoring and control system using field programmable microprocessor-based units with communication to the existing DDCS. New controllers shall be connected to the existing DDCS network (BACnet, MS/TP) and must be seen and operated through the existing DDCS user interface.

3. Include computer software and hardware, operator input/output devices, control units, local area networks (LAN), sensors, control devices, actuators.

4. Provide control systems consisting of thermostats, control valves, dampers, and operators, indicating devices, interface equipment and other apparatus and accessories required to operate mechanical systems, and to perform functions specified.

5. Include installation and calibration, supervision, adjustments, and fine tuning necessary for complete and fully operational system.

6. HVAC equipment provided with factory control systems shall communicate with the DDCS via a BACnet interface for global monitoring and control via the DDCS:

D. The Work also includes:

1. DDCS panels.

2. Direct digital controllers.

3. Sensors, controllers, thermostats, mounting accessories, junction boxes, face plates, wall plates, covers, mounting hardware as required.

4. Relays, selector switches, pushbuttons, indicating lights,

5. Other control devices and appurtenances, as required.

6. Power and control wiring and conduit: The conduit and wiring to be provided under this Section shall include the following:
   a. All wiring and conduit from each DDCS panel to sensors, controllers, switches, dampers, valves, louvers, HVAC equipment panels, smoke purge panels, audio visual alarms, etc.

b. All wiring and conduit between HVAC equipment panels and associated field devices.
c. Any other HVAC device requiring control under this Contract.
d. All power wiring and conduit to DDCS panels, except where specified to be provided under the Electrical Contract.
e. Conduit layouts for these wiring requirements are not shown; CONTRACTOR shall determine the requirements based upon the arrangement of the components being furnished.

E. Work Furnished Under the Electrical Contract:

1. All 3 phase power wiring and conduit.

2. 120 volt, single phase power wiring and conduit for the following:
   a. Power to DDCS panels.
   b. Power from DDCS panels to single phase fans and pumps controlled from the DDCS panels.

3. Starters.

4. Disconnects, except where specified to be furnished under the HVAC Contract.

5. "HAND/OFF/AUTOMATIC" selector switches, lockout stops, pushbuttons, "START/STOP" switches, and indicating lights, except those located at DDCS panels, which shall be provided under the HVAC Contract.

6. Control wiring and conduit and status wiring and conduit from motor control centers to DDCS panels.

7. Control wiring and conduit and status wiring and conduit from VFD's to DDCS panels except where VFD's are provided within packaged HVAC equipment.

8. Control wiring and conduit and status wiring and conduit from the Fire Alarm System panels to the DDCS panels for each fire alarm zone.

9. Smoke detectors.

10. Signal wiring and conduit where specified to be provided under the Electrical Contract.

F. Coordination:

1. Review installation procedures under this and other Sections and coordinate the installation of items that must be installed with, or before, Instrumentation and Control for HVAC Work.

2. Notify other contractors in advance of the installation of Instrumentation and Control for HVAC items to provide them with sufficient time for the installation of items included in their contracts that must be installed with, or before, Instrumentation and Control for HVAC Work.

G. Related Sections:

1. Section 23 05 53, Identification for HVAC Piping and Equipment.
2. Section 23 05 93, Testing, Adjusting, and Balancing for HVAC.
3. Section 23 34 23, HVAC Power Ventilators.
4. Section 23 72 00, Packaged Outdoor Heating-Only Makeup-Air Units
5. Section 23 74 13, Rooftop Heat Pump Units
6. Section 23 31 13, HVAC Ducts And Casings
7. Section 23 82 00, Convection Heating And Cooling Units.
8. Section 23 81 26, Split-System Air-Conditioners
9. Division 26 related sections.

1.2 REFERENCES

A. Standards referenced in this Section are listed below:

1. American National Standards Institute, (ANSI).
2. Institute of Electrical and Electronic Engineers, (IEEE).
3. The Instrumentation, Systems and Automation Society, (ISA).
4. National Electrical Code, (NEC).
   a. NFPA 79, Electrical Standard for Industries Machinery.
5. National Electrical Manufacturers Association, (NEMA).
6. National Fire Protection Association, (NFPA).
   a. NFPA 90A, Standard for the Installation of Air-Conditioning and Ventilating Systems
7. Underwriters' Laboratories, Inc., (UL).
   a. UL 873, Standard for Temperature-Indicating and -Regulating Equipment.
   b. UL 916, Standard for Energy Management Equipment.
   c. UL 555S, Standard for Smoke Dampers.
8. ANSI/ASHRAE Standard 135, BACnet - A Data Communication Protocol for Building Automation and Control Systems

1.3 DEFINITIONS

A. Unless specifically defined within the Contract Documents, the words or acronyms contained within this specification shall be as defined within, or by the references listed within this specification, the Contract Documents, or, if not listed by either, by common industry practice.

B. Definitions:

1. Supplier: The Supplier shall be Contractor and manufacturer jointly, that has undivided responsibility for the engineering, design, installation and commissioning of a complete and fully functional DDCS with all required appurtenances. An approved representative of the manufacturer is an acceptable substitute to for the manufacture where independent control Contractors are authorized by the manufacturer to provide their products and services.

C. Acronyms:

1. General
   a. ASHRAE: American Society Heating, Refrigeration, Air Conditioning Engineers
   b. AHU: Air Handling Unit
   c. ASC: Application Specific Controllers
   d. ATC: Automatic Temperature Control
   e. BACnet: Building Automation Controls Network
   f. BMS: Building Management System
   g. BAS: Building Automation System
   h. DDC: Direct Digital Control
   i. DDCS:Direct-Digital Control System
   j. EIA: Electronic Industries Alliance
   k. GUI: Graphical User Interface
   l. HVAC: Heating, Ventilation, and Air Conditioning
   m. IEEE: Institute Electrical Electronic Engineers
   n. MBPS: Mega Bites Per Second
   o. MER: Mechanical Equipment Room
   p. PID: Proportional, Integral, Derivative

2. Communications and protocols
   a. ARP: Address Resolution Protocol
   b. BACnet: Building Automation and Control Networks
   c. CORBA: Common Object Request Broker Architecture
   d. CSMA/CD: Carrier Sense Multiple Access/Collision Detect
   e. DDE: Dynamic Data Exchange
   f. FTP: File Transfer Protocol
   g. FTT: Free Topology Transceivers
   h. HTTP: Hyper Text Transfer Protocol
   i. IIOP: Internet Inter-ORB Protocol

j. IP: Internet Protocol
k. LAN: Local Area Network
l. LON: Echelon Communication – Local Operating Network
m. MS/TP: Master Slave Token Passing
n. OBIX: Open Building Information Exchange
o. ODBC: Open Database Connectivity
p. ORB: Object Request Broker
q. SNVT: Standard Network Variables Types
r. SQL: Structured Query Language
s. UDP: User Datagram Protocol
t. XML: eXtensible Markup Language

3. Controllers
   a. ASD: Application Specific Device
   b. AAC: Advanced Application Controller
   c. ASC: Application Specific Controller.
   d. CAC: Custom Application Controller.
   e. DCU: Distributed Control Unit
   f. LCM: Local Control Module
   g. MC: MicroControllers
   h. MPC: Multi-purpose Controller
   i. NSC: Network Server Controller
   j. PEM: Package Equipment Module
   k. PPC: Programmable Process Controller
   l. RC: Room controller
   m. SDCU: Standalone Digital Control Units
   n. SLC: Supervisory Logic Controller
   o. UEC: Unitary Equipment Controller
   p. VAVDDC: Variable Air Volume Direct Digital Controller

4. Tools and Software
   a. AFDD: Automated Fault Detection and Diagnostic
   b. APEO: Automated Predictive Energy Optimization
   c. DR: Demand Response
   d. CCDT: Configuration, Commissioning and Diagnostic Tool
   e. BPES: BACnet Portable Engineering Station
   f. LPES: LON Portable Engineering Station
   g. POT: Portable Operator's Terminal
   h. PEMS: Power and Energy Management Software
   i. MTBF: Mean Time Between Failure

1.4 SYSTEM PERFORMANCE

A. Performance Standards. System shall conform to the following minimum standards over network connections. Systems shall be tested using manufacturer's recommended hardware and software for display through the existing BAS.

1. Graphic Refresh. A graphic with 20 dynamic points shall update with current data within 8 sec. and shall automatically refresh every 15 sec.

2. Configuration and Tuning Screens. Screens used for configuring, calibrating, or tuning points, PID loops, and similar control logic shall automatically refresh within 6 sec.

3. Object Command. Devices shall react to command of a binary object within 2 sec. Devices shall begin reacting to command of an analog object within 2 sec.

4. Alarm Response Time. An object that goes into alarm shall be annunciated at the browser within 45 sec.

5. Program Execution Frequency. Custom and standard applications shall be capable of running as often as once every 5 sec.

6. Performance. Programmable controllers shall be able to completely execute DDC PID control loops at a frequency adjustable down to once per sec. Select execution times consistent with the mechanical process under control.

7. Multiple Alarm Annunciation. Each user, connected to network accessing the system through their browser (workstation), shall receive alarms within 5 seconds of one another.

8. Reporting Accuracy. System shall report values with minimum end-to-end accuracy listed in Table 1.

9. Control Stability and Accuracy. Control loops shall maintain measured variable at setpoint within tolerances listed in Table 2

Table-1
Reporting Accuracy

Measured Variable	**Reported Accuracy**
Space Temperature	±0.5ºC (±1ºF)
Ducted Air	±0.5ºC (±1ºF)
Outside Air	±1.0ºC (±2ºF)
Dew Point	±1.5ºC (±3ºF)
Water Temperature	±0.5ºC (±1ºF)
Delta-T	±0.15º (±0.25ºF)
Relative Humidity	±5% RH
Water Flow	±2% of full scale
Airflow (terminal)	±10% of full scale (see Note 1)
Airflow (measuring stations)	±5% of full scale
Airflow (pressurized spaces)	±3% of full scale
Air Pressure (ducts)	±25 Pa (±0.1 in. w.g.)
Air Pressure (space)	±3 Pa (±0.01 in. w.g.)
Water Pressure	±2% of full scale (see Note 2)
Electrical (A, V, W, Power Factor)	±1% of reading (see Note 3)
Carbon Monoxide (CO)	±5% of reading
Carbon Dioxide (CO_2)	±50 ppm

General Note: Comprehensive variable list applicable for all projects.

Note 1: Accuracy applies to 10%–100% of scale
Note 2: For both absolute and differential pressure
Note 3: Not including utility-supplied meters.

Table 2
Control Stability and Accuracy

Controlled Variable	Control Accuracy	Range of Medium
Air Pressure	±50 Pa (±0.2 in. w.g.) ±3 Pa (±0.01 in. w.g.)	0–1.5 kPa (0–6 in. w.g.) -25 to 25 Pa (-0.1 to 0.1 in. w.g.)
Airflow	±10% of full scale	
Space Temperature	±1.0ºC (±2.0ºF)	
Duct Temperature	±1.0ºC (±2.0ºF)	
Humidity	±5% RH	
Fluid Pressure	±10 kPa (±1.5 psi) ±250 Pa (±1.0 in. w.g.)	MPa (1–150 psi) 0–12.5 kPa (0–50 in. w.g.) differential

General Note: Comprehensive variable list applicable for all projects.

1.5 QUALITY ASSURANCE

A. General:

1. The DDCS shall be furnished by a single Supplier responsible for the adequacy, performance and configuration of all items.

2. All work described in this section shall be installed, wired, circuit tested and calibrated by factory certified technicians qualified for this work and in the regular employment of the approved manufacturer's local field office.

3. Supervision, hardware and software engineering, calibration and checkout of the system shall be by the employees of the manufacturer or manufacturers approved technical representative.

4. Provide DDCS components and ancillary equipment, which are UL-916 listed and labeled.

5. All components used in conditioned air streams, spaces or return air plenums shall comply with NFPA 90A Flame/Smoke rating of 25/50.

6. All wiring shall conform to the National Electrical Code.

7. All smoke dampers shall be rated in accordance with UL 555S.

8. Comply with FCC rules, Part 15 regarding Class A radiation for computing devices and low power communication equipment operating in commercial environments.

9. Comply with FCC, Part 68 rules for telephone modems and data sets.

B. Supplier's Qualifications:

1. Shall have a minimum of 5 years of installation experience with the manufacturer and shall provide documentation in the bid and submittal package verifying longevity of the installing company's relationship with the manufacturer.

2. Shall have an in place support facility within 100 miles of the site with factory certified technicians and engineers, spare parts inventory and all necessary test and diagnostic equipment for the installed system.

3. Shall have the capability to provide on-site service within a 2 hour period.

4. Shall have 24 hours/day, 7 days/week emergency service available.

5. Shall be a financially sound firm having at least five years continuous experience in designing, implementing, supplying and supporting control systems at similar facilities which are comparable to the DDCS in terms of hardware, software, cost and complexity.

6. Shall have manufactured and supported standard lines of digital processing and control equipment and application software continuously for the last five years.

7. Shall have in existence an experienced engineering and technical staff capable of designing, implementing, supplying and supporting the DDCS and handling the DDCS submittal and training requirements.

8. Shall provide system hardware components and software packages of fully developed, field proven standardized designs and therefore shall furnish a system which is not a highly unique, custom one-of-a-kind system.

9. Shall have a minimum of five years' experience in software configuration, hardware application, programming, and data highway systems.

10. Shall provide standard course offerings in general control applications and in operation, programming and maintenance of the control system and equipment at a facility specifically utilized for training purposes. The facility shall have been in operation continuously for the last two years.

11. Shall have a demonstrated record of prompt response to field failures.

12. Shall have a documented program of failure analysis.

13. Shall utilize a UL approved panel shop.

C. Component Supply and Compatibility:

1. Obtain all equipment included in this Section regardless of the component manufacturer from a single Supplier.

2. The Supplier shall review and approve or prepare all Shop Drawings and other submittals for all components furnished under this Section.

3. All components shall be specifically constructed for the specified service conditions and shall be integrated into the overall equipment assembly by the Supplier.

1.6 SUBMITTALS

A. Action Submittals: Submit the following:

1. All shop drawings shall be prepared in Visio Professional or AutoCAD software. In addition to the drawings, the Contractor shall furnish a CD containing the identical information. Drawings shall be 11” x 17” size or larger.

2. Shop drawings shall include a riser diagram depicting locations of all controllers and workstations, with associated network wiring. Also included shall be individual schematics of each mechanical system showing all connected points with reference to their associated controller.

3. Submittal data shall contain manufacturer's data on all hardware and software products required by the specification. Valve, damper and air flow station schedules shall indicate size, CV where applicable, configuration, capacity and location of all equipment.

4. Software submittals shall contain narrative descriptions of sequences of operation, program listings, point lists, and a complete description of the graphics, reports, alarms and configuration to be furnished with the workstation software. If color has been used to differentiate information, the information shall be in color.

5. Information common to the entire system shall be provided. This shall include but not be limited to the following.
   a. Product manuals for the key software tasks.
   b. Operating the system.
   c. Administrating the system.
   d. Engineering the operator workstation.
   e. Application programming.
   f. Engineering the network.
   g. Setting up the web server.
   h. Report creation.
   i. Graphics creation.
   j. All other engineering tasks.
   k. System architecture diagram.
   l. List of recommended maintenance tasks associated with the system servers, operator workstations, data servers, web servers and web clients.
   m. Define the task.
   n. Recommend a frequency for the task.
   o. Reference the product manual that includes instructions on executing the task.
   p. Licenses, guarantees, and warranty documents for equipment and systems.

q. Submit one copy for each building, plus two extra copies.

6. Information common to the systems in a single building shall be provided.
   a. System architecture diagram for components within the building annotated with specific location information.
   b. As-built drawing for each control panel.
   c. As-built wiring design diagram for all components.
   d. Installation design details for each I/O device.
   e. As-built system flow diagram for each system.
   f. Sequence of operations for each system.
   g. Binding map for the building.
   h. Product data sheet for each component.
   i. Installation data sheet for each component.
   j. Submit two copies for each building and two extra copies.

7. Software shall be provided:
   a. Submit a copy of all software installed on the servers and workstations.
   b. Submit all licensing information for all software installed on the servers and workstations.
   c. Submit a copy of all software used to execute the project even if the software was not installed on the servers and workstations.
   d. Submit all licensing information for all the software used to execute the project.
   e. All software revisions shall be as installed at the time of the system acceptance.
   f. Firmware Files
   g. Submit a copy of all firmware files that were downloaded to or pre-installed on any devices installed as part of this project.
   h. This does not apply to firmware that is permanently burned on a chip at the factory and can only be replaced by replacing the chip.
   i. Submit a copy of all application files that were created during the execution of the project.
   j. Submit a copy of all graphic page files created during the execution of the project.

8. Panel and Cabinet Information:
   a. Layout Drawings, including the following:
      1) Front views to scale.
      2) Dimensional information.
      3) Functional name of components mounted in and on panel.
      4) Product information on all panel components.
      5) Nameplate location and legend including text, letter size and colors to be used.
      6) Location of anchoring connections and holes.
      7) Location of external wiring connections.
      8) Mounting, support and installation details.
   b. Wiring diagrams, including the following:
      1) Name of panel, console or cabinet.
      2) Wiring sizes and types.
      3) Terminal strip numbers.
      4) Color coding.

5) Functional name and manufacturer's designation for components to which wiring is connected.

c. Electrical control schematics in accordance with NFPA 79 Standards.

9. Conduit Layout Information:
   a. Conduit layout drawings showing proposed routing of exposed and concealed conduits.
   b. Drawings shall show locations of pull boxes, junction boxes, and all building penetrations.
   c. All conduits shall have proper identification as to size and quantity of wire.

B. Informational Submittals: Submit the following:

1. Source Quality Control Submittals:
   a. Submit factory test reports.

2. Site Quality Control Submittals:
   a. Submit field Test Reports.

3. Qualifications Statements:
   a. Supplier’s Qualifications Data:
      1) Submit qualifications data as required in Paragraph 1.5.B, above.

C. Closeout Submittals: Submit the following

1. Operations and Maintenance Manuals:
   a. Operation and Maintenance Manuals shall conform to the requirements of Section 01 78 23, Operation and Maintenance Data and the supplemental requirements below.
   b. The Operation and Maintenance Manuals shall include the following:
      1) Name, address, e-mail address and telephone number of the Supplier's local service representative.
      2) Complete list of supplied system hardware parts with full model numbers referred to system part designations, including spares.
      3) Copy of all approved submittal information and system Shop Drawings.
      4) The following is a list of post construction submittals that shall be updated to reflect any changes during construction and re-submitted as “As-Built”.
         a) System architecture drawing.
         b) Layout drawing for each control panel
         c) Wiring diagram for individual components
         d) System flow diagram for each controlled system
         e) Instrumentation list for each controlled system
         f) Sequence of operation
         g) Binding map
         h) A matrix sheet detailing all system addresses and communication settings

5) Safety considerations relating to operation and maintenance procedures.

2. Record Documentation:
   a. CONTRACTOR and Supplier shall revise all system drawings, submittals and software documentation to reflect as-built conditions in accordance with the requirements of the Contract Documents.
   b. Half-size black line prints of wiring diagrams and any program or configuration printouts applicable to each control panel shall be placed inside a clear plastic envelope and stored in a suitable print pocket or container inside each control panel.

D. Maintenance Material Submittals: Furnish the following:

1. Spare Parts:
   a. Spare parts and testing equipment list with recommended quantities to be provided.

1.7 SOFTWARE OWNERSHIP

A. The OWNER shall retain licenses to software.

B. The OWNER shall sign a copy of the manufacturer's standard software and firmware licensing agreement as a condition of this contractor. Such license shall grant use of all programs and application software to the OWNER as defined by the manufacturer's license agreement but shall protect the manufacturer's rights to disclosure of Trade Secrets contained within such software.

C. The licensing agreement shall not preclude the use of the software by individuals under contract to the OWNER for commissioning, servicing or altering the system in the future. Use of the software by individuals under contract to the OWNER shall be restricted to use on the OWNER's computers and only for the purpose of commissioning, servicing, or altering the installed system.

D. All project developed software, files and documentation shall become the property of the OWNER. These include but are not limited to:

1. Server and workstation software

2. Application programming tools

3. Configuration tools

4. Network diagnostic tools

5. Addressing tools

6. Application files

7. Configuration files

8. Graphic files

9. Report files

10. Graphic symbol libraries

11. All documentation

1.8 DELIVERY, STORAGE AND HANDLING

A. Packing, Shipping, Handling and Unloading:

1. DDCS equipment shall be packaged at the factory prior to shipment to protect each item from damage during shipment and storage. Containers shall be protected against impact, abrasion, corrosion, discoloration and/or other damages.

2. Clearly label contents of each container and provide information on the required storage conditions necessary for the equipment. Keep OWNER and ENGINEER informed of equipment delivery.

3. Deliver materials to the Site to ensure uninterrupted progress of the Work.

B. Storage and Protection:

1. Store materials and equipment to permit easy access for inspection and identification. Keep all material off the ground, using pallets, platforms or other supports. Protect metal enclosures and parts and other material from corrosion.

2. Supplier shall notify CONTRACTOR, in writing, of the storage requirements and recommendations for the equipment prior to shipment.

3. Protection of materials and equipment shall comply with the requirements of Division 01, General Requirements, and in accordance with manufacturer's instructions and relevant organization standards.

4. Store all material in covered storage and protect from condensation and in accordance with the manufacturer’s recommendations.

5. Store computers and electronic devices in a secure environmentally control warehouse.

C. Acceptance At Site:

1. All boxes and crates and packages shall be inspected by CONTRACTOR upon delivery to the Site. CONTRACTOR shall notify ENGINEER, in writing, if any loss or damage exists to the components or equipment. Replace lost equipment or components and repair damage to like new condition in accordance with the manufacturer’s requirements.

1.9 WARRANTY

A. The warranty specified in this Article shall not deprive OWNER of other rights or remedies OWNER may otherwise have under the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under the Contract Documents.

B. All components, system software, and parts furnished and installed by the Supplier shall be guaranteed against defects in materials and workmanship for 1 year after substantial completion. Labor to repair, reprogram, or replace these components shall be provided. All corrective software modifications made during warranty periods shall be updated on all user documentation and on user and manufacturer archived software disks.

PART 2 - PRODUCTS

2.1 CONTROLLERS – GENERAL REQUIREMENTS

A. Custom Application Controllers (CAC) shall contain their control programs in programmable non-volatile memory and their operating systems in firmware. Each CAC shall have the intelligence to perform control strategies without communication to other control units.

B. CAC and Intelligent Devices shall be able to have their sequence of operation program edited and/or modified. The inputs and outputs shall be able to be configured and reconfigured to permit the controller to accept field modifications and/or different operating strategies. Each controller shall complete an entire internal scan in less than one second. Each internal scan shall consist of updating inputs, making necessary mathematical calculations, and sequencing appropriate outputs for local control.

C. When Application Generic Controllers (AGC) and/or Custom Application Controllers (CAC) are applied, provide the following minimum spare points for each controller:

1. (2) Universal Inputs (AI/BI), or

2. (1) Analog Input AND (1) Binary Input.

3. (1) Analog Output.

4. (1) Binary Output.

D. Acceptable Manufacturers

1. Automated Logic (ALC)

2. Schneider Electric.

3. Siemens.

4. Johnson Controls.

5. Honeywell.

6. Distech.

7. Or approved equal.

2.2 APPLICATION GENERIC CONTROLLER (AGC)

A. Application Generic Controllers shall be equipped with a minimum of 64K programmable non-volatile (flash) memory for general data processing, power supply, input/output modules, termination blocks, network transceivers.

B. Operating system software, operating sequence software and application programs, as approved by the AEOR/FMSI, shall be stored in programmable, non-volatile memory.

C. The AGC unit shall be equipped with a dedicated clock battery, continuously recharged via trickle-current, or equivalent.

D. AGC Interface Software:

1. General: AGC shall be configured, not programmed, via PC based interface software.

2. AGC shall provide a selection of control function blocks that can be configured.

2.3 CUSTOM APPLICATION CONTROLLER (CAC)

A. Custom BACnet Application Controllers shall be equipped with a minimum of 64K programmable non-volatile (flash) memory for general data processing, power supply, input/output modules, termination blocks, network transceivers.

B. Operating system software, custom operating sequence software and application programs shall be stored in programmable, non-volatile memory.

C. The CAC unit shall be equipped with a dedicated clock battery, continuously recharged via trickle-current, or equivalent.

D. CAC Software

1. General: A CAC shall be able to operate in stand-alone mode, as needed for specified control applications. Software shall include a complete operating system (O.S.), communications handler, point processing, standard control algorithms, and specific control sequences.

2. O.S. software shall reside in programmable flash memory, operate in real-time, provide prioritized task scheduling, control time programs, monitor and manage CAC to OI communications, and scan inputs and outputs. O.S. shall also contain built in diagnostics.

3. Input/Output Point Processing Software shall include:
   a. Continuous update of input and output values and conditions. All continuous points are to be updated at a minimum of one-second intervals.
   b. Reasonability checks on all analog inputs against the previously read value and discards those values falling outside pre-programmed reasonability limits.
   c. Assignment of proper engineering units and status condition identifiers to all analog and digital input and outputs.
   d. Analog input alarm comparison with the ability to assign two individual sets of high and low limits (warning and actual alarm) to an input or to assign a set of floating limits (alarm follows a reset schedule or control point) to the input. Each alarm shall be assigned a unique differential to prevent a point from oscillating into and out of alarm. Alarm comparisons shall be made each scan cycle.
   e. De-bounce of digital inputs to prevent nuisance alarms. De-bounce timing shall be adjustable from two seconds to two minutes in one-second increments.

4. Alarm Lockouts
   a. Alarm lockout software shall be provided to prevent nuisance alarms. On initial start-up of air handler and other mechanical equipment a "timed lockout" period shall be assigned to analog points to allow them to reach a stable condition before activating alarm comparison logic. Lockout period is to be programmable on a per point basis from 0 to 90 minutes in one-minute increments.

5. Custom DDC Control Loops
   a. Custom DDC programs are to be provided to meet the control strategies as called for in the sequence of operation sections of these specifications. Each DDC Controller shall have residential in its memory and available to the programs a full library of DDC algorithms, intrinsic control operators, arithmetic, logic and relational operators for implementation of control sequences:
      1) All DDC set points, gains and time constants associated with DDC programs shall be available to the operator for display and modification via the SOC (portable operator's terminal).
      2) DDC control programs shall include an assignment of initialization values to all outputs to assure that controlled devices/controllers assume a fail-safe position on initial system start-up.

2.4 HARD-WIRED DEVICES

A. Outside air temperature or humidity sensors, occupancy buttons or CO_2 sensors are to be hard wired. All outdoor applications shall utilize NEMA 4x enclosures. All primary control loop sensors such as duct pressure transmitters; space temperature or humidity sensors are to be hard-wired to the controller's I/O points.

2.5 ELECTRONIC INPUT/OUTPUT DEVICES

A. Temperature and Humidity Sensors and Transmitters

1. General Sensor & Transmitter Requirements
   a. Provide sensors and transmitters required as outlined in the input/output summary and sequence of operation and as required achieving the specified accuracy as specified herein.
   b. Temperature transmitters shall be equipped with individual zero and span adjustments. The zero and span adjustments shall be non-interactive to permit calibration without iterative operations. Provide a loop test signal to aid in sensor calibration.
   c. Temperature transmitters shall be sized and constructed to be compatible with the medium to be monitored. Transmitters shall be equipped with a linearization circuit to compensate for non-linearity of the sensor and bridge and provide a true linear output signal.
   d. Temperature sensors shall be of the resistance type and shall be either three-wire 100-ohm platinum RTD, or two-wire 1000-ohm platinum RTD.
   e. Thermistors may be acceptable provided that the temperature vs. resistance curves are contained either in the controller's software or firmware and that its performance is as specified herein elsewhere. Submit proof of the software mathematical equation or the firmware conversion charts together with the temperature/resistance charts from the manufacturer of the sensor. Thermistors shall be of the Thermistor (NTC) Type with a minimum of 100 ohm/F resistance change versus temperature to insure good resolution and accuracy. Thermistors shall be certified to be stable ±0.24F. over five years and ±0.36F. accurate and free from drift for five years.
   f. The following accuracies are required and include errors associated with the sensor, lead wire and A to D conversion.

Point Type	Accuracy
Outside Air	0.5°F
Water	0.5°F
Room Temperature	1.0°F
Duct Temperature	0.5°F

2. Thermowells
   a. Thermo-wells are required for all temperature sensors in fluids transported within piping.
   b. Thermo-wells shall be supplied as a complete assembly including the sensor, separable well, wellhead and Greenfield fitting.

c. Thermowells shall be pressure rated and constructed in accordance with the system working pressure.
d. Thermowells and sensors shall be mounted in a threadolet or 1/2" NPT saddle and allow easy access to the sensor for repair or replacement.
e. Thermowells shall be filled with heat-conductive compound which is specifically manufactured for the application. The compound shall be suitable for the temperature range being sensed.
f. Thermowells shall be constructed of the following materials:
    1) Brass.

3. Duct-Mounted Sensors
    a. Duct-mounted sensors shall mount in a handibox through a hole in the duct and be positioned so as to be easily accessible for repair or replacement. A neoprene grommet (Sealtite fitting and mounting plate) shall be used on the sensor assembly to prevent air leaks.
    b. Duct sensors shall be insertion type allowable for discharge air temperature measurement.
    c. Acceptable Manufacturers and Model Numbers
        1) Bapi BA/series
        2) Veris Industries TD series
        3) Greystone TE200 Series
        4) GE Sontay Model TT-322
        5) Dwyer Series TE
        6) Or approved equal

4. Duct Relative Humidity & Temperature Sensors
    a. Operating range: 0 to 100% RH
    b. Accuracy at 68°F (20°C): ±2% RH, 20-95% RH including hysteresis, linearity, and repeatability
    c. Operating temperature: 32 to 122°F (-6 to 50°C)
    d. Temperature effect: Less than 0.06% per degree F
    e. Sensing element: Capacitive
    f. Output signal-RH only units: -20 mA, 0-10 VDC, 0-100% linear, proportional (Provide interface to BACnet controller)
    g. Output signal-RH/T units: 0-10 VDC, 0-100% linear, proportional
    h. Polarity protection
    i. Acceptable Manufacturers and Model Numbers
        1) Siemens Model Number 538-896
        2) Kele GEH series
        3) Bapi Model Number BA/xx-H210
        4) Dwyer Series RH or approved equal

5. Room Relative Humidity Sensors
    a. Operating range: 0 to 100% RH
    b. Accuracy at 77°F (20°C): ±2% RH, 20-95% RH including hysteresis, linearity, and repeatability
    c. Sensing element: Capacitive
    d. Operating temperature: 32 to 122°F (-6 to 50°C)
    e. Temperature effect: Less than 0.06% per degree F
    f. Output signal-RH only units: -20 mA, 0-10 VDC, 0-100% linear, proportional (Provide interface to BACnet controller)

g. Output signal-RH/T units: 4-20 ma DC 0-100% linear, proportional
h. Acceptable Manufacturers and Model Numbers
    1) Greystone Model Number RH200A
    2) Veris Model Number HD2XVSTC2
    3) Kele GEH series
    4) Dwyer Series RH
    5) approved equal

6. Outside Air Temperature and Humidity Sensors
    a. Outside air temperature and humidity sensors shall be designed to withstand the environmental conditions to which they will be exposed. All outdoor applications shall utilize NEMA 4x enclosures. The sensing element shall be 100-ohm platinum RTB with minimum 2% accuracy over the operable range of not less than 30°F to 130°F service. They shall also be provided with a solar shield.
    b. The outside air temperature sensor shall be furnished with a sun-shield to reduce the heating effects of reflected sunlight from adjacent surfaces. This shield surrounding the sensor element shall also protect the sensors against wind velocity effects.
    c. Outside sensors shall be mounted on a north-facing surface, out of direct sunlight, and away from other heat surfaces. Install the outside air humidity and CO2 sensors adjacent to the outside air temperature sensor.
    d. Outside Temperature and humidity sensors shall comply with the section 2.8.and shall be rated for ambient temperatures.
    e. Acceptable Manufacturers and Model Numbers
        1) Bapi BA/xx-H210-0-EU
        2) Veris HO series
        3) Greystone TE200 series
        4) Or approved equal

7. Room Sensors (Temperature Only)
    a. Terminal unit temperature sensors shall all be of the thermistor (NTC) type with a 100-ohm/oF resistance change versus temperature change to insure good resolution and accuracy.
    b. Sensor shall be supplied with a vertical base for mounting on a standard single gang junction box supplied by the ATC Contractor.
    c. Space sensors shall utilize the local occupancy button to override the unoccupied mode to occupied for a 2-hour time period.
    d. Sensors shall be able to provide access to a local BACnet network using built-in communication jack.
    e. Acceptable Manufacturers and Model Numbers
        1) Bapi BA/xx-SP-O2,
        2) Greystone TE200AS-xx-BS,
        3) or approved equal

8. Programmable BACnet thermostats (with ability to connect to BACnet network)
    a. In lieu of having a separate remote temperature sensor driving a native BACnet controller, one may combine the sensor and controller components into one thermostat. This shall be used for fan coil units, cabinet unit heaters.

b. BACnet thermostats shall have integral temperature sensor with LCD and set point adjustments of +3ºF. Schedule via central BACnet scheduler.
c. Thermostat shall be powered from 24VAC. Thermostat shall provide BACnet Standard Objects for Space Comfort Controller. Thermostat shall be able to provide peer to peer communication and shall utilize the BACnet protocol.
d. Power: Nominal 24 VAC, 60 Hz.
e. Operating Temperature: 32ºF to 122ºF
f. Display Range: -40ºF to 122ºF
g. Transceiver for MS/TP network: RS-485; 38.4 kbps
h. LCD: 2 rows – 8 characters each
i. Resolution: +/- 0.2ºF
j. Control Accuracy: +/- 0.9ºF at 70ºF (calibrated)
k. Sensor Range: Heating: 40ºF to 90ºF
l. Sensor Range: Cooling: 54ºF to 100ºF
m. Provide local programmable occupied/unoccupied override adjustment.
n. Acceptable Manufacturers and Model Numbers
    1) Distech: EC-Stat
    2) Viconics: VT7200 or VT7600 depending on application
    3) Johnson TEC22xx
    4) Or approved equal

B. Differential Pressure Transmitters and Accessories

1. General Air and Water Pressure Transmitter Requirements:
    a. Pressure transmitters shall be constructed to withstand 100% pressure over-range without damage and to hold calibrated accuracy when subject to a momentary 40% over-range input.
    b. Pressure transmitters shall provide the option to transmit a 0 to 5VDC, 0 to 10VDC, or 4 to 20 mA output signal.
    c. Differential pressure transmitters used for flow measurement shall be sized to the flow sensing device and shall be supplied with shutoff and bleed valves in the high and low sensing pick-up lines (two way or 3-way valve manifolds as applicable).
    d. Provide the transmitter with a NEMA rating suitable for its installed location. Locate transmitters in accessible local control panels wherever possible.
    e. Duct sensing pressure applications where the velocity exceeds 1500 fpm shall utilize static pressure traverse probes.

2. Low Air Pressure Applications (0 to 0.5-inch WC)
    a. The pressure transmitter shall be capable of transmitting a linear electronic signal proportional to the differential of the room and reference static pressure input signals with the following minimum performance specifications.
        1) Span: Not greater than two times the design differential pressure.
        2) Accuracy: Plus or minus 0.5% of F.S.
        3) Dead Band: Less than 0.3% of output.
        4) Repeatability: Within 0.2% of output.
        5) Linearity: Plus or minus 0.2% of span.
        6) Response: Less than one second for full span input.

7) Temperature Stability: Output < 0.01%/□F shift.
8) Pressure transmitters shall transmit a 0 to 5VDC, 0 to 10VDC, or 4 to 20 mA output signals.
9) The transmitter shall utilize variable capacitance sensor technology and be immune to shock and vibration.

b. Acceptable Manufacturers and Model Numbers
1) Veris Industries PX series
2) Setra Model 260
3) Ashcroft CXLDP
4) Dwyer Series MS
5) Or approved equal

C. Damper Actuators

1. Outside Air (OA) and Exhaust Air (EXH) actuators shall be modulating, spring-return, normally-closed for fail-safe operation.

2. The control circuit shall be fully modulating using 0-10VDC or 4-20mA signals. Accuracy and repeatability shall be within ±1/21 of control signal. A 0-10VDC or 4-20mA signal shall be produced by the actuator that is directly proportional to the shaft clamp position which can be used to control actuators which are paralleled off a master motor or to provide a feedback signal to the automation system indicating damper position. Accuracy shall be within ±2.5%.

3. Face and bypass dampers and other control dampers shall be modulated using the same control circuit detailed above but shall not be spring-return.

4. Acceptable manufacturers:
a. Belimo
b. Siemens
c. Dodge
d. Delta.
e. Or approved equal

D. Valve Actuators

1. Control Valves Actuators (3 inch and smaller)
a. Actuators shall have a gear release button on all non-spring return models to allow manual setting. Pipes shall be fully insulated and heat shields shall be installed if necessary.
b. The control circuit shall be on/off using 24VAC signals or fully modulating using 0-10 volt or 4-20 mA signals. Accuracy and repeatability shall be within 1/21 of control signal. A 0-10VDC or 4-20mA feedback signal shall be produced by the actuator which is directly proportional to the shaft clamp position which can be used to control actuators which are paralleled off a master motor or to provide a feedback signal to the automation system indicating valve position.
c. Valve body and actuators shall be shipped fully assembled and tested at the valve factory prior to shipment.

d. Acceptable manufacturers:
   1) Belimo
   2) Siemens
   3) Dodge
   4) Delta.
   5) Or approved equal

2.6 SWITCHES

A. Differential Pressure Switches

1. All pressure sensing elements shall be corrosion resistant. Pressure sensing elements shall be bourdon tubes, bellows, or diaphragm type. Units shall have tamper-proof adjustable range and differential pressure settings.

2. Unit shall be provided with indicating 4” Magnehelic gauge (or approved equal). Two pressure sensor snap-acting, dry-contact micro-switches shall be provided that shall be rated up to 10A @ 120VAC, 60 Hz. Sensor assembly shall operate automatically with manual reset, one required for each circuit. Complete sensor assembly shall be protected against vibration at all critical movement pivots, slides, etc. Unit shall have 2% full-scale accuracy at 70°F and shall be UL approved.

3. Unit shall be rated for 10-inch Hg to 25 psig total overpressure on either side of the diaphragm.

4. Ambient temperature: 20°F to 120°F.

5. Acceptable Manufacturers: Dwyer Photohelic A3000 Series or approved equal.

B. Electric Low-Limit Thermostat (Freezestat)

1. Duct-type, fixed-differential, temperature range of 5.0°F. Sensing element shall be a 20-foot long capillary tube responding to the lowest temperature sensed along any segment (typically between two and twelve inches) of bulb length. Hardwired contacts shall be provided. One NC-SPST rated for 16A @ 120VAC, 9.2A @ 208VAC; 8A @ 240VAC, and one NO-SPST rated for 6A @ 120VAC, 3.3A @ 208VAC; 3A @ 240VAC. Provide one low limit thermostat for each twenty (20) square-feet or fraction thereof of coil surface area.

2. The NC-SPST contact shall be hardwired into the supply fan motor control circuit and shall not be wired in the auto-leg of the HOA switch. The NO-SPST contact shall be wired into the DDC controller as a digital input.

3. Provide hardwired interlocked automatic-reset type thermostat set at 35°F on each air handling unit, with an adjustable (0 to 120 second) time delay before the fan shuts down. Provide a pushbutton switch at the unit control panel in order to reset the freezestat when tripped.

4. Provide an override of this safety-shutdown for air handling units requiring smoke-purge initiation from the Fire Alarm System. Coordinate override with Fire Alarm Contractor.

5. Acceptable Manufacturers
   a. Dynacon FS-53
   b. Kele A70GA-1
   c. Siemens 134-1510
   d. Or approved equal

C. Water Flow Switches

1. UL-listed, suitable for all service application conditions. Body minimum working pressure rating shall equal or exceed service pressure. Switch electrical rating shall be 230 volts AC 3.7 ampere, 115 volts AC 7.4 ampere, and 125 VAC 115-230 VAC Pilot duty. Unit shall have two SPDT switches. Actuating flow rated shall be field adjustable for the specified and indicated service. Switch location shall preclude exposure to turbulent or pulsating flow conditions. Flow switch shall not cause pressure drop exceeding 2 psi at maximum system flow rate. Manufacturer: McDonnell-Miller FS7-4 or Ameritrol, Inc. FX series or Dwyer Model FS-2 Series or Kele F61 Series or approved equal

D. Strap-On Aquastat

1. UL-listed, provided with a suitable removable spring-clip for attaching aquastat to pipe and a snap-action SPDT switch. Switch adjustable set point shall be as indicated. Electrical rating shall be 5 Amps, 120 VAC.

2. Acceptable Manufacturers
   a. Honeywell L4006H1004
   b. JCI A19DAC-1C
   c. or approved equal.

2.7 AIR FLOW MEASURING STATION (AMS)

A. Each measurement device shall consist of one or more sensor probe assemblies and a single microprocessor-based transmitter. Each sensor probe assembly will contain one or more independently wired sensor housings. Multiple independent sensors shall produce measurements equally weighted and averaged by the transmitter prior to output. Pitot tubes and arrays are not acceptable. Vortex shedding airflow meters are not acceptable.

B. Each sensor housing shall utilize two hermetically sealed, bead-in-glass type thermistor probes used to determine airflow rate and ambient temperature. Devices that use “chip” type thermistors are unacceptable. Devices that do not have two thermistors in each independent sensor-housing are not acceptable.

C. Each independent sensor-housing shall be calibrated at a minimum of sixteen (16) airflow rates and have an accuracy of ±2% of reading over the entire operating

airflow range. Each sensor assembly shall be factory calibrated to standards that are traceable to the National Institute of Standards and Technology (NIST).

D. Devices whose accuracy is the combined accuracy of the transmitter and sensor probes must demonstrate that the total accuracy meets the performance requirements of this specification throughout the measurement range.

E. The operating temperature range for the sensor probe assembly shall be -20°F to 160°F. The operating humidity range for the sensor probe assembly shall be 0-99% RH (non-condensing).

F. Each temperature sensor shall be calibrated at a minimum of three temperatures and have an accuracy of ±0.15°F over the entire operating temperature range. Each temperature sensor shall be factory calibrated to standards that are traceable to the National Institute of Standards and Technology (NIST).

G. Each sensor probe assembly shall have an integral, U.L. listed, plenum rated cable and terminal plug for connection to a remotely mounted transmitter. All interconnecting pins shall be gold plated.

H. Each sensor assembly shall not require matching to the transmitter in the field.

I. A single manufacturer shall provide both the airflow/temperature measuring probe(s) and transmitter at a given measurement location.

J. The number of sensor housings provided for each location shall be as follows:

Area (sq.ft.)	**Sensors**
<=1	2
>1 to <4	4
4 to <8	6
8 to <12	8
12 to <16	12
>16	16

K. Probe assembly mounting brackets shall be constructed of stainless steel. Probe assemblies shall be mounted using one of the following options:

1. Insertion mounted (through the side or top of the duct)

2. Internally mounted (inside the duct or plenum)

3. Standoff mounted (inside the plenum, immediately upstream of an intake damper or downstream of a filter or coil bank.)

4. The operating airflow range shall be 0 to 5,000 FPM unless otherwise indicated on the plans.

L. Airflow with Integral Temperature Transmitters

1. The transmitters shall have an LCD display capable of displaying airflow and temperature. Airflow shall be field configurable to be displayed as a velocity or a volumetric rate.

2. The transmitter shall be capable of displaying the individual airflow and temperature readings of each sensor on the LCD display.

3. The transmitter shall operate on 24 VAC or 24 VDC. The transmitter shall not require an isolated power source.

4. The operating temperature range for the transmitter shall be -20°F to 120°F. The transmitter shall be protected from weather and water.

5. The transmitter shall be capable of communicating with the host controls using one of the following interface options:
   a. Linear analog output signal: Field selectable, fuse protected and isolated, 0-10 VDC and 4-20mA (4-wire)

6. The airflow/temperature measuring device shall be UL listed as an entire assembly.

7. The manufacturer's authorized representative shall review and approve placement and operating airflow rates for each measurement location indicated on the ATC shop drawings. A written report shall be submitted to the EOR if any measurement locations do not meet the manufacturer's placement requirements.

8. Acceptable Manufacturers
   a. Ebtron Series GP1 Duct and Plenum Probe
   b. Air Monitor (AMC) Electra-flo Ultra Series
   c. Or approved equal

M. Current Sensing Switches

1. Current sensing switches shall consist of a solid-state current sensing circuit, adjustable trip point, solid state switch, SPDT relay and an LED indicating the on or off status. A conductor of the load shall be passed through the window of the device. It shall accept over-current up to twice its trip into range.

2. Acceptable Manufacturers
   a. Kele Model SCS1 series
   b. Greystone SC-500 series
   c. Veris Industries H908
   d. Dwyer Series SCS

2.8 CONTROL VALVES

A. General Control Valve Requirements:

1. All automatic control valves shall be linear, fully proportioning, either two-position or modulating ball, plug or V-port inner guides unless otherwise specified. The valves shall be quiet in operation and fail safe in either normally open or normally closed position in the event of control air failure or loss of electronic low voltage power.

2. All valves shall be capable of operating in sequence when required by the sequence of operation. All control valves shall be sized by the ATC Contractor, and shall be guaranteed to meet the heating and cooling loads as specified. Valve authority (i.e., ratio of open valve pressure drop to closed valve pressure drop) shall be greater-than or equal-to 0.5 for throttling valve applications. The pressure drop through the control valve when it is fully open shall be at least 50% of the pressure drop from the supply to the return line.

3. All control valves shall be suitable for the pressure conditions, and shall close against the differential pressures involved. Valve body pressure rating and connection type (screwed or flanged) shall conform to ANSI pressure classifications appropriate for the system working pressures.

4. All control valve actuators installed outdoors shall be rated for the ambient conditions and shall be NEMA 4x.

B. Hot and Cold Water Control Valves

1. Hot and cold water globe type control valves shall be single-seated type, with equal percentage flow characteristics. The valve discs shall be composition type and shall be sized using ISA methods.

2. Pressure drop through the valves shall not exceed 5 psig unless otherwise indicated.

3. Hot and cold water ball type control valves shall be equipped with 316 stainless steel trim, Teflon seals and adjustable packing gland nuts. Provide a handle for manual operation during start-up and maintenance.

2.9 PANELS AND ENCLOSURES

A. DDC Control Panels

1. For all input/output devices/controllers that require field interface devices, these devices where practical shall be mounted in a field DDC Control panel. All other field interface devices shall be mounted at the point of field interface in a separate enclosure suitable for the location. The ATC Contractor shall provide an enclosure that protects the device(s) from dust, moisture, conceals integral wiring and moving parts. DDC control panels shall contain power

supplies for sensors, interface relays and contactors, safety circuits, and I/P transducers.

2. The DDC control panel enclosure shall be of steel construction with baked enamel finish; NEMA 1 rated for indoor applications with a hinged door and keyed lock. The enclosure shall be sized for twenty percent spare mounting space. All locks shall be keyed identically. All controller enclosures installed outdoors shall be rated for the ambient conditions and shall be NEMA 4X.

3. All wiring to and from the DDC control panel shall be to screw type terminals. Analog or communications wiring may use the panel as a raceway without terminating. The use of wire nuts within the panel or on any DDC Controller input or output wiring is prohibited.

4. All wiring within the panel shall be run in plastic wire way to give a neat and workmanlike appearance.

B. Room Thermostat Enclosure

1. Clear plastic construction.

2. Include guard cover, tamper-resistant tumbler lock, two keys.

3. Guard base vents to allow airflow for optimum thermostat performance.

4. Acceptable Manufacturers
   a. Honeywell
   b. Or approved equal.

2.10 DDC HARDWARE IDENTIFICATION

A. Automatic Control Valve Tags

1. Refer to Section 23 05 53, Identification for HVAC Piping and Equipment.

B. Wire Tags

1. All conductors or cables in all pull boxes, control panels, devices and terminal strip cabinets shall be tagged.

2. Provide wire Tags as per Division 26.

C. Conduit Tags

1. Provide tagging or labeling of conduit so that it is always readily observable which conduit was installed or used in implementation of this Work.

D. Miscellaneous Equipment Identification

1. Screwed-on, engraved black Lamicoid sheet with white lettering on all control panels and remote processing panels. Lettering sizes subject to approval.

2. Inscription, subject to review and acceptance, indicating equipment, system numbers, functions and switches. For panel interior wiring, input/output modules, local control panel device identification.

3. All I/O field devices (except space sensors) that are not mounted within the controller panel shall be identified with name plates.

4. All I/O field devices inside the controller panel shall be labeled.

5. The identification shall match all documentation and identify the function (i.e., mixed air temperature sensor).

6. Calibration settings shall be clearly marked with paint or indelible ink. Each terminal strip termination shall be tagged with an identification that matches the control drawings.

7. The outside of each DDC controller panel shall be identified with a phenolic label with black lettering on white background, matching the identification name shown on the drawings.

8. All wiring and cabling, including that within factory-fabricated panels shall be labeled at each end within 2" of termination with a cable identifier and other descriptive information.

9. Permanently label or code each point of field terminal strips to show the instrument or item served.

E. Identify all other control components with permanent labels. Identifiers shall match record documents. All plug-in components shall be labeled such that removal of the component does not remove the label. Identify all equipment and panels. Identification shall be with labels describing equipment and panel use function.

F. All wires and cables shall be identified with permanent markers or wire tag at controller. Wire designations at controllers shall describe the device termination point and function. Also provide control wiring diagram within terminal controller enclosure. Label all input and output field devices as labeled on control diagram.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General requirements

1. The installation of the control system shall be made by the manufacturer or approved franchised dealers.

2. Install the complete DDC systems of temperature control, as noted on the Drawings and as specified. Provide all necessary relays, mounting brackets, switches, digital controllers, control wiring and accessories required, even though not specifically called for, so as to result in complete workable systems.

3. Install all control components in accordance with manufacturer's instructions and recommendations.

4. Mount control panels adjacent to associated equipment on vibration-free walls or freestanding angle iron supports. One cabinet may accommodate more than one system in same equipment room. Provide engraved plastic nameplates for instruments and controls inside cabinet and engraved Lamicoid nameplates on cabinet face.

5. After completion of installation, test and adjust control equipment. Submit data showing calibration, set points and final adjustments of controls.

6. Install equipment, piping, wiring, cable trays, etc. parallel to building lines (i.e., horizontal, vertical, and parallel to walls) wherever possible.

7. Provide sufficient slack and flexible connections to allow for vibration of piping and equipment.

8. Install all equipment in readily accessible location as defined by the NEC or by NYS Code.

9. Verify integrity of all wiring to ensure continuity and freedom from shorts and grounds.

10. All equipment, installation, and wiring shall comply with acceptable industry specifications and standards for performance, reliability, and compatibility and be executed in strict adherence to local codes and standard practices.

B. Sensor Installation

1. Temperature and humidity sensors and thermostats shall require no field calibrations.

2. Temperature and humidity sensor and thermostats assemblies shall be readily accessible and adaptable to each type of application in such manner

as to allow for quick, easy replacement and servicing without special tools or skills.

3. Temperature sensor strap-on mountings, utilizing helical screw stainless steel clamps, shall only be permitted on hot water piping up to 2 inches. All other water temperature sensors shall be in wells.

4. All outdoor applications shall utilize NEMA 4x enclosures. These installations shall be protected from solar radiation and wind effects. Protective shield shall be stainless steel.

5. Thermostats shall be provided with guards.

6. All sensor and thermostat guard depth dimensions shall not exceed 4” per ADA requirements.

7. Sensors in ducts shall be mounted in locations to sense the correct temperature and/or humidity of the air only and shall not be located in dead air spaces or positions obstructed by ducts, equipment, and so forth. Locations where installed shall be within the vibration and velocity limit of the sensing element. Ducts shall be securely sealed where elements or connections penetrate ducts to avoid measuring false conditions.

8. All sensors measuring temperatures in pipes larger than 2 inches in diameter or in pressure vessels shall be supplied with wells properly fabricated for the service. Wells shall be non-corrosive to the medium being measured and shall have sufficient physical strength to withstand pressures and velocities to which they are subjected. Wells shall be installed in the piping at elbows where piping is smaller than the length of the well to affect proper flow across the entire area of the well.

9. Thermo-well-mounted sensors shall include thermal conducting compound to ensure good heat transfer to the sensor.

C. Actuator Installation

1. Mount and link control damper actuators per manufacturer's instructions.

2. To compress seals when spring return actuators are used on normally closed dampers, power actuator to approximately 5 degrees open position, manually close the damper, and then tighten the linkage.

3. Check operation of damper/actuator combination to confirm that actuator modulates damper smoothly throughout stroke to both open and closed positions.

4. Valves - Actuators shall be mounted on valves with adapters approved by the actuator manufacturer. Actuators and adapters shall be mounted following manufacturer's recommendations.

D. Control Valve Installation

1. Valve submittals shall be coordinated for type, quantity, size, and piping configuration to ensure compatibility with pipe design. The equipment manufacturer or the mechanical field contractor shall install all valves.

2. All control valves shall be installed so that the stem position is not more than 60 degrees from the vertical up position or as directed by the valve manufacturer, whichever is the most limiting.

3. Valves shall be installed in accordance with the manufacturer's recommendations.

4. Control valves shall be installed so that they are accessible and serviceable, and such that actuators may be serviced and removed without interference from structure or other pipes and/or equipment.

5. Isolation valves shall be installed such that control valve body may be serviced without draining the supply/return side piping system. Unions shall be installed at all connections to screwed type control valves.

6. Provide tags for all control valves indicating service and number.

E. Control Damper Installation

1. Dampers are field furnished by ATC contractor and installed by mechanical contractor. Article does not apply to factory furnished equipment.

2. Damper submittals shall be coordinated for type, quantity, and size to ensure compatibility with sheet metal design.

3. Duct openings shall be free of any obstruction or irregularities that might interfere with blade or linkage rotation or actuator mounting. Duct openings shall measure 1/4" larger than damper dimensions and shall be square, straight, and level.

4. Individual damper sections, as well as entire multiple section assemblies, must be completely square and free from racking, twisting, or bending. Measure diagonally from upper corners to opposite lower corners of each damper section. Both dimensions must be equal +-1/8".

5. Mechanical contractor shall follow manufacturer's instructions for field installation of control dampers. Unless specifically designed for vertical blade application, dampers must be mounted with blade axis horizontal.

6. Mechanical contractor shall install extended shaft or jackshaft per manufacturer's instructions. (Typically, a sticker on the damper face shows recommended extended shaft location. Attach shaft on labeled side of damper to that blade.)

7. Damper blades, axles, and linkage must operate without binding. Before system operation, cycle damper after installation to assure proper operation.

On multiple section assemblies, all sections must open and close simultaneously.

8. Provide a visible and accessible indication of damper position on the drive shaft end. The orientation of the blades shall be indicated by the Mechanical Contractor by notching the end of the damper shaft in the direction of the blades.

9. Mechanical contractor shall support ductwork in area of damper when required to prevent sagging due to damper weight.

10. After installation of low-leakage dampers with seals, mechanical contractor shall caulk between frame and duct or opening to prevent leakage around perimeter of damper.

F. Location

1. Space carbon dioxide or temperature sensors shall be mounted away from machinery generating heat, direct light, and diffuser air streams.

2. Outdoor air sensors shall be mounted on the building's north face directly in the outside air. Install these sensors such that the effect of heat radiated from the building or sunlight is minimized. Install the outside air humidity and CO2 sensors adjacent to the outside air temperature sensor. All outdoor applications shall utilize NEMA 4x enclosures.

3. Field enclosures shall be located immediately adjacent to the controller panel to which it is being interfaced.

3.2 PROTECTION

A. The ATC Contractor shall protect all work and material from damage by his/her work or workers, and shall be liable for all damage thus caused.

B. The ATC Contractor shall be responsible for his/her work and equipment until finally inspected, tested, and accepted by the EOR. The ATC Contractor shall protect his/her work against theft or damage, and shall carefully store material and equipment received on-site that is not immediately installed. The ATC Contractor shall close all open ends of work with temporary covers or plugs during storage and construction to prevent entry of foreign objects.

3.3 START-UP POINT-TO-POINT AND BASIC FUNCTIONAL TESTING

A. Upon completion of component or system installation, the ATC Contractor shall initiate comprehensive point-to-point and basic functional testing. Factory calibration and bench testing will not be considered acceptable alternates to onsite field testing.

B. Start-up/Point-to-Point Scope

1. Test all end field devices through proper input/output to BMS fron-end.

2. Testing must be complete, detailed and documented on approved point-to-point verification forms.

3. All field calibration must be done with high quality instrumentation. Test instrumentation selected for calibrating field devices shall be suitable for application. Instruments shall display current (within the past 12-months) NIST traceable calibration sticker. Associated instrument calibration certificates shall be made available within 24 hours of request for copy.

4. Provide testing and documentation criteria.
   a. Field device and functionality
      1) Verify all field devices installed are properly sized or ranged for anticipated operating range. Verify devices are adjusted for correct position, orientation and full range.
   b. Conductor Integrity
      1) Test all wiring continuity from field devices to correct input/output.
   c. Conductor Termination
      1) Verify all device wire terminations are per submittal package.
      2) Verify all input/output wire terminations are correct.
      3) Verify field devices communicate to the BMS front-end.
   d. Conductor to Output
      1) Test linear-scaling calibration of every analog output point.
   e. Device Calibration
      1) All field devices are to be field calibrated. All thermistor sensors shall be tested for accuracy in the field or at the factory prior to shipment (when integral with NIST traceable calibration).
   f. Calibration must be done at or close to normal operating conditions.
   g. Field Calibration Criteria

Space Temperature	± 1°F
Air Temperature–Unitary	± 1°F
Fluid Temperature	± 1°F
Air Flow Rate	± 5%
Liquid Flow Rate	± 5%
Differential Pressure	± 3%
Gage Pressure	± 5%
Relative Humidity	± 2%
CO_2 Monitor	± 5% mid-range

5. The ATC Contractor shall completely check out, calibrate, and test all connected hardware and ATC CONTRACTOR supplied software to ensure that the system performs in accordance with the approved specifications and

sequences of operation submitted. The Authority's Project Officer and FMSI shall witness all testing performed by the ATC Contractor.

6. The ATC Contractor shall be responsible for all testing, repair, and retesting as outlined in this specification.

7. Complete records shall be kept of all tests and test reports. Records shall be made available to the Project Officer and FMSI personnel for inspection and approval. Records shall be turned over to the Authority at the end of the work phase.

8. The ATC Contractor shall notify the EOR and Owner's representative (5) days prior to testing in order that representatives may witness such tests.

9. Demonstrate to the EOR and Owner's representative approved operation and acceptance testing of the complete system.

10. Field Test: When installation of the system is complete, calibrate equipment and verify transmission media operation before the system is placed on-line. All testing, calibrating, adjusting and final field tests shall be completed by the ATC Contractor. Provide a crosscheck of each control point within the system by making a comparison between the control command and the field-controlled device. Verify that all systems are operable from local controls in the specified failure mode upon panel failure or loss of power or loss of network. Submit the results of functional and diagnostic tests and calibrations to the EOR and Owner's representative for final system acceptance.

11. Comprehensive functional performance testing shall be performed on every installation or modification to the control system. The ATC Contractor shall test and document all logic and control sequence statements for accomplishing each specific control function as detailed in the approved sequence of operation. The ATC Contractor shall record each process and corresponding results. Documentation will include names of test personnel and final test dates.

12. Demonstrate the complete system to the EOR and Owner's representative to verify compliance with the project specifications. Failure to comply with the specified information shall constitute non-performance of the contract. The ATC Contractor shall submit written justification for each item that he is unable to comply with.

3.4 ELECTRICAL WORK

A. Division 26 Electrical Contractor to provide power supply wiring from power source to power connection at unit control panels including starters, disconnects, and required electrical devices, except where specified as furnished, or factory-installed, by manufacturer. ATC Contractor to provide control wiring as required and necessary for a complete operation. Interlock wiring between electrically operated

equipment and between equipment and field-installed control devices shall be provided by the ATC Contractor.

1. Control Wiring
    a. Install control signal and control power wiring without splices between terminal points. Install in neat workmanlike manner, securely fastened. Install raceways, boxes, cabinets, electronic, building wire, cables, and signal cable in accordance with National Electrical Code and the requirements of Division 26.

3.5 INSPECTION

A. Verify that systems are ready to receive work.

B. Beginning of installation means installer accepts existing conditions.

C. The project plans shall be thoroughly examined for control device and equipment locations, and any discrepancies, conflicts, or omissions shall be reported to the EOR for resolution before rough-in work is started.

D. The ATC Contractor shall inspect the site to verify that equipment is installable as shown, and any discrepancies, conflicts, or omissions shall be reported to the EOR for resolution before rough-in work is started.

E. The ATC Contractor shall examine the drawings and specifications for other parts of the work, and if head room or space conditions appear inadequate or if any discrepancies occur between the plans and his work and the plans for the work of others, he shall report such discrepancies to the Authority and shall obtain written instructions for any changes necessary to accommodate his work with the work of others.

3.6 TRAINING

A. The ATC Contractor shall provide competent instructors to give full instruction (minimum 40 hours) utilizing specified manuals, as-built documentation and the on-line help utility to designated personnel (Custodian / Owner's Maintenance Representative) in the adjustment, operation and maintenance of the equipment installed rather than a general training course. Instructors shall be thoroughly familiar with all aspects of the subject matter they are to teach. ATC Contractor shall submit training program with submittal for the EOR approval.

1. Operator Training
    a. Instruct Owner's operating personnel in proper starting sequences, operation, shut down, and maintenance procedures, including normal and emergency procedures.
    b. Instruct Owner's operating personnel in proper use of system scheduling procedures.

c. Instruction shall be by personnel skilled in operation of equipment. Instruction for major equipment shall be by equipment manufacturer's representatives.
d. Reference instructions contained in the Operating and Maintenance Manuals. Instructions cannot be substituted for manuals.
e. Provide equipment and materials required for classroom training.
f. All training performed shall reference site-specific installation examples whenever possible. Training shall utilize the approved O&M manuals, as-built documentation, and the on-line help utilities
g. Operator training shall include:
    1) Sequence of Operation review
    2) Download and initialization of DDC controllers
    3) Troubleshooting of sensors (determining bad sensors)

3.7 SEQUENCES OF OPERATION

A. ROOFTOP HEAT PUMP UNIT RTU-015 (HEALTH SUITE)

RUN CONDITIONS - SCHEDULED:
THE UNIT SHALL RUN ACCORDING TO A USER DEFINABLE TIME SCHEDULE IN THE FOLLOWING MODES:

OCCUPIED MODE: THE UNIT SHALL MAINTAIN 75°F (ADJ.) COOLING SETPOINT; 70°F (ADJ.) HEATING SETPOINT.

UNOCCUPIED MODE (NIGHT SETBACK): THE UNIT SHALL MAINTAIN 85°F (ADJ.) COOLING SETPOINT; 55°F (ADJ.) HEATING SETPOINT.

ZONE SETPOINT ADJUST:

THE OCCUPANT SHALL BE ABLE TO ADJUST THE ZONE TEMPERATURE HEATING AND COOLING SETPOINTS AT THE ZONE SENSOR.

ZONE OPTIMAL START:

THE UNIT SHALL USE AN OPTIMAL START ALGORITHM FOR MORNING START-UP. THIS ALGORITHM SHALL MINIMIZE THE UNOCCUPIED WARM-UP OR COOL-DOWN PERIOD WHILE STILL ACHIEVING COMFORT CONDITIONS BY THE START OF SCHEDULED OCCUPIED PERIOD.

ZONE UNOCCUPIED OVERRIDE:

A TIMED LOCAL OVERRIDE MODE AT THE ZONE SENSOR SHALL ALLOW AN OCCUPANT TO OVERRIDE THE SCHEDULE AND PLACE THE UNIT INTO AN OCCUPIED MODE FOR AN ADJUSTABLE PERIOD OF TIME. AT THE EXPIRATION OF THIS TIME, CONTROL OF THE UNIT SHALL AUTOMATICALLY RETURN TO THE SCHEDULE.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

HIGH ZONE TEMP: IF THE ZONE TEMPERATURE IS GREATER THAN THE COOLING SETPOINT BY A USER DEFINABLE AMOUNT (ADJ.).

LOW ZONE TEMP: IF THE ZONE TEMPERATURE IS LESS THAN THE HEATING SETPOINT BY A USER DEFINABLE AMOUNT (ADJ.).

SUPPLY FAN:

FAN PROVED BY FACTORY AIR-FLOW PROVING SWITCH; ALARM IF COMMANDED ON BUT STATUS OFF, VICE-VERSA, OR RUNTIME > USER LIMIT.

MINIMUM RUN-TIME 3 MINUTES TO AVOID SHORT-CYCLING (ADJ.).

FAN STARTS BEFORE ANY COMPRESSOR OR ELECTRIC HEAT CALL AND REMAINS ON FOR 90 S POST-CALL FOR COIL SWEEP-DOWN (ADJ.).

OUTDOOR / RETURN / BAROMETRIC RELIEF DAMPERS (ECONOMIZER)

ECONOMIZER OPTION: 0–100% DIFFERENTIAL DRY-BULB

MINIMUM OA: 20 % STROKE WHENEVER FAN IS ON & UNIT OCCUPIED (ADJ.).

ECONOMIZER ENABLE WHEN ALL TRUE:

- OAT < 65 °F (ADJ.) AS FIXED DRY-BULB HIGH LIMIT;
- DIFFERENTIAL DRY-BULB FAVORS OA: OAT < RAT − 2 °F (ADJ.);
- MIXED AIR TEMP (MAT) > 45 °F (ADJ.).

ECONOMIZER MODULATES TO MAINTAIN A SET POINT 2 °F BELOW ZONE COOLING SET POINT (PROPORTIONAL PLUS INTEGRAL TRIM BY OEM CONTROLLER).

ECONOMIZER CLOSES IF MAT FALLS FROM 45 → 40 °F (LOW-LIMIT TRIP) OR ON LOSS OF FAN STATUS. PROVIDE 1–2 °F (ADJ.) DIFFERENTIAL/HYSTERESIS ON CHANGEOVER TO PREVENT HUNTING.

BAROMETRIC RELIEF DAMPER OPENS ON BUILDING POSITIVE PRESSURE.

THE OUTSIDE DAMPER SHALL CLOSE AND THE RETURN AIR DAMPER SHALL OPEN WHEN THE UNIT IS OFF, DURING OPTIMAL START UP AND DURING UNOCCUPIED MODE.

COOLING (INVERTER SCROLL HEAT PUMP CIRCUIT)

OEM CONTROLLER MODULATES CAPACITY 20–100 % TO HOLD ZONE SET POINT.

ECONOMIZER FIRST: MECHANICAL COOLING LOCKED OUT IF ECONOMIZER ALONE SATISFIES LOAD.

ENABLE WHEN:

- OAT > 60 °F (ADJ.) OR ECONOMIZER UNAVAILABLE.

- ZONE TEMP > SET POINT;
- FAN PROVEN & HEATING INACTIVE;
- MINIMUM 5 MIN OFF & 3 MIN ON TIMERS (ADJ.) ENFORCED BY OEM CONTROLLER.

HEAT PUMP HEATING (REFRIGERATION RE VERSING)

OEM CONTROLLER MODULATES CAPACITY 20–100 % TO HOLD ZONE SET POINT.

ENABLED WHEN:

- OAT ≥ 10 °F (AS PER FACTORY LOW AMBIENT KIT);
- ZONE TEMP < HEATING SET POINT;
- COMPRESSOR / SAFETIES CLEARED;
- FAN PROVEN.

CAPACITY IS FULLY MODULATING; CONTROLLER RESETS DISCHARGE AIR TARGET (55–95 °F) TO PREVENT OVER HEATING.

DEFROST: ON TIME /TEMP LOGIC; DURING DEFROST THE ELECTRIC HEATER (§6) IS ALLOWED TO ENERGIZE TO AVOID SPACE TEMPERATURE DROOP.

HEAT PUMP LOCKED OUT ON ANY OF: OAT < 10 °F (OR OEM LIMIT), 3 SUCCESSIVE HIGH PRESSURE TRIPS, OR AFTER 60 MIN FAILED TO SATISFY SPACE LOAD (ADJ.).

ELECTRIC RESISTANCE HEATING (SCR)

ENABLED WHEN:

- ZONE TEMP < SET POINT AND HEAT PUMP AT 100 % FOR >10 MIN (ADJ.).
- MORNING WARM UP IF OAT < 35 °F (ADJ.).
- HEAT PUMP UNAVAILABLE (LOW AMBIENT LOCKOUT, DEFROST, FAULT).

SCR MODULATES 0–100 % VIA DISCHARGE AIR PID LOOP TO MAINTAIN DAT = MAX 100 °F (ADJ.).

DE HUMIDIFICATION

RTU HAS NO HOT GAS REHEAT; LATENT IS HANDLED BY COIL ONLY

ENABLE IF RETURN RH> 60 % RH (ADJ.) AND ZONE T WITHIN 2 °F OF COOLING SET POINT.

CONTROLLER LOWERS DAT TO 55 °F MINIMUM WHILE MAINTAINING SPACE TEMP; RE HEAT NOT AVAILABLE, SO SEQUENCE LIMITS OVERSHOOT BY CYCLING COMPRESSOR.

SAFETY & MONITORING

ALARMS: PER OEM CONTROLLER TABLES FOR ALL SENSORS; ALARM TRIP (FACTORY / ADJ.). ALL FAULTS ARE ANNUNCIATED LOCALLY AND VIA BACNET MSTP (FACTORY CARD).

MISCELLANEOUS

CONDENSATE OVERFLOW PROTECTION: PAN FLOAT SWITCH OPENS → FAN & COMPRESSORS OFF; OA DAMPER CLOSED; BAS ALARM 'RTU-1 CONDENSATE OVERFLOW – UNIT SHUT DOWN' (URGENT). RESET AFTER PAN DRAINED AND ALARM ACKNOWLEDGED."

B. ROOFTOP HEAT PUMP UNIT RTU-011 (DISTRICT OFFICE) — VAV WITH TERMINAL REHEAT & PERIMETER HOT-WATER HEATING

RUN CONDITIONS - SCHEDULED:
THE UNIT SHALL RUN ACCORDING TO A USER DEFINABLE TIME SCHEDULE IN THE FOLLOWING MODES:

OCCUPIED MODE: THE UNIT SHALL MAINTAIN 75°F (ADJ.) COOLING SETPOINT; 70°F (ADJ.) HEATING SETPOINT.

UNOCCUPIED MODE (NIGHT SETBACK): THE UNIT SHALL MAINTAIN 85°F (ADJ.) COOLING SETPOINT; 55°F (ADJ.) HEATING SETPOINT.

ZONE SETPOINT ADJUST:

THE OCCUPANT SHALL BE ABLE TO ADJUST THE ZONE TEMPERATURE HEATING AND COOLING SETPOINTS AT THE ZONE SENSOR.

ZONE OPTIMAL START:

THE UNIT SHALL USE AN OPTIMAL START ALGORITHM FOR MORNING START-UP. THIS ALGORITHM SHALL MINIMIZE THE UNOCCUPIED WARM-UP OR COOL-DOWN PERIOD WHILE STILL ACHIEVING COMFORT CONDITIONS BY THE START OF SCHEDULED OCCUPIED PERIOD.

ZONE UNOCCUPIED OVERRIDE:

A TIMED LOCAL OVERRIDE MODE AT THE ZONE SENSOR SHALL ALLOW AN OCCUPANT TO OVERRIDE THE SCHEDULE AND PLACE THE UNIT INTO AN OCCUPIED MODE FOR AN ADJUSTABLE PERIOD OF TIME. AT THE EXPIRATION OF THIS TIME, CONTROL OF THE UNIT SHALL AUTOMATICALLY RETURN TO THE SCHEDULE.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

HIGH ZONE TEMP: IF THE ZONE TEMPERATURE IS GREATER THAN THE COOLING SETPOINT BY A USER DEFINABLE AMOUNT (ADJ.).

LOW ZONE TEMP: IF THE ZONE TEMPERATURE IS LESS THAN THE HEATING SETPOINT BY A USER DEFINABLE AMOUNT (ADJ.).

SUPPLY FAN (VFD) & DUCT STATIC:

FAN PROVED BY STATUS; ALARM IF COMMANDED ON BUT STATUS OFF, OR RUNTIME EXCEEDS USER LIMIT; ENFORCE MINIMUM RUN-TIME 3 MIN (ADJ.) AND 90 S POST-RUN FOR COIL SWEEP-DOWN (ADJ.).

THE SUPPLY FAN SHALL BE VFD-CONTROLLED TO MAINTAIN SUPPLY AIR DUCT STATIC PRESSURE AT A SETPOINT (ADJ.), SENSED APPROX. ¾ DOWN THE LONGEST RUN (REF. “LOCATE ¾ DISTANCE DOWN LONGEST DUCT”). HIGH-STATIC SAFETY SHALL TRIP THE FAN AND GENERATE AN ALARM.

STATIC PRESSURE SETPOINT SHALL RESET (ADJ.) BASED ON ZONE DEMAND (E.G., TO KEEP THE MOST-OPEN VAV DAMPER ≈90 % OPEN) WHEN SUCH FEEDBACK IS AVAILABLE FROM TERMINALS.

OUTDOOR / RETURN / BAROMETRIC RELIEF DAMPERS (ECONOMIZER):

ECONOMIZER OPTION: 0–100 % DRY-BULB WITH BAROMETRIC RELIEF (FACTORY).

MINIMUM OUTDOOR AIR: WHENEVER FAN IS ON & UNIT OCCUPIED, MODULATE DAMPERS TO MAINTAIN THE MINIMUM OA CFM (ADJ.) USING THE OA FLOW STATION; DEFAULT TO A FIXED MINIMUM POSITION (ADJ.) IF FLOW IS UNAVAILABLE.

ECONOMIZER ENABLE WHEN ALL TRUE:

- OAT < 65 °F (ADJ.);
- DIFFERENTIAL DRY-BULB FAVORS OA: OAT < RAT − 2 °F (ADJ.);
- MIXED AIR TEMP (MAT) > 45 °F (ADJ.).

ECONOMIZER MODULATES TO MAINTAIN A SET POINT 2 °F BELOW ZONE COOLING SET POINT (PROPORTIONAL PLUS INTEGRAL TRIM BY OEM CONTROLLER).

ECONOMIZER CLOSES IF MAT FALLS FROM 45 → 40 °F OR ON LOSS OF FAN STATUS.

BAROMETRIC RELIEF DAMPER OPENS ON BUILDING POSITIVE PRESSURE.

THE OUTSIDE DAMPER SHALL CLOSE AND THE RETURN AIR DAMPER SHALL OPEN WHEN THE UNIT IS OFF, DURING OPTIMAL START UP AND DURING UNOCCUPIED MODE.

COOLING (INVERTER SCROLL HEAT PUMP CIRCUIT)

OEM CONTROLLER MODULATES CAPACITY 20–100 % TO HOLD ZONE SET POINT.

ECONOMIZER FIRST: MECHANICAL COOLING LOCKED OUT IF ECONOMIZER ALONE SATISFIES LOAD.

ENABLE WHEN:

- OAT > 60 °F (ADJ.) OR ECONOMIZER UNAVAILABLE.
- ZONE TEMP > SET POINT;
- FAN PROVEN & HEATING INACTIVE;
- MINIMUM 5 MIN OFF & 3 MIN ON TIMERS (ADJ.) ENFORCED BY OEM CONTROLLER.

HEAT PUMP HEATING (REFRIGERATION RE VERSING)

OEM CONTROLLER MODULATES CAPACITY 20–100 % TO HOLD ZONE SET POINT.

ENABLED WHEN:

- OAT ≥ 10 °F (AS PER FACTORY LOW AMBIENT KIT);
- ZONE TEMP < HEATING SET POINT;
- COMPRESSOR / SAFETIES CLEARED;
- FAN PROVEN.

CAPACITY IS FULLY MODULATING; CONTROLLER RESETS DISCHARGE AIR TARGET (55–95 °F) TO PREVENT OVER HEATING.

DEFROST: ON TIME /TEMP LOGIC; DURING DEFROST THE ELECTRIC HEATER (§6) IS ALLOWED TO ENERGIZE TO AVOID SPACE TEMPERATURE DROOP.

HEAT PUMP LOCKED OUT ON ANY OF: OAT < 10 °F (OR OEM LIMIT), 3 SUCCESSIVE HIGH PRESSURE TRIPS, OR AFTER 60 MIN FAILED TO SATISFY SPACE LOAD (ADJ.).

ELECTRIC RESISTANCE HEATING (SCR)

ENABLED WHEN:

- ZONE TEMP < SET POINT AND HEAT PUMP AT 100 % FOR >10 MIN (ADJ.).
- MORNING WARM UP IF OAT < 35 °F (ADJ.).
- HEAT PUMP UNAVAILABLE (LOW AMBIENT LOCKOUT, DEFROST, FAULT).

SCR MODULATES 0–100 % VIA DISCHARGE AIR PID LOOP TO MAINTAIN DAT = MAX 100 °F (ADJ.).

DE HUMIDIFICATION

RTU HAS NO HOT GAS REHEAT; LATENT IS HANDLED BY COIL ONLY

ENABLE IF RETURN RH> 60 % RH (ADJ.) AND ZONE T WITHIN 2 °F OF COOLING SET POINT.

CONTROLLER LOWERS DAT TO 55 °F MINIMUM WHILE MAINTAINING SPACE TEMP; RE HEAT NOT AVAILABLE, SO SEQUENCE LIMITS OVERSHOOT BY CYCLING COMPRESSOR.

SAFETY & MONITORING

ALARMS: PER OEM CONTROLLER TABLES FOR ALL SENSORS; ALARM TRIP (FACTORY / ADJ.). ALL FAULTS ARE ANNUNCIATED LOCALLY AND VIA BACNET MSTP (FACTORY CARD).

MISCELLANEOUS

CONDENSATE OVERFLOW PROTECTION: PAN FLOAT SWITCH OPENS → FAN & COMPRESSORS OFF; OA DAMPER CLOSED; BAS ALARM 'RTU-1 CONDENSATE OVERFLOW – UNIT SHUT DOWN' (URGENT). RESET AFTER PAN DRAINED AND ALARM ACKNOWLEDGED."

TERMINAL UNITS – VAV-011A / 011B / 011C / 011D

GENERAL: EACH SINGLE-DUCT VAV TERMINAL IS PRESSURE-INDEPENDENT WITH FLOW RING; DAMPER MODULATES TO MAINTAIN COMMANDED AIRFLOW SETPOINTS. TERMINALS REPORT AIRFLOW AND DAMPER POSITION TO THE BAS/OEM CONTROLLER.

OCCUPANCY & SETPOINTS: TERMINALS FOLLOW THE RTU SCHEDULE (§RUN CONDITIONS). ZONE SENSORS PROVIDE TEMP, LOCAL OVERRIDE, AND SETPOINT ADJUST.

COOLING MODE (ALL VAVS)

- WHEN ZONE TEMP > COOLING SETPOINT (DB + DEADBAND, ADJ.), DAMPER MODULATES FROM MIN-COOLING AIRFLOW TO DESIGN COOLING AIRFLOW TO HOLD ZONE TEMP.
- WHEN ZONE SATISFIED, DAMPER RETURNS TO MIN-COOLING AIRFLOW (ADJ.).
- IF ANY ZONE DEMANDS COOLING, THE RTU COOLING (§COOLING) IS ENABLED SUBJECT TO ECONOMIZER PRIORITY.

HEATING MODE — REHEAT TERMINALS (VAV-011A / 011C / 011D)

TERMINALS WITH ELECTRIC REHEAT SHALL:

- DRIVE DAMPER TO HEATING-MIN AIRFLOW (ADJ.) AND MODULATE SCR ELECTRIC HEATER TO HOLD ZONE HEATING SETPOINT, WITH DISCHARGE-AIR HIGH-TEMP LIMIT (ADJ.).

- ELECTRIC REHEAT ENABLE ONLY WHEN AIRFLOW IS PROVEN (ADJ.) VIA BUILT-IN AIRFLOW SWITCH.

HEATING MODE — COOLING-ONLY TERMINAL + PERIMETER HOT-WATER (ZONE VAV-011B)

- VAV-011B IS COOLING-ONLY (NO ELECTRIC REHEAT). DURING HEATING DEMAND, ITS DAMPER MAINTAINS HEATING-MIN AIRFLOW (ADJ.) WHILE A 2-WAY PERIMETER HOT-WATER VALVE MODULATES TO HOLD ZONE TEMP. THE VALVE IS COMMANDED BY THE ZONE CONTROLLER; ENABLE WHEN HW AVAILABLE (BAS STATUS, ADJ.) AND OAT < WWSD (ADJ.).

WARM-UP / COOL-DOWN ASSISTS

- MORNING WARM-UP: WHERE ENABLED, TERMINALS MAY BE COMMANDED TO A WARM-UP POSITION (ADJ.) AND REHEAT (OR PERIMETER HW FOR 011B) MAY BE USED TO ACHIEVE OCCUPIED HEATING SETPOINT BY START TIME; RTU AUX HEAT MAY ALSO ENGAGE PER §ELECTRIC HEAT.
- COOL-DOWN: TERMINALS OPEN PER ZONE DEMAND; RTU ECONOMIZER/COOLING MAINTAIN DAT TARGET.

FAIL-SAFE & ALARMS (TERMINALS)

- ZONE SENSOR FAILURE → TERMINAL FALLS BACK TO SAFE MIN AIRFLOW (ADJ.) AND ANNUNCIATES.
- AIRFLOW LOW AT MAX CMD → ALARM “LOW VAV AIRFLOW.”
- DISCHARGE-AIR HIGH TEMP (REHEAT VAVS) → REHEAT LIMIT TRIP AND ALARM.

C. DX SPLIT SYSTEMS: OEM SEQUENCE OF OPERATIONS

D. UNIT VENTILATORS

RUN CONDITIONS - SCHEDULED:
THE UNIT SHALL RUN ACCORDING TO A USER DEFINABLE TIME SCHEDULE IN THE FOLLOWING MODES:

OCCUPIED MODE: THE UNIT SHALL MAINTAIN:

A 70°F (ADJ.) HEATING SETPOINT.

A 68°F (ADJ.) SUPPLY DISCHARGE TEMPERATURE SETPOINT (WHEN HEATING IS DISABLED)

UNOCCUPIED MODE (NIGHT SETBACK): THE UNIT SHALL MAINTAIN

A 55°F (ADJ.) HEATING SETPOINT.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

LOW ZONE TEMP: IF THE ZONE TEMPERATURE IS LESS THAN THE HEATING SETPOINT BY A USER DEFINABLE AMOUNT (ADJ.).

ZONE SETPOINT ADJUST:
THE OCCUPANT SHALL BE ABLE TO ADJUST THE ZONE TEMPERATURE HEATING SETPOINTS AT THE ZONE SENSOR.

ZONE OPTIMAL START:
THE UNIT SHALL USE AN OPTIMAL START ALGORITHM FOR MORNING START-UP. THIS ALGORITHM SHALL MINIMIZE THE UNOCCUPIED WARM-UP PERIOD WHILE STILL ACHIEVING COMFORT CONDITIONS BY THE START OF SCHEDULED OCCUPIED PERIOD.

ZONE UNOCCUPIED OVERRIDE:
A TIMED LOCAL OVERRIDE CONTROL SHALL ALLOW AN OCCUPANT TO OVERRIDE THE SCHEDULE AND PLACE THE UNIT INTO AN OCCUPIED MODE FOR AN ADJUSTABLE PERIOD OF TIME. AT THE EXPIRATION OF THIS TIME, CONTROL OF THE UNIT SHALL AUTOMATICALLY RETURN TO THE SCHEDULE.

SUPPLY FAN:
THE SUPPLY FAN SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN, UNLESS SHUTDOWN ON SAFETIES. TO PREVENT SHORT CYCLING, THE SUPPLY FAN SHALL HAVE A USER DEFINABLE (ADJ.) MINIMUM RUNTIME.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

SUPPLY FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.

SUPPLY FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

SUPPLY FAN RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT (ADJ.).

ZONE TEMPERATURE CONTROL:
THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND SHALL CHANGE THE SUPPLY FAN SPEED TO MAINTAIN ZONE TEMPERATURE SETPOINT. THE FAN SPEED SHALL INCREASE AS THE ZONE TEMPERATURE DROPS BELOW HEATING SETPOINT. THE SUPPLY FAN VFD SPEED OF EACH UNIT SHALL NOT DROP BELOW MINIMUM FLOW AS PER MANUFACTURER.

HEATING
THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND MODULATE THE CONTROL VALVE TO MAINTAIN ITS SETPOINT.
THE HEATING SHALL BE ENABLED WHENEVER:

OUTSIDE AIR TEMPERATURE IS LESS THAN 65°F (ADJ.).

AND THE SUPPLY FAN STATUS IS ON.

AND HEATING MODE IS SET AT SCHOOL OPERATING CONSOLE.

MINIMUM OUTSIDE AIR VENTILATION - FIXED PERCENTAGE:
THE OUTSIDE AIR DAMPERS SHALL MAINTAIN A MINIMUM POSITION AS PER VENTILATION SCHEDULE DURING BUILDING OCCUPIED HOURS AND BE CLOSED DURING UNOCCUPIED HOURS.

FILTER DIFFERENTIAL PRESSURE MONITOR:
THE CONTROLLER SHALL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE FINAL FILTER.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

FINAL FILTER CHANGE REQUIRED: FINAL FILTER DIFFERENTIAL PRESSURE EXCEEDS A USER DEFINABLE LIMIT (ADJ.).

MIXED AIR TEMPERATURE:
THE CONTROLLER SHALL MONITOR THE MIXED AIR TEMPERATURE AND USE AS REQUIRED FOR PREHEATING CONTROL.
ALARMS SHALL BE PROVIDED AS FOLLOWS:
HIGH MIXED AIR TEMP: IF THE MIXED AIR TEMPERATURE IS GREATER THAN 90°F (ADJ.).

LOW MIXED AIR TEMP: IF THE MIXED AIR TEMPERATURE IS LESS THAN 50°F (ADJ.).

RETURN AIR TEMPERATURE:
THE CONTROLLER SHALL MONITOR THE RETURN AIR TEMPERATURE AND USE AS REQUIRED FOR ECONOMIZER CONTROL (IF PRESENT).

ALARMS SHALL BE PROVIDED AS FOLLOWS:

HIGH RETURN AIR TEMP: IF THE RETURN AIR TEMPERATURE IS GREATER THAN 90°F (ADJ.).

LOW RETURN AIR TEMP: IF THE RETURN AIR TEMPERATURE IS LESS THAN 45°F (ADJ.).

SUPPLY AIR TEMPERATURE:
THE CONTROLLER SHALL MONITOR THE SUPPLY AIR TEMPERATURE.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

HIGH SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS GREATER THAN 120°F (ADJ.).

LOW SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS LESS THAN 45°F (ADJ.).

E. EXHAUST FANS - GENERAL

RUN CONDITIONS - SCHEDULED:

THE FAN(S) SHALL RUN ACCORDING TO A USER DEFINABLE SCHEDULE (SCHOOL HOURS)

FAN:
THE FAN SHALL HAVE A USER DEFINABLE (ADJ.) MINIMUM RUNTIME.

EXHAUST AIR DAMPER:
THE EXHAUST AIR DAMPER SHALL OPEN ANYTIME THE UNIT RUNS AND SHALL CLOSE ANYTIME THE UNIT STOPS. THE EXHAUST AIR DAMPER SHALL CLOSE 30 SEC (ADJ.) AFTER THE FAN STOPS.

FAN STATUS:
THE CONTROLLER SHALL MONITOR THE FAN STATUS.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
FAN RUNTIME EXCEEDED: FAN STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT (ADJ.).

F. KITCHEN HOOD VENTILATION

CONTROLLERS & HARDWARE (SUMMARY)

- MAU-1 HAS FACTORY MICROPROCESSOR, OA INLET DAMPER/ACTUATOR, SUPPLY FAN VFD (FOR BALANCE/CV), DISCHARGE TEMP CONTROL, DIRTY-FILTER AND AIRFLOW-PROVING SWITCHES, BACNET MSTP INTERFACE, AND ELECTRIC HEAT W/ SCR MODULATION AND SUPPLY-AIR LOW-LIMIT PROTECTION.
- EF-16 CONTROLLED BY EC-PROVIDED HOA MOTOR STARTER (MS) WITH AUXILIARY “FAN PROVEN” DRY CONTACT.
- ANSUL PROVIDES DRY CONTACT(S): FIRE (AND TROUBLE IF FURNISHED).

RUN CONDITIONS:

- SYSTEM ENABLE (“HOOD ON”) BY ANY OF: (A) LOCAL HOOD FAN SWITCH (HFS); (B) BAS COMMAND; NOT IN FIRE/LOCKOUT
- SYSTEM DISABLE: HFS OFF AND BAS OFF, OR FIRE ACTIVE, OR MAU LOW-LIMIT/FAULT TRIP.

NORMAL (OCCUPIED) OPERATION
START ORDER (TO MAINTAIN NEGATIVE PRESSURE):

1. EF-16 → START (HOA IN AUTO).
2. WHEN EF-1 PROOF CLOSES (AUX CONTACT), MAU-1 ACCEPTS “EXHAUST INTERLOCK” AND PROCEEDS. (WIRE EF PROOF TO MAU “AIRFLOW PROVING/EXHAUST FAN INTERLOCK” TERMINALS

MAU-1 SEQUENCE:

- OA DAMPER DRIVES OPEN, THEN SUPPLY FAN STARTS AFTER DAMPER-OPEN DELAY/PROVE.
- SUPPLY FAN RUNS CONSTANT VOLUME (VFD SET FOR TAB; NO MODULATION IN NORMAL CONTROL).
- DISCHARGE AIR HEATING MODULATES (SCR) TO MAINTAIN SUPPLY AIR TEMP SETPOINT (TYP. 65 °F, ADJ.). HEAT IS AMBIENT-LOCKOUT ABOVE THE HEATING LOCKOUT OAT (ADJ.).

BALANCE/PRESSURIZATION: SYSTEM IS AIR-BALANCED SO NET KITCHEN EXHAUST REMAINS NEGATIVE.

SHUT-DOWN (NORMAL): ON HFS/BAS OFF → MAU SUPPLY FAN STOPS AND OA DAMPER CLOSES; EF STOPS AFTER ADJUSTABLE POST-PURGE (0–2 MIN, IF ENABLED).

UNCCUPIED OPERATION
- HOOD SYSTEM OFF. MAU OA DAMPER CLOSED. EF OFF. BAS “OCCUPIED OVERRIDE” MAY START SYSTEM AS ABOVE.

FIRE / ANSUL EVENT (FROM ANSUL FIRE CONTACT)

- EF-16: RUN/HOLD-ON (OVERRIDE HOA/OFF; LATCHED).
- MAU-1: STOP SUPPLY FAN, CLOSE OA DAMPER, INHIBIT HEAT. INTERLOCKS LATCH UNTIL MANUAL RESET AFTER CAUSE CLEARED. (THIS IMPLEMENTS EXHAUST-ON / MAKE-UP-AIR-OFF ON DISCHARGE.)
- COOKING EQUIPMENT POWER/FUEL SHUTDOWN BY FSC/EC (OUTSIDE THIS SOO; COORDINATED).

APPLIANCE INTERLOCKS
METHOD USED ON THIS PROJECT: “APPLIANCE LOCKOUT ON LOSS OF EXHAUST.”
- PROVIDE AN APPLIANCE ENABLE BUS (AEB) THAT IS ENERGIZED ONLY WHEN EF-RUN PROOF IS PRESENT (AND NO FIRE).
- AEB DROPS IMMEDIATELY IF EF-RUN PROOF IS LOST; APPLIANCES UNDER THE HOOD CANNOT OPERATE WITHOUT EXHAUST.
- FOR GAS APPLIANCES WITH STANDING PILOTS, INTERLOCK MAIN BURNER ONLY (DO NOT EXTINGUISH STANDING PILOTS).
- FOR ELECTRIC APPLIANCES, INTERLOCK THE APPLIANCE HEATING/CONTACTORS VIA EC-FURNISHED RELAYS.
- DO NOT USE THE FIRE-EXTINGUISHING SYSTEM AS THE MEANS OF THIS INTERLOCK.

- PREFERRED PROOFS: (A) EF MS AUX RUN PLUS (B) HOOD-COLLAR ΔP PROVING CAPTURE.
- NON-LATCHING IN NORMAL OPERATION: WHEN EF PROOF RETURNS, AEB RE-ENERGIZES AND APPLIANCES MAY OPERATE PER THEIR OWN CONTROLS.

G. HYDRONIC CABINET/UNIT HEATERS

RUN CONDITIONS - SCHEDULED:
THE UNIT SHALL RUN ACCORDING TO A USER DEFINABLE TIME SCHEDULE IN THE FOLLOWING MODES:

OCCUPIED MODE: THE UNIT SHALL MAINTAIN A HEATING SETPOINT OF 70°F (ADJ.).
UNOCCUPIED MODE (NIGHT SETBACK): THE UNIT SHALL MAINTAIN A HEATING SETPOINT OF 65°F (ADJ.).

ALARMS SHALL BE PROVIDED AS FOLLOWS:
LOW ZONE TEMP: IF THE ZONE TEMPERATURE IS LESS THAN THE HEATING SETPOINT BY A USER DEFINABLE AMOUNT (ADJ.).

ZONE SETPOINT ADJUST:
THE OCCUPANT SHALL BE ABLE TO ADJUST THE ZONE TEMPERATURE HEATING AND COOLING SETPOINTS AT THE ZONE SENSOR.

ZONE OPTIMAL START:
THE UNIT SHALL USE AN OPTIMAL START ALGORITHM FOR MORNING START-UP. THIS ALGORITHM SHALL MINIMIZE THE UNOCCUPIED WARM-UP OR COOL-DOWN PERIOD WHILE STILL ACHIEVING COMFORT CONDITIONS BY THE START OF SCHEDULED OCCUPIED PERIOD.

ZONE UNOCCUPIED OVERRIDE:
A TIMED LOCAL OVERRIDE CONTROL SHALL ALLOW AN OCCUPANT TO OVERRIDE THE SCHEDULE AND PLACE THE UNIT INTO AN OCCUPIED MODE FOR AN ADJUSTABLE PERIOD OF TIME. AT THE EXPIRATION OF THIS TIME, CONTROL OF THE UNIT SHALL AUTOMATICALLY RETURN TO THE SCHEDULE.
THE FAN SHALL RUN ANYTIME THE ZONE TEMPERATURE IS BELOW HEATING SETPOINT, UNLESS SHUTDOWN ON SAFETIES.

HYDRONIC COIL CONTROL:
EACH UNIT SHALL HAVE A NORMALLY CLOSED, TWO WAY MODULATING CONTROL VALVE (0–10 VDC OR 4–20 MA) INSTALLED IN THE HOT WATER SUPPLY.
THE CONTROLLER SHALL MODULATE THE VALVE FROM 0 % TO 100 % TO MAINTAIN THE ACTIVE HEATING SETPOINT.
THE VALVE SHALL FAIL CLOSED UPON LOSS OF CONTROL SIGNAL OR POWER.

WHEN VALVE COMMAND ≤ 0 % FOR A USER DEFINABLE POST RUN TIME (ADJ.), THE FAN SHALL STOP.

FAN OPERATION:

THE FAN SHALL RUN WHENEVER THE VALVE POSITION EXCEEDS A USER DEFINABLE THRESHOLD (E.G., 10 %) OR WHEN THE ZONE TEMPERATURE IS BELOW HEATING SETPOINT AND THE VALVE IS DRIVING OPEN, UNLESS SHUT DOWN BY SAFETIES.

CABINET UNIT HEATER STAGING:

THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND CONTINUOUSLY MODULATE THE CONTROL VALVE (AND FAN PER "FAN OPERATION") TO MAINTAIN THE HEATING SETPOINT. TO PREVENT SHORT CYCLING, THE VALVE AND FAN SHALL HAVE USER DEFINABLE MINIMUM RUNTIME AND POSITION DEADBAND PARAMETERS (ADJ.).
THE UNIT SHALL BE ENABLED WHENEVER:
THE ZONE TEMPERATURE IS BELOW HEATING SETPOINT.

3.8 ADJUSTING

A. Adjust the DDCS for proper settings and to achieve proper control.

3.9 CLEANING

A. Thoroughly clean all equipment and accessories prior to installation and at substantial completion.

B. Remove all dirt, rust, dust, etc. from equipment and accessories.

C. Remove and dispose of all debris and waste from the Site resulting from installation.

3.10 PROTECTION OF EXECUTED WORK

A. Equipment shall be tightly covered and protected against dirt, water, and chemical or mechanical damage.

B. Provide final protection and maintain conditions in a manner acceptable to the manufacturer that shall help ensure that the equipment is without damage at time of Substantial Completion.

END OF SECTION

SECTION 23 21 13

HYDRONIC PIPING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. Contractor shall provide all labor, materials, tools, equipment, and incidentals as shown, specified and required to furnish pipes, pipe fittings, pipe specialties, and pipe supports as shown on the Drawings, and as needed for a complete and proper installation of hydronic piping. Product specific requirements are contained herein; Section 23 01 00, Basic Mechanical Requirements, shall be referred to for general requirements.

B. This section includes:

1. Hydronic piping and fittings.

2. Valves.

3. Hydronic piping specialties.

4. Hydronic piping hangers and supports.

5. Saddles and shields.

6. Metal Pipe Enclosures

C. Coordination:

1. Review installation procedures under this and other Sections and coordinate the installation of items that must be installed with, or before, the hydronic piping.

2. Notify other Contractors in advance of the installation of hydronic piping to provide other contractors with sufficient time for the installation of items included in their contracts that must be installed with, or before the hydronic piping.

D. Related Sections:

1. Section 23 05 29, Hangers and Supports for HVAC Piping and Equipment

2. Section 23 05 53, Identification for HVAC Piping and Equipment.

3. Section 23 05 93, Testing, Adjusting, and Balancing for HVAC.

4. Section 23 07 19, HVAC Piping Insulation.

5. Section 23 09 23, Direct-Digital Control System for HVAC

1.2 QUALITY ASSURANCE

A. Codes and Standards

1. Brazing: Certify brazing procedures, brazers, and operations in accordance with ASME Boiler and Pressure Vessel Code, Section IX, Part QB Brazing for shop and job-site brazing of piping work or in accordance with AWS B2.2 standard for Brazing Procedure and Performance Qualification per Section MC 1203.3.1.

2. Fluid Control Institute (FCI) Compliance: Test and rate "Y" type strainers in accordance with FCI 73 1: Pressure Rating Standard for "Y" Type Strainers. Test and rate other type strainers in accordance with FCI 78-1: Pressure Rating Standard for Pipeline Strainers Other than "Y" Type.

B. Manufacturers Standardization Society of the Valve and Fittings Industry (MSS) Compliance: Comply with:

1. Mark valves in accordance with MSS-25: Standard Marking System for valves, fittings, flanges and unions and all other applicable MSS Standards.

2. MSS SP-80 – Bronze Gate, Globe, Angle and Check Valves.

3. MSS SP-110 – Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

4. MSS SP-58 Pipe Hangers and Supports - Materials, Design and Manufacture

5. MSS SP-69 Pipe Hangers and Supports - Selection and Application

6. MSS SP-89 Pipe Hangers and Supports - Fabrication and Installation Practices

C. Piping shall be supported at distances not exceeding the spacing specified in MC Table 305.4 or in accordance with ANSI/MSS SP-58.

D. Comply with ANSI B31.1A, ASME Code for pressure Piping, and ASHRAE Equipment Guide.

E. New York State Construction Codes: Comply with the 2020 New York City Building Code, Mechanical Code, Fuel Gas Code, Plumbing Code and Fire Code.

1.3 SUBMITTALS

A. Product Data: Provide product data for the following:

1. Piping and Fittings.

2. Valves.

3. Piping Specialties.

4. Hangers and Supports.

B. Shop Drawings

1. Provide shop drawings of all HVAC lines, including, but not limited to, showing all diameters, pitch, cleanouts, traps, routings, terminations, shut-off valves, vents, riser drains, etc.

C. Schedules

1. Submit schedule showing pipe or tube weight, fitting and joint type for each piping system; size, location and feature for each piping specialty, hanger and support.

2. Grooved joint coupling and fitting product submittals shall be specifically identified with the applicable manufacturer's style or series number.

D. Certifications

1. Brazing Certifications: Submit reports as required for piping work.

2. For expansion bolts installed in concrete, submit ICC certification for use in cracked concrete.

1.4 DELIVERY, STORAGE AND HANDLING

A. Packing, Shipping, Handling and Unloading:

1. Deliver materials to the Site to ensure uninterrupted progress of the Work.

2. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete, in ample time to prevent delay of that Work.

3. Comply with manufacturer's recommendations for rigging of equipment.

B. Storage and Protection:

1. Store materials to permit easy access for inspection and identification. Keep all material off the ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.

2. Store all equipment in covered storage off the ground and prevent condensation and in accordance with the manufacturer's recommendations for long-term storage.

C. Acceptance at Site:

1. All boxes, crates and packages shall be inspected by Contractor upon delivery to the Site. Contractor shall notify Engineer, in writing, if any loss or damage exists to equipment or components. Replace lost equipment or components and repair damage to new condition, in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.1 PIPES

A. Pipe used shall be free from scale or rust. Each length of pipe shall be properly marked at the mill for proper identification with name or symbol of manufacturer. Dimensions for steel pipe shall be in accordance with the ANSI B36.10. Dimensions for red brass pipe shall be in accordance with ASTM B251.

B. Steel Pipe

1. Black or Galvanized; Standard Weight: Schedule 40 or Extra Heavy Weight: Schedule 80; ASTM A135 or ASTM A53 or ASTM A106.

2. Steel Pipe for Threading: ASTM A53 Type F, Type E or S; ASTM A135 or A106.

3. Grooved End Type: Schedule 40, ASTM A53, Type F, Type E or S; or ASTM A135 or ASTM A106.

4. Steel pipe shall be manufactured by:
   a. Koppel Steel Corp.
   b. North Star Steel Co.
   c. Sawhill Tubular Co.
   d. Sharon Tube Co.
   e. U.S. Steel Co.
   f. Wheatland Tube Company
   g. EXLTUBE Inc.

C. Copper Tubing

1. Hard-Drawn Temper; Water tubes shall be Type L per ASTM B88

2. Copper tubing shall be manufactured by:
   a. Mueller Industries
   b. NIBCO Inc.
   c. Phelps-Dodge Copper Products Corp.
   d. Revere Copper and Brass Inc.
   e. Merit Brass Company

2.2 FITTINGS

A. Steel, Malleable/Cast Iron

1. Steel Fittings, except couplings and unions, 2 1/2" and less: Threaded pattern, standard weight, black cast iron

2. Grooved End Type: Steel ASTM A53 Grade B or Ductile iron ASTM A536 Grade 65-45-12; with factory grooved ends designed to accept manufacturer's couplings.

3. Steel and malleable/cast iron pipe fittings shall be manufactured by:
   a. Anvil International
   b. CIFUNSA Marketing, Inc.
   c. Smith-Cooper International
   d. Tube-Line
   e. Victaulic Co. of America
   f. Ward Manufacturing
   g. Weldbend Corporation
   h. TYCO Grinnell Mechanical Products
   i. Shurjoint Piping Products
   j. The Viking Corporation
   k. B. Brass

B. Unions:

1. 3" Size and Under: Steel: malleable iron, 300 lb class, with brass to iron or brass to brass seats and bronze to bronze, bronze to iron, or brass to iron ground joint, except as otherwise specified. The pressure rating shall be indicated on the union.

2. Unions for Use in Brass Pipe or Copper Tubing Systems, 2" and under: Cast bronze, 150 lb Class, with bronze to bronze seats; with screw, brazing or solder ends, or with adapters as required.

3. Union shall be manufactured by:
   a. Anvil International
   b. E.M. Dart Co.
   c. NIBCO Inc.
   d. Smith-Cooper International
   e. Weldbend Corporation
   f. Ward Manufacturing LLC
   g. The Viking Corporation

C. Fittings for Type "L" copper tubing

1. Fittings shall be wrought copper solder joint fittings suitable for brazing and shall be in accordance with ANSI B16.22. Type "L" fittings shall have a minimum working water pressure of 150 p.s.i.

2. Flux for brazing Type L shall be equal to "Handy Flux" and shall comply with Navy Dept. Spec. 51F 4a.

3. The silver brazing alloy for brazed Type L joints shall be similar to Handy & Harmon Sil-Fos brazing alloy having a silver content of not less than 15% and a flow point of 1300°F.

4. Alternately, fittings for Type "L" copper tubing may be cast bronze threaded fittings, Class 125 working pressure, conforming to ASTM B62 and ASME B16.24.

5. Grooved end fittings for Type “L” copper tube: ASME B16.22 wrought copper or ASME B16.18 bronze casting; dimensioned grooved ends designed to accept manufacturer’s couplings.

6. Alternately, hydronic fittings may be press fittings (press fit - pressure-sealed joints) by Viega ProPress, Elkhart Xpress, NIBCO Press System, Grinnell G-Press, Merit Brass Corporation (or approved equal) up to and including 4” in diameter. O-rings: EPDM; Special Tools recommended and approved by the Manufacturer.

7. Type "L" fittings shall be manufactured by:
   a. Elkhart Products Corp.
   b. Mueller Industries
   c. NIBCO Inc.
   d. Smith-Cooper International
   e. Viega ProPress
   f. Victaulic Co.
   g. Anvil International
   h. TYCO Grinnell Mechanical Products
   i. Shurjoint Piping Products
   j. Merit Brass Company

D. Couplings: Same material and pressure rating as adjoining pipe, conforming to standards for fittings in such pipe. Use taper tapped threaded type in screwed pipe systems operating in excess of 15 psig.

E. Grooved Joints - for Steel Piping: Rolled or cut grooves, Pipe: Carbon Steel, ASTM A53, or ASTM A106, EPDM gaskets; Housing: Ductile Iron. System shall be designed for flexible or rigid installation. Welded flanges shall be used at equipment connections, and for maintenance removal sections. Manufacturers: Victaulic, Anvil International Inc, TYCO Grinnell Mechanical Products or Shurjoint Piping Products

1. Rigid Type: Housings shall be cast with offsetting, angle-pattern bolt pads or recessed tongue and grooves to provide system rigidity and support and hanging in accordance with ASME B31.1 and B31.9.
   a. 2” through 8”: Rigid coupling designed for direct installation onto grooved end pipe without prior field disassembly and no loose parts. Gasket shall be Grade “E” EPDM suitable for hot/dual temperature water up to 230°F. Victaulic Style 107 QuickVic, Anvil Slidelok 74, GRUVLOK Fig. 7401 Rigidlok, TYCO Grinnell Figure 772, Shurjoint Models Z07/7771 or approved equal.

2. Flexible Type: Use in locations where vibration isolation and stress relief are required. Flexible couplings may be used in lieu of flexible connectors for vibration isolation at equipment connections. Three couplings for each connector shall be placed in close proximity to the source of vibration.
   a. 2” through 6”: Flexible coupling designed for direct installation onto grooved end pipe without prior field disassembly and no loose parts. Gasket shall be Grade “E” EPDM suitable for hot/dual temperature water up to 230oF. Victaulic Style 177 QuickVic, Anvil GRUVLOK Fig. 7001, TYCO Grinnell Figure 705, Shurjoint Models 7707/7705 or approved equal.

F. Nipples: same material and strength as adjoining pipe, except nipples having a length of less than 1" between threads shall be extra heavy Schedule 80. Manufacturer: Allied Piping Products, Babcock & Wilcox, Crane Co., Tube Turns, Smith-Cooper International and Anvil International.

2.3 VALVES

A. General

1. Provide all the valves necessary for the control and easy maintenance of all piping and equipment. Valves shall be first quality, have proper clearance, followers in the packing glands, and shall seal tight at the specified test pressure. Each valve shall have the maker's name or brand, the figure or list number and the guaranteed working pressure cast on the body and cast or stamped on the bonnet. Valves which are concealed in hung ceilings or in furring and any other places shall be made accessible by means of access doors provided in the ceilings and furrings. The access doors shall be not less than 12" x 12", unless otherwise shown on the Drawings.

2. Working Pressure: Valves shall be designed for water of not less than 200 psi and 350 psig hydrostatic tests.

3. Valves of one type throughout the Project shall be of the same manufacturer. Valve parts of same manufacturer, size and type shall be interchangeable.

B. Ball Valves

1. Ball valves shall be two-piece full ported 600 W.O.G. bronze body or Dezincification Resistant (DZR) Brass body, solid blow-out proof stem, teflon seats, chrome plated bronze or brass ball and teflon seals, corrosion resistant steel lever handles with vinyl grips, balancing stop with screw or solder ends. Screw end ball valve shall be Apollo Valves 77-100 Conbraco Industries, Inc., Crane 9211, Milwaukee BA-400, Hammond 8301A, NIBCO T-585-70, Stockham T-255-BR-R, Dwyer Series BV2MB, Smith-Cooper 1728155 Series or Jomar Valve T-100NE and solder end ball valve shall be Apollo Valves 77-200 Conbraco Industries, Inc., Crane 9212, Milwaukee BA450, Hammond 8311, NIBCO S-585-70, Stockham S-255-BR-R, Smith-Cooper 1728156 Series or Jomar Valve S-100NE. Ball valves should be used for up to 2" sizes only.

2. Ball Valves for Press-fit Copper Fittings shall be two-piece bronze or brass body with full port, chrome or brass plated ball, blow-out proof stem and PTFE or RTFE seats, rated at 250 psi minimum with press fitting ends. Ball Valves shall be Viega Model 2970.10, NIBCO PC585-70; Apollo Valves 77W-140 Series or Jomar Valve JP-100. Ball valves shall have a metal lever handle.

3. Ball valves made of brass alloy must contain dezincification resistant inhibitors and be thermally treated (annealed). Valves must be 3rd party tested by a Nationally Recognized Testing Lab in accordance with ISO 6509-1 and exhibit less than 200 microns of dezincification in accordance with ISO 6509-2.

4. Grooved End Ball Valves for Steel Pipe, 1-1/2" through 6": Two-piece standard ported 800 psi CWP, ductile iron body, chrome or nickel plated carbon steel stem, chrome-plated carbon steel ball, TFE seat, Fluoroelastomer seals. Provide lever handle, gear operator with handwheel or power actuator: Victaulic Series 726, TYCO Grinnell Model BV835, Anvil GRUVLOK Series 7500, Shurjoint Model SJ-500 or approved equal.

C. Gate Valves

1. All gate valves shall be of the solid wedge disk type.

2. Bronze Gate Valve: Class 125, 125 psig WSP, 200 psig WOG, bronze body with integral seat and screw-in or union bonnet; Class 150, 150 psig WSP, 300 psig WOG, bronze body with integral seat, union bonnet (rising stem), threaded bonnet (non-rising stem), threaded ends.

3. Hose gate valves shall be 125 psi, 3/4", standard weight bronze with cap.

4. Manufacturers
   a. NIBCO, Inc.
   b. Hammond Valve Corp.
   c. Milwaukee Valve Company
   d. Conbraco Industries, Inc.; Apollo Valves.
   e. Crane Co.; Crane Valve Group; Jenkins Valves.

2.4 PIPING SPECIALTIES

A. Provide factory-fabricated piping specialties recommended by manufacturer for use in service indicated. Provide sizes and connections that properly mate with pipe, tube and equipment connections.

B. Pipe Escutcheons

1. Provide pipe escutcheons as specified herein with inside diameter closely fitting pipe outside diameter or outside of pipe insulation where pipe is insulated. Select outside diameter of escutcheon to completely cover pipe penetration hole in floors, walls, or ceilings; and pipe sleeve extension, if any. Provide pipe escutcheons with nickel or chrome finish for occupied areas, prime paint finish for unoccupied areas.

2. Pipe Escutcheons for Moist Areas: For waterproof floors and areas, where water and condensation can be expected to accumulate, provide cast brass or sheet brass escutcheons, solid or split hinged. If exposed to view, escutcheon shall be solid type.

3. Pipe Escutcheons for Dry Areas: Provide sheet steel escutcheons, solid or split hinged. If exposed to view, escutcheon shall be solid type.

4. Manufacturers
   a. Zurn Industries, Inc.
   b. McGuire Mfg. Co.

C. Strainers: Low Pressure Y-Type Pipeline Strainers:

1. Provide strainers full line size of connecting piping with ends matching piping system materials. Select strainers for 125 psi working pressure with perforated stainless-steel basket with 50 percent free area. Perforation or mesh size shall depend on strainer size and/or material being strained.

2. Threaded Ends, 21/2" and Smaller: Bronze or Cast-iron body, screwed screen retainer with centered blow down fitted with pipe plug.

3. Grooved Ends, 2" and Larger: Tee or Wye Type, ductile-iron or carbon steel body and access end cap, access coupling with EDPM gasket. Tee type shall be Anvil GRUVLOK Fig. 7260, TYCO Grinnell Figure S855, Victaulic Series 730 or W730, Shurjoint Model 728 or approved equal. Include wye type with off-center blow down port fitted with pipe plug, Anvil GRUVLOK Fig. 758G and 768G, TYCO Grinnell Figure S855, Victaulic Style 732 or W732 Shurjoint Model 726 or approved equal.

4. Manufacturers
   a. Anvil International
   b. Armstrong Machine Works.
   c. Conbraco Industries, Inc.; Apollo Valves
   d. Hoffman Specialty ITT; Fluid Handling Div
   e. O.C. Keckley Company
   f. Metraflex Co.
   g. Victaulic Co. of America
   h. TYCO Grinnell Mechanical Products
   i. Shurjoint Piping Products
   j. Spirax Sarco

D. Dielectric Unions

1. Provide products which effectively isolate ferrous from non-ferrous piping (electrical conductance), prevent galvanic action, and stop corrosion.

2. Manufacturers
   a. Mueller Industries
   b. Capitol Mfg. Co.; Div. of Harsco Corp.
   c. Eclipse, Inc.
   d. Epco Sales, Inc.

e. Perfection Corp.

E. Pipe Sleeves: Provide pipe sleeves of one of the following. Pipe sleeve must be one of the following appropriate types and thickness as specified below unless otherwise noted in the UL firestopping assembly details in which case type and thickness shall be as indicated in the UL details.

1. Sheet-Metal: Fabricate from galvanized sheet metal; round tube closed with snaplock joint, welded spiral seams, or welded longitudinal joint. Fabricate from the following gauges: 3" and smaller, 20 gage minimum; 4" to 6", 16 gage; over 6", 14 gage minimum.

2. Steel-Pipe: Fabricate from Schedule 40 galvanized steel pipe; remove burrs.

3. Iron-Pipe: Fabricate from standard weight cast-iron or ductile-iron pipe; remove burrs.

4. Plastic-Pipe: Fabricate from Schedule 80 PVC plastic pipe; remove burrs.

5. Firestop penetration materials for sealing sleeves shall be listed by Underwriters Laboratories. The materials shall be as specified in Section 078400. For pipes passing through fire-rated floor, cast-in place firestop device with Underwriters Laboratories listing, and if not listed, is permitted as an acceptable sleeve alternative to a metallic sleeve with firestopping material. The cast-in place device is a one-step firestopping process that does not require additional firestop penetration materials for sealing the sleeves. The device shall be installed where required for sleeving purposes. The cast-in place firestop device shall not be used for wall applications.

6. Materials for sealing space between each pipe and sleeve through non-rated interior walls shall consist of mineral wool and sealant.

F. Drip Pans: Fabricated from corrosion-resistant sheet metal with watertight joints, and with edges turned up 21/2". Reinforce top, either by structural angles or by rolling top over 1/4" steel rod. Provide hole, gasket, and flange at low point for watertight joint and 1" drain line connection.

G. Balancing Valves with Read-out Ports

1. Where the Drawings indicate a balancing valve in the water piping, provide a combination shut-off and balancing valve with read-out ports of heavy brass, bronze or dezincification-resistant copper alloy construction up to 2" and cast-iron or ductile-iron construction 2½" and above, with visible graduated dial indicator and read-out ports built for a working water pressure of 250 psig at 250oF. Valve shall be globe or ball type. Valve shall be complete with a locking mechanism that can be set at a balance point, so that the valve may be opened and closed, but not opened beyond the pre-set balance point.

2. Manufacturers
   a. Anvil International/Gruvlok
   b. Armstrong Pumps, Inc.
   c. Bell & Gossett ITT; Fluid Handling Div.

d. Griswold Controls
e. Victaulic/Tour & Andersson, Inc.
f. Wheatley HVAC Products
g. Macon Balancing/Tunstall Corporation
h. Grinnell Mechanical Products by Tyco
i. NIBCO Inc.
j. Watts Regulator Co.
k. Nexus
l. Oventrop Corporation

H. Air Vents

1. Manual Air Vent shall consist of a 1/4" bronze pet cock with lever handle, fitted into a pipe tee.

2. Automatic Air Vent: Provide automatic air vent designed to vent automatically with float principle, stainless steel or non-ferrous float and mechanisms, cast-iron or brass body, pressure rated for 125 psi, 1/2" NPS inlet and outlet connections if required. (Sarco Co. Type 13WS; Spirotherm, Inc. Spirotop; Watson McDaniel AV813W; ANVIL Gruvlok Model GAV-15; Val-Matic Air Release Valve Series No. 15A)

3. Manufacturers
   a. Anvil International/Gruvlok
   b. Armstrong Pumps, Inc.
   c. Bell & Gossett ITT: Fluid Handling Div.
   d. Crane Co.
   e. Conbraco Industries, Inc.
   f. Hoffman Specialty ITT; Fluid Handling Div.
   g. Spirax Sarco.
   h. Spirotherm, Inc.
   i. Watson McDaniel
   j. Val-Matic Valve & Manufacturing Corporation

2.5 SADDLES AND SHIELDS

A. Except as otherwise indicated on the Drawings, provide saddles or shields under piping hangers and supports, factory-fabricated, for all insulated piping. Size saddles and shields for exact fit to mate with pipe insulation.

B. Protection Saddles: MSS Type 39; fill interior voids with segments of insulation matching adjoining insulation.

C. Protection Shields: MSS Type 40; of length recommended by the manufacturer to prevent crushing of insulation.

D. Thermal Hanger Shields: Constructed of 360° insert of high density, 100 psi, waterproofed calcium silicate, encased in 360° sheet metal shield. Provide assembly of same thickness as adjoining insulation.

E. Manufacturers:

1. Elcen Metal Products Co.

2. Pipe Shields, Inc.

3. Value Engineered Products, Inc.

2.6 METAL PIPE ENCLOSURES

A. Material and Fabrication

1. Each enclosure shall be field-verified and fabricated to accurately fit around the piping from floor level to ceiling in locations shown in drawings.

2. Fabricate enclosures from 16-gauge (minimum) ASTM A1008 CS Type B Cold-Rolled Steel suitable for a prime and finish paint system.

3. All fasteners and edges must be concealed or finished to avoid sharp edges.

4. Corners shall be welded or mechanically fastened. Exposed edges shall be rolled, hemmed, or otherwise finished to eliminate sharp edges.

5. Provide all necessary stiffeners, angles, or supports to ensure rigidity and proper attachment to existing construction.

6. Engage manufacturer with at least five (5) years of experience producing architectural metal enclosures to conceal piping and equipment.

B. Finish / Painting

1. All metal surfaces shall be thoroughly cleaned and prepared to receive primer and finish paint.

2. Prime Coat: Factory-applied or shop-applied corrosion-inhibiting primer (compatible with finish coats).

3. Finish Coat: Two-coat, high-performance paint system (e.g., epoxy or alkyd enamel) or powder coat, in color to match adjacent wall finish.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine conditions under which materials and equipment will be installed and notify Engineer in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected.

B. Take field measurements where required prior to installation to ensure proper fitting of Work.

3.2 PREPARATION

A. Surface Preparation:

1. Proceed with installation of hangers, supports and anchors only after required building structural work has been completed. Correct inadequacies including (but not limited to) proper placement of inserts, anchors and other building structural attachments.

3.3 PIPE INSTALLATION

A. Install pipes in accordance with recognized industry practices which will achieve permanently-leakproof piping systems, capable of performing each indicated service without piping failure. Align piping accurately at connections, within 1/16" misalignment tolerance. Comply with ANSI B31 Code for Pressure Piping.

B. Locate piping runs, except as otherwise indicated, vertically and horizontally (pitched to drain) and avoid diagonal runs wherever possible. Orient horizontal runs parallel with walls and column lines. Locate runs as shown or described by diagrams, details and notations. Run piping in shortest route which does not obstruct usable space or block access for servicing building and its equipment. Hold piping close to walls, overhead construction, columns and other structural and permanent-enclosure elements of building; limit clearance to 1/2" where furring is shown for enclosure or concealment of piping, but allow for insulation thickness, if any. Where possible, locate insulated piping for 1" clearance outside insulation. All piping in finished and occupied spaces shall be concealed from view by locating piping in column enclosures, in hollow wall construction or above suspended ceilings; do not encase horizontal runs in solid partitions, except as indicated on the Drawings.

C. Do not run piping through transformer vaults and other electrical or electronic equipment spaces and enclosures unless unavoidable. Install drip pan under piping that must be run through electrical spaces. Do not run piping in stairwells or elevator equipment rooms except for systems serving those spaces.

D. In the outlet from each cooling coil condensate drain pan, provide a tee with a brass plug at one end to facilitate cleaning of drain. Additionally, provide a single "P" trap for proper operation of the unit.

E. Casing for pipe at or near floors: Where pipes at or near floors are indicated on the Drawings to be encased, pipes shall be supported, insulated, and then enclosed in a casing of No. 20-gage galvanized sheet steel.

3.4 INSTALLATION OF PIPE SYSTEM JOINTS

A. Provide joint of type indicated in each piping system.

B. Thread pipe in accordance with ASME B1.20.1; cut threads full and clean using sharp dies. Ream threaded ends to remove burrs and restore full inside diameter. Apply pipe joint compound, or pipe joint tape where recommended by pipe/fitting manufacturer, on male threads at each joint and tighten joint to leave not more than three threads exposed.

C. Solder copper tube-and-fitting joints in accordance with recognized industry practice. Cut tube ends squarely, ream to full inside diameter, and clean outside of tube ends and inside of fittings. Apply solder flux to joint areas of both tubes and fittings. Insert tube full depth into fitting, and solder in manner that will draw solder full depth and circumference of joint. Wipe excess solder from joint before it hardens.

D. Offsets in piping shall be accomplished by means of standard fittings; pipe bends shall not be used for this purpose unless shown on the Drawings.

E. Reducing Fittings: Reducing fittings shall be used where drips are required.

F. Unions shall be used in piping only adjacent to units of equipment such as pumps, heating coils, cooling coils and all other items and accessories, or in other locations where specified, where shown on the Drawings, or where written permission is granted prior to installation.

G. Mechanical Couplings Type Fittings: The use of mechanical coupling type fittings on hot, cold and dual temperature water piping in lieu of other fitting is acceptable in sizes 2" to 8" inclusive. The mechanical couplings shall be self-centering and shall engage and lock the grooved pipe and/or fittings in a positive couple while allowing for some degree of angular pipe deflection, contraction and expansion. Entire coupling installation including pipe grooving shall be performed in accordance with the manufacturer's instructions. Mechanical Products couplings together with their respective grooved end pipe fittings are acceptable.

1. The gasket style and elastomeric material (grade) shall be verified as suitable for the intended service as specified.

2. Grooved end shall be clean and free from indentations, projections, and roll marks in the area from pipe end to groove for proper gasket sealing.

3. A manufacturer factory-trained field representative shall provide on-site training for contractor's field personnel in the proper use of grooving tools and installation of grooved piping products. Factory-trained representative shall periodically review the product installation. Contractor shall remove and replace any improperly installed products.

H. Grooved Copper coupling may be used in lieu of soldering joints on 2" and up Type L copper tubing; on water services from -30oF to +250^{o}F within the manufacturer rated working pressures. Tubing shall be roll grooved as per manufacturer.

I. Pressed Connect Fit (Pressure Seal - Press Fit) Fittings: All the connections shall be made in accordance with the manufacturer's installation instructions. Copper tubing shall be cut at right angles using displacement type cutter or fine-toothed saw. Burrs shall be removed from inside and outside of tubing to prevent cutting sealing element. Mark insertion depth according to manufacturer's insertion depth chart. Seals and grip ring shall be checked for correct fit. Only the manufacturer's sealing elements shall be used. Press fitting shall be slid onto tubing while turning slightly to the marked depth. Oils or lubricants shall not be used. Fitting connections shall be made with the tool provided by manufacturer. Manufacturer's assembly tool shall be used to perform the pressing process.

J. For locations where there is insufficient access to accommodate the pressing tool, this type of joint is not allowed. Sufficient clearance must be left around each joint to allow room for the pressing tool and jaw to be attached without interference when repairing the system in the future.

3.5 INSTALLATION OF VALVES

A. All valves shall be manually opened and closed before installation to check their operation, and the interior of the valves shall be cleaned. Joints shall be made as specified.

B. Install the valves so that they can be conveniently operated. Do not place operators at angles other than parallel to the floors or walls.

C. Valves shall be supported as integral components of the piping systems.

D. Install valves where required for proper operation of piping and equipment including valves in branch lines where necessary to isolate sections of piping. Locate valves so as to be accessible and so that separate support can be provided when necessary.

E. Install valves with stems pointed up, in vertical position where possible, but in no case with stems pointed downward from horizontal plane unless unavoidable. Install valve drains with hose-end adapter for each valve that must be installed with stem below horizontal plane.

3.6 INSTALLATION OF PIPING SPECIALTIES

A. Pipe Escutcheons: Install pipe escutcheons on each pipe penetration through floors, walls, partitions, and ceilings where penetration is exposed to view; and on exterior of building. Secure escutcheon to pipe or insulation so escutcheon covers penetration hole and is flush with adjoining surface.

B. Strainers:

1. Provide pipe nipple and shutoff valve in strainer blow down connection, full size of connection, except for strainers 2" and smaller installed ahead of control valves feeding individual terminals. Where indicated, provide drain line from shutoff valve to plumbing drain, full size of blow down connection.

2. Provide strainers in supply line ahead of the following equipment and elsewhere as indicated:
   a. Temperature control valves

C. Dielectric Unions: Jints between different ferrous and non-ferrous metallic piping materials shall be made with approved dielectric fittings or brass converter fittings.

D. Pipe Sleeves

1. Install pipe sleeves where piping passes through walls, floors, ceilings, and roofs. Do not install sleeves through structural members of work, except as detailed on the Drawings or as reviewed by the Project Architect. Install sleeves accurately centered on pipe runs. Size sleeves so that piping and insulation (if any) will have free movement in sleeve, including allowance for thermal expansion; but not less than 2 pipe sizes larger than piping run. Where insulation includes vapor-barrier jacket, provide sleeve with sufficient clearance for installation. Install length of sleeve equal to thickness of construction penetrated, and finish flush to surface; except floor sleeves. Extend floor sleeves 1/4" above level floor finish, and 3/4" above floor finish sloped to drain.
   a. Install sheet-metal sleeves at interior partitions and ceilings other than suspended ceilings.
   b. Install iron-pipe sleeves at exterior penetrations, both above and below grade.
   c. Install steel-pipe or plastic-pipe sleeves where indicated on the Drawings.

2. Sleeves for floors, walls and other masonry work shall be set in place before the slabs or walls are constructed. In buildings having floor slab of composite metal deck construction, Contractor shall be responsible for cutting holes in the steel deck. Where drilled openings are in terra cotta arch, exposed hollow core of the blocks shall be completely filled with non-shrink grout and prepacked to achieve firm bearing on the entire perimeter of the structural steel sleeve. Where corrugated sheet metal is encountered, it shall be cut by the rotary drill used to cut the arch. For location of sleeve, Contractor is to coordinate with new and existing Drawings (Structural steel beams are shown on original Drawings). Openings in arch must be located to miss existing

structural steel. Openings in existing arch are to be made by rotary core drill only. Hammering of any type is not permitted. The size of the opening in arch may not exceed the requirement shown on the Details Drawings. The mix for non-shrink grout shall be in accordance with the manufacturer's recommendations. The non-shrink grout shall be compacted to provide firm bearing between the structural steel sleeve or sleeves and the existing arch. Additionally, where there are two sleeves, provide compacted non-shrink grout between the sleeves.

E. Fire Barrier Penetration Seals: refer to Section 078400 - Firestopping.

F. Drip Pans: locate drip pans under piping passing over or within 3 feet of electrical equipment, and elsewhere as indicated. Hang from structure with rods and building attachments, weld rods to side of drip pan. Brace to prevent sagging or swaying. Connect 1" drain line to drain connection and run to nearest plumbing drain or elsewhere as indicated on Drawings.

G. Insulated Piping: Comply with the following installation requirements.

1. Clamps: Attach clamps, including spacers (if any), to piping with clamps projecting through insulation; do not exceed pipe stresses allowed by ANSI B31.

2. Shields: Where low-compressive-strength insulation or vapor barriers are used, install coated protective shields.

3. Saddles: Where insulation without vapor barrier is indicated, install protection saddles.

4. Insulation Saddle System, the equal of Anvil Fig 260 ISS can be used instead of shields and/or saddles when proper insulating techniques are employed including the use of mastic and caulk on all insulation edges and final taping. Position the pipe on the saddle, notch section of the insulation to fit around the saddle, square cut the adjoining insulation section and butt the mating end to the notched section, finish taping according to standard methods, no metal shield is required between the hanger and pipe insulation.

H. Balancing Valves: Install balancing valves where shown on the Drawings. After hydronic system balancing has been completed, mark each balancing valve with stripe of yellow lacquer across body and stop plate to permanently mark final balanced position.

I. Air Vent

1. Manual Air Vent: Install manual air vent on each hydronic terminal at highest point, at the top of each hydronic riser and on each hydronic piping drop in direction of flow for mains, branches, and runouts, and elsewhere as indicated on the Drawings.

2. Automatic Air Vent: Install automatic air vent as indicated on the Drawings. Install shutoff valve for air vent; pipe outlet to suitable plumbing drain, or as indicated on the Drawings.

J. Flow Control Check Valves: Install flow control valves on discharge of each pump servicing hydronic system or zone, and elsewhere as indicated on the Drawings. Install with check mechanism in upright position, with adequate clearance of service and replacement. Screw check down for automatic operation.

K. Air Separators

1. Install coalescing type combination air and dirt separator in pump suction lines. Connect inlet and outlet piping. Connections are to be in-line at the center of the vessel. In the air elimination mode using a diaphragm or bladder type tank, air will be vented to the atmosphere, not directed to the tank. Hard pipe the blow down valve to floor drain to permit periodic blowing down of dirt and sediment.

L. Diaphragm Expansion Tank:

1. Install expansion tanks on the suction side of the system pumps. Expansion tank to be tied into system piping in close proximity to air separator and system fill line. Check the air pressure in the expansion tank by attaching a gage to the air recharge (Schrader) valve at the bottom of the tank. Fill to pressure indicated by manufacturer’s instructions. Lockable shutoff valves shall be installed at connections to all expansion tanks. Valves shall remain locked in the open position.

M. Water Relief Valves: Install hot water converters, and elsewhere as indicated on the Drawings. Pipe discharge to floor drain. Comply with ASME Boiler and Pressure Vessel Code.

N. Pressure Reducing Valves: Install where indicated on the Drawings, and in accordance with manufacturer's installation instructions.

O. Differential Pressure Regulating Valve: Install in the circulating water by-pass piping in the location indicated on the Drawings and in accordance with manufacturer's installation instructions.

P. Manual Water Flow Rate Control: Install at each location as shown on the Drawings. For pipe sizes over 3", Insert shall be installed with gaskets between standard ASA pipe flanges. A globe valve furnished with square operating nut shall be provided in the piping on the discharge side of the insert at a minimum distance of 12".

Q. Install anchors at proper locations to prevent stresses from exceeding those permitted by ANSI B31 and to prevent transfer of loading and stresses to connected equipment.

R. Fabricate and install anchor by welding steel shapes plates and bars to piping and to structure. Comply with AWS standards.

S. Where expansion compensators are indicated, install anchors in accordance with expansion unit manufacturer's written instructions and to limit movement of piping and forces to maximum recommended by manufacturer for each unit.

T. Anchor Spacings: where not otherwise indicated, install anchors at ends of principal pipe-runs, at intermediate points in pipe-runs between expansion loops and bends. Make provisions for preset of anchors as required to accommodate both expansion and contraction of piping.

U. Piping passing under concrete areas shall be supported by hangers secured by means of beam clamps fastened to the beams. Where pipe support spacing is excessive between steel, beam clamps shall be fastened to structural members that are approved by the Engineer of Record. Removed fireproofing around beams shall be replaced to original condition. No hangers or supports shall be attached to hung ceilings, concrete, ductwork or work of other trades.

3.7 INSTALLATION OF METAL PIPE ENCLOSURES

A. Secure enclosures plumb, level, and true to lines with concealed fasteners or brackets wherever possible.

B. Provide continuous blocking or suitable framing behind the attachment points as required for rigid support.

C. Tightly seal junctions between the metal enclosure and surfaces to prevent gaps and ensure a neat finish.

D. Coordinate any access openings or removable panels necessary for valve or piping maintenance. Panels should be flush, with concealed hinges or fasteners.

E. After installation, touch up any damaged areas of the finish so that repaired surfaces match adjacent undamaged surfaces.

3.8 CLEANING, FLUSHING, INSPECTING

A. Clean exterior surfaces of superfluous materials and prepare for application of specified coatings (if any). Flush out piping systems with clean water before proceeding with required tests. Inspect each run of each system for completion of joints, supports and accessory items. Inspect pressure piping in accordance with procedures of ASME B31.

B. Hanger Adjustments: adjust hangers so as to distribute loads equally on attachments.

C. Support Adjustment: provide grout under supports so as to bring piping and equipment to proper level and elevations.

3.9 PIPE APPLICATION

A. Low Points: Low points of each seal or pocket in piping shall be provided with a 1/2" (minimum size) gate valve arranged to empty the line.

B. Piping shall be installed at the elevations and locations indicated on the Drawings. It shall be so supported as to avoid the trapping of air. However, where trapping of air cannot be avoided, provision shall be made for manual venting of piping in such locations. Each low point in a main shall be provided with a 1" bronze hose gate valve, having a bronze cap and chain on the outlet.

C. Pitch: Pitch horizontal piping 1/8" per 10' in direction indicated on Drawings. When direction of flow is not indicated, pitch supply piping up in direction of flow and return piping downward in direction of flow.

D. Air Vents: Install air vents at locations indicated on the Drawings, and at each high point in system. Use manual air vents, unless otherwise indicated.

E. Drains: Provide drains at low points, consisting of a 1/2" valve with a hose bibb connection, and at the following locations and equipment:

1. In each section of piping separated by valves.

2. For each riser, where riser or runout to riser has a valve installed.

3. For each heating cooling unit, having valves in supply and return connections.

4. In low point of piping to each down feed convector or radiator.

F. Condensate Drain Piping: Condensate drain piping from cooling coil drain pans shall be pitched at not less than one-eighth unit vertical in 12 units horizontal (1-percent slope) in the direction of discharge per Section MC 307.2.1.

G. Dissimilar Pipe Joints

1. Between Cast Iron and Threaded Pipe: Use a half coupling screwed onto the threaded pipe to form a spigot end and calk into the cast iron pipe.

2. Between Black Steel Pipe and copper pipe or tubing: Use a dielectric connector or brass converter fittings per Sections MC 1203.1.1.

3. Between galvanized steel pipe and copper pipe or tubing: Use a dielectric connector or brass converter fittings per Sections MC 1203.1.1.

4. Between Threaded Brass and Threadless Copper Pipe: Use a suitable brazing adapter.

5. Between Threaded Pipe and Types L Copper Tubing or Welded Brass: Water Tube: Use suitable cast bronze soldering adapter.

6. Between Cast Iron and Threadless Copper Pipe: Use an approved flanged adapter.

7. Between Cast Iron Soil Pipe and Type DWV Copper Tubing or Welded Brass: Drainage Tube: Use a suitable copper to soil pipe adapter and caulk into the cast iron pipe.

8. Between Type DWV Copper Tubing or Welded Brass Drainage Tube and Threaded Outlets at Drains or Fixtures: Use a suitable cast bronze adapter.

9. Between Grooved End Steel Pipe and Other Types of Pipe Joints, Pipe Fittings and Pipe Materials: Use adapter fittings and grooved end coupling fittings, as manufactured by the grooved end pipe fitting manufacturer.

3.10 PIPE AND FITTING SCHEDULE

A. Hot Water Supply and Return (HWS and HWR) 125 psig and less:

1. 3” and Less: Type L hard drawn copper tubing with wrought copper or cast copper alloy solder fittings and Type 3 solder (ASTM B32 Alloy Grade E, AC or HB) or mechanically extracted joints made up with brazing alloy or press fit or grooved end fittings.

B. Condensate Drain Piping: Connected to all drip piping from air handling units; all drains and overflow lines from heating and air conditioning systems, and all condensate piping systems connected to drain pans - All Sizes: Type L hard temper copper tubing and fittings. Minimum condensate drain line diameter shall be in accordance with MC Table 307.2.2.

3.11 VALVE APPLICATION SCHEDULE

A. Hot Water Piping: Ball Valves, 3" in size and less with threaded, press fitting or solder ends as required by the particular application, operating at a maximum of 125 psig WSP, 200 psig WOG.

B. Drain cocks with threaded ends for hose connection shall be provided for any low points in the risers.

C. All main piping shall have air automatic air vents, similar to Sarco 13W at high points.

3.12 CLEANING

A. Thoroughly clean all equipment and accessories prior to installation.

B. Remove all dirt, rust, dust, etc. from equipment and accessories after installation.

C. Remove and dispose of all debris and waste from the Site resulting from installation.

END OF SECTION

SECTION 23 23 00

REFRIGERANT PIPING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. Contractor shall provide all labor, materials, equipment and incidentals as shown, specified, and required to furnish and install refrigerant piping complete and operational with accessories. Product specific requirements are contained herein; Section 23 01 00, Basic Mechanical Requirements, shall be referred to for general requirements.

B. This section includes:

1. Refrigerant tubing, fittings and joints

2. Refrigerant piping accessories.

C. Coordination:

1. Review installation procedures under this and other Sections and coordinate the installation of items that must be installed with, or before the refrigerant piping Work.

2. Notify other contractors in advance of the installation of the refrigerant piping to provide them with sufficient time for the installation of items included in their contracts that must be installed with, or before, the refrigerant piping Work.

D. Related Sections:

1. Section 23 05 29, Hangers and Supports for HVAC Piping and Equipment

2. Section 23 05 53, Identification for HVAC Piping and Equipment.

3. Section 23 07 19, HVAC Piping Insulation.

1.2 REFERENCES

A. American National Standards Institute (ANSI).

B. American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).

1. ASHRAE Standard 15 – Safety Standard for Refrigeration Systems.

C. American Society of Mechanical Engineers (ASME).

1. ASME/ANSI B16.18 – Cast Copper Alloy Solder Joint Pressure Fittings.

2. ASME/ANSI B16.22 – Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.

3. ASME B40.100 – Pressure Gauges and Gauge Attachments.

D. American Society for Testing and Materials (ASTM).

1. ASTM B32 – Standard Specification for Solder Metal.

2. ASTM B280 – Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.

3. ASTM B813 – Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube.

4. ASTM B828 – Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings.

E. American Welding Society (AWS).

1. AWS A5.8/A5.8M – Specification for Filler Metals for Brazing and Braze Welding.

2. AWS A5.31 – Specification for Fluxes and Braze Welding.

3. AWS B2.2 – Specification for Brazing Procedure and Performance Qualification.

4. AWS B2.3 – Specification for Soldering Procedure and Performance Qualification.

1.3 QUALITY ASSURANCE

A. Qualifications:

1. Installer:
   a. Engage an experienced installer to perform the work of this Section who has specialized in installing refrigerant piping similar to that required for this Project and who is acceptable to manufacturer.

2. Brazing and Soldering:
   a. Qualify processes and operators in accordance with AWS B2.2 and B2.3 as appropriate for material to be brazed or soldered.
   b. Provide certification that operators employed on or to be employed for the Work have satisfactorily passed AWS qualification tests within previous 12 months. Ensure that all certifications are current.

B. Regulatory Requirements:

1. National Electrical Code (NEC).

2. National Fire Protection Association (NFPA).

3. Underwriters Laboratories Inc. (UL).

4. Local and State Building Codes and Ordinances.

5. Permits: Contractor shall obtain and pay for all required permits, fees and inspections.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:

1. Shop Drawings:
   a. Drawings showing fabrication methods, assembly, accessories, and installation details, including supports, expansion joints, guides and anchors.
   b. 1/4-inch scale piping layouts, dimensioned to show length of runs, sizes, support spacing and expansion provisions.
   c. Setting drawings, templates, and directions for the installation of anchor bolts and other anchorages.

2. Product Data:
   a. Manufacturer's literature, illustrations, specifications, weight, dimensions, required clearances, materials of construction, and performance data for all equipment.
   b. Complete component list.
   c. Detailed description of each component.
   d. Catalog cut sheets for each component.
   e. Deviations from Contract Documents. Any exceptions to the Contract Documents must be clearly defined. Contractor shall be responsible for any additional expenses that may occur due to any exception made.
   f. Other technical data related to specified material and equipment as requested by Engineer.

3. Testing Plans, Procedures, and Testing Limitations:
   a. Plan for performing required field testing.

B. Informational Submittals: Submit the following:

1. Manufacturer Instructions:
   a. Instructions and recommendations for handling, storing, protecting the equipment.
   b. Installation Data.
   c. Instructions for handling, start-up, and troubleshooting.

2. Field Quality Control Submittals:
   a. Written report presenting results of required field testing.

3. Supplier Reports:
   a. Submit written report of results of each visit to Site by Supplier's service personnel, including purpose and time of visit, tasks performed, and results obtained. Submit within two days of completion of visit to the Site.

4. Qualifications Statements:
   a. Manufacturer, when requested by Engineer.
   b. Installer, when requested by Engineer.
   c. Brazing and Soldering, when requested by Engineer.

C. Closeout Submittals: Submit the following:

1. Record Documentation:
   a. During progress of the Work keep an up-to-date set of the Drawings showing field and Shop Drawing modifications. Immediately upon completion of the Work, submit "pdf" of CADD drawings showing the actual in place installation of all refrigerant piping and equipment installed under this Section at a scale satisfactory to the Owner. The drawings shall show all piping on plans and in sections, with all reference dimensions and elevations required for complete Record Drawings of the systems. Two paper prints shall also be furnished. The prints and electronic copies of the CADD files shall be furnished no later than 30 days after completion of the Contract and prior to final payment.

1.5 DELIVERY, STORAGE AND HANDLING

A. Packing, Shipping, Handling and Unloading:

1. Deliver materials to the Site to ensure uninterrupted progress of the Work.

2. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete, in ample time to prevent delay of the Work.

B. Storage and Protection:

1. Store materials to permit easy access for inspection and identification. Keep all material off the ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.

2. Store all equipment in covered storage off the ground and prevent condensation and in accordance with the manufacturer's recommendations for long-term storage.

C. Acceptance at Site:

1. All boxes, crates and packages shall be inspected by Contractor upon delivery to the Site. Contractor shall notify Engineer, in writing, if any loss or damage exists to equipment or components. Replace lost equipment or components and repair damage to new condition, in accordance with manufacturer's instructions.

1.6 SITE CONDITIONS

A. Existing Conditions:

1. The Contract Documents show the general arrangement and extent of the Work to be completed. The exact location and arrangement of all parts shall be determined as the Work progresses. The exact location of all parts of the Work must be governed by the general building plans and the actual building conditions.

2. The Drawings are intended as an indication of the arrangement of equipment and piping and are as nearly correct as can be determined in advance of the actual construction of the Work. Equipment, piping and appurtenances found to interfere with the construction of the building, plumbing apparatus and piping, electrical wiring or other obstructions, etc., must be changed in location to clear such obstructions.

PART 2 - PRODUCTS

2.1 DETAILS OF MATERIALS

A. Tubing:

1. Tubing shall be seamless copper tube of Type ACR, hard or annealed, complying with ASTM B280.

2. Tubing shall be clean, dehydrated, and supplied with a nitrogen charge and pressure tight plugs for each length.

B. Fittings:

1. Fittings shall be in long pattern and shall be wrought copper or copper alloy conforming to the requirements of ASME/ANSI 16.22 or cast copper alloy conforming to the requirements of ASME/ANSI 16.18.

2. Unions shall be wrought or cast copper with a 300 psig working pressure, female pattern, brass to brass seat, and ground joint.

3. Gaskets shall be of a material suitable for the refrigerant, temperature and pressure for which they will be used.

C. Joints:

1. Joints shall be brazed using alloys meeting the requirements of AWS A5.8/A5.8M with BCuP or BAg designation.

2. Joints between dissimilar metals shall be fabricated using an approved brazing flux conforming to the requirements of AWS A5.31, Types FB3A or FB3C, and an appropriate brazing filler metal with BCuP or BAg designation.

3. The outside of the copper tube and the inside of the fitting where brazing rod will be applied, shall be cleaned and burnished with fine crocus cloth until all dirt and oxide is removed. A light coat of non-corrosive brazing flux shall be applied to both pipe and fittings (Acid flux shall not be used). Joint shall be uniformly heated to proper brazing temperature and the brazing material shall be fed to the joint until a uniform line of brazing material appears around the pipe at the end of the fitting. Brazing shall be done only by mechanics that are qualified for brazing refrigerant piping.

4. Fittings for copper tubing for refrigerant use shall be wrought copper with brazed type ends as applicable. Forged brass fittings are also acceptable for this purpose. Fittings shall be suitable for working pressure up to 250 psi. The use of cast brass fittings for this service will not be approved.

2.2 ACCESSORIES

A. Mechanical Link Seals:

1. Manufacturer: Provide product of one of the following:
   a. Pipeline Seal and Insulator, Inc.
   b. Thunderline Corporation.
   c. Calpico, Inc.
   d. Or equal.

2. Provide mechanical link seals through walls or floors with adjusting bolts suitable for 20 psig of pressure where shown or specified.

3. Details of Construction:
   a. Non-Fire Rated Seals:
      1) Pressure Plates: Glass reinforced nylon composite.
      2) Bolts and Nuts: Type 316 stainless steel.
      3) Sealing Element: EPDM.
   b. Fire Rated Seals:
      1) Pressure Plates: Zinc dichromate steel.
      2) Bolts and Nuts: Two part zinc dichromate steel with corrosion inhibiting coating.
      3) Sealing Element: Silicone.
      4) 1-1/2-hour fire rating.

B. Sleeves and Wall Pipes:

1. General:
   a. Wall pipes and wall sleeves shall be provided in accordance with the following schedule when passing through new or existing concrete or masonry structures, except where noted otherwise:

From	To	Fitting
Dry area	Wet area	Wall Pipe
Dry area	Earth Exterior	Wall Pipe
Dry area	Dry area	Plain Sleeve
Earth	Earth	Plain Sleeve
Exterior	Exterior	Plain Sleeve

   b. Material of construction shall be Type 316 stainless steel where located in corrosive areas and G90 hot dipped galvanized steel in non-corrosive areas.

2. Sleeves:
   a. Wall sleeves shall be Schedule 40.
   b. Shall be of sufficient size to pass the pipe and the insulation covering the pipe.
   c. Shall extend 2-inches above the finished floor.
   d. Shall be provided with split type escutcheon plates at the floor and wall openings.
   e. Shall terminate flush with walls and ceilings.
   f. Shall not be required in existing concrete walls where walls are core drilled and the resulting hole has a smooth inside surface.
   g. Shall be caulked with a fire retardant caulking compound at firewalls and a gas tight caulking compound at gas tight walls.

3. Wall Pipes:
   a. Wall pipes shall be equipped with a waterstop.
   b. Shall be of sufficient length to pass through the wall and provide adequate clearance for fastening.
   c. The end of the wall pipes shall be of a type consistent with the piping to be connected to them and shall conform to their standards and specifications.
   d. All wall pipes shall have the same interior protection as specified for the connecting piping. Exterior protection shall be as specified for the yard piping.

C. Structural Supports:

1. Contractor shall provide and install all hangers, rods, supports, bolts, nuts, washers, inserts, and appurtenances as required to mount all refrigerant piping.

2. All hangers, rods, supports, bolts, nuts, washers, inserts, and appurtenances shall conform to Section 23 05 29, Hangers and Supports for HVAC Ductwork, Piping, and Equipment.

2.3 IDENTIFICATION

A. All piping and equipment identification shall be provided in accordance with Section 23 05 53 - Identification for HVAC Piping and Equipment.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine conditions under which materials and equipment will be installed and notify Engineer in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected.

B. Take field measurements where required prior to installation to ensure proper fitting of Work.

3.2 PREPARATION

A. Protection of Surrounding Areas/Surfaces:

1. Properly plug or cap the open ends of all piping at the end of each day's Work or other stopping point through construction. Equipment shall be tightly covered and protected against dirt, water, and chemical or mechanical damage.

3.3 INSTALLATION

A. General:

1. Install the piping and equipment in accordance with the Contract Documents and by manufacturer's instructions and recommendations. Obtain written interpretation from Engineer in the event of conflict between manufacturer's instructions and recommendations and the Contract Documents.

2. Install in accordance with Laws and Regulations.

3. Do not modify structures to facilitate installation of piping, unless specifically approved by Engineer.

4. Installation shall conform to requirements of all local and state codes.

B. All refrigerant piping installations shall conform to ANSI/ASHRAE Standard 15.

C. All pipes, whether insulated or not, shall be identified with pipe labels and the direction of flow indicated.

D. Install oil traps and oil return line tubing in refrigerant piping, as required.

E. All valves shall be manually opened and closed before installation to check their operation, and the interior of the valves shall be cleaned. Joints shall be made as specified.

F. Install the valves so that they can be conveniently operated.

G. Valves shall be supported as integral components of the piping systems.

H. For systems containing more than 6.6 pounds of a refrigerant in systems using positive-displacement compressors, isolation valves shall be installed:

1. At the inlet of each compressor, compressor unit or condensing unit.

2. At the discharge outlet of each compressor, compressor unit or condensing unit and each liquid receiver.

I. Before setting wall sleeves, pipes, castings and pipes to be cast-in-place, Contractor shall coordinate with the Drawings and Figures, which may have a direct bearing on the pipe locations. Contractor shall be responsible for coordinating the proper location of the pipes and appurtenances during the construction with all trades.

J. Field coordinate for exact pipe penetrations and routing of all piping.

K. Provide mechanical link seals with sleeves or wall pipes at all piping penetrations through wall, roof and floor slabs.

L. Escutcheon plates shall be provided for all exposed piping penetrations.

M. Contractor shall coordinate accessories included in packaged and split air conditioning equipment. Any accessories not included shall be provided by Contractor.

N. Contractor shall furnish and install a complete charge of refrigerant.

3.4 FIELD QUALITY CONTROL

A. Field Tests:

1. Remove and plug the connection points of any controls or relief valves that could be damaged by test pressure.

2. Remove all expansion valves and install temporary bypasses.

3. Front seat both the compressor suction and discharge valves.

4. Open the liquid line shutoff valve at the condenser, and any auxiliary valves in the hot gas and liquid lines.

5. Apply control power to open all solenoid valves.

6. Connect a cylinder of oil free dry nitrogen to the front seat port of the compressor discharge valve.

7. Introduce dry nitrogen into the system to a design test pressure listed on the condensing unit, compressor or compressor unit nameplate, as required by ANSI/ASHRAE Standard 15.

8. Test all piping for leaks by observing system pressure drop and applying a bubble test to all joints and connections.

9. After testing is completed, bleed the test pressure and repair any leaks found.

10. After the system is assumed to be free of leaks, charge enough refrigerant through the liquid line charging valve to raise the pressure to 15 psig. Remove the refrigerant connection and charge enough dry nitrogen into the system to raise the system pressure to the listed design test pressure.

11. Test all joints with an electronic leak detection meter. Record all test results.

12. After the results of the pressure tests have been approved, release test pressure and mechanically evacuate the system to a minimum of 22-inches Hg vacuum and maintain for 24 hours with no leaks. Disconnect the vacuum pump prior to vacuum leak test.

13. Record and report the test results.

14. After test results have been approved by Engineer, remove plugs and temporary bypass, and fully charge the system with the specified refrigerant.

15. All leaking joints shall be disassembled and remade using new materials. Retesting shall be conducted on all portions failing the tests.

B. Inspection:

1. Examine areas to receive piping and accessories for:
   a. Defects that adversely affect execution and quality of the Work.
   b. Deviations beyond allowable tolerances.
   c. Start the Work only when conditions are satisfactory.

2. The Engineer reserves the right to reject or authorize replacement of piping and accessories found to be defective or deviated from allowable tolerances.

3.5 ADJUSTING

A. Adjust all controls for proper settings.

B. While system is operable, balance all equipment to achieve design conditions.

3.6 CLEANING

A. Remove all dirt, rust, dust, etc. from refrigerant piping after installation.

B. Remove and dispose of all debris and waste from the Site resulting from installation.

3.7 SCHEDULES

A. All refrigerant piping shall be sized in accordance with manufacturer's recommendation.

END OF SECTION

SECTION 23 31 13

HVAC DUCTS AND CASINGS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. Contractor shall provide all labor, materials, tools, equipment and incidentals as shown, specified and required to furnish and install metal ductwork complete and operational with accessories. Product specific requirements are contained herein; Section 23 01 00, Basic Mechanical Requirements, shall be referred to for general requirements.

B. This section includes:

1. Metal ducts

2. Metal ducts accessories
   a. Duct Hardware
   b. Duct Access Doors
   c. Flexible Air Ducts
   d. Miscellaneous duct fittings
   e. Sleeves
   f. Duct Gaskets
   g. Hardware and Fasteners
   h. Grilles and Diffusers
   i. Variable Air Volume (VAV) Terminal Units

1.2 COORDINATION

A. Notify other Contractors in advance of the installation of metal ductwork to provide other contractors with sufficient time for the installation of items included in their contracts that must be installed with, or before, the metal ductwork Work.

1.3 RELATED SECTIONS:

A. Section 23 05 29, Hangers and Supports for HVAC Piping and Equipment

B. Section 23 05 53, identification for HVAC Piping and Equipment.

C. Section 23 05 93, Testing, Adjusting, and Balancing for HVAC.

D. Section 23 07 13, Duct Insulation.

E. Section 23 09 23, Direct-Digital Control System for HVAC.

1.4 REFERENCES

A. Air Movement and Control Association International, Inc. (AMCA).

1. AMCA Standard 500-D – Laboratory Methods of Testing Dampers for Rating.

2. AMCA Publication 511 – Certified Ratings Program - Product Rating Manual for Air Control Devices.

B. American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).

1. ASHRAE Standard 52.2 – Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size.

C. American Society for Testing and Materials (ASTM).

1. ASTM E84 – Standard Test Method for Burning Characteristics of Building Materials.

2. ASTM B209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

3. ASTM A653/A653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

D. American Welding Society (AWS).

1. AWS B2.1 – Specification for Welding Procedure and Performance Qualification.

E. National Fire Protection Association (NFPA).

1. NFPA 90A – Standard for the Installation of Air-Conditioning and Ventilating Systems.

2. NFPA 90B – Standard for the Installation of Warm Air Heating and Air-Conditioning Systems.

3. NFPA 701 – Standard Methods of Fire Tests for Flame Propagation of Textiles and Films.

F. Sheet Metal and Air Conditioning Contractors National Association (SMACNA).

1. Fire, Smoke and Radiation Damper Installation Guide for HVAC Systems.

2. HVAC Duct Construction Standards – Metal and Flexible.

3. Underwriters Laboratories Inc. (UL).

4. UL 181 – Factory-Made Air Ducts and Air Connectors.

5. UL 181A – Closure Systems for Use With Rigid Air Ducts.

6. UL 181B – Closure Systems for Use With Flexible Air Ducts and Air Connectors.

7. UL 555 – Fire Dampers.

8. UL 555S – Smoke Dampers.

9. UL 900 – Air Filter Units.

1.5 QUALITY ASSURANCE

A. Qualifications:

1. Installer:
   a. Engage an experienced installer to perform the work of this Section who has specialized in installing metal ductwork similar to that required for this Project and who is acceptable to manufacturer.
   b. Welding:
   c. Qualify processes and operators in accordance with AWS B2.1 as appropriate for material to be welded.
   d. Provide certification that operators employed on or to be employed for the Work have satisfactorily passed AWS qualification tests within previous 12 months. Ensure that all certifications are current.

1.6 REGULATORY REQUIREMENTS:

A. National Electrical Code (NEC).

B. National Fire Protection Association (NFPA).

C. Underwriters Laboratories Inc. (UL).

D. Local and State Building Codes and Ordinances.

E. Permits: Contractor shall obtain and pay for all required permits, fees and inspections.

1.7 SUBMITTALS

A. Action Submittals: Submit the following:

1. Shop Drawings:

a. Drawings showing fabrication methods, assembly, accessories, and installation details.
b. 1/4-inch scale duct layouts, dimensioned to show length of runs, sizes, support spacing and expansion provisions.

c. Detailed installation drawing of each individual component showing:
   1) Mounting requirements.
   2) Locations.
d. Setting drawings, templates, and directions for the installation of anchor bolts and other anchorages.
e. Layout and fabrication details for kitchen exhaust ducts.

Coordinate Shop Drawings with related trades prior to submission. HVAC Contractor shall provide shop drawings for all roof openings required for installation of HVAC systems. Roof opening shop drawings shall be dimensioned from the centerline of the nearest structural column and coordinated with the approved HVAC equipment, sheet metal shop drawings, framing plan, etc.

2. Product Data - General:
   a. Manufacturer's literature, illustrations, specifications, weight, wall thicknesses, design pressures, dimensions, required clearances, materials of construction, and performance data for all equipment.
   b. Complete component list.
   c. Detailed description of each component.
   d. Catalog cut sheets for each component.
   e. Deviations from Contract Documents. Any exceptions to the Contract Documents must be clearly defined. Contractor shall be responsible for any additional expenses that may occur due to any exception made.
   f. Other technical data related to specified material and equipment as requested by Engineer.

3. Product Data –Diffusers, Grilles, Registers:
   a. Schedule of diffusers, registers and grilles indicating drawing designation, room location, quantity, model number, size, and accessories.
   b. Data sheet for each type of air outlet and inlet, and accessory indicating construction, finish, and mounting details.
   c. Performance data for each type of air outlet and inlet including blade setting angle, cfm, pressure drop, temperature and velocity traverses, throw and drop, and noise criteria ratings.

B. Informational Submittals: Submit the following:

1. Manufacturer Instructions:
   a. Instructions and recommendations for handling, storing, protecting the equipment.
   b. Installation Data.

2. Source Quality Control Submittals:
   a. Factory test reports.

3. Field Quality Control Submittals:

a. Written report presenting results of required field testing.

4. Supplier Reports:
   a. Submit written report of results of each visit to Site by Supplier's service personnel, including purpose and time of visit, tasks performed, and results obtained. Submit within two days of completion of visit to the Site.

5. Qualifications Statements:
   a. Installer, when requested by Engineer.

C. Closeout Submittals: Submit the following:

1. Record Documentation:
   a. During progress of the Work keep an up-to-date set of the Drawings showing field and Shop Drawing modifications. Immediately upon completion of the Work, submit "pdf" of CADD drawings showing the actual in place installation of all ductwork and equipment installed under this Section at a scale satisfactory to the Owner. The drawings shall show all ductwork on plans and in sections, with all reference dimensions and elevations required for complete Record Drawings of the systems. Two paper prints shall also be furnished. The prints and electronic copies of the CADD files shall be furnished no later than 30 days after completion of the Contract and prior to final payment.

1.8 DELIVERY, STORAGE AND HANDLING

A. Packing, Shipping, Handling and Unloading:

1. Deliver materials to the Site to ensure uninterrupted progress of the Work.

2. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete, in ample time to prevent delay of that Work.

3. Comply with manufacturer's recommendations for rigging of equipment.

B. Storage and Protection:

1. Store materials to permit easy access for inspection and identification. Keep all material off the ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.

2. Store all equipment in covered storage off the ground and prevent condensation and in accordance with the manufacturer's recommendations for long-term storage.

C. Acceptance at Site:

1. All boxes, crates and packages shall be inspected by Contractor upon delivery to the Site. Contractor shall notify Engineer, in writing, if any loss or damage exists to equipment or components. Replace lost equipment or components and repair damage to new condition, in accordance with manufacturer's instructions.

1.9 SITE CONDITIONS

A. Existing Conditions:

1. The Contract Documents show the general arrangement and extent of the Work to be done. The exact location and arrangement of all parts shall be determined as the Work progresses. The exact location of all parts of the Work is governed by the general building plans and the actual building conditions.

2. The Drawings are intended as an indication of the arrangement of equipment and ductwork and are as nearly correct as can be determined in advance of the actual construction of the Work. Equipment, ductwork, and appurtenances found to interfere with the construction of the building, plumbing apparatus and piping, electrical wiring or other obstructions, etc., must be changed in location to clear such obstructions.

PART 2 - PRODUCTS

2.1 SYSTEM PERFORMANCE

A. System Description:

1. The Drawings show the general arrangement of all systems. Should local conditions necessitate rearrangement of the systems, Contractor, before proceeding with the Work, shall prepare and submit complete drawings showing all details of the proposed rearrangement for written approval.

2. The connections shown to the various units are intended as an indication only. The actual connections at the time of installation to be made and arranged to suit the requirements of each case and adequately provide for expansion and minimize the amount of space required for the same.

3. The Drawings do not show all offsets, fittings, accessories and details, which may be required. Contractor shall carefully examine all of the General Construction, Electrical, Mechanical, Structural and other Drawings and the respective Specifications for conditions which may affect the installation of the Work, and shall arrange the Work accordingly, furnishing all required items to meet such conditions which are not specified as work "by others," to complete the systems to the true extent of the Contract Documents.

B. Design Criteria:

1. All sheet metal construction shall be in accordance with the construction details and installation details in the latest edition of the SMACNA HVAC Duct Construction Standards. This Standard is hereinafter referred to as HVAC DS.

2. Sheet metal construction shall conform to the following minimum pressure classification (positive and negative pressure), unless otherwise shown or specified:
   a. All ductwork: 2-inch W.G.

3. Seal Class, Duct Leakage:
   a. All ductwork: Seal Class A, duct leakage class 2.

2.2 DETAILS OF MATERIALS

A. Material Type:

1. Galvanized steel ductwork shall be G90 hot dipped in accordance with ASTM A653/A653M.
   a. All accessories for galvanized ductwork shall be G90 hot dipped galvanized steel, unless noted otherwise.

2. Aluminum ductwork shall be Alloy 3003 – H-14 in accordance with ASTM B209.
   a. All accessories for aluminum ductwork shall be aluminum, unless noted otherwise.

3. Duct construction alternatives (duct gauge in relation to reinforcement spacing) selected by Contractor from HVAC DS Tables shall be identified by duct system and shall be submitted in schedule form to the Engineer prior to beginning installation of ductwork. Contractor shall construct ductwork to meet the requirements of the HVAC DS Tables in conjunction with the minimum duct thickness schedules in Article 3.10 except where noted below.

B. Thickness of aluminum ductwork and size and thickness of aluminum supports shall be appropriately converted using the aluminum conversion tables in the HVAC DS.

C. Rectangular ductwork longitudinal seams shall be Pittsburgh Lock type with permanently elastomeric sealant applied continuously within the seam.

D. Round ductwork seams shall be spiral lock seam.

E. Duct reinforcement shall be made using external stiffener angles. Tie rods shall not be acceptable. Stiffener angles shall be constructed of the same material as the ductwork.

F. Transverse Joints:

1. Manufacturer: Provide product of one of the following:
   a. Ductmate Industries, Inc.
   b. Elgen Manufacturing Company, Inc.
   c. Or equal.

2. Ductwork shall be connected by a mechanical joining system, except where otherwise noted.

3. Manufacturer's installation instructions will be followed, except where otherwise noted.

4. SMACNA T-24 and other flange type connectors formed from the duct edge will NOT be allowed.

5. All connectors shall meet or exceed the functional criteria outlined in the HVAC DS and shall be constructed of the same material as the ductwork.

G. Turning Vanes:

1. Manufacturer: Provide product of one of the following:
   a. Ductmate Industries, Inc.
   b. Elgen Manufacturing Company, Inc.
   c. C.L. Ward & Family, Inc.
   d. Or equal.

2. Material: Same material as ductwork.

3. Ducts 24-inches or shorter:
   a. Vanes: Single thickness.
   b. Runners: Type 2.

4. Ducts taller than 24-inches:
   a. Vanes: Double thickness.
   b. Runners: Type 1.

H. Splitter Dampers:

1. Reference: HVAC DS.

2. Material: Same material as ductwork.

I. Transitions and Offsets:

1. Reference: HVAC DS.

2. Material: Same material as ductwork.

J. Branch Take-Offs:

1. Reference: HVAC DS.

2. Material: Same material as ductwork.

3. 45 degrees, NO straight taps, unless specifically shown.

K. Rectangular Square Throat Elbows:

1. Reference: HVAC DS.

2. Material: Same material as ductwork.

3. Provided with turning vanes.

L. Rectangular Radius Elbows and Round Elbows:

1. Reference: HVAC DS.

2. Material: Same material as ductwork.

3. Centerline Radius: R=1.5W, unless specifically shown otherwise.

M. Round Converging Flow Fittings:

1. Converging flow fittings shall be constructed with a radius entrance to all branch taps and with no excess material projecting from the body into the branch tap entrance.

2. Branch entrances shall be by means of factory-fabricated fittings or factory fabricated duct tap assemblies.

N. Flexible duct or duct constructed of fiberglass duct board shall not be permitted, except where specifically shown or indicated.

2.3 KITCHEN EXHAUST DUCTS

A. Fabricate kitchen hood exhaust ducts and supports of carbon steel sheets complying with ASTM A1008/A1008M according to the following per Section NYS MC 506.3

2.4 VARIABLE AIR VOLUME (VAV) TERMINAL UNITS

A. Description: Factory-assembled, single-duct VAV terminal units with round primary air valve, rectangular discharge, dual-wall construction, integral flow sensor, and unit-mounted controls and accessories as scheduled on drawings.

B. Performance & Listings

1. Units shall be UL and cUL listed as room air terminal units and AHRI 880 certified.

2. Provide published sound power data developed per AHRI 880 and apply room/duct transfer functions per AHRI 885.

3. Manufacturers: Basis of Design: Trane VCCF (cooling only) and VCEF (electric heat). Models and sizes as scheduled. Acceptable Equals: Titus, Krueger, Price, or approved equal meeting this Section.

4. Unit Construction
   a. Casing: Minimum 22-gauge galvanized steel outer casing; rectangular discharge configured for slip-and-drive connection.
   b. Insulation (Dual-Wall): 1-inch fiberglass, composite density approx. 1.0 lb/ft³, interior liner 26-gauge galvanized steel; no exposed insulation edges (complete metal encapsulation).
   c. Access/Clearances: Provide bottom access door; maintain service clearances per manufacturer.

5. Primary Air Valve and Flow Sensing
   a. Inlet: Round, 18-gauge galvanized cylinder to fit standard spiral/round duct; integral multi-point averaging flow ring with pressure taps and factory calibration chart.
   b. Damper: Foam-seal blade captured between (2) 22-gauge disks, zinc shaft with position indicator, self-lubricating bearings, mechanical end-stop.
   c. Leakage: Air-valve leakage ≤1% of cataloged airflow at 4.0 in. w.g.

6. Actuator & Controls (unit-mounted)
   a. Damper Actuator: 24 VAC floating-point, non-spring-return, integral terminal block; suitable for BACnet zone controller interface.
   b. Control Side: Provide same-side coil and control arrangement for serviceability.
   c. Transformers: Provide integral 208/24 V transformer to power unit controls.

7. Electric Heat Section (where scheduled)
   a. Type: Factory-mounted open-coil nickel-chromium electric heater with airflow switch, primary auto reset thermal cutoff, secondary manual-reset thermal cutoff and backup contactor; terminal box with knockouts.
   b. Controls: Solid-state SCR modulating heat control compatible with UC-series/BACnet controllers for silent, precise modulation.
   c. Disconnect: Provide factory interlocking door disconnect on electric-heat control panel (VCEF). Provide toggle disconnect on cooling-only units (VCCF).
   d. Control Power: Integral Class-2 50–75 VA transformer sized for controls served.

8. Accessories
   a. Integral attenuator with bottom access.
   b. Factory balancing taps and calibration chart for each unit.

2.5 ACCESSORIES

A. Duct Hardware

1. Provide test hole fittings for making air readings for the proper adjusting and testing of the ventilating systems. Material and gauge of the fittings shall be compatible with the duct material. Include screw cap and gasket. Size of fitting shall allow insertion of testing instruments and of length of fitting shall allow for the duct insulation thickness. "Duro Dyne", instrument test port, "Ventlock 699" are suitable for this purpose. If required, provide test hole fitting for microprocessor type of instrument reading either local or remote.

2. Provide shop fabricated duct hardware or provide from of one of the following manufacturers:
   a. Duro Dyne Corp.
   b. Young Regulator Co.
   c. Or equal.

B. Duct Access Doors

1. Provide duct access doors to permit inspections, operation and maintenance of all valves, coils including reheat coils, controls, fire dampers, fire/smoke dampers, air monitors where applicable, automatic or motorized dampers, filters, bearings, traps, or other apparatus concealed behind the sheet metal work.

2. Construction: Construct of same or greater gage as ductwork served, provide insulated doors for insulated ductwork. Provide flush frames for uninsulated ductwork, extended frames for externally insulated duct. Provide 2 handle latch type access doors.

3. General Contractor shall provide access doors for access to valves, dampers and all the aforementioned equipment concealed in walls, furring and hung ceilings. The size of the access doors shall be at least 24" x 24".

4. Provide shop fabricated duct access doors or provide from one of the following manufacturers:
   a. Duro Dyne Corp.
   b. Ruskin Mfg.
   c. Air Balance Inc.
   d. Or equal.

C. Flexible Air Ducts:

1. Design and Performance Criteria:
   a. Flexible air ducts shall be tested in accordance with UL 181.
   b. Flexible air ducts shall be listed and labeled as Class 0 or Class 1 flexible air ducts.
   c. Flexible air ducts including insulation and jacketing shall have the following Fire Hazard Classifications in accordance with ASTM E84:
      1) Flame Spread: 25 maximum.
      2) Smoke Developed: 50 maximum.

d. Flexible connectors shall meet NFPA 90A, NFPA 90B, and local building codes.
e. Maximum Design Total Static Pressure: 10.0-inch W.G.
f. Maximum Operating Velocity: 4000 fpm.
g. Maximum Water Vapor Transmission: 0.05 perm.

2. Product and Manufacturer: Provide one of the following:
   a. Model M-KC, as manufactured by Thermaflex – A Division of Flexible Technologies, Inc.
   b. Model F296, as manufactured by Hart & Cooley, Inc.
   c. Or equal.

3. Details of Construction:
   a. Flexible ductwork shall be limited to six feet and allowed only where shown or indicated on Drawings.
   b. Inner liner shall be woven and coated fiberglass fabric permanently bonded to a coated spring steel wire helix.
   c. Fiberglass insulation shall have a minimum thermal conductance R-value of 6.
   d. Outer jacket shall be a fiberglass scrim reinforced aluminized polyester film vapor barrier.

D. Kitchen exhaust fan connections: Duct-to-exhaust fan connections shall be flanged and gasketed at the base of the fan for vertical discharge fans. Approved flexible connectors may be provided. Gasket and sealing materials shall be rated for continuous duty at a temperature of not less than 1,500ºF.

E. Miscellaneous Duct Fittings:

1. Reference: HVAC DS.

2. Material: Same material as ductwork.

F. Sleeves:

1. Material: Same material as ductwork passing through opening.

2. Thickness: Minimum 24-gauge.

3. Calk airtight with fire resistant sealant between sleeve and ductwork.

G. Duct Gaskets:

1. Product and Manufacturer: Provide one of the following:
   a. Model 440 Gasket Tape, as manufactured by Ductmate Industries, Inc.
   b. Model 440 Butyl Gasket, as manufactured by Elgen Manufacturing Company, Inc.
   c. Or equal.

2. Material: Non-hardening butyl.

3. Service Temperatures: -30 degrees F to 180 degrees F.

4. Service Life: 20 years minimum.

5. Gaskets shall have the following Fire Hazard Classifications in accordance with ASTM E84:
   a. Flame Spread: 10 maximum.
   b. Smoke Developed: 10 maximum.

H. Hardware and Fasteners:

1. All hardware and fasteners for aluminum ductwork shall be Type 316 stainless steel, unless noted otherwise.

2. All hardware and fasteners for galvanized ductwork shall be G90 hot dipped galvanized steel, unless noted otherwise.

I. Grilles and Diffusers:

1. General:
   a. Grilles and diffusers mounted in hung ceilings shall have a baked enamel white finish.
   b. Where registers are shown to be provided in lieu of grilles, include an integral opposed blade damper of the same construction as the grille.

2. Supply Grilles (SG):
   a. Product and Manufacturer: Provide one of the following:
      1) Steel construction:
         a) Model 20, as manufactured by Anemostat.
         b) Model T54 as manufactured by Tuttle & Bailey.
         c) Model 300RL- as manufactured by Titus.
         d) Or equal.
   b. Double deflection with horizontal face bars for horizontal duct and vertical face bars for vertical duct.
   c. 3/4-inch blade spacing.
   d. For surface mounting as shown or indicated on Drawings.

3. Return/Exhaust Grilles (RG/EG):
   a. Product and Manufacturer: Provide one of the following:
      1) Aluminum construction:
         a) Model X30, as manufactured by Anemostat.
         b) Model A70, as manufactured by Tuttle & Bailey.
         c) Model FL, as manufactured by Titus.
         d) Or equal.
      2) Single 0- or 45-degree deflection with horizontal face bars for horizontal duct and vertical face bars for vertical duct.
   b. 3/4-inch blade spacing.
   c. For surface mounting as shown or indicated on Drawings.

4. Ceiling Return/Exhaust Grilles (CRG/CEG) (For use with Return or Exhaust Grille Plenum Detail):
   a. Product and Manufacturer: Provide one of the following:
      1) Aluminum construction:
         a) Model XAC3LOD, as manufactured by Anemostat.

b) Model A70D, as manufactured by Tuttle & Bailey.
c) Model 3FL, as manufactured by Titus.
d) Or equal.

2) Single 45-degree deflection with horizontal face bars parallel to long dimension.

b. 3/4-inch blade spacing.
c. Provide opposed blade damper in plenum.
d. For use in T-bar ceiling as shown or indicated on Drawings.

5. Grid Core Grilles (GCG):
   a. Product and Manufacturer: Provide one of the following:
      1) Aluminum construction:
         a) Model CRE1000, as manufactured by Tuttle & Bailey.
         b) Model 50F, as manufactured by Titus.
         c) Or equal.
   b. 1-inch by 1-inch by 1-inch extruded grid core.
   c. 0-degree deflection.
   d. For surface mounting as shown or indicated on Drawings.

6. Supply Air Diffusers (SAD):
   a. Product and Manufacturer: Provide one of the following:
      1) Aluminum construction:
         a) Model EPLA, as manufactured by Anemostat.
         b) Model A1200A, as manufactured by Tuttle & Bailey.
         c) Model TMSA-AA, as manufactured by Titus.
         d) Or equal.
   b. 24-inch by 24-inch louvered face with adjustable internal air pattern controller.
   c. Round neck.
   d. 360 degree discharge pattern.
   e. For use in T-bar ceiling as shown or indicated on Drawings.

7. Plaque Air Diffusers (PAD):
   a. Product and Manufacturer: Provide one of the following:
      1) Aluminum construction:
         a) Model PGL, as manufactured by Anemostat.
         b) Model A1100, as manufactured by Tuttle & Bailey.
         c) Model OMNI-AA, as manufactured by Titus.
         d) Or equal.
      2) 24-inch by 24-inch architectural diffuser with 18-inch square plaque face.
   b. Round neck.
   c. 360 degree horizontal air pattern.
   d. For use in T-bar ceiling as shown or indicated on Drawings.

8. Circular Plaque Air Diffusers (CPAD):
   a. Product and Manufacturer: Provide one of the following:
      1) Aluminum construction:
         a) Model CM-1P, as manufactured by Anemostat.
         b) Model RT1100, as manufactured by Tuttle & Bailey.
         c) Model R-OMNI, as manufactured by Titus.
         d) Or equal.

b. Round architectural diffuser with round plaque face.
c. Round neck.
d. 360 degree horizontal air pattern.
e. For surface mounting or use in exposed duct as shown or indicated on Drawings.

9. Fire Damper Grille: Provide grille, an interlocking blade type fire damper and a volume control device.

2.6 IDENTIFICATION

A. All equipment and component identification shall be provided in accordance with Section 23 05 53 – Identification for HVAC Piping and Equipment.

2.7 SOURCE QUALITY CONTROL

A. Shop Tests:

1. Equipment shall be completely manufactured and pre-assembled in accordance with Reference Standards. Perform the following tests and inspections at factory before shipment:
   a. Tested and inspected for approval as a unit by Underwriters Laboratories Inc., UL Label or equal.
   b. Factory test equipment to ensure that the entire package has been properly fabricated and assembled, that all the controls function as specified herein and that the package meets the specified performance requirements including manufacturer's data report.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine conditions under which materials and equipment will be installed and notify Engineer in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected.

B. Take field measurements where required prior to installation to ensure proper fitting of Work.

3.2 PREPARATION

A. Protection of Surrounding Areas/Surfaces:

1. Openings and penetrations shall be capped to protect the building from outside conditions.

2. Properly cap the open ends of all ductwork at the end of each day's Work or other stopping point throughout the construction. Equipment shall be tightly covered and protected against dirt, water, and chemical or mechanical damage.

3.3 INSTALLATION

A. General:

1. Install the equipment in accordance with the Contract Documents and by manufacturer's instructions and recommendations. Obtain written interpretation from Engineer in the event of conflict between manufacturer's instructions and recommendations and the Contract Documents.

2. Install in accordance with Laws and Regulations.

3. Do not modify structures to facilitate installation of equipment, unless approved in writing by Engineer.

4. Installation to conform to requirements of all local and state codes.

B. All ductwork shall conform accurately to the dimensions shown, the ducts shall be straight and smooth inside with joints neatly finished. Ductwork shall be installed so as to preclude the possibility of vibration under all operating conditions.

C. Install ductwork to allow maximum headroom. Properly seam, brace, stiffen, support and render ducts mechanically airtight. Adjust ducts to suit job conditions. Dimensions may be changed as approved, if cross sectional area is maintained.

D. Pitch horizontal ducts connected to shower room exhaust downward toward exhaust air outlet not less than 1" in 10'.

E. Provide necessary transformation pieces, and flexible fabric connections for ductwork connected to air handling units or air inlet and outlet devices.

F. Routing: Locate ductwork runs, except as otherwise indicated on the Drawings, vertically and horizontally and avoid diagonal runs wherever possible. Drawings are essentially diagrammatic. Provide offsets, rises, drops, all other items, accessories and necessary work as required to fit structure, avoid obstruction, and retain clearances, headroom openings and passageways. Hold ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building. Install parallel to or at right angles to walls and partitions, parallel to ceilings, level and plumb, unless shown otherwise. Limit clearance to 1/2" where furring is shown for enclosure or concealment of ducts, but allow for insulation thickness, if any. Where possible, locate insulated ductwork for 1" clearance outside of insulation. Wherever possible in finished and occupied spaces, conceal ductwork from view, by locating in mechanical shafts, hollow wall construction or above suspended ceilings. Do not encase horizontal runs in solid partitions, except as specifically shown on the Drawings. Coordinate layout with suspended ceiling and lighting fixtures and similar finished work. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

G. Penetrations: Where ducts pass through interior partitions and exterior walls, and are exposed to view, conceal space between construction opening and duct or duct insulation with sheet metal flanges of same gage as duct. Overlap opening on 4 sides by at least $1^1/_2$".

H. Tape and seal all joints in accordance with HVAC DS. Tape shall not be used as the primary means of sealing. Tape used in sealing metallic ductwork shall be listed and labeled in accordance with UL 181A and shall be marked “181 A-P” for pressure-sensitive tape, “181 A-M” for mastic or “181 A-H” for heat-sensitive tape. Tape used in sealing flexible ductwork and connectors shall be listed and labeled in accordance with UL 181B and shall be marked “181 B-FX” for pressure-sensitive tape or “181 B-M” for mastic.

I. Fire dampers shall be provided and installed where indicated and where required by UL and authorities having jurisdiction, and shall be approved by local building codes and in accordance with the requirements of the NFPA.

J. Install all ductwork and accessories to provide a system free from buckling, warping, bellowing, or vibration.

K. All ducts at flexible connections with fans shall be supported at free end within 12-inches of flexible connection.

L. Provisions shall be made for supporting all ductwork, dampers, and other ductwork accessories, where necessary.

M. Coordinate all air outlets for compatibility with ceiling system.

N. Coordinate duct installations with installation of accessories, dampers, air handling unit, controls and other associated work of the ductwork system. Coordinate work of other trades affecting the ductwork. Penetrations made by all trades are to be sealed to an air-tight condition. Testing of ductwork shall be performed after all penetrations have been made, or redone if made after original testing.

O. Installation Of VAV Terminal Units:

1. Verify locations, clearances, service access, and orientation before setting units.

2. Provide minimum 1.5 duct diameters of straight, same-size round duct upstream of the primary inlet to ensure accurate airflow sensing.

3. Install units level; support without distorting casing. Coordinate hanger locations with unit weight and access doors.

4. Duct Connections: Round inlet to round duct; rectangular discharge slip-and-drive as standard; seal per duct sealing requirements.

5. Orientation: Units may be flipped for left/right control access unless restricted by options; match drawings and labels.

6. Electrical: Provide dedicated branch circuits, grounding, and overcurrent protection per schedules and NEC; field-wire to unit terminal block. Provide unit disconnects furnished with equipment. Coordinate with EC.

7. Controls: Land actuator/control wiring at unit and integrate with BAS. Provide 24 VAC control power transformer when required. Refer to specification section 23 09 23 - Direct-Digital Control System For HVAC.

8. Electric Heat (where provided): Interlock heater enable with proven airflow and BAS call for heat; SCR modulation to maintain discharge/space setpoint as specified. Verify operation of airflow switch and both thermal cutouts; confirm kW staging/modulation and heater LAT does not exceed manufacturer limits.

P. Connections: General Contractor shall arrange to have the connections of metal ductwork to equipment and shall provide flexible connection for each ductwork connection to equipment mounted on vibration isolators, and/or equipment containing rotating machinery.

Q. Flexible Ducts

1. Maximum Length: For any duct run using flexible ductwork, do not exceed 3'-0" extended length. Per Section MC 607.7, flexible ducts and air connectors shall not pass through any fire-resistance-rated assembly. Flexible air connectors shall not pass through any wall, floor or ceiling.

R. Install ductwork accessories in accordance with manufacturer's installation instructions, with applicable portions of details of construction as shown in

SMACNA standards, and in accordance with recognized industry practices to ensure that products serve intended function.

S. Install turning vanes in square throat elbows in supply and exhaust air systems, and elsewhere as indicated on the Drawings.

T. Install test hole fittings for making air readings, on both (opposite) sides of discharge duct from all supply and exhaust fans, at set dampers on supply and return branch ducts, and at other locations where shown on the Drawings for the proper adjusting and testing of the ventilating systems.

U. Install doors in built-up casing to open against system air pressure, with latches operable from both sides.

V. Coordinate as necessary to interface installation of ductwork accessories with other work.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Services:

1. Provide a qualified, factory-trained service person to perform the following:
   a. Instruct Contractor in installing equipment.
   b. After installation, inspect and adjust equipment, verify proper operation, and assist with field testing.
   c. Instruct operations and maintenance personnel in operation and maintenance of the equipment.

3.5 ADJUSTING

A. All duct systems shall be tested, adjusted, and balanced per Section 23 05 93, Testing, Adjusting, and Balancing for HVAC.

B. Test openings shall be installed in the ductwork as directed by the testing, adjusting, and balancing Contractor. Test openings shall be sealed by a screw cap and gasket.

3.6 CLEANING

A. Thoroughly clean all ductwork and accessories prior to installation.

B. Remove all dirt, rust, dust, etc. from ductwork and accessories after installation.

C. Remove and dispose of all debris and waste from the Site resulting from installation.

D. Contractor to clean all existing ductwork.

3.7 PROTECTION OF EXECUTED WORK

A. Contractor to protect all occupied areas from working areas and clean-up/dispose of debris daily.

3.8 SCHEDULES

A. Minimum Duct Thicknesses:

1. As recommended in the HVAC DS for the pressure classification, reinforcement and support spacing.

2. As per 2020 NYSMC, Section 510.9 Table 510.9.

B. All ductwork and plenums serving the following equipment/spaces shall be aluminum:

1. HH –1st Floor Locker Rooms: Exhaust ductwork. Refer to drawings HH-M105

C. All ductwork serving the following equipment shall be galvanized steel:

1. All ductwork other than HH –1st Floor Locker Rooms.

END OF SECTION

SECTION 23 34 23

HVAC POWER VENTILATORS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. Contractor shall provide all labor, materials, tools, equipment and incidentals as shown, specified and required to furnish and install HVAC Power Ventilators complete and operational with accessories. Product specific requirements are contained herein; Section 23 01 00, Basic Mechanical Requirements, shall be referred to for general requirements.

2. This section includes:
   a. Direct Drive Roof Downblast Centrifugal Exhaust Fans
   b. Direct Drive Roof Upblast Centrifugal Exhaust Fans
   c. Belt-Drive Roof Upblast Centrifugal Exhaust Fans (Kitchen Hood)

B. Coordination:

1. Review installation procedures under this and other Sections and coordinate the installation of items that must be installed with, or before, the HVAC Power Ventilators Work.

2. Notify other Contractors in advance of the installation of HVAC Power Ventilators to provide other contractors with sufficient time for the installation of items included in their contracts that must be installed with, or before, the HVAC Power Ventilators Work.

C. Related Sections:

1. Section 23 05 53, Identification for HVAC Piping and Equipment.

2. Section 23 05 93, Testing, Adjusting, and Balancing for HVAC.

3. Section 23 09 23, Direct-Digital Control System for HVAC.

1.2 REFERENCES

A. Air Movement and Control Association International, Inc. (AMCA).

1. AMCA Standard 99-2408 – Operating Limits for Centrifugal Fans.

2. AMCA Standard 204 – Balance Quality and Vibration Levels for Fans.

3. AMCA Standard 210 – Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating.

4. AMCA Standard 301 – Methods for Calculating Fan Sound Ratings from Laboratory Test Data.

B. American Society for Testing and Materials (ASTM).

1. ASTM B117 – Standard Practice for Operating Salt Spray (Fog) Apparatus.

C. Institute of Electrical and Electronic Engineers (IEEE).

D. National Electrical Code (NEC).

E. National Fire Protection Association (NFPA).

1. NFPA 90A – Standard for the Installation of Air-Conditioning and Ventilating Systems.

F. Underwriters Laboratories Inc. (UL).

1. UL 705 – Power Ventilators.

1.3 QUALITY ASSURANCE

A. Component Supply and Compatibility:

1. Obtain all equipment included in this Section regardless of the component manufacturer from a single HVAC Power Ventilator manufacturer.

2. Require the HVAC Power Ventilator manufacturer to review and approve or to prepare all Shop Drawings and other submittals for all components furnished under this Section.

3. All components shall be specifically constructed for the specified service conditions and shall be integrated into the overall equipment assembly by the HVAC Power Ventilator manufacturer.

B. Regulatory Requirements:

1. National Electrical Code (NEC).

2. National Fire Protection Association (NFPA).

3. Underwriters Laboratories Inc. (UL).

4. Local and State Building Codes and Ordinances.

5. Permits: Contractor shall obtain and pay for all required permits, fees and inspections.

C. Certifications:

1. HVAC Power Ventilators shall bear an approved label with all the necessary identification marks, electrical data, and any necessary cautions as required by the National Electric Code.

2. HVAC Power Ventilators shall be AMCA certified.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:

1. Shop Drawings:
   a. Drawings showing fabrication methods, assembly, accessories, installation details, and wiring diagrams.
   b. Setting drawings, templates, and directions for the installation of roof/equipment curbs, anchor bolts, and other anchorages.

2. Product Data:
   a. Manufacturer's literature, illustrations, specifications, weight, dimensions, required clearances, materials of construction, and performance data for all equipment.
   b. Complete component list.
   c. Detailed description of each component.
   d. Catalog cut sheets for each component.
   e. Fan performance curves with operating points.
   f. Standard and custom color selection charts for finishing system.
   g. Lubricant Specification: Furnish lubricant specification for type and grade required for equipment furnished.
   h. Deviations from Contract Documents. Any exceptions to the Contract Documents must be clearly defined. Contractor shall be responsible for any additional expenses that may occur due to any exception made.
   i. Other technical data related to specified material and equipment as requested by Engineer.

3. Testing Plans, Procedures, and Testing Limitations:
   a. Plan for performing required field testing.

B. Informational Submittals: Submit the following:

1. Certificates:
   a. Certification of painting systems, in accordance with "Finishing" Article in this Section.
   b. Independent certification reports:
      1) UL Label or equal.
      2) AMCA certification.

2. Manufacturer Instructions:
   a. Instructions and recommendations for handling, storing, protecting the equipment.
   b. Installation Data.

c. Instructions for handling, start-up, and troubleshooting.

3. Source Quality Control Submittals:
   a. Written report presenting results of required shop testing.
   b. Factory test reports.

4. Field Quality Control Submittals:
   a. Written report presenting results of required field testing.

C. Closeout Submittals: Submit the following:

1. Operations and Maintenance Data:
   a. Submit complete Installation, Operation and Maintenance Manuals, including, test reports, maintenance data and schedules, description of operation, and spare parts information.

2. Warranty Documentation:
   a. General warranty.
   b. Special warranties on materials and equipment.

D. Maintenance Material Submittals: Furnish the following:

1. Spare Parts:
   a. Spare parts list and recommended quantities.

2. Extra Stock Materials:
   a. Touch up paint for each unit.

3. Tools:
   a. Two sets of special tools, if any, required for normal operation and maintenance.

4. Spare parts, extra stock materials, and tools shall be packed in sturdy containers with clear indelible identification markings and shall be stored in a dry, warm location until transferred to the Owner at the conclusion of the Project.

1.5 DELIVERY, STORAGE AND HANDLING

A. Packing, Shipping, Handling and Unloading:

1. Deliver materials to the Site to ensure uninterrupted progress of the Work.

2. Comply with manufacturer’s recommendations for rigging of equipment.

B. Storage and Protection:

1. Store materials to permit easy access for inspection and identification. Keep all material off the ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.

2. Store all equipment in covered storage off the ground and prevent condensation and in accordance with the manufacturer's recommendations for long-term storage.

C. Acceptance at Site:

1. All boxes, crates and packages shall be inspected by Contractor upon delivery to the Site. Contractor shall notify Engineer, in writing, if any loss or damage exists to equipment or components. Replace lost equipment or components and repair damage to new condition, in accordance with manufacturer's instructions.

1.6 WARRANTY

A. General Warranty: The special warranty specified in this Article shall not deprive Owner of other rights or remedies Owner may otherwise have under the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under the Contract Documents. The obligations of Contractor under the Contract Documents shall not be limited in any way by the provisions of the specified special warranty.

B. Special Warranty on Materials and Equipment:

1. Provide manufacturer's written warranty, running to the benefit of Owner, agreeing to correct, or at option of Owner, remove or replace materials or equipment specified in this Section found to be defective during a period of 1 year after the date of Substantial Completion.

PART 2 - PRODUCTS

2.1 EQUIPMENT PERFORMANCE

A. Design Criteria:

1. Design conditions shall be as indicated on the Equipment Schedule.

2. Fans shall conform and be certified to UL 705.

3. Fan bearings shall be rated for a minimum L-10 life of 100,000 hours at the fan's maximum operating speed in accordance with ABMA 9 or 11.

4. Fans shall be balanced in accordance with AMCA Standard 204.

B. Performance Criteria:

1. Minimum performance data for each unit shall be as indicated on the Equipment Schedule. Provided equipment shall not exceed scheduled total power.

2. Fans shall be performance rated in accordance with AMCA Standards 210, 300, and 301.

2.2 DETAILS OF EQUIPMENT

A. Direct Drive Roof Downblast Centrifugal Exhaust Fans

1. Product and Manufacturer: Provide one of the following:
   a. Model G, as manufactured by Greenheck.
   b. Model ACE, as manufactured by Loren Cook Company.
   c. Or equal.

2. Housing:
   a. Motor cover, shroud, curb cap, and lower windband shall be constructed of heavy gauge aluminum
   b. Shroud shall have an integral rolled bead for extra strength
   c. Shroud shall be drawn from a disc and direct air downward
   d. Lower windband shall have a formed edge for added strength
   e. Motor cover shall be drawn from a disc
   f. All housing components shall have final thicknesses equal to or greater then preformed thickness
   g. Curb cap shall have pre-punched mounting holes to ensure correct attachment
   h. Rigid internal support structure
   i. Leak proof
   j. Each fan shall bear a permanently affixed manufacturer's engraved metal nameplate containing the model number and individual serial number.

3. Housing Supports and Drive Frame:
   a. Drive frame assemblies shall be constructed of heavy gauge steel and mounted on vibration isolators

4. Vibration Isolation:
   a. Rubber isolators, sized to match the weight of each fan.

5. Wheel:
   a. Constructed of Aluminum
   b. Non-overloading, backward inclined centrifugal
   c. Statically and dynamically balanced in accordance to AMCA Standard 204-05
   d. The wheel cone and fan inlet will be matched and shall have precise running tolerances for maximum performance and operating efficiency

6. Motors:
   a. Electronically Commutated Motor
   b. Motor enclosure: TENV
   c. Motor to be a DC electronic commutation type motor (ECM) specifically designed for fan applications. AC induction type motors are not acceptable. Examples of unacceptable motors are: Shaded Pole, Permanent Split Capacitor (PSC), Split Phase, Capacitor Start and 3 phase induction type motors

d. Motors are permanently lubricated, heavy duty ball bearing type to match with the fan load and pre-wired to the specific voltage and phase
e. Internal motor circuitry to convert AC power supplied to the fan to DC power to operate the motor.
f. Motor shall be speed controllable down to 20% of full speed (80% turndown). Speed shall be controlled by potentiometer dial mounted at the motor for balancing and on/off controlled by BMS via motor starter interlock.

7. Accessories
   a. Bird Screens: Galvanized steel mesh screen securely anchored to housing, 84% free area.
   b. Disconnecting Switch: Each roof type exhauster with 2-horsepower or smaller motor shall be provided with a disconnecting switch in general purpose enclosure mounted inside of the housing near the motor. Wiring between motor and switch shall be installed by the fan manufacturer in 1/2" (minimum size) Greenfield conduit. Disconnect switch shall be positioned in a location easily accessible for field connection of service wiring. Conduit outlet from switch shall be 3/4".
   c. Motorized Dampers: Refer to Section 23 31 00 HVAC Ducts and Casings.

B. Direct Drive Roof Upblast Centrifugal Exhaust Fans

1. Product and Manufacturer: Provide one of the following:
   a. Model CUE, as manufactured by Greenheck.
   b. Or equal.

2. Housing:
   a. Hood, motor cover, and curb cap constructed of heavy-gauge aluminum.
   b. Hood shall provide vertical, upblast discharge; tool-less access for service and removal of power pack.
   c. Curb cap shall have pre-punched mounting holes to ensure correct attachment.
   d. Rigid internal support structure.
   e. Leak proof.
   f. Each fan shall bear a permanently affixed manufacturer’s engraved metal nameplate containing the model number and individual serial number.

3. Housing Supports and Drive Frame:
   a. Motor/power-pack assembly mounted on vibration isolators and removable as a unit for service.

4. Vibration Isolation:
   a. Rubber isolators, sized to match the weight of each fan.

5. Wheel:
   a. Constructed of Aluminum
   b. Non-overloading, backward inclined centrifugal
   c. Statically and dynamically balanced in accordance to AMCA Standard 204-05

d. The wheel cone and fan inlet will be matched and shall have precise running tolerances for maximum performance and operating efficiency

6. Motors:
   a. Electronically Commutated Motor
   b. Motor enclosure: TENV
   c. Motor to be a DC electronic commutation type motor (ECM) specifically designed for fan applications. AC induction type motors are not acceptable. Examples of unacceptable motors are: Shaded Pole, Permanent Split Capacitor (PSC), Split Phase, Capacitor Start and 3 phase induction type motors
   d. Motors are permanently lubricated, heavy duty ball bearing type to match with the fan load and pre-wired to the specific voltage and phase
   e. Internal motor circuitry to convert AC power supplied to the fan to DC power to operate the motor.
   f. Motor shall be speed controllable down to 20% of full speed (80% turndown). Speed shall be controlled by potentiometer dial mounted at the motor for balancing and on/off controlled by BMS via motor starter interlock.

7. Accessories
   a. Bird Screens: Galvanized steel mesh screen securely anchored to housing, 84% free area.
   b. Disconnecting Switch: Each roof type exhauster with 2-horsepower or smaller motor shall be provided with a disconnecting switch in general purpose enclosure mounted inside of the housing near the motor. Wiring between motor and switch shall be installed by the fan manufacturer in 1/2" (minimum size) Greenfield conduit. Disconnect switch shall be positioned in a location easily accessible for field connection of service wiring. Conduit outlet from switch shall be 3/4".
   c. Motorized Dampers: Refer to Section 23 31 00 HVAC Ducts and Casings.

C. Belt-Drive Roof Upblast Centrifugal Exhaust Fans (Kitchen Hood)

1. Product and Manufacturer: Provide one of the following:
   a. Greenheck CUBE (belt drive), UL/cUL 705 Listed – Supplement SC “Power Ventilators for Restaurant Exhaust Appliances” (formerly UL 762).
   b. Or equal.

2. Compliance
   a. UL/cUL 705 with Supplement SC for restaurant grease exhaust.
   b. Conform to NFPA 96 for commercial cooking exhaust (hinge/hold-open, grease drain/collection, clean-out, vented curb as required).

3. Housing:
   a. Spun aluminum, one-piece windband continuously welded to curb cap; discharge vertically up and away from roof or wall.
   b. Tool-accessible hood; embossed metal nameplate; pre-punched curb cap holes; double-studded isolators.
   c. Internal conduit chase not permitted on UL 705 Supplement SC units (per NFPA 96).

4. Vibration Isolation:
   a. Rubber isolators, sized to match the weight of each fan.

5. Wheel:
   a. Backward-inclined aluminum centrifugal wheel; non-overloading; statically/dynamically balanced to AMCA 204.

6. Motors and Drives:
   a. Premium-efficiency, TEFC motor (out of airstream).
   b. V-belt drive with adjustable motor sheave; matched belts; minimum L10 bearing life 100,000 hours at max operating speed.
   c. Sheave/guarding furnished; alignment and belt tension per manufacturer.

7. Accessories
   a. Disconnecting Switch: factory fan-mounted disconnect (NEMA 3R) sized for motor HP.
   b. Hinge kit with hold-open hardware; orient for safe tip-up and proper drainage.
   c. Grease drain trough and grease collection (container ≤ 1 gallon) with clean-out port; vented curb where required by NFPA 96.
   d. Curb gasket/seal.
   e. Finish: Mill aluminum standard

2.3 CONTROLS

A. Refer to Drawing HS-M402 and Section 23 09 23, Direct-Digital Control System for HVAC for controls schematics and sequence of operations.

2.4 IDENTIFICATION

A. All equipment and component identification shall be provided in accordance with Section 23 05 53, Identification for HVAC Piping and Equipment.

B. All electrical wiring shall be color-coded and labeled for simplified identification. Power wiring shall be coded per Owner standards.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine conditions under which materials and equipment will be installed and notify Engineer in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected.

B. Take field measurements where required prior to installation to ensure proper fitting of Work.

3.2 PREPARATION

A. Protection of Surrounding Areas/Surfaces:

1. Openings and penetrations shall be capped to protect the building from outside conditions.

2. Equipment shall be tightly covered and protected against dirt, water, and chemical or mechanical damage.

3.3 INSTALLATION

A. General:

1. Install the equipment in accordance with the Contract Documents and by manufacturer's instructions and recommendations. Obtain written interpretation from Engineer in the event of conflict between manufacturer's instructions and recommendations and the Contract Documents.

2. Install in accordance with Laws and Regulations.

3. Do not modify structures to facilitate installation of equipment, unless approved in writing by Engineer.

4. Installation to conform to requirements of all local and state codes.

5. Curb mounted fans shall be provided with enough electrical wiring and conduit slack to allow the fan to be removed from the curb without disconnecting the electrical wiring at the fan.

6. Install vibrator isolators.

B. Installation of Belt-Drive Roof Upblast Centrifugal Exhaust Fans (Kitchen Hood)

1. Install per manufacturer IOM and NFPA 96; maintain required clearances and discharge locations.

2. Provide hinge kit + hold-open; verify safe 90° tip-up without stressing conduit/wiring; route wiring external to housing where UL 705 — Supplement SC listing prohibits internal chase.

3. Set grease trough/collection level to drain; confirm container capacity and placement.

4. Align sheaves; set belt tension; re-tension after 24 hours run time.

5. Do not install dampers/screens at discharge.

3.4 FIELD QUALITY CONTROL

A. Field Tests:

1. After equipment installation is complete, Contractor and a qualified field service representative of unit manufacturer shall perform an operating test of each unit and associated controls, in presence of Engineer. Equipment will pass the test when each unit and its controls are demonstrated to function correctly.

2. Running Tests:
   a. Field-test each equipment together with its controls and appurtenances. Tests shall demonstrate to Engineer that each part and all parts together function in accordance with the Contract Documents. Provide all necessary testing equipment, labor, and appurtenances.
   b. Verify that equipment operates at design point as intended, that vibration limits are not excessive and beyond manufacturer's recommendations, and that equipment operates smoothly without excessive noise, temperature rise, or other defects, across entire range of operating curve. Verify that all controls work as intended in both manual and automatic mode.
   c. If equipment does not comply with the Contract Documents and does not pass the tests, Contractor shall adjust, modify, and retest the equipment as often as necessary until tests are successfully passed.

3.5 ADJUSTING

A. Adjust all controls for proper settings.

B. While system is operable, balance all equipment to achieve design conditions.

3.6 CLEANING

A. Thoroughly clean all equipment and accessories prior to installation.

B. Remove all dirt, rust, dust, etc. from equipment and accessories after installation.

C. Remove and dispose of all debris and waste from the Site resulting from installation.

3.7 COMMISSIONING OF HVAC POWER VENTILATORS

A. HVAC Contractor shall comply with the Commissioning Requirements of Contract Specification Section 23 08 00, Commissioning of HVAC.

END OF SECTION

SECTION 23 73 13

PACKAGED OUTDOOR HEATING-ONLY MAKEUP-AIR UNITS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. Contractor shall provide all labor, materials, tools, equipment and incidentals as shown, specified and required to furnish and install packaged outdoor heating-only makeup-air units complete and operational with accessories. Product specific requirements are contained herein; Section 23 01 00, Basic Mechanical Requirements, shall be referred to for general requirements.

B. Coordination:

1. Review installation procedures under this and other Sections and coordinate the installation of items that must be installed with, or before, the packaged outdoor heating-only makeup-air units Work.

2. Notify other Contractors in advance of the installation of packaged outdoor heating-only makeup-air units to provide other contractors with sufficient time for the installation of items included in their contracts that must be installed with, or before, the packaged outdoor heating-only makeup-air units Work.

C. Related Sections:

1. Section 23 05 29, Hangers and Supports for HVAC Piping and Equipment

2. Section 23 05 53, Identification for HVAC Piping and Equipment.

3. Section 23 05 93, Testing, Adjusting, and Balancing for HVAC.

4. Section 23 09 23, Direct-Digital Control System for HVAC

5. Section 23 08 00, Commissioning of HVAC

1.2 REFERENCES

A. Air-Conditioning, Heating, and Refrigeration Institute (AHRI).

1. AHRI 410 – Forced-Circulation Air-Cooling and Air-Heating Coils.

B. Air Movement and Control Association International, Inc. (AMCA).

1. AMCA Standard 210 – Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating.

2. AMCA Standard 500-D – Laboratory Methods of Testing Dampers for Rating.

3. AMCA Publication 511 – Certified Ratings Program - Product Rating Manual for Air Control Devices.

C. American Bearing Manufacturers Association (ABMA).

1. ABMA 9 – Load Ratings and Fatigue Life for Ball Bearings.

2. ABMA 11 – Load Ratings and Fatigue Life for Roller Bearings.

D. American National Standards Institute (ANSI).

1. ANSI/UL 60335-2-40 and CSA C22.2 No. 60335-2-40 (ETL/cETL listing)

E. American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).

1. ASHRAE Standard 52.2 – Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size.

F. American Society for Testing and Materials (ASTM).

1. ASTM B117 – Standard Practice for Operating Salt Spray (Fog) Apparatus.

2. ASTM D870 – Standard Practice for Testing Water Resistance of Coatings Using Water Immersion.

3. ASTM D1929 – Standard Test Method for Determining Ignition Temperature of Plastics.

4. ASTM D2247 – Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity.

G. National Electrical Code (NEC).

H. National Electrical Manufacturers Association (NEMA).

1. NEMA ICS 3.1 – Guide for the Application, Handling, Storage, Installation and Maintenance of Medium-Voltage AC Contactors, Controllers and Control Centers.

I. Underwriters Laboratories Inc. (UL).

1. ANSI/UL 60335-2-40 and CSA C22.2 No. 60335-2-40 (ETL/cETL listing)

2. UL 900 – Air Filter Units.

1.3 QUALITY ASSURANCE

A. Component Supply and Compatibility:

1. Obtain all equipment included in this Section regardless of the component manufacturer from a single packaged outdoor heating-only makeup-air unit manufacturer.

2. Require the unit manufacturer to review and approve or to prepare all Shop Drawings and other submittals for all components furnished under this Section.

3. All components shall be specifically constructed for the specified service conditions and shall be integrated into the overall equipment assembly by the unit manufacturer.

B. Regulatory Requirements:

1. National Electrical Code (NEC).

2. National Fire Protection Association (NFPA).

3. Underwriters Laboratories Inc. (UL).

4. Local and State Building Codes and Ordinances.

5. Permits: Contractor shall obtain and pay for all required permits, fees and inspections.

C. Certifications:

1. Energy Recovery Equipment shall bear an approved label with all the necessary identification marks, electrical data, and any necessary cautions as required by the National Electric Code.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:

1. Shop Drawings:
   a. Drawings showing fabrication methods, assembly, accessories, installation details, and wiring diagrams.
   b. Detailed drawings of each individual component's wiring diagrams.
   c. Detailed drawings of control panel layout.
   d. Detailed installation drawing of each individual component showing:
      1) Mounting requirements including roof/equipment curbs.
      2) Locations (panel, field, etc.)
      3) Ductwork, piping, and wiring connections, labeled and coded.
   e. Setting drawings, templates, and directions for the installation of roof/equipment curbs, anchor bolts, and other anchorages.

2. Product Data:
   a. Manufacturer's literature, illustrations, specifications, weight, dimensions, required clearances, materials of construction, and performance data for all equipment.
   b. Complete component list.
   c. Detailed description of each component.
   d. Catalog cut sheets for each component.
   e. Fan performance curves with operating points.
   f. Standard and custom color selection charts for finishing system.
   g. Lubricant Specification: Furnish lubricant specification for type and grade required for equipment furnished.
   h. Electrical data: nameplate voltage, MCA, MOCP, SCCR, and disconnect type.
   i. Factory BACnet MS/TP points list and write/read matrix.
   j. Deviations from Contract Documents. Any exceptions to the Contract Documents must be clearly defined. Contractor shall be responsible for any additional expenses that may occur due to any exception made.
   k. Other technical data related to specified material and equipment as requested by Engineer.

B. Informational Submittals: Submit the following:

1. Certificates:
   a. Independent certification reports:
      1) UL Label or equal.
      2) AHRI Label.
      3) AGA Label or equal.

2. Manufacturer Instructions:
   a. Instructions and recommendations for handling, storing, protecting the equipment.
   b. Installation Data.
   c. Instructions for handling, start-up, and troubleshooting.

3. Source Quality Control Submittals:
   a. Written report presenting results of required shop testing.
   b. Factory test reports.

4. Field Quality Control Submittals:
   a. Written report presenting results of required field testing.
   b. Results of motor tests at the Site in accordance with Section 40 05 93, Common Motor Requirements for Process Equipment.

5. Supplier Reports:
   a. Submit written report of results of each visit to Site by Supplier's service personnel, including purpose and time of visit, tasks performed, and results obtained. Submit within two days of completion of visit to the Site.

C. Closeout Submittals: Submit the following:

1. Operations and Maintenance Data:
   a. Submit complete Installation, Operation and Maintenance Manuals, including, test reports, maintenance data and schedules, description of operation, and spare parts information.

2. Warranty Documentation:
   a. General warranty.
   b. Special warranties on materials and equipment.

D. Maintenance Material Submittals: Furnish the following:

1. Spare Parts:
   a. Spare parts list and recommended quantities.
   b. One set of bearings for each belt drive fan.
   c. One set of belts for each belt drive.
   d. One set of filters for each unit.

2. Extra Stock Materials:
   a. Touch up paint for each unit.

3. Tools:
   a. Two sets of fin combs for each fin spacing required.

4. Spare parts, extra stock materials, and tools shall be packed in sturdy containers with clear indelible identification markings and shall be stored in a dry, warm location until transferred to the Owner at the conclusion of the Project.

1.5 DELIVERY, STORAGE AND HANDLING

A. Packing, Shipping, Handling and Unloading:

1. Cover all openings into gear boxes with vapor inhibiting and water repellent material.

2. Deliver materials to the Site to ensure uninterrupted progress of the Work.

3. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete, in ample time to prevent delay of that Work.

4. Comply with manufacturer's recommendations for rigging of equipment.

B. Storage and Protection:

1. Store materials to permit easy access for inspection and identification. Keep all material off the ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.

2. Store all equipment in covered storage off the ground and prevent condensation and in accordance with the manufacturer's recommendations for long-term storage.

C. Acceptance at Site:

1. All boxes, crates and packages shall be inspected by Contractor upon delivery to the Site. Contractor shall notify Engineer, in writing, if any loss or damage exists to equipment or components. Replace lost equipment or components and repair damage to new condition, in accordance with manufacturer's instructions.

1.6 WARRANTY

A. 18 months from shipment; startup within 6 months of ship date (submit startup report)

B. General Warranty: The special warranties specified in this Article shall not deprive Owner of other rights or remedies Owner may otherwise have under the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under the Contract Documents. The obligations of Contractor under the Contract Documents shall not be limited in any way by the provisions of the specified special warranties.

PART 2 - PRODUCTS

2.1 EQUIPMENT PERFORMANCE

A. Equipment Description:

1. Units shall be completely factory assembled and tested, internally wired, and equipped for outdoor installation. Unit shall consist of insulated weatherproof cabinet with dampers, filters, heating section, supply fans, motors and drives, outside air intake hood, and including all unit mounted controls, wiring and accessories.

2. Units shall be equipped with provisions for forklift or crane lifting and be designed structurally to withstand the stresses.

3. Factory fabricate and test units of sizes, capacities, and configuration as indicated and specified. Units shall be fully assembled on support members up to practical shipping limitations. On units not shipped fully assembled, manufacturer shall tag each section to indicate location and direction of airflow to facilitate assembly at the Site.

B. Design Criteria:

1. Design conditions shall be as indicated on the Equipment Schedule.

2. Units shall conform and be certified to the latest edition of UL 1995.

C. Performance Criteria:

1. Minimum performance data for each unit shall be as indicated on the Equipment Schedule. Provided equipment shall not exceed scheduled total power.

2.2 MANUFACTURERS

A. Manufacturer: Provide product of one of the following:

1. Greenheck

2. Or equal.

2.3 DETAILS OF CONSTRUCTION

A. Cabinet:

1. Materials: Formed, double wall insulated metal cabinet, fabricated to permit access to internal components for maintenance.

a. Internal assemblies: 24 gauge, galvanized (G90) steel except for motor supports which shall be minimum 14 gauge galvanized (G90) steel.

2. Cabinet Insulation: Comply with NFPA 90A and NFPA 90B and erosion requirements of UL 181.

3. Double-wall G90 galvanized construction with 1 in. fiberglass wall insulation and 1 in. fiberglass base-pan insulation with sheet-metal liner (paneled bottom).
   a. Thickness: 2 inch (50.8 mm)
   b. Meets UL94HF-1 flame requirements.

4. Materials: Fiberglass insulation. If insulation other than fiberglass is used, it must also meet the Fire Hazard Classification shown below.
   a. Thickness: 2 inch (50.8 mm)
   b. Thermal Resistance R8
   c. Fire Hazard Classification: Maximum flame spread of 25 and smoke developed of 50, when tested in accordance with ASTM C 411.
   d. Location and application: Divider panels between outdoor air and return air/exhaust air streams.

5. Roof Insulation: 2 inch (50.8 mm) fiberglass located above the 1 inch (25.4 mm) foam panel.

6. Access panels / doors: Unit shall be equipped with insulated, hinged doors or removable access panels to provide easy access to all major components. Doors and access panels shall be fabricated of 18 gauge galvanized G90 steel or painted galvannealed steel.

7. Supply Air blower assemblies: Blower assembly shall consist of an electric motor and direct-drive fans. Assembly shall be mounted on heavy gauge galvanized steel rails and further mounted on 1.125 inch thick neoprene vibration isolators. Blower motors shall be capable of continuous speed modulation and controlled by a VFD.

8. Control panel / connections: Units shall have an electrical control center where all high and low voltage connections are made. Control center shall be constructed to permit single-point high voltage power supply connections. RTU shall be equipped with a Unit Disconnect Switch. Electric heater shall have single point power.

9. Electric Heater: Heater shall be SCR control and shall include a temperature sensor with field adjustable set point, located in the outdoor air stream. Heat output of the heater shall be infinitely variable.

10. Phase and brownout protection: Unit shall have a factory-installed phase monitor to detect electric supply phase loss and voltage brown-out conditions. Upon detection of a fault, the monitor shall disconnect supply voltage to all motors.

11. Motorized dampers / Intake Air, Motorized dampers of low leakage type shall be factory installed. Low-leak damper leakage 3 cfm/ft² @ 1 in. wg (AMCA Class 1A) with actuator end switch; provide factory weatherhood with aluminum-mesh intake filters.

12. Curb Assembly: A curb assembly made of 14 gauge galvanized steel shall be provided by the factory for assembly and installation as part of this division. The curb assembly shall provide perimeter support of the entire unit. Curb assembly shall enclose the underside of the unit and shall be sized to fit into a recess in the bottom of the unit. Contractor shall be responsible for coordinating with roofing contractor to ensure curb unit is properly flashed to provide protection against weather/moisture penetration. Contractor shall provide and install appropriate insulation for the curb assembly. The curb shall be the height of 14 in. Horizontal connections through unit only. Plenum curb for horizontal connections is not acceptable.

13. Service receptacle: Unpowered 120 VAC GFCI service outlet shall be factory-provided and installed by EC. Service outlet requires a dedicated single phase electric circuit. Unit contains a 120 VAC transformer to provide power to service outlet.

B. Blowers:

1. Blower section construction, Supply Air: direct drive motor and blower shall be assembled on a 14 gauge galvanized steel platform and shall be equipped with 1.125 inch thick neoprene vibration isolation devices.

2. Blower assemblies: Shall be statically and dynamically balanced and designed for continuous operation at maximum rated fan speed and horsepower.

3. Fan: Direct drive, airfoil plenum fan with aluminum wheel statically and dynamically balanced. Prop or belt-drive fan not acceptable due to low static capabilities.

4. Blades: Welded aluminum blades only.

5. Blower section motor source quality control: Blower performance shall be factory tested for flow rate, pressure, power, air density, rotation speed and efficiency. Ratings are to be established in accordance with AMCA 210, "Laboratory Methods of Testing Fans for Rating".

C. Motors:

1. General: Blower motors greater than 1/2 horsepower shall be "NEMA Premium" unless otherwise indicated. Compliance with EPAct minimum energy-efficiency standards for single speed ODP and TE enclosures is not acceptable. Motors shall be heavy-duty, permanently lubricated type to match the fan load and furnished at the specified voltage, phase and enclosure.

2. Motors shall be 60 cycle, 3 phase 208 volts.

D. Variable Frequency Drives:

1. Motors shall be provided with a factory installed and wired variable frequency drive (VFD) where specified on the Equipment Schedule.

E. OEM Controls

1. The unit shall be constructed so that it can function as a stand-alone heating controlled by factory-supplied controllers, thermostats and sensors or it can be operated as a heating and cooling system controlled by a Building Management System (BMS). This unit shall be controlled by a factory-installed microprocessor programmable controller (DDC) that is connected to various optional sensors.

2. Unit shall incorporate a DDC controller with integral LCD screen that provides text readouts of status. DDC controller shall have a built-in keypad to permit operator to access read-out screens without the use of ancillary equipment, devices or software. DDC controllers that require the use of equipment or software that is not factory-installed in the unit are not acceptable. Alarm readouts consisting of flashing light codes are not acceptable. Owner-specified ventilating conditions can be input by means of pushbuttons.

3. Unit supply fan shall be configured for Variable Volume.

4. Dirty filter sensor shall be factory installed.

5. Operating protocol: The DDC shall be factory-programmed for BACNet/MSTP.

6. Variable Frequency Drive (VFD): unit shall have factory installed variable frequency drive for modulation of the supply air blower assemblies. The VFD shall be factory-programmed for unit-specific requirements and shall not require additional field programming to operate.

7. Airflow monitoring required in the supply airstream.

8. Unit shall be provided with a space thermostat measuring temperature. Thermostat shall have an LCD display and push buttons allowing for setpoint adjustments. 2 temperature sensors shall be provided for temperature averaging.

F. Filters:

1. Unit shall have permanent 2 inch (50.8 mm) aluminum filters located in the outdoor air intake and shall be accessible from the exterior of the unit. MERV 8 disposable pleated filters shall be provided in the supply air stream.

2.4 CONTROLS

A. Refer to control drawings and Section 23 09 23, Direct-Digital Control System for HVAC for controls schematics and sequence of operations.

2.5 IDENTIFICATION

A. All equipment and component identification shall be provided in accordance with Section 23 05 53, Identification for HVAC Piping and Equipment.

B. All electrical wiring shall be color-coded and labeled for simplified identification. Power wiring shall be coded per Owner standards.

2.6 SOURCE QUALITY CONTROL

A. Shop Tests:

1. Equipment shall be completely manufactured and pre-assembled in accordance with Reference Standards. Perform the following tests and inspections at factory before shipment:
   a. Tested and inspected for approval as a unit by Underwriters Laboratories Inc., UL Label or equal.
   b. Factory test equipment to ensure that the entire package has been properly fabricated and assembled, that all the controls function as specified herein and that the package meets the specified performance requirements including manufacturer's data report.
   c. Fan wheels and shafts shall be statically and dynamically balanced.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine conditions under which materials and equipment will be installed and notify Engineer in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected.

B. Take field measurements where required prior to installation to ensure proper fitting of Work.

3.2 PREPARATION

A. Protection of Surrounding Areas/Surfaces:

1. Openings and penetrations shall be capped to protect the building from outside conditions.

2. Equipment shall be tightly covered and protected against dirt, water, and chemical or mechanical damage.

3.3 INSTALLATION

A. General:

1. Set unit on factory curb; align down-discharge opening; maintain manufacturer clearances; verify right-hand service orientation; coordinate electrical entry locations per manufacturer drawings.

2. Install the equipment in accordance with the Contract Documents and by manufacturer's instructions and recommendations. Obtain written interpretation from Engineer in the event of conflict between manufacturer's instructions and recommendations and the Contract Documents.

3. Install in accordance with Laws and Regulations.

4. Do not modify structures to facilitate installation of equipment, unless approved in writing by Engineer.

5. Installation to conform to requirements of all local and state codes.

3.4 FIELD QUALITY CONTROL

A. Field Tests:

1. After equipment installation is complete, Contractor and a qualified field service representative of unit manufacturer shall perform an operating test and a sound test of each unit and associated controls, in presence of Engineer. Equipment will pass the test when each unit and its controls are demonstrated to function correctly, and sound levels do not exceed maximum limits.

2. Running Tests:
   a. Field-test each equipment together with its controls and appurtenances. Tests shall demonstrate to Engineer that each part and all parts together function in accordance with the Contract Documents. Provide all necessary testing equipment, labor, and appurtenances.
   b. Verify that equipment operates at design point as intended, that vibration limits are not excessive and beyond manufacturer's recommendations, and that equipment operates smoothly without excessive noise, temperature rise, or other defects, across entire range of operating curve. Verify that all controls work as intended in both manual and automatic mode.
   c. If equipment does not comply with the Contract Documents and does not pass the tests, Contractor shall adjust, modify, and retest the equipment as often as necessary until tests are successfully passed.

3. Provide a qualified, factory-trained service person to perform the following:
   a. Instruct Contractor in installing equipment.
   b. After installation, inspect and adjust equipment, verify proper operation, and assist with field testing.
   c. Instruct operations and maintenance personnel in operation and maintenance of the equipment.

4. All costs, including expenses for travel, lodging, meals and incidentals, and cost of travel time, for visits to the Site shall be included in the Contract Price.

3.5 ADJUSTING

A. Adjust all controls for proper settings.

B. While system is operable, balance all equipment to achieve design conditions.

3.6 CLEANING

A. Thoroughly clean all equipment and accessories prior to installation.

B. Remove all dirt, rust, dust, etc. from equipment and accessories after installation.

C. Remove and dispose of all debris and waste from the Site resulting from installation.

3.7 COMMISSIONING OF PACKAGED OUTDOOR HEATING-ONLY MAKEUP-AIR UNITS

A. HVAC Contractor shall comply with the Commissioning Requirements of Contract Specification Section 23 08 00, Commissioning of HVAC.

END OF SECTION

SECTION 23 74 13

ROOFTOP HEAT PUMP UNITS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. Contractor shall provide all labor, materials, tools, equipment and incidentals as shown, specified, and required to furnish and install rooftop heat pump units complete and operational with accessories. Product specific requirements are contained herein; Section 23 01 00, Basic Mechanical Requirements, shall be referred to for general requirements.

B. Coordination:

1. Review installation procedures under this and other Sections and coordinate the installation of items that must be installed with, or before, the Rooftop Heat Pump Units Work.

2. Notify other Contractors in advance of the installation of the Rooftop Heat Pump Units to provide other contractors with sufficient time for the installation of items included in their contracts that must be installed with, or before, the Rooftop Heat Pump Units.

C. Related Sections:

1. Section 23 05 53, Identification for HVAC Piping and Equipment.

2. Section 23 05 93, Testing, Adjusting, and Balancing for HVAC.

3. Section 23 09 23, Direct-Digital Control System for HVAC

4. Section 23 08 00, Commissioning of HVAC

1.2 REFERENCES

A. Air-Conditioning, Heating, and Refrigeration Institute (AHRI).

1. AHRI 410 – Forced-Circulation Air-Cooling and Air-Heating Coils.

2. AHRI 210/240 – Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment.

3. AHRI 340/360 – Performance Rating of Commercial and Industrial Unitary Air-Conditioning and Heat Pump Equipment.

B. Air Movement and Control Association International, Inc. (AMCA).

1. AMCA Standard 210 – Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating.

C. American Bearing Manufacturers Association (ABMA).

1. ABMA 9 – Load Ratings and Fatigue Life for Ball Bearings.

2. ABMA 11 – Load Ratings and Fatigue Life for Roller Bearings.

D. American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).

1. ASHRAE Standard 15 – Safety Standard for Refrigeration Systems.

2. ASHRAE Standard 52.2 – Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size.

E. American Society for Testing and Materials (ASTM).

1. ASTM B117 – Standard Practice for Operating Salt Spray (Fog) Apparatus.

2. ASTM D870 – Standard Practice for Testing Water Resistance of Coatings Using Water Immersion.

3. ASTM D1929 – Standard Test Method for Determining Ignition Temperature of Plastics.

4. ASTM D2247 – Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity.

F. National Electrical Code (NEC).

G. National Electrical Manufacturers Association (NEMA).

1. NEMA ICS 3.1 – Guide for the Application, Handling, Storage, Installation and Maintenance of Medium-Voltage AC Contactors, Controllers and Control Centers.

H. Underwriters Laboratories Inc. (UL).

1. UL 900 – Air Filter Units.

2. UL 60335-2-40 – Heating and Cooling Equipment.

1.3 QUALITY ASSURANCE

A. Qualifications:

B. Component Supply and Compatibility:

1. Obtain all equipment included in this Section regardless of the component manufacturer from a single modular indoor central-station air-handling unit manufacturer.

2. Require the Rooftop Heat Pump Unit manufacturer to review and approve or to prepare all Shop Drawings and other submittals for all components furnished under this Section.

3. All components shall be specifically constructed for the specified service conditions and shall be integrated into the overall equipment assembly by the modular indoor central-station air-handling unit manufacturer.

C. Regulatory Requirements:

1. National Electrical Code (NEC).

2. National Fire Protection Association (NFPA).

3. Underwriters Laboratories Inc. (UL).

4. Local and State Building Codes and Ordinances.

5. Permits: Contractor shall obtain and pay for all required permits, fees and inspections.

D. Certifications:

1. Rooftop Heat Pump Units shall bear an approved label with all the necessary identification marks, electrical data, and any necessary cautions as required by the National Electric Code.

2. Units using A2L refrigerant (R-454B) shall comply with ASHRAE Standard 34 and 15 and UL 60335-2-40.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:

1. Shop Drawings:
   a. Drawings showing fabrication methods, assembly, accessories, installation details, and wiring diagrams.
   b. Detailed drawings of each individual component's wiring diagrams.
   c. Detailed drawings of control panel layout.
   d. Detailed installation drawing of each individual component showing:
      1) Mounting requirements.
      2) Locations (panel, field, etc.).
      3) Ductwork, piping, and wiring connections, labeled and coded.
   e. Setting drawings, templates, and directions for the installation of anchor bolts and other anchorages.
   f. BACnet diagrams and complete points list (read/write); unit I/O map; OEM unit controller field wiring diagrams; MCA/MOP and branch

circuiting; roof curb drawings; economizer hood/relief details; through-base electrical knockouts/locations.

2. Product Data:
   a. Manufacturer's literature, illustrations, specifications, weight, dimensions, required clearances, materials of construction, and performance data for all equipment.
   b. Complete component list.
   c. Detailed description of each component.
   d. Catalog cut sheets for each component.
   e. Fan performance curves with operating points.
   f. Expected sound power levels in each octave band and A-weighted for unit's inlet and outlet.
   g. Deviations from Contract Documents. Any exceptions to the Contract Documents must be clearly defined. Contractor shall be responsible for any additional expenses that may occur due to any exception made.
   h. Lubricant Specification: Furnish lubricant specification for type and grade required for equipment furnished.
   i. Other technical data related to specified material and equipment as requested by Engineer.

B. Informational Submittals: Submit the following:

1. Certificates:
   a. Independent certification reports:
      1) UL Label or equal.
      2) AHRI Label.
      3) AGA Label or equal.

2. Manufacturer Instructions:
   a. Instructions and recommendations for handling, storing, protecting the equipment.
   b. Installation Data.
   c. Instructions for handling, start-up, and troubleshooting.

3. Source Quality Control Submittals:
   a. Written report presenting results of required shop testing.
   b. Factory test reports.

4. Field Quality Control Submittals:
   a. Written report presenting results of required field testing.
   b. Results of motor tests at the Site in accordance with Section 40 05 93, Common Motor Requirements for Process Equipment.

5. Supplier Reports:
   a. Submit written report of results of each visit to Site by Supplier's service personnel, including purpose and time of visit, tasks performed, and results obtained. Submit within two days of completion of visit to the Site.

6. Controls integration narrative specific to OEM unit controller and BAS interface; sequence of operations confirming compressor/heat/economizer control.

7. Qualifications Statements:
   a. Manufacturer, when requested by Engineer.

C. Closeout Submittals: Submit the following:

1. Operations and Maintenance Data:
   a. Submit complete Installation, Operation and Maintenance Manuals, including, test reports, maintenance data and schedules, description of operation, and spare parts information.

2. Warranty Documentation:
   a. General warranty.
   b. Special warranties on materials and equipment.

D. Maintenance Material Submittals: Furnish the following:

1. Spare Parts:
   a. Spare parts list and recommended quantities.
   b. One set of bearings for each fan.
   c. One set of filters for each unit.

2. Extra Stock Materials:
   a. Touch up paint for each unit.

3. Tools:
   a. Two sets of fin combs for each fin spacing required.

4. Spare parts, extra stock materials, and tools shall be packed in sturdy containers with clear indelible identification markings and shall be stored in a dry, warm location until transferred to the Owner at the conclusion of the Project.

1.5 DELIVERY, STORAGE AND HANDLING

A. Packing, Shipping, Handling and Unloading:

1. Deliver materials to the Site to ensure uninterrupted progress of the Work.

2. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete, in ample time to prevent delay of the Work.

3. Comply with manufacturer’s recommendations for rigging of equipment.

B. Storage and Protection:

1. Store materials to permit easy access for inspection and identification. Keep all material off the ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.

2. Store all equipment in covered storage off the ground and prevent condensation and in accordance with the manufacturer's recommendations for long-term storage.

C. Acceptance at Site:

1. All boxes, crates and packages shall be inspected by Contractor upon delivery to the Site. Contractor shall notify Engineer, in writing, if any loss or damage exists to equipment or components. Replace lost equipment or components and repair damage to new condition, in accordance with manufacturer's instructions.

1.6 WARRANTY

A. General Warranty: The special warranties specified in this Article shall not deprive Owner of other rights or remedies Owner may otherwise have under the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under the Contract Documents. The obligations of Contractor under the Contract Documents shall not be limited in any way by the provisions of the specified special warranties.

B. Special Warranties on Materials and Equipment:

1. Provide manufacturer's written warranty, running to the benefit of Owner, agreeing to correct, or at option of Owner, remove or replace materials or equipment specified in this Section found to be defective during a period of years as listed below after the date of Substantial Completion.
   a. Compressors shall carry a 5 year non-prorated warranty.
   b. Heat exchanger shall carry a 10 year prorated warranty.
   c. All coil coatings shall carry a 5 year non-prorated warranty.]
   d. All other components not listed above shall carry a minimum 1 year non-prorated warranty.

PART 2 - PRODUCTS

2.1 EQUIPMENT PERFORMANCE

A. Equipment Description:

1. Factory-packaged, outdoor, air-cooled rooftop heat pumps with auxiliary electric resistance heat, refrigerant R-454B; factory economizer (dry-bulb) with barometric relief; 2-inch MERV-13 filters; through-base electrical with non-fused disconnect and convenience outlet; return and supply duct smoke detectors; clogged-filter and condensate overflow monitoring; and OEM controls with BACnet interface. Cooling capacity shall be staged via dual

scroll compressors. Fans shall be factory direct-drive backward-curved plenum; single-zone VAV where indicated on the schedule.

2. Unit furnished and installed shall be packaged outdoor air unit(s) as scheduled on contract documents and described in these specifications. Unit(s) shall be designed for cooling and heating and ventilation. Compressor controls shall modulate capacity to maintain evaporator leaving set point. Hot Gas Bypass shall not be used to control compressor capacity. Heating system Heat Pump and with electric auxiliary heating and modulating controls. Compressor on-off only or primary heating on-off only controls shall not be acceptable control strategies.

3. Provide factory OEM controller with BACnet; include all I/O, safeties, and sequences for compressor staging, electric heat staging, economizer control, supply fan control (single-zone VAV where shown), clogged filter, condensate overflow, and freezestat.

4. Unit discharge airflow configuration shall be as indicated on the drawings and schedules (downflow or horizontal).

5. Units shall be equipped with provisions for forklift or crane lifting and be designed structurally to withstand the stresses.

6. Factory fabricate and test units of sizes, capacities, and configuration as indicated and specified. Units shall be fully assembled on steel support members up to practical shipping limitations. On units not shipped fully assembled, manufacturer shall tag each section to indicate location and direction of airflow to facilitate assembly at the Site.

B. Design Criteria:

1. Design conditions shall be as indicated on the Equipment Schedule.

2. Units shall conform and be certified to the latest editions of ASHRAE Standard 15 and UL 60335-2-40.

C. Performance Criteria:

1. Minimum performance data for each unit shall be as indicated on the Equipment Schedule. Provided equipment shall not exceed scheduled total power.

2.2 MANUFACTURERS

A. Product and Manufacturer: Provide one of the following:

1. TRANE

2. DAIKIN

3. Or equal.

2.3 DETAILS OF CONSTRUCTION

A. Cabinet:

1. Unit construction shall be weather-resistant, galvanized steel cabinet with pre-painted exterior finish; internally lined with foil-faced insulation meeting ASTM E84/UL 723; dual-slope corrosion-resistant drain pan; gasketed, hinged access panels; integral base rails and lifting provisions. Provide factory gasketing to minimize air leakage.

2. All cabinet walls and access doors shall be insulated with closed cell polyurethane foam. Insulation shall have a minimum thermal resistances R-value of 6.25. Foam insulation shall have a minimum density of 2 lb/ft^3 and shall be tested in accordance with ASTM D1929 for a minimum flash ignition temperature of 610 degrees F.

3. Unit shall be designed to reduce air leakage and infiltration through the cabinet. Continuous sealing shall be included between panels and between access doors and openings. Refrigerant piping and electrical conduit through cabinet panels shall include sealing.

4. Unit construction shall allow for all maintenance on one side of the unit. Access to filters, dampers, cooling sections, heating sections, supply fans, and electrical and controls components shall be through flush mounted access doors with quarter turn, zinc cast, lockable handles. Removable stainless steel hinges shall be included on the doors. Removal of screwed wall panels shall not be acceptable.

5. Horizontal units shall include top-mounted threaded galvanized steel retainers to allow field installation of vertical hanger rods for hanging the units.

6. Unit shall provide an external location for mounting a disconnect device.

B. Electric Resistance Heating Section:

1. Provide factory electric resistance heat (capacity per schedule). Nickel-chromium elements, staged via OEM controller. Provide automatic high-limit and manual reset safety limits; factory contactors; branch circuiting and terminal blocks. Coordinate kW and voltage with drawings.

C. Supply Fan:

1. Direct-drive, backward-curved plenum fan; no belts. Dynamically balanced to AMCA standards. Provide variable speed control via OEM unit controller.

2. Fan-motor assembly shall be provided with vibration isolators.

3. Factory-integrated fan speed control via OEM unit controller.

D. Fan Motors:

1. Where motor type is not inherent to the factory fan assembly, motors shall be suitable for the environment and application. ODP or ECM motors are acceptable; TEFC is not required unless indicated.

2. Motors shall have a service factor of 1.15.

3. Motors shall be normal starting torque, normal slip, squirrel cage induction type. VFD driven motors shall be compatible for variable frequency drive operation and suitable to be applied in speed varying service without overheating.

4. Motors shall be of sufficient size so that there will be no overload on the motor above rated nameplate horsepower under any condition of operation imposed by the driven equipment.

5. Motors shall have Class F insulation with Class B temperature rise and be capable of carrying nameplate full load current plus service factor continuously without an injurious temperature rise in an ambient temperature of 40 degrees C.

6. Motor thrust bearings shall be adequate to carry continuous thrust loads under all conditions of operation imposed by the driven equipment.

7. Motors shall be in accordance with all current applicable standards of NEMA, IEEE, ABMA, NEC, and ANSI.

8. Locked rotor currents shall be as specified in NEMA Standards.

9. Provide lubrication of non-hygroscopic grease or oil type.

10. Provide automatic breather and drain for TEFC motor enclosures.

11. Provide integral overload protection on all single phase motors.

E. Economizer (Outdoor Air Section):

1. Provide factory integral economizer with low-leak dampers, 0–100% modulation, dry-bulb control and spring-return actuator. Provide barometric relief. Economizer hood, birdscreen, and filters as required by manufacturer.

2. Dampers shall be constructed of extruded aluminum, hollow core, airfoil blades with rubber edge seals and aluminum end seals. Damper blades shall be gear driven and designed to have leakage no more than 15 cfm/ft^2 of damper area when subjected to 2-inch W.G. air pressure differential across the damper.

3. Damper assembly shall be controlled by spring return, two position fully modulating with dual minimum position actuator.

F. Filter Section:

1. Unit shall include a filter section of similar construction and finish as unit cabinet with filter guides or holding frames.

2. Section shall be fabricated to flange to other unit components.

3. Block-offs shall be provided as required to prevent air bypass around filters.

G. Filters:

1. Manufacturer: Provide product of one of the following:
   a. Camfil Farr Company.
   b. Koch Filter Corporation.
   c. American Air Filter.
   d. Flanders Corporation.
   e. Or equal.

2. Filter shall be of the throwaway pleated panel type.

3. Filter media shall be a cotton and synthetic fiber blend lofted to a uniform depth and formed into a uniform radial pleat.

4. A welded wire grid, spot-welded and treated for corrosion resistance shall be bonded to the downstream side of the media to maintain radial pleats and prevent media oscillation.

5. A biodegradable enclosing frame of virgin-origin Kraft board, produced under an initiative for sustainable forest management, shall provide a rigid and durable enclosure. The frame shall be bonded to the media on all sides to prevent air bypass. Integral diagonal support members on the air entering and air exiting side shall be bonded to the apex of each pleat to maintain uniform pleat spacing in varying airflows.

6. Filter efficiency shall be determined in accordance with ASHRAE Standard 52.2 with a minimum MERV 13 rating.

7. Filter shall be UL 900 Class 2 rated.

8. Initial resistance to airflow shall not exceed 0.41-inch W.G. for a 2-inch deep or 0.35-inch W.G. for a 4-inch deep filter at a velocity of 500 fpm.

2.4 ACCESSORIES

A. Units shall include factory clogged-filter switch/sensor integrated to OEM unit controller for remote indication; provide local indicator (gauge or display) for visual filter pressure differential.

B. Units shall be provided with an UL 268A rated smoke detectors sensing the return air and supply air of the unit, wired to shut off the unit's control circuit.

C. Units shall be provided with a terminal block for field installation of a smoke detector which shuts off the unit's control circuit.

D. Units shall be provided with a frostat/freezestat (factory coil freeze protection)

E. Provide factory through-the-base electrical; factory non-fused disconnect and unpowered convenience outlet.

F. Provide condensate overflow (float) switch interlocked to shut down compressors/fan on high water.

G. Units shall be provided with low ambient kits.

2.5 CONTROLS

A. Refer to Section 23 09 23, Direct-Digital Control System for HVAC and control drawings.

2.6 IDENTIFICATION

A. All equipment and component identification shall be provided in accordance with Section 23 05 53, Identification for HVAC Piping and Equipment..

B. All electrical wiring shall be color-coded and labeled for simplified identification. Power wiring shall be coded per Owner standards.

2.7 SOURCE QUALITY CONTROL

A. Shop Tests:

1. Equipment shall be completely manufactured and pre-assembled in accordance with Reference Standards. Perform the following tests and inspections at factory before shipment:
    a. Tested and inspected for approval as a unit by Underwriters Laboratories Inc., UL Label or equal.
    b. Factory test equipment to ensure that the entire package has been properly fabricated and assembled, that all the controls function as specified herein and that the package meets the specified performance requirements including manufacturer's data report.
    c. Fan wheels and shafts shall be statically and dynamically balanced.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine conditions under which materials and equipment will be installed and notify Engineer in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected.

B. Take field measurements where required prior to installation to ensure proper fitting of Work.

3.2 PREPARATION

A. Protection of Surrounding Areas/Surfaces:

1. Openings and penetrations shall be capped to protect the building from outside conditions.

2. Equipment shall be tightly covered and protected against dirt, water, and chemical or mechanical damage.

3.3 INSTALLATION

A. General:

1. Install the equipment in accordance with the Contract Documents and by manufacturer's instructions and recommendations. Obtain written interpretation from Engineer in the event of conflict between manufacturer's instructions and recommendations and the Contract Documents.

2. Install in accordance with Laws and Regulations.

3. Do not modify structures to facilitate installation of equipment, unless approved in writing by Engineer.

4. Installation to conform to requirements of all local and state codes.

3.4 FIELD QUALITY CONTROL

A. Field Tests:

1. After equipment installation is complete, Contractor and a qualified field service representative of unit manufacturer shall perform an operating test and a sound test of each unit and associated controls, in presence of Engineer. Equipment will pass the test when each unit and its controls are

demonstrated to function correctly, and sound levels do not exceed maximum limits.

2. Running Tests:
   a. Verify that equipment operates at design point as intended, that vibration limits are not excessive and beyond manufacturer's recommendations, and that equipment operates smoothly without excessive noise, temperature rise, or other defects, across entire range of operating curve. Verify that all controls work as intended in both manual and automatic mode.
   b. If equipment does not comply with the Contract Documents and does not pass the tests, Contractor shall adjust, modify, and retest the equipment as often as necessary until tests are successfully passed.

B. Manufacturer's Services:

1. Provide a qualified, factory-trained service person to perform the following:
   a. Instruct Contractor in installing equipment.
   b. After installation, inspect and adjust equipment, verify proper operation, and assist with field testing.
   c. Instruct operations and maintenance personnel in operation and maintenance of the equipment.

2. All costs, including expenses for travel, lodging, meals and incidentals, and cost of travel time, for visits to the Site shall be included in the Contract Price.

3.5 ADJUSTING

A. Adjust all controls for proper settings.

B. While system is operable, balance all equipment to achieve design conditions.

3.6 CLEANING

A. Thoroughly clean all equipment and accessories prior to installation.

B. Remove all dirt, rust, dust, etc. from equipment and accessories after installation.

C. Remove and dispose of all debris and waste from the Site resulting from installation.

3.7 COMMISSIONING OF ROOFTOP HEAT PUMP UNITS

A. HVAC Contractor shall comply with the Commissioning Requirements of Contract Specification Section 23 08 00, Commissioning of HVAC.

END OF SECTION

SECTION 23 81 26

SPLIT-SYSTEM AIR-CONDITIONERS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. Contractor shall provide all labor, materials, tools, equipment and incidentals as shown, specified, and required to furnish and install ductless split-system air-conditioners complete and operational with accessories.

B. Coordination:

1. Review installation procedures under this and other Sections and coordinate the installation of items that must be installed with, or before, the ductless split-system air-conditioners Work.

2. Notify other Contractors in advance of the installation of the ductless split-system air-conditioners to provide other contractors with sufficient time for the installation of items included in their contracts that must be installed with, or before, the ductless split-system air-conditioners Work.

C. Related Sections:

1. Section 23 05 53, Identification for HVAC Piping and Equipment.

2. Section 23 05 29, Hangers and Supports for HVAC Ductwork, Piping, and Equipment.

3. Section 26 28 16.33, Disconnect Switches.

1.2 REFERENCES

A. Air-Conditioning, Heating, and Refrigeration Institute (AHRI).

1. AHRI 210/240 – Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment.

B. American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).

1. ASHRAE Standard 15 – Safety Standard for Refrigeration Systems.

C. American Society for Testing and Materials (ASTM).

1. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.

2. ASTM B117 – Standard Practice for Operating Salt Spray (Fog) Apparatus.

3. ASTM B280 – Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.

D. National Electrical Code (NEC).

E. National Electrical Manufacturers Association (NEMA).

F. Underwriters Laboratories Inc. (UL).

1. UL 1995 – Heating and Cooling Equipment.

1.3 QUALITY ASSURANCE

A. Qualifications:

1. Installer:
   a. Engage an experienced installer to perform the work of this Section who has specialized in installing ductless split-system air-conditioners similar to that required for this Project and who is acceptable to manufacturer.

B. Component Supply and Compatibility:

1. Obtain all equipment included in this Section regardless of the component manufacturer from a single ductless split-system air-conditioner manufacturer.

2. Require the ductless split-system air-conditioner manufacturer to review and approve or to prepare all Shop Drawings and other submittals for all components furnished under this Section.

3. All components shall be specifically constructed for the specified service conditions and shall be integrated into the overall equipment assembly by the ductless split-system air-conditioner manufacturer.

C. Regulatory Requirements:

1. National Electrical Code (NEC).

2. National Fire Protection Association (NFPA).

3. Underwriters Laboratories Inc. (UL).

4. Local and State Building Codes and Ordinances.

5. Permits: Contractor shall obtain and pay for all required permits, fees and inspections.

D. Certifications:

1. Ductless split-system air-conditioners shall bear an approved label with all the necessary identification marks, electrical data, and any necessary cautions as required by the National Electric Code.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:

1. Shop Drawings:
   a. Drawings showing fabrication methods, assembly, accessories, installation details, and wiring diagrams.
   b. Detailed drawings of each individual component's wiring diagrams.
   c. Detailed drawings of control panel layout.
   d. Detailed installation drawing of each individual component showing:
      1) Mounting requirements.
      2) Locations (panel, field, etc.).
      3) Piping, and wiring connections, labeled and coded.
   e. Setting drawings, templates, and directions for the installation of anchor bolts and other anchorages.

2. Product Data:
   a. Manufacturer's literature, illustrations, specifications, weight, dimensions, required clearances, materials of construction, and performance data for all equipment.
   b. Complete component list.
   c. Detailed description of each component.
   d. Catalog cut sheets for each component.
   e. Deviations from Contract Documents. Any exceptions to the Contract Documents must be clearly defined. Contractor shall be responsible for any additional expenses that may occur due to any exception made.
   f. Other technical data related to specified material and equipment as requested by Engineer.

B. Informational Submittals: Submit the following:

1. Certificates:
   a. Independent certification reports:
      1) UL Label or equal.
      2) AHRI Label.

2. Manufacturer Instructions:
   a. Instructions and recommendations for handling, storing, protecting the equipment.
   b. Installation Data.
   c. Instructions for handling, start-up, and troubleshooting.

3. Field Quality Control Submittals:
   a. Written report presenting results of required field testing.

4. Supplier Reports:
   a. Submit written report of results of each visit to Site by Supplier's service personnel, including purpose and time of visit, tasks performed, and results obtained. Submit within two days of completion of visit to the Site.

5. Qualifications Statements:
   a. Installer, when requested by Engineer.

C. Closeout Submittals: Submit the following:

1. Operations and Maintenance Data:
   a. Submit complete Installation, Operation and Maintenance Manuals, including, test reports, maintenance data and schedules, description of operation, and spare parts information.
   b. Furnish Operation and Maintenance Manuals in conformance with the requirements of Section 01 78 23, Operations and Maintenance Data.

2. Warranty Documentation:
   a. General warranty.
   b. Special warranties on materials and equipment.

D. Maintenance Material Submittals: Furnish the following:

1. Spare Parts:
   a. Spare parts list and recommended quantities.
   b. One set of filters for each unit.

2. Spare parts, extra stock materials, and tools shall be packed in sturdy containers with clear indelible identification markings and shall be stored in a dry, warm location until transferred to the Owner at the conclusion of the Project.

1.5 DELIVERY, STORAGE AND HANDLING

A. Packing, Shipping, Handling and Unloading:

1. Deliver materials to the Site to ensure uninterrupted progress of the Work.

2. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete, in ample time to prevent delay of the Work.

3. Comply with manufacturer's recommendations for rigging of equipment.

B. Storage and Protection:

1. Store materials to permit easy access for inspection and identification. Keep all material off the ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.

2. Store all equipment in covered storage off the ground and prevent condensation and in accordance with the manufacturer's recommendations for long-term storage.

C. Acceptance at Site:

1. All boxes, crates and packages shall be inspected by Contractor upon delivery to the Site. Contractor shall notify Engineer, in writing, if any loss or damage exists to equipment or components. Replace lost equipment or components and repair damage to new condition, in accordance with manufacturer's instructions.

1.6 WARRANTY

A. General Warranty: The special warranties specified in this Article shall not deprive Owner of other rights or remedies Owner may otherwise have under the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under the Contract Documents. The obligations of Contractor under the Contract Documents shall not be limited in any way by the provisions of the specified special warranties.

B. Special Warranties on Materials and Equipment:

1. Provide manufacturer's written warranty, running to the benefit of Owner, agreeing to correct, or at option of Owner, remove or replace materials or equipment specified in this Section found to be defective during a period of years as listed below after the date of Substantial Completion.
   a. Compressors shall carry a minimum 6 year non-prorated warranty.
   b. All other components not listed above shall carry a minimum 5 year non-prorated warranty.

PART 2 - PRODUCTS

2.1 EQUIPMENT PERFORMANCE

A. Equipment Description:

1. Units shall be completely factory assembled and tested, and internally piped and wired. Units shall consist of indoor air conditioners (indoor units) with filters, evaporator coils, supply fans, motors, and remotely located outdoor air-cooled heat pumps outdoor unit.

2. Units shall include all unit mounted controls, wiring, and accessories.

3. Indoor units and refrigerant pipes shall be purged with dry air before shipment from the factory.

4. Outdoor units shall be pre-charged with refrigerant for a minimum of 70 feet of refrigerant tubing.

B. Design Criteria:

1. Design conditions shall be as indicated on the Equipment Schedule.

2. Units shall conform and be certified to the latest editions of ASHRAE Standard 15 and UL 1995.

C. Performance Criteria:

1. Minimum performance data for each unit shall be as indicated on the Equipment Schedule. Provided equipment shall not exceed scheduled total power.

2. Units shall meet or exceed the Energy Efficiency Ratio (EER) shown on the Equipment Schedule when tested in accordance to the latest editions of AHRI Standard 210/240.

3. System shall be capable of operating up to a minimum refrigerant tubing length of 100 feet between indoor and outdoor units without the need for line size changes, traps or additional oil.

2.2 DETAILS OF EQUIPMENT

A. Wall-Mounted Ductless Indoor Unit

1. The Wall-Mounted Ductless Indoor Unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, electronic modulating linear expansion device, control circuit board and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, an auto restart function, an emergency operation function, a test run switch, and the ability to adjust airflow patterns for different ceiling heights. Indoor unit and refrigerant pipes shall be charged with dehydrated air before shipment from the factory.

2. Cabinet:
   a. Attractive, durable, impact-resistant front panel.
   b. Easy-to-remove front grille for filter cleaning and maintenance.
   c. Cabinet shall be for wall mounting provided with mounting supports.

3. Evaporator Coil:
   a. Copper tubes with aluminum fins for efficient heat transfer.
   b. Unit shall include a built-in, automatic condensate lift mechanism that will be able to raise condensate 33 inches above the condensate pan. The lift mechanism shall be equipped with a positive acting liquid level sensor to shut down the indoor unit if liquid level in the drain pan reached maximum level.
   c. If gravity drain is not feasible; an external or field-installed pump shall be used.

4. Supply Fans:
   a. Direct-drive, cross-flow (or tangential) fan designed for quiet operation.

b. Multi-speed fan motor shall have permanently lubricated bearings.
c. Fan shall have a selectable AUTO fan setting that will adjust the fan speed based on the difference between controller setpoint and sensed space temperature.
d. High-efficiency DC fan motor.

5. Vanes:
   a. Motorized adjustable air outlet system shall provide two-way, three-way, or four-way airflow with switches that can be set to provide optimum airflow based on ceiling height and number of outlets used.
   b. Vane angles shall be individually adjustable from the remote controller to customize the airflow pattern for the conditioned space.
   c. Vanes shall have five fixed positions and a swing feature that shall be capable of automatically swinging the vanes up and down for uniform air distribution.
   d. Vanes shall have the selectable capability to randomly cycle the vanes up and down to evenly heat the space in the heating mode.

6. Filter:
   a. Return air shall be filtered by means of an easily removable, washable polypropylene honeycomb filter.
   b. High efficiency MERV 10 filter shall be installed in the multi-function casement.

7. Accessories:
   a. Return air shall be filtered by means of an easily removable, washable polypropylene honeycomb filter.
   b. High efficiency MERV 10 filter shall be installed in the multi-function casement.

B. Horizontal-Ducted Indoor Unit

1. The Horizontal-Ducted Indoor Unit shall be factory assembled, wired and tested. Contained within the unit shall be all factory wiring, piping, electronic modulating linear expansion device, control circuit board and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, an auto restart function, an emergency operation function, a test run switch Indoor unit and refrigerant pipes shall be charged with dehydrated air before shipment from the factory. The unit shall be suitable for use in plenums in accordance with UL1995 ed 4.

2. Cabinet:
   a. Galvanized steel or corrosion-resistant material suitable for concealed installations.
   b. Factory-applied insulation to minimize sound and condensation.
   c. Removable access panels to access fan motor, coil, and control box for maintenance.
   d. Access panels securely fastened; gasketed to reduce noise and air leakage.

3. Evaporator Coil:

a. Coil shall be of nonferrous construction with pre-coated aluminum strake fins on copper tubing. All tube joints shall be brazed with PhosCopper or silver alloy.
b. Coil shall be pressure tested at the factory.
c. Coil shall be furnished with a condensate pan and drain.
d. Unit shall include a built-in, automatic condensate lift mechanism that will be able to raise condensate 33 inches above the condensate pan. The lift mechanism shall be equipped with a positive acting liquid level sensor to shut down the indoor unit if liquid level in the drain pan reached maximum level.
e. If gravity drain is not feasible; an external or field-installed pump shall be used.

4. Supply Fans:
   a. Direct drive, turbo propeller fan shall be driven by a single motor.
   b. Multi-speed fan motor shall have permanently lubricated bearings.
   c. Fan shall have a selectable AUTO fan setting that will adjust the fan speed based on the difference between controller setpoint and sensed space temperature.
   d. Electronically commutated (EC) motor or equivalent high-efficiency motor

5. Filter:
   a. High efficiency MERV 10 filter shall be installed in the multi-function casement.

C. Outdoor Units:

1. Product and Manufacturer: Provide one of the following:
   a. Trane / Mitsubishi Electric.
   b. Or equal.

2. Cabinet:
   a. Casing shall be fabricated of galvanized steel.
   b. Mounting feet shall be provided and shall be welded to the base of the cabinet.
   c. Removable panel sections shall allow easy access to all serviceable parts.
   d. Fan grill shall be constructed from ABS plastic.
   e. Cabinet mounting and construction shall be sufficient to withstand 155 MPH wind speed conditions for use in Hurricane condition areas.

3. Condenser Fans:
   a. Direct drive fan and motor shall be configured for horizontal discharge airflow.
   b. Fan blades shall be of aerodynamic design for quiet operation and the fan motor bearings shall be permanently lubricated.
   c. Fan shall be mounted in front of the coil, pulling air across it from the rear and dispelling it through the front.
   d. Fan shall be provided with a raised guard to prevent external contact with moving parts.

4. Condenser Coil:

a. Coil shall be of copper tubing with flat aluminum fins.
b. Coil shall be protected with an integral metal guard.

5. Compressors:
   a. Compressor shall be hermetically sealed, variable speed, rotary or scroll type. Compressor shall be equipped with an internal thermal overload.
   b. Compressor shall be driven by inverter circuit to control compressor speed.
   c. In lieu of a crankcase heater, minimal amount of current shall be automatically and intermittently applied to the compressor motor windings to maintain sufficient heat to vaporize any refrigerant during the off cycle to prevent liquid accumulation.
   d. Compressor shall be mounted so as to avoid transmission of vibration.

6. Refrigeration System:
   a. Refrigerant flow from the condenser shall be controlled by means of an electronic linear expansion valve (LEV) metering device. The LEV shall be control by a microprocessor controlled step motor.
   b. System shall include an accumulator, high pressure safety switch, refrigerant line filter driers (strainers), Schrader type service fittings (stop valves) for liquid and suction connections, and service ports.

7. R-454B or R-32 refrigerant

2.3 ACCESSORIES

A. Hangers and Supports:

1. Hangers and supports shall be provided in accordance with Section 23 05 29, Hangers and Supports for HVAC Ductwork, Piping, and Equipment.

B. Outdoor and indoor units shall be provided by Electrical contractor conforming to Section 26 28 16.33, Disconnect Switches.

C. Refrigerant Piping and Insulation:

1. All refrigerant lines between outdoor and indoor units shall be of annealed, refrigeration grade copper tubing, Type ACR, meeting ASTM B280 requirements.

2. Refrigerant piping shall be individually insulated in twin-tube, flexible, closed-cell, CFC-free (ozone depletion potential of zero), elastomeric material.

3. Insulation shall have a maximum thermal conductivity of 0.27 Btu-in/hr-ft^2-degree F at 75 degrees F and a maximum water vapor transmission of 0.08 perm-in.

4. Insulation shall have a maximum Flame Spread Index of 25 and a maximum Smoke Developed Index of 50 when tested in accordance with ASTM E84.

D. Indoor units shall be provided with a condensate mini-pump that is capable of lifting condensate 23 inches above the drain pan.

2.4 CONTROLS

A. Unit shall be completely factory wired with the necessary controls, starters, contactors and terminal blocks for power and control wiring.

B. A color-coded circuit diagram of the approved electrical drawing shall be provided with the unit.

C. All electrical components shall bear the UL label.

D. Unit shall be designed for single point electrical connection. All necessary power transformers shall be factory provided and installed.

E. The system shall be capable of satisfactory operation within voltage limits of 198 VAC to 253 VAC, 1 Phase, 60 Hz.

F. The control system shall consist of a minimum of two microprocessors, one on each indoor and outdoor unit, interconnected by a single non-polar two-wire cable. The outdoor unit shall be controlled by the microprocessor located in the indoor unit using 24 VDC pulse control signal.

G. The indoor unit control board shall have auxiliary control contact connectors to provide:

1. Remote Switch.

2. Central Control.

3. IP Terminal.

H. The microprocessor located in the indoor unit shall have the capability of monitoring return air temperature and indoor coil temperature, receiving and processing commands from a wireless or wired controller, providing emergency operation and controlling the outdoor unit.

I. The system shall include a 3-minute time delay mechanism, an automatic restart function when power is restored after power interruption, and a test run switch.

J. The system shall have self-diagnostics ability, including total hours of compressor run time. Diagnostics codes for indoor and outdoor units shall be displayed on the controller panel.

K. Remote Controllers:

1. Remote Controller - Hard Wired:
   a. Controller shall perform input functions necessary to operate the system.

b. Controller shall have a Power ON/OFF switch, Mode Selector (Cool, Dry, Heat, Auto, and Powerful Modes), Temperature Setting, Timer Control, Fan Speed Select, and Horizontal and Vertical Vane control selector.
c. The indoor unit shall perform Self-diagnostic Function and Check Mode switching.
d. Temperature changes shall be in 1 degree F (0.5 degree C) increments with a setting range of 61-88 degrees F (16-31 degrees C).

2.5 IDENTIFICATION

A. All equipment and component identification shall be provided in accordance with Section 10 14 00, Signage.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine conditions under which materials and equipment will be installed and notify Engineer in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected.

B. Take field measurements where required prior to installation to ensure proper fitting of Work.

3.2 PREPARATION

A. Protection of Surrounding Areas/Surfaces:

1. Openings and penetrations shall be capped to protect the building from outside conditions.

2. Equipment shall be tightly covered and protected against dirt, water, and chemical or mechanical damage.

3.3 INSTALLATION

A. General:

1. Install the equipment in accordance with the Contract Documents and by manufacturer's instructions and recommendations. Obtain written interpretation from Engineer in the event of conflict between manufacturer's instructions and recommendations and the Contract Documents.

2. Install in accordance with Laws and Regulations.

3. Do not modify structures to facilitate installation of equipment, unless approved in writing by Engineer.

4. Installation to conform to requirements of all local and state codes.

3.4 FIELD QUALITY CONTROL

A. Field Tests:

1. After equipment installation is complete, Contractor and a qualified field service representative of unit manufacturer shall perform an operating test and a sound test of each unit and associated controls, in presence of Engineer. Equipment will pass the test when each unit and its controls are demonstrated to function correctly, and sound levels do not exceed maximum limits.

2. Running Tests:
   a. Field-test each equipment together with its controls and appurtenances. Tests shall demonstrate to Engineer that each part and all parts together function in accordance with the Contract Documents. Provide all necessary testing equipment, labor, and appurtenances.
   b. Verify that equipment operates at design point as intended, that vibration limits are not excessive and beyond manufacturer's recommendations, and that equipment operates smoothly without excessive noise, temperature rise, or other defects, across entire range of operating curve. Verify that all controls work as intended in both manual and automatic mode.
   c. If equipment does not comply with the Contract Documents and does not pass the tests, Contractor shall adjust, modify, and retest the equipment as often as necessary until tests are successfully passed.

3.5 ADJUSTING

A. Adjust all controls for proper settings.

B. While system is operable, balance all equipment to achieve design conditions.

3.6 CLEANING

A. Thoroughly clean all equipment and accessories prior to installation.

B. Remove all dirt, rust, dust, etc. from equipment and accessories after installation.

C. Remove and dispose of all debris and waste from the Site resulting from installation.

END OF SECTION

SECTION 23 82 00

CONVECTION HEATING AND COOLING UNITS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. Contractor shall provide all labor, materials, tools, equipment and incidentals as shown, specified and required to furnish and install cabinet unit heaters complete and operational with accessories. Product specific requirements are contained herein; Section 23 01 00, Basic Mechanical Requirements, shall be referred to for general requirements.

B. This section contains:

1. Electric Baseboard Heaters

2. Hot Water Cabinet Unit Heaters

3. Electric Cabinet Unit Heaters

4. Hot Water Unit Heaters

5. Unit Ventilators

C. Coordination:

1. Review installation procedures under this and other Sections and coordinate the installation of items that must be installed with, or before, the cabinet unit heaters Work.

2. Notify other Contractors in advance of the installation of cabinet unit heaters to provide other contractors with sufficient time for the installation of items included in their contracts that must be installed with, or before, the cabinet unit heaters Work.

D. Related Sections:

1. Section 23 05 53, Identification for HVAC Piping and Equipment.

2. Section 23 05 93, Testing, Adjusting, and Balancing for HVAC.

3. Section 23 09 23, Direct-Digital Control System for HVAC.

1.2 REFERENCES

A. National Electrical Code (NEC).

B. National Electrical Manufacturers Association (NEMA).

C. Underwriters Laboratories Inc. (UL).

1. UL 873 – Temperature-Indicating and -Regulating Equipment.

1.3 QUALITY ASSURANCE

A. Qualifications:

B. Component Supply and Compatibility:

1. Obtain all equipment included in this Section regardless of the component manufacturer from a single cabinet unit heater manufacturer.

2. Require the cabinet unit heater manufacturer to review and approve or to prepare all Shop Drawings and other submittals for all components furnished under this Section.

3. All components shall be specifically constructed for the specified service conditions and shall be integrated into the overall equipment assembly by the cabinet unit heater manufacturer.

C. Regulatory Requirements:

1. National Electrical Code (NEC).

2. National Fire Protection Association (NFPA).

3. Underwriters Laboratories Inc. (UL).

4. Local and State Building Codes and Ordinances.

5. Permits: Contractor shall obtain and pay for all required permits, fees and inspections.

D. Certifications:

1. Cabinet unit heaters shall bear an approved label with all the necessary identification marks, electrical data, and any necessary cautions as required by the National Electric Code.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:

1. Shop Drawings:
   a. Drawings showing fabrication methods, assembly, accessories, installation details, and wiring diagrams.

2. Product Data:
   a. Manufacturer's literature, illustrations, specifications, weight, dimensions, required clearances, materials of construction, and performance data for all equipment.
   b. Complete component list.
   c. Detailed description of each component.
   d. Catalog cut sheets for each component.
   e. Deviations from Contract Documents. Any exceptions to the Contract Documents must be clearly defined. Contractor shall be responsible for any additional expenses that may occur due to any exception made.
   f. Other technical data related to specified material and equipment as requested by Engineer.

3. Color Sample: Color of heater shall be selected from manufacturer's standard colors.

B. Informational Submittals: Submit the following:

1. Certificates:
   a. Independent certification reports:
      1) UL Label or equal.

2. Manufacturer Instructions:
   a. Instructions and recommendations for handling, storing, protecting the equipment.
   b. Installation Data.
   c. Instructions for handling, start-up, and troubleshooting.

C. Closeout Submittals: Submit the following:

1. Operations and Maintenance Data:
   a. Submit complete Installation, Operation and Maintenance Manuals, including, test reports, maintenance data and schedules, description of operation, and spare parts information.

2. Certificate: Contractor's start-up and demonstration affidavit/

D. Maintenance Material Submittals: Furnish the following:

1. Spare Parts:
   a. Spare parts list and recommended quantities.

2. Tools:
   a. Two sets of special tools, if any, required for normal operation and maintenance.

Spare parts and tools shall be packed in sturdy containers with clear indelible identification markings and shall be stored in a dry, warm location until transferred to the Owner at the conclusion of the Project.

1.5 DELIVERY, STORAGE AND HANDLING

A. Packing, Shipping, Handling and Unloading:

1. Deliver materials to the Site to ensure uninterrupted progress of the Work.

2. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete, in ample time to prevent delay of that Work.

3. Comply with manufacturer's recommendations for rigging of equipment.

B. Storage and Protection:

1. Store materials to permit easy access for inspection and identification. Keep all material off the ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.

2. Store all equipment in covered storage off the ground and prevent condensation and in accordance with the manufacturer's recommendations for long-term storage.

C. Acceptance at Site:

1. All boxes, crates and packages shall be inspected by Contractor upon delivery to the Site. Contractor shall notify Engineer, in writing, if any loss or damage exists to equipment or components. Replace lost equipment or components and repair damage to new condition, in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.1 EQUIPMENT PERFORMANCE

A. Design Criteria:

1. Design conditions shall be as indicated on the Equipment Schedule.

B. Performance Criteria:

1. Minimum performance data for each unit shall be as indicated on the Equipment Schedule. Provided equipment shall not exceed scheduled total power.

2.2 DETAILS OF EQUIPMENT

A. Electric Baseboard Heaters

1. Manufacturer: Provide one of the following:
   a. BERKO
   b. QMARK
   c. Or equal.

2. General: Beige durable textured polyester powder coat finish for corrosion resistance. The complete heater shall have a height of 6 ¾ inches and a depth of 2 ⅞ inches. Heaters shall have cULus approval for mounting on any floor surface including carpeting

3. Enclosure: The heaters shall be fabricated of minimum .024 inch steel with minimum .040 inch steel control boxes. Support brackets shall be .035 inch steel. Junction box enclosure to have provisions for incoming and outgoing cable with cable clamp for restraining without additional hardware. Ground wire pigtail provided in each junction box for grounding.
   The front cover shall be fabricated of minimum .048 inch steel.

4. Heating Element: The heating element wire shall consist of 80% nickel, 20% chromium, and shall be encased in steel sheath to ensure long and trouble-free life. Aluminum fins shall be so designed as to block sheath radiation to front and back of heater body and pressure bonded to steel sheath.

5. Controls:
   a. Linear thermal cut-out shall be factory installed to automatically shut off heater in event of overheating and reactivate heater when temperatures return to normal.
   b. Double-Pole Power On/Off switch.
   c. Remote Double-Pole Thermostat, wall mounted.

B. Hot Water Cabinet Unit Heater

1. Manufacturer: Provide one of the following:
   a. SIGMA
   b. TRANE
   c. DAIKIN
   d. Or equal.

2. Construction:
   a. The unit shall include a chassis, coil, fan wheel(s), fan casing(s), fan board, fan board assembly easily removable. The fan board assembly shall include a quick-disconnect motor plug.
   b. The chassis construction shall be 18-gauge galvanized steel, and continuous throughout the unit. The unit shall be acoustically and

thermally insulated with closed-cell insulation and panels made rigid by channel forming.

c. Concealed/Recessed Units:
   1) Exposed panels on recessed units are 18-gauge steel construction. Horizontal recessed units shall feature a telescoping panel to allow the panel to be adjusted to line up flush with the ceiling.

3. Fans and Motors:
   a. Fans shall be galvanized metal fan wheels centrifugal forward-curved and double -width, corrosion resistant.

   b. Motors: Brushless DC (BLDC)/electronically commutated motors (ECM) factory- programmed and run-tested in assembled units. The motor controller shall be mounted in a touch-safe control box with a built-in integrated user interface and LED tachometer. If adjustments are needed, motor parameters shall be capable of adjusting through momentary contact switches accessible without factory service personnel on the motor control board.
   c. Motors shall soft-ramp between speeds to lessen the acoustics due to sudden speed changes. Motors shall be capable of operating at three speeds or with a field-supplied variable speed controller. The motor will choose the highest speed if there are simultaneous /conflicting speed requests.
   d. All motors shall have integral thermal overload protection with a maximum ambient operating temperature of 104°F and are permanently lubricated. Motors shall be capable of starting at 50 percent of rated voltage and operating at 90 percent of rated voltage on all speed settings. Motors can operate up to 10 percent over voltage.

4. Finishing: All cabinet parts and exposed recessed panels shall be cleaned, bonderized, phosphatized, and painted with a baked powder finish meeting ASTM B117 specifications (salt spray test).

5. Coils:
   a. All water coils shall be proof-tested at 300 psig (air) and leak-tested at 100 psig (air under water), 3/8-inch OD copper with aluminum fins mechanically bonded to the copper tubes.

6. Provided with mounting bracket and hardware for recessed, T-Bar mounting.

7. Coils:
   a. Evenly spaced aluminum fins mechanically bonded to copper tubes..

8. Fan and Motor:
   a. Fan: Centrifugal forward-curved double-width wheels, statically and dynamically balanced, direct driven.
   b. Motor: Tap wound multiple speed permanent split capacitor with sleeve bearings, resiliently mounted.

9. Filters
   a. Filters shall be concealed from sight and easily removable. Filters shall be 1 ” throwaway.

10. Controls:
    a. Built-in 120/24VAC transformer for remote 24 VAC thermostat control.
    b. Thermostats:
        1) Refer to Equipment Schedule for type.
        2) Refer to Section 23 09 23, Direct-Digital Control System for HVAC.

C. Electric Cabinet Unit Heaters

1. Manufacturer: Provide one of the following:
    a. Model AWFA, as manufactured by STELPRO
    b. Or equal.

2. Casing:
    a. Minimum 22 gauge steel cabinet.
    b. Provided with integral mounting bracket and hardware for recessed, or surface mounting.

3. Heating Elements: High-quality nichrome element.

4. Fan and Motor: Totally enclosed fan motor shall be permanently lubricated with automatic reset thermal overload protection.

5. Grilles: Extruded aluminum grille with a thickness equivalent to 13 gauge.

6. Controls:
    a. Built-in 120/24VAC transformer for remote 24 VAC thermostat control.
    b. Thermostats:
        1) Refer to Equipment Schedule for type.
        2) Refer to Section 23 09 23, Direct-Digital Control System for HVAC.

D. Hot Water Unit Heater

1. Manufacturer: Provide one of the following:
    a. Modine, HSB Series
    b. Or equal.

2. Construction:
    a. Two-piece corrosion-resistant steel casing with baked polyester powder-coat finish; integral fan venturi. Adjustable horizontal discharge louvers and steel-rod safety fan guard.
    b. Serpentine copper-tube/aluminum-fin coil, vertical fins, mechanically bonded.
    c. Mounting: Suitable for wall or ceiling installation. HSB-24 is supported by supply/return piping (no casing hanger taps on this size).

3. Fans and Motors:
    a. Enclosed air-over motor, internal thermal overload (single-phase). Fan blades dynamically balanced aluminum with steel hub.
    b. Provide manufacturer’s manual starter accessory; branch-circuit disconnecting means by Division 26.

4. Controls and Safety:

a. Control Voltage: Provide field-supplied 24 VAC control transformer and pilot relay with 24 VAC coil and motor-rated contacts to power BACnet thermostat and switch the unit motor. Coordinate transformer VA with connected load and furnish control wiring and interlocks (aquastat). Branch-circuit disconnect by Div 26.
b. Thermostats:
   1) Refer to Section 23 09 23, Direct-Digital Control System for HVAC.

E. Unit Ventilators

1. Manufacturer: Provide one of the following:
   a. Trane
   b. Daikin
   c. Or equal.

2. Cabinet and Chassis:
   a. Unit frames shall be of unitized, welded construction, with structural elements aligned in an assembly jig prior to welding, to insure proper dimensions, rigidity, and squareness. Frames assembled with mechanical fasteners shall not be acceptable.
   b. Internal sheet metal parts shall be constructed of galvanized steel to inhibit corrosion.
   c. Exterior cabinet panels shall be fabricated from furniture grade steel of not less than 16 gauge steel with no sharp edges and no unsightly screw heads and shall receive an electro-statically applied powder paint, and be oven baked with environmentally friendly thermosetting urethane powder finish to provide a high quality appearance. Finish color shall be as selected by Architect from manufacturer's standard colors.
   d. The interior areas of the unit ventilator shall be insulated for sound attenuation and to provide protection against condensation of moisture on or within the unit. The unit shall be provided with an ultra-quiet sound package consisting of acoustically matched low speed fans to fan housing, sound barrier insulation material (non-fiberglass) adhered to the bottom underside of the unit top panel, sides of the fan section and sound absorbing insulation (non-fiberglass) material applied to the unit front panel.
   e. Units shall be constructed so that testing and troubleshooting can be accomplished in the end pockets of operating units, without affecting the normal air flow patterns through the unit.
   f. Each unit shall be provided with a non-fused power interrupt switch that disconnects the main power to the unit for servicing or when the unit is to be shut down for an extended period. The fan motor and controls shall have the hot line(s) protected by factory installed cartridge type fuse(s).
   g. The manufacturer shall have published cataloged sound data available for the engineer's review. Sound data shall have been conducted using a qualified reverberant room per ANSI S1.31 and ANSI S12.32. Sound test data shall be based on standard cfm at standard air (fixed density of air at 70F) in accordance with ARI procedures based upon ARI 350. The engineer shall have the right to reject equipment not conforming to the specified manufacturer's sound data, as a minimum.

3. Floor Units:

a. Floor mounted units shall have an integral pipe tunnel for convenient crossover of piping and a built-in metal wire raceway from right end compartment to left end compartment to contain any line voltage electrical wiring separate from the air stream. Line voltage wiring shall not be touchable in the air stream of the unit during normal maintenance procedures of oiling bearings or motors. Unit shall come standard with a factory installed and wired disconnect switch.
b. Unit top surface shall be supplied with a charcoal bronze textured finish, to resist scuffing, reduce glare and help hide fingerprints. Unit top shall have two access doors, one at each end (for access to motor and bearings for easy servicing). The front and ends shall be available in a selection of architecturally pleasing colors by the manufacturer, for selection by the Architect.
c. Unit discharge grille shall be constructed of continuous rounded edge steel bars to provide 10 degrees vertical deflection. A 1/4" painted, galvanized mesh screen shall be provided beneath the discharge grille to protect against objects being dropped through the discharge grille.
d. The unit top and grille shall be of a modular construction so that it is removable for service and maintenance.
e. The unit front surface shall be comprised of three separate removable panels. The controls and piping shall be accessible without removing the entire front panel. Panels shall be secured to the unit with recessed, tamper resistant, Allen head fasteners. Slots for flat head screwdrivers shall not be acceptable as tamper resistant.
f. An extended cabinet depth unit shall incorporate a full adapter back with full rear panel and closed pipe tunnel with the same features of the standard cabinet depth units with the additional capability of bringing in fresh air from 1” to 28” from the floor. A full rear panel shall be screwed and sealed to the unit rear with insulation attached to the rear panel in the outdoor section. The unit top, back and vertical adapter back partitions shall be insulated to form a thermal barrier. A compressible gasket shall be provided to form an airtight seal between the wall and the contractor cut fresh air opening in the unit full rear panel.

4. Coils:
   a. Coil assembly shall be of a modular construction so that it is removeable from the front of the unit.
   b. All coils shall be installed in a draw through position to assure uniform air distribution over the full-face area of the coil, and an even unit discharge temperature.
   c. All heating coils shall be constructed with copper tubes and mechanically bonded aluminum corrugated plate type fins. All coils shall have aluminum individual unshared fin surfaces. An air-break shall exist between coils.
   d. All heating coils shall be furnished with a threaded drain plug at the lowest point and a manual air vent at the high point of the coil. A factory installed low temperature freeze-stat shall be provided on the leaving edge of the water heating coil in a wave-like configuration to sense multiple locations and shall react to possible freezing conditions. The unit- mounted controls shall incorporate this device.

5. Fan and Motor:

a. The fan and motor assembly shall be of a low speed design to assure maximum quietness and efficiency.
b. Fans shall be double-inlet, forward-curved, centrifugal type with offset aerodynamic blades. Fans and shaft shall be statically and dynamically balanced as an assembly in the unit before shipment.
c. Fan housings shall be constructed of galvanized steel incorporating logarithmic expansion for quiet operation. Fan and motor assembly shall be of the direct drive type. Belt drive fans shall not be allowed.
d. Motors shall be 115- volt, single phase, 60Hz, ECM with auto reset internal thermal overload device designed specifically for unit ventilator operation. Motors shall be located out of the conditioned air stream.
e. All components of the fan/motor assembly shall be removable from the top of floor-mounted units.
f. Units shall have sleeve type motor and fan shaft bearings and shall not require oiling more than annually. All bearings shall be located out of the airstream. Bearings in the air stream are not acceptable.
g. ECM Motor speed shall be factory programed for three (3) speeds, HIGH- MEDIUM-LOW-OFF (not accessible from the exterior of the unit). Fan motor shall have hot leg protected by a factory installed cartridge fuse.Controls:
h. Built-in 120/24VAC transformer for remote 24 VAC thermostat control.

6. Valve Control Type Units:
   a. Each unit shall be provided with a factory-installed metal block-off to ensure all air is drawn from the filter through the coil. This shall be in addition to the outside front panel.

7. Outdoor & Room Dampers:
   a. Each unit shall be provided with separate room air and outdoor air dampers.
   b. The room air damper shall be two-piece, double-wall construction fabricated from aluminum, and be counterbalanced against backpressure to close by gusts of wind pressure, thereby preventing outdoor air from blowing directly into the room.
   c. The outdoor air damper shall be two- piece, double wall construction fabricated from galvanized steel, with ½" thick, 1½ lb. density glass-fiber insulation encapsulated between the welded blade halves for rigidity and to inhibit corrosion. The outdoor air damper shall have additional foam insulation on the exterior surface damper blade and on the ends of the outdoor air chamber. A single blade damper, which can be twisted and will leak air, will not be considered.
   d. Dampers shall be fitted with blended mohair seals along all sealing edges. Pressure adhesive sponge neoprene or plastic clip-on brush type sealers for damper seals are not acceptable. Rubber type gasket using pressure adhesive for fastening to metal and exposed to the outside air is not acceptable.
   e. Dampers shall use the turned-metal principle on long closing ends with no metal-to-metal contact for proper sealing.
   f. The damper shaft shall be mechanically fastened to the blade and shall operate in bearings made of nylon or other material which does not require lubrication.

8. Filter:
    a. Each unit ventilator shall be equipped with a one-piece filter 2" thick MERV 13 filter located to provide filtration of the return air/outdoor air mixture, in lieu of separate filters for each air stream. The entire filter surface must be useable for filtration of 100% room air or 100% of outdoor air. The filter shall be easily accessible from the front, and removable in one piece without removal of the unit return air damper stop. The unit shall ship with a factory installed 1" thick fiberglass, single-use type.

9. Control Components:
    a. The hot water heating coil shall use a factory selectable, field installed, modulating control valve to modulate the heating medium during the heating cycle. Upon a power failure, the modulating heating valve shall spring return to the normally open position for flow of water. Modulating valves without spring return to the normal position upon a power failure shall not be acceptable. The modulating valves shall be of the 2-way configuration.
    b. Each unit ventilator shall be furnished capable of accepting direct coupled damper actuators with a factory installed low temperature freeze-stat provided on the leaving edge of the water heating coil in a wave-like configuration to sense multiple locations and shall react to possible freezing conditions. The temperature control contractor shall be responsible for the proper operation of controls to prevent damage of any unit ventilator components while ensuring comfort.

2.3 ACCESSORIES

A. Units shall be provided with integral disconnect switch.

B. Space Thermostats

1. Refer to Section 23 09 23, Direct-Digital Control System for HVAC.

2.4 IDENTIFICATION

A. All equipment and component identification shall be provided in accordance with Section 23 05 53, Identification for HVAC Piping and Equipment.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine conditions under which materials and equipment will be installed and notify Engineer in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected.

B. Take field measurements where required prior to installation to ensure proper fitting of Work.

3.2 INSTALLATION

A. General:

1. Install the equipment in accordance with the Contract Documents and by manufacturer's instructions and recommendations. Obtain written interpretation from Engineer in the event of conflict between manufacturer's instructions and recommendations and the Contract Documents.

2. Install in accordance with Laws and Regulations.

3. Do not modify structures to facilitate installation of equipment, unless approved in writing by Engineer.

4. Installation to conform to requirements of all local and state codes.

B. The Division 23 Temperature Control Contractor shall furnish and install field control devices (BACnet thermostats)

C. The Division 23 Temperature Control Contractor shall verify that the control wiring installation is in accordance with manufacturer's submittal and installation requirements of Division-23 Sections. Do not proceed with equipment start-up until control wiring installation is acceptable.

3.3 FIELD QUALITY CONTROL

A. Field Tests:

1. After equipment installation is complete, Contractor and a qualified field service representative of unit manufacturer shall perform an operating test of each unit and associated controls, in presence of Engineer. Equipment will pass the test when each unit and its controls are demonstrated to function correctly.

3.4 ADJUSTING

A. Adjust all controls for proper settings.

B. Position unit and adjust grilles.

3.5 CLEANING

A. Thoroughly clean all equipment and accessories prior to installation.

B. Remove all dirt, rust, dust, etc. from equipment and accessories after installation.

C. Remove and dispose of all debris and waste from the Site resulting from installation.

3.6 COMMISSIONING OF CONVECTION HEATING AND COOLING UNITS

A. HVAC Contractor shall comply with the Commissioning Requirements of Contract Specification Section 23 08 00, Commissioning of HVAC.

END OF SECTION

DIVISION 26 - ELECTRICAL

SECTION 26 01 00

GENERAL REQUIREMENTS FOR ELECTRICAL CONTRACT

PART 1 GENERAL

1.1 SCOPE OF WORK

A. All drawings and general provisions of the Contract, including all General and Supplementary Conditions, Division 01 Specification Sections, and Instructions to Bidders apply to this section and all other sections of Division 26.

B. The electrical work includes but is not limited to the following work:

1. Removal and installation of light fixtures and the associated lighting controls.

1.2 LICENSING

A. Where required the contractor shall hold a license, issued or recognized by the authority having Jurisdiction, to perform electrical work.

1.3 INSPECTIONS

A. Provide rough in and final inspection by an electrical inspector certified by the AIAEI (the American International Association of Electrical Inspectors)

1.4 CODES AND STANDARDS

A. New York State Uniform Fire Prevention and Building Code: Provide all work in compliance with and meet the requirements of the latest issue.

B. National Electrical Code: All work covered under these Contract Documents shall conform to the latest issue of the National Electrical Code.

C. Standards: All equipment shall meet all the requirements of ANSI, NEMA, IES, and IEEE standards.

D. Listing: All equipment and devices for which Underwriters' Laboratory has a listing service, shall be UL listed and bear the UL listing label.

E. All materials and installation shall comply with the requirements of:

1. Building Code of New York State

2. Energy Conservation Construction Code of New York State.

3. Fire Code of New York State

4. National Fire Protection Association (NFPA).

5. New York State Department of Labor Rules and Regulations.

6. New York Board of Fire Underwriters.

7. The Americans with Disabilities Act.

8. Local Utilities.

9. Local Municipality/City Codes and Ordinances and the Authority Having Jurisdiction

10. Local Fire Department.

11. New York State Education Department

1.5 INTENT OF DRAWINGS

A. The drawings are diagrammatic, unless detailed dimensioned drawings are included. Drawings show approximate locations of equipment, fixtures, panelboards, conduits, and wiring devices. Exact locations are subject to the approval of the Owner's Representative. The general run of electrical feeders, branch circuits, and conduits, indicated on the drawings, is not intended to be the exact routing. Circuit designations, in the form of "Home Runs" on branches, indicate the designation of the branch circuit, and the panelboard or interconnection box from which the branch circuit is served.

B. Drawings show general design and arrangement. Verify exact location and elevations at the job location. Do not scale plans and diagrams.

C. Drawings do not show all offsets, fittings, interferences, and elevation changes. Adjust installation of conduit, equipment location, etc. to accommodate work with the obstacles and interferences. Where a major and important rearrangement is necessary, report same to Architect for review. Obtain written approval for all major changes.

D. Cooperate with all Contracts and Owners and determine the exact route of all raceway and location of all equipment.

1.6 BASIS OF DESIGN

A. The contract documents are prepared on basis of one manufacturer as "design equipment," even though other manufacturers' names are listed as acceptable makes. If Contractor elects to use one of the listed makes other than "design equipment," submit detailed drawings, indicating proposed installation of equipment. Show maintenance clearances, service removal space required, and other pertinent revisions to the design arrangement. Make required changes in the work of other trades, at no increase in any contract. Provide larger electrical feeders, circuit breakers, equipment, additional control devices and other miscellaneous equipment required for proper operation, and assume responsibility for proper location of roughing and connections by other trades. Remove and replace door frames, access doors, walls ceilings or floors required to install other than design make equipment. If revised arrangement submittal is rejected, revise and resubmit specified "design equipment" item which conforms to contract documents.

1.7 QUALITY ASSURANCE

A. Manufactures of equipment shall be firms regularly engaged in the production of factory fabricated systems and equipment whose products have been in satisfactory use in similar service for not less than three (3) years.

B. Suppliers of equipment must have factory trained and authorized personnel for the service of all equipment provided

1.8 DEFINITIONS

As Called For	Materials, equipment including the execution specified/shown in the Contract Documents.
Code Requirements	Minimum requirements.
Concealed	Work installed in pipe and duct shafts chases or recesses, inside walls, above ceilings, in slabs or below grade.
Design Equipment	Refer to the article, BASIS OF DESIGN.
Design Make	Refer to the article, BASIS OF DESIGN.
Exposed	Work not identified as concealed.
Acceptance	Owner acceptance of the project from Contractor upon certification by Owner's Representative.
Furnished by Others	Receive delivery at job site or where called for and install.
Inspection	Visual observations by Owner's Site Representative.
Install	Mount or place equipment and connect complete and operational.
Labeled	Refers to classification by a standards

	agency.
Make	Refer to the article BASIS OF DESIGN.
Provide	Furnish and install complete.
Relocate	Disassemble, disconnect, and transport equipment to new locations, then clean, test, and install ready for use.
Replace	Remove and provide new item.
Review	A general contractual conformance check of specified products.
Roughing	Pipe, duct, conduit, equipment layout and installation.
Satisfactory	As specified in Contract Documents.
Site Representative	Construction Manager or Owner's Inspector at the work site.

Refer to General Conditions of the Contract for additional information.

PART 2 PRODUCTS

2.1 MATERIALS

A. All materials, unless otherwise specified, shall be new and be the standard products of the manufacturer. Used equipment or damaged material will be rejected.

B. The listing of a manufacturer as “acceptable” does not indicate acceptance of a standard or catalogued item of equipment. All equipment and systems conform to the Specifications.

2.2 SHOP DRAWINGS/PRODUCT DATA/SAMPLES

A. Refer to Division 01 for general requirements. All products specified in an individual Division 26 section shall be submitted at the same time. Number each submittal. Indicate deviations from contract requirements on Letter of Transmittal. Corrections or comments made on the Shop Drawings during the review do not relieve Contractor from compliance with requirements of the drawings and specifications. The Contractor is responsible for confirming and correcting all quantities; checking electrical characteristics and dimensions; selecting fabrication processes and techniques of construction; coordinating his work with that of all other trades; and performing his work in a safe and satisfactory manner.

2.3 U.L. LISTING

A. Equipment shall bear the Underwriter's Laboratories (UL), or other approved agency listing label. This listing requirement applies to the entire assembly. Any modifications to equipment to suit the intent of the specifications shall be performed in accordance with the National Electric Code and listed by U.L.

2.4 FIRE STOPPING

A. Fire-stopping for Openings through Fire and Smoke Rated Walls and Floor Assemblies shall be listed or classified by an approved independent testing laboratory for "Through-Penetration Fire-Stop Systems." The system shall meet the requirements of "Fire Tests of Through-Penetration Fire-Stops" designated ASTM E814.

B. Acceptable Manufacturers:

1. Dow Corning Fire-Stop System Foams and Sealants.
2. Nelson Electric Fire-Stop System Putty, CLK and WRP.
3. Thomas & Betts - S-100 FS500/600,
4. Carborundum Fyre Putty.
5. Hilti Firestop Systems

PART 3 EXECUTION

3.1 SEALING AND FIRESTOPPING

A. Installation of Fire-stopping for Openings through Fire and Smoke Rated Walls and Floor Assemblies shall be as follows:

1. Provide fire-stop system seals at all locations where piping, tubing, conduit, electrical busways/cables/wires, ductwork and similar utilities pass through or penetrate fire rated wall or floor assembly. Provide fire-stop seal between sleeve and wall for dry wall construction.
2. The minimum required fire resistance ratings of the wall or floor assembly shall be maintained by the fire-stop system. The installation shall provide an air and watertight seal.

3. The methods used shall incorporate qualities that permit the easy removal or addition of electrical conduits or cables without drilling or use of special tools. The product shall adhere to itself to allow repairs to be made with the same material and permit the vibration, expansion and/or contraction of any items passing through the penetration without cracking, crumbling and resulting reduction in fire rating.

4. Provide rigid steel sleeves where non-armored cables pass through fire rated walls and barriers.

3.2 SUPPORTS

A. Provide required supports for work of this Contract, including beams, angles, channel, hangers, rods, columns, plates, bases, braces, etc. to properly support all work.

B. Provide steel angles, channels and other materials necessary for the proper support and erection of motor starters, distribution panelboards, large disconnect switches, pendant-mounted lighting fixtures, etc.

3.3 CONCEALMENT

A. Unless otherwise specifically indicated, all work shall be concealed above ceiling space, in wall space, below slabs in crawl spaces, and elsewhere throughout the building.

B. In areas with no ceilings, install only after Architect reviews and comments on arrangement and appearance.

3.4 PAINTING

A. This Contract includes the following:

1. Painting for all cut and patch work performed as part of Division 26 contract.

2. Painting required for touch-up of surfaces damaged due to the installation of electrical work.

3. Painting as required to repair finish of equipment furnished.

4. Painting of all surface mounted raceways in finished areas.

3.5 CLEANING

A. After all tests are made and installations completed satisfactorily:

B. Thoroughly clean entire installation, both exposed surfaces and interiors.

C. Remove all debris caused by work.

D. Remove tools, surplus, materials, when work is finally accepted.

END OF SECTION

SECTION 26 05 19

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Single conductor building wire.

B. Wiring connectors.

C. Electrical tape.

D. Wire pulling lubricant.

E. Cable ties.

1.2 RELATED REQUIREMENTS

A. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

1.3 REFERENCE STANDARDS

A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire; 2013.

B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft; 2011.

C. ASTM B33 - Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes; 2010 (Reapproved 2014).

D. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation; 2004 (Reapproved 2014).

E. NECA 120 - Standard for Installing Armored Cable (AC) and Metal-Clad Cable (MC); 2012.

F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

G. UL 44 - Thermoset-Insulated Wires and Cables; Current Edition, Including All

Revisions.

H. UL 83 - Thermoplastic-Insulated Wires and Cables; Current Edition, Including All Revisions.

I. UL 486A-486B - Wire Connectors; Current Edition, Including All Revisions.

J. UL 486C - Splicing Wire Connectors; Current Edition, Including All Revisions.

K. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape; Current Edition, Including All Revisions.

L. UL 1569 - Metal-Clad Cables; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.

2. Coordinate with electrical equipment installed under other sections to provide terminations suitable for use with the conductors to be installed.

3. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conductors and cables, including detailed information on materials, construction, ratings, listings, and available sizes, configurations, and stranding.

C. Project Record Documents: Record actual installed circuiting arrangements. Record actual routing for underground circuits.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

A. Provide products that comply with requirements of NFPA 70.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Provide new conductors and cables manufactured not more than one year prior to installation.

D. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.

E. Comply with NEMA WC 70.

F. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.

G. Conductor Material:

1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.

2. Copper Conductors: Soft drawn annealed, 98 percent conductivity. Single conductor copper cable complying with ASTM B3 and ASTM B8 with flame-retardant, moisture- and heat-resistant insulation rated for 90 degrees C in dry or wet locations, listed by UL as Type XHHW-2 or RHW-2 complying with UL 44.

3. Tinned Copper Conductors: Comply with ASTM B33.

H. Minimum Conductor Size:

1. Branch Circuits: 12 AWG.
   a. Exceptions:
      1) 20 A, 120 V circuits longer than 75 feet: 10 AWG, for voltage drop.
      2) 20 A, 120 V circuits longer than 150 feet: 8 AWG, for voltage drop.

2. Control Circuits: 14 AWG.

I. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

J. Conductor Color Coding:

1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.

2. Color Coding Method: Integrally colored insulation.
   a. Conductors size 4 AWG and larger may have black insulation color coded using vinyl color coding electrical tape.

3. Color Code:
   a. 208Y/120 V, 3 Phase, 4 Wire System:
      1) Phase A: Black.
      2) Phase B: Red.
      3) Phase C: Blue.
      4) Neutral/Grounded: White.
   b. Equipment Ground, All Systems: Green.
   c. 480/277 V, 3 Phase, 4 Wire System:
      1) Phase A: Brown.
      2) Phase B: Orange.
      3) Phase C: Yellow.
      4) Neutral/Grounded: White.

2.2 SINGLE CONDUCTOR BUILDING WIRE

A. Manufacturers:

1. Copper Building Wire:
   a. Cerro Wire LLC: www.cerrowire.com.
   b. Encore Wire Corporation: www.encorewire.com.
   c. Southwire Company: www.southwire.com.
   d. Substitutions: See Section 01 60 00 - Product Requirements.

B. Description: Single conductor insulated wire.

C. Conductor Stranding:

1. Feeders and Branch Circuits:
   a. Size 10 AWG and Smaller: Solid.
   b. Size 8 AWG and Larger: Stranded.

2. Control Circuits: Stranded.

D. Insulation Voltage Rating: 600 V.

E. Insulation:

1. Copper Building Wire: Type XHHW-2 or RHW-2, except as indicated below.
   a. Fixture Wiring Within Luminaires: Type TFFN/TFN for luminaires with labeled maximum temperature of 90 degrees C; Approved suitable type for luminaires with labeled maximum temperature greater than 90

degrees C.

2.3 WIRING CONNECTORS

A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.

B. Wiring Connectors for Splices and Taps:

1. Copper Conductors Size 8 AWG and Smaller: Use twist-on insulated spring connectors.

C. Wiring Connectors for Terminations:

1. Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.

2. Provide compression adapters for connecting conductors to equipment furnished with mechanical lugs when only compression connectors are specified.

3. Stranded Conductors Size 10 AWG and Smaller: Use crimped terminals for connections to terminal screws.

4. Conductors for Control Circuits: Use crimped terminals for all connections.

D. Do not use insulation-piercing or insulation-displacement connectors designed for use with conductors without stripping insulation.

E. Do not use push-in wire connectors as a substitute for twist-on insulated spring connectors.

F. Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F for standard applications and 302 degrees F for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.

1. Manufacturers:
   a. 3M: www.3m.com.
   b. Ideal Industries, Inc: www.idealindustries.com.
   c. NSI Industries LLC: www.nsiindustries.com.

G. Mechanical Connectors: Provide bolted type or set-screw type.

1. Manufacturers:
   a. Burndy: www.burndy.com.
   b. Ilsco: www.ilsco.com.

c. Thomas & Betts Corporation: www.tnb.com.
d. Substitutions: See Section 01 60 00 - Product Requirements.

H. Compression Connectors: Provide circumferential type or hex type crimp configuration.

1. Manufacturers:
a. Burndy: www.burndy.com.
b. Ilsco: www.ilsco.com.
c. Thomas & Betts Corporation: www.tnb.com.
d. Substitutions: See Section 01 60 00 - Product Requirements.

I. Crimped Terminals: Nylon-insulated, with insulation grip and terminal configuration suitable for connection to be made.

1. Manufacturers:
a. Burndy: www.burndy.com.
b. Ilsco: www.ilsco.com.
c. Thomas & Betts Corporation: www.tnb.com.
d. Substitutions: See Section 01 60 00 - Product Requirements.

2.4 WIRING ACCESSORIES

A. Electrical Tape:

1. Vinyl Color Coding Electrical Tape: Integrally colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 221 degrees F.

2. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F and suitable for continuous temperature environment up to 221 degrees F.

B. Heat Shrink Tubing: Heavy-wall, split-resistant, with factory-applied adhesive; rated 600 V; suitable for direct burial applications; listed as complying with UL 486D. Utilize splices with heat shrink tubing for spices in field boxes for site lighting and signage.

1. Manufacturers:
a. 3M: www.3m.com.
b. Burndy: www.burndy.com.
c. Thomas & Betts Corporation: www.tnb.com.

C. Wire Pulling Lubricant: Listed; suitable for use with the conductors or cables to be installed and suitable for use at the installation temperature.

1. Manufacturers:
   a. 3M: www.3m.com.
   b. American Polywater Corporation: www.polywater.com.
   c. Ideal Industries, Inc: www.idealindustries.com.
   d. Substitutions: See Section 01 60 00 - Product Requirements.

D. Cable Ties: Material and tensile strength rating suitable for application.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that interior of building has been protected from weather.

B. Verify that work likely to damage wire and cable has been completed.

C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.

D. Verify that field measurements are as shown on the drawings.

E. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

3.3 INSTALLATION

A. Circuiting Requirements:

1. Unless dimensioned, circuit routing indicated is diagrammatic.

2. When circuit destination is indicated and routing is not shown, determine exact routing required.

3. Arrange circuiting to minimize splices.

4. Include circuit lengths required to install connected devices within 10 ft of

location shown.

5. Maintain separation of wiring for emergency systems in accordance with NFPA 70.

6. Circuiting Adjustments: Unless otherwise indicated, when branch circuits are shown as separate, combining them together in a single raceway is permitted, under the following conditions:
   a. Provide no more than six current-carrying conductors in a single raceway. Dedicated neutral conductors are considered current-carrying conductors.
   b. Increase size of conductors as required to account for ampacity derating.
   c. Size raceways, boxes, etc. to accommodate conductors.

7. Common Neutrals: Unless otherwise indicated, sharing of neutral/grounded conductors among up to three single phase branch circuits of different phases installed in the same raceway is permitted where not otherwise prohibited, except for the following:
   a. Branch circuits fed from ground fault circuit interrupter (GFCI) circuit breakers.
   b. Branch circuits fed from feed-through protection of GFI receptacles.
   c. Branch circuits with dimming controls.
   d. Branch circuits with isolated grounding conductor.

B. Install products in accordance with manufacturer's instructions.

C. Install conductors and cable in a neat and workmanlike manner in accordance with NECA 1.

D. Installation in Raceway:

1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.

2. Pull all conductors and cables together into raceway at same time.

3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.

4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.

E. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.

F. Secure and support conductors and cables in accordance with NFPA 70 using

suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.

1. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conductors and cables to lay on ceiling tiles.

2. Installation in Vertical Raceways: Provide supports where vertical rise exceeds permissible limits.

G. Install conductors with a minimum of 12 inches of slack at each outlet.

H. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.

I. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.

J. Make wiring connections using specified wiring connectors.

1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.

2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.

3. Do not remove conductor strands to facilitate insertion into connector.

4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminates. Do not use wire brush on plated connector surfaces.

5. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.

6. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.

K. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.

L. Insulate ends of spare conductors using vinyl insulating electrical tape.

M. Field-Applied Color Coding: Where vinyl color coding electrical tape is used in lieu of integrally colored insulation as permitted in Part 2 under "Color Coding", apply half overlapping turns of tape at each termination and at each location conductors are accessible.

N. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

3.4 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Control, for additional requirements.

B. Inspect and test in accordance with NETA ATS, except Section 4.

C. Perform inspections and tests listed in NETA ATS, Section 7.3.2. The insulation resistance test is required for all conductors. The resistance test for parallel conductors listed as optional is not required.

D. Correct deficiencies and replace damaged or defective conductors and cables.

END OF SECTION

SECTION 26 05 23

INSTRUMENTATION AND COMMUNICATION CABLES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall provide all labor, materials, equipment, and incidentals shown, specified, and required to furnish and install communication cables.

2. Types of cables include the following:
   a. Data communication cables.

B. Related Sections:

1. Section 26 05 34, Conduits.

2. Section 26 05 53, Identification for Electrical Systems.

1.2 TERMINOLOGY

A. The following words or terms are not defined but, when used in this Section, have the following meaning:

1. “CPE” means chlorinated polyethylene.

2. “FEP” means fluorinated ethylene-propylene.

3. “XLPE” means cross-linked polyethylene.

1.3 REFERENCES

A. Standards referenced in this Section are:

1. ASTM A510, Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel.

2. ASTM B633, Specification for Electrodeposited Coatings of Zinc on Iron and Steel.

3. ANSI/TIA/EIA-568, Commercial Building Telecommunications Cabling (requirements and restrictions of Technical Service Bulletins (TSBs) apply.)

4. TIA/EIA-485, Electrical Characteristics of Generators and Receivers for Use in Balanced Digital Multipoint Systems (known as RS-485).

5. UL 13, Power-Limited Circuit Cables.

6. UL 1581, Electrical Wires, Cables and Flexible Cords.

7. UL VW-1, Vertical Wire Flame Test.

8. UL 910, Safety Test for Flame-Propagation and Smoke-Density Values for Electrical and Optical-Fiber Cables Used in Spaces Transporting Environmental Air

1.4 QUALITY ASSURANCE

A. Regulatory Requirements:

1. NEC 725, Class 1, Class 2, and Class 3 Remote-Control, Signaling and Power-Limited Circuits.

2. NEC 800, Communications Circuits.

1.5 SUBMITTALS

A. Action Submittals: Submit the following:

1. Product Data: Manufacturer's technical information for instrumentation cables and communications cables proposed.

B. Informational Submittals: Submit the following:

1. Field Quality Control Submittals: Written report of results of field quality control testing specified in this Section.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General:

1. Cables shall bear the UL label.

B. Horizontal Unshielded Twisted Pair (UTP) Cables:

1. Horizontal cabling is cabling between and including the telecommunications outlet/connector and patch panel or termination block.

2. Manufacturers: Provide products of one of the following:
   a. Bertek.
   b. Belden.
   c. Mohawk
   d. Or equal.

3. Cables shall consist of no. 24 AWG, thermoplastic-insulated, solid conductors formed into four individually twisted pairs and enclosed by thermoplastic jacket.

4. Comply with ANSI/TIA/EIA-568, Part 10.2.

5. Riser-rated where installed in conduit. Other installations shall be plenum-rated.

6. Rated for Category 6 use.

C. Patch Cords:

1. Patch cords are used for connecting patch panel to hub, or wall jack to equipment.

2. Manufacturer: Provide products of one of the following:
   a. Bertek.
   b. Belden.
   c. Mohawk
   d. Or equal.

3. Cables shall consist of no. 24 AWG, thermoplastic-insulated, stranded conductors formed into four individually twisted pairs and enclosed by thermoplastic jacket.

4. Cables shall be riser-rated.

5. Rated for Category 6 use.

6. Cables shall incorporate integral strain relief into the connector at each end. Connectors shall be RJ45 plugs.

7. Provide the following patch cords:
   a. One 10-foot cable per wall jack installed.
   b. One 3-foot cable per every two wall jacks installed.
   c. One 5-foot cable per every two wall jacks installed.

D. Connecting Hardware for Unshielded Twisted Pair (UTP) Cables:

1. Hardware used to terminate UTP cable shall comply with ANSI/TIA/EIA-568, Part 10.4.

2. Connecting hardware shall be compatible with wiring specified in the Contract Documents.

3. Rated for Category 6 use.

4. Connecting hardware shall utilize 110-type terminal blocks to coordinate with patch panels and termination blocks specified the Contract Documents.

5. Telecommunications Outlets/Connectors:
   a. Manufacturers: Provide products of one of the following:
      1) Hubbell.
      2) Or equal.
   b. Outlets and connectors shall utilize RJ45 (eight-pin modular) plug/receptacle configuration.
   c. Outlets and connectors shall utilize T568B pin/pair assignments and be coordinated with wire type (solid or stranded conductor).
   d. Outlets shall be flush-mount type or surface-mount type, as indicated on the Drawings.

E. Cable Support Hardware:

1. Conduit:
   a. Where conduit is shown or indicated on the Drawings, comply with Section 26 05 3, Conduits.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine conditions under which materials and equipment will be installed and notify ENGINEER in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. General:

1. Install cables complete with proper terminations at both ends.

2. Install in conduit separate from power cables, unless shown or indicated otherwise.

3. Ground shield on shielded cables at one end only and as recommended by instrument manufacturer.

4. Identify conductors in accordance with Section 26 05 53, Identification for Electrical Systems.

5. Install and terminate Supplier-furnished cable in accordance with equipment manufacturer requirements and cable manufacturer's recommendations.

6. Install in accordance with Laws and Regulations, including NEC.

3.3 FIELD QUALITY CONTROL

A. Site Tests:

1. Test shielded instrumentation cable shields with ohmmeter for continuity along full length of cables, and for shield continuity to ground.

2. Connect shielded instrumentation cables to calibrated 4 to 20 mA dc signal transmitter and receiver. Test at 4 and 20 mA transmitter settings.

3. Replace with new cables the full length of cables that fail test.

4. CONTRACTOR shall provide test equipment.

5. For testing of communications cables, test equipment used shall comply with the following:
   a. Equipment shall consist of a “master” and a “remote” unit.
   b. Test of all aspects of cables shall be automatic and initiated with a single command. Test over entire frequency range. Test unit shall be capable of accepting cable identification tag for reporting. Test unit shall return “pass/fail” status for cables and, if “fail,” shall indicate reason for failure.
   c. Test unit shall be capable of storing all test results internally and printing the results later.
   d. For unshielded twisted pair cables, test unit shall be specifically designed and manufactured to certify cabling relative to Category 6 compliant.

END OF SECTION

SECTION 26 05 26

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall provide labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install complete grounding for electrical systems, structures, and equipment.

1.2 REFERENCES

A. Standards referenced in this Section are:

1. ANSI/NETA ATS, Acceptance Testing Specifications for Electrical Power Equipment and Systems.

2. ASTM B8, Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard or Soft.

3. UL 467, Grounding and Bonding Equipment.

1.3 QUALITY ASSURANCE

A. Qualifications:

1. Field Acceptance Testing Firm: Retain services of independent testing firm to perform acceptance field testing of grounding system. Testing firm shall have experience in testing grounding systems and shall be a member company of NETA.

B. Regulatory Requirements

1. National Electrical Code, (NEC).
   a. NEC Article 250, Grounding and Bonding.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:

1. Shop Drawings:
   a. Listing of grounding connector types identifying where each will be used.

2. Product Data:
   a. Manufacturer's technical information for grounding materials proposed for use.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Bare Ground Cable:

1. Manufacturers: Provide products of one of the following:
   a. Cablec Corporation.
   b. General Cable Corporation.
   c. Southwire Cable Company.
   d. Or equal.

2. Material: Soft-drawn, bare copper stranded cable complying with ASTM B8. No. 4/0 AWG minimum size unless otherwise shown or indicated on the Drawings.

B. Equipment Ground Conductors:

1. Manufacturers: Provide products of one of the following:
   a. Cablec Corporation .
   b. General Cable Corporation.
   c. Southwire Cable Company.
   d. Or equal.

2. Provide insulated ground conductor as indicated on the contract documents.

3. When not specifically indicated on the contract documents and associated with a feeder or branch circuit, use the same size conductor as the feeder or branch circuit.

4. Provide #6 insulated ground conductor to cable trays, equipment racks, etc. unless indicated otherwise.

C. Grounding Connectors:

1. Products and Manufacturers: Provide one of the following:
   a. Pressure Connectors:
      1) O.Z./Gedney, Division of General Signal Corporation.
      2) Burndy Corporation.
      3) Or equal.

2. Material: Pressure connectors shall be copper alloy castings, designed and fabricated specifically for items to be connected and assembled with Durium or silicone bronze bolts, nuts, and washers.

D. Ground system components shall comply with UL 467.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine conditions for the Work and notify ENGINEER in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with Work until unsatisfactory conditions are corrected.

3.2 EQUIPMENT GROUNDING

A. Ground electrical equipment in compliance with Laws and Regulations and the Contract Documents.

B. Equipment Grounding Conductor: Install separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing. Use flexible straps for vibrating/moveable equipment.

C. Equipment grounding conductors shall be bare stranded copper cable of adequate size installed in metal conduit where required for mechanical protection. Ground conductors, pulled into conduits with non-grounded conductors, shall be insulated. Insulation shall be green.

D. Control panels grounding conductors shall be bare stranded copper cable of adequate size to ground grid from AC ground bus, and an insulated stranded copper cable of adequate size to ground grid from DC ground bus.

E. Connect ground conductors to conduit with copper clamps, straps, or with grounding bushings.

F. Accomplish grounding of electrical system by using insulated grounding conductor installed with feeders and branch circuit conductors in conduits. Size grounding conductors in accordance with NEC or as indicated on drawings. Install from grounding bus of serving panel to ground bus of served panel, grounding screw of receptacles, lighting fixture housing, light switch outlet boxes, receptacle outlet boxes or metal enclosures of electrical distribution system and service equipment per NEC. Ground conduits by means of grounding bushings on terminations at panel boards with minimum installed #12 insulated conductor to grounding system.

G. Connect to piping by welding or brazing. Use copper bonding jumpers on gasketed joints.

H. Connect to equipment by means of lug compressed on cable end. Bolt lug to equipment frame using holes or terminals provided on equipment specifically for grounding. Do not use hold-down bolts. Where grounding provisions are not included, drill suitable holes in locations recommended by equipment manufacturer or designated by ENGINEER.

I. Connect to motors by bolting directly to motor frames, not to soleplates or supporting structures.

J. Scrape bolted surfaces clean and coat with conductive oxide-resistant compound.

K. Permanently attach equipment and grounding conductors prior to energizing equipment.

3.3 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

1. Perform acceptance testing of grounding system. Testing shall be performed by testing firm in accordance with ANSI/NETA ATS.

2. Test Equipment, Calibration and Reporting: Test equipment, instrument calibration, and test reports shall comply with ANSI/NETA ATS.

B. Grounding and Bonding: Perform inspections and tests listed in NETA ATS, Section 7.13.

C. Perform continuity testing on all grounds in accordance with IEEE 142.

D. When improper grounding is found on receptacles, check receptacles in entire project and correct. Perform retest.

END OF SECTION

SECTION 26 05 29

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Support and attachment components for equipment, conduit, cable, boxes, and other electrical work.

1.2 RELATED REQUIREMENTS

A. Section 26 05 34 - Conduit: Additional support and attachment requirements for conduits.

B. Section 26 05 37 - Boxes: Additional support and attachment requirements for boxes.

1.3 REFERENCE STANDARDS

A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.

C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2013.

D. MFMA-4 - Metal Framing Standards Publication; 2004.

E. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.

F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

G. UL 5B - Strut-Type Channel Raceways and Fittings; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.

2. Coordinate the work with other trades to provide additional framing and materials required for installation.

3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.

4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.

5. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for metal channel (strut) framing systems, non-penetrating rooftop supports, and post-installed concrete and masonry anchors.

PART 2 PRODUCTS

2.1 SUPPORT AND ATTACHMENT COMPONENTS

A. General Requirements:

1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of electrical work.

2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.

3. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported. Include consideration for vibration, equipment operation, and shock loads where applicable.

4. Do not use products for applications other than as permitted by NFPA 70 and product listing.

5. Do not use wire, chain, perforated pipe strap, or wood for permanent supports unless specifically indicated or permitted.

6. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
   a. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.
   b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel, stainless steel, or approved equivalent unless otherwise indicated.
   c. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
   d. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.

B. Conduit and Cable Supports: Straps, clamps, etc. suitable for the conduit or cable to be supported.

1. Conduit Straps: One-hole or two-hole type; steel or malleable iron.

2. Conduit Clamps: Bolted type unless otherwise indicated.

C. Outlet Box Supports: Hangers, brackets, etc. suitable for the boxes to be supported.

D. Metal Channel (Strut) Framing Systems: Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.

1. Comply with MFMA-4.

2. Minimum Channel Thickness: Steel sheet, 12 gage, 0.1046 inch.

3. Minimum Channel Dimensions: 1-5/8 inch width by 13/16 inch height.

4. Manufacturers:
   a. Cooper B-Line, a division of Eaton Corporation: www.cooperindustries.com.
   b. Thomas & Betts Corporation: www.tnb.com.
   c. Unistrut, a brand of Atkore International Inc: www.unistrut.com.

E. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.

1. Minimum Size, Unless Otherwise Indicated or Required:
   a. Equipment Supports: 1/2 inch diameter.
   b. Single Conduit up to 1 inch (27mm) trade size: 1/4 inch diameter.
   c. Single Conduit larger than 1 inch (27mm) trade size: 3/8 inch diameter.
   d. Trapeze Support for Multiple Conduits: 3/8 inch diameter.
   e. Outlet Boxes: 1/4 inch diameter.
   f. Luminaires: 1/4 inch diameter.

F. Anchors and Fasteners:

1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.

2. Concrete: Use preset concrete inserts, expansion anchors, or screw anchors.

3. Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.

4. Hollow Masonry: Use toggle bolts.

5. Hollow Stud Walls: Use toggle bolts.

6. Steel: Use beam clamps, machine bolts, or welded threaded studs.

7. Sheet Metal: Use sheet metal screws.

8. Wood: Use wood screws.

9. Powder-actuated fasteners are not permitted.

10. Hammer-driven anchors and fasteners are not permitted.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install support and attachment components in a neat and workmanlike manner in accordance with NECA 1.

C. Provide independent support from building structure. Do not provide support from piping, ductwork, ceiling grid, or other systems.

D. Unless specifically indicated or approved by Architect, do not provide support from roof deck.

E. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.

F. Equipment Support and Attachment:

1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.

2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.

3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.

4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.

G. Secure fasteners according to manufacturer's recommended torque settings.

H. Remove temporary supports.

END OF SECTION

SECTION 26 05 34

CONDUIT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Liquid tight flexible metal conduit (LFMC).

B. Electrical metallic tubing (EMT).

C. Non-Metallic Conduit (PVC).

D. Conduit fittings.

1.2 RELATED REQUIREMENTS

A. Section 26 05 29 - Hangers and Supports for Electrical Systems.

B. Section 26 05 37 - Boxes.

C. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

1.3 REFERENCE STANDARDS

A. ANSI C80.3 - American National Standard for Steel Electrical Metallic Tubing (EMT); 2005.

B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.

C. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2012.

D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

E. UL 6 - Electrical Rigid Metal Conduit-Steel; Current Edition, Including All Revisions.

F. UL 360 - Liquid-Tight Flexible Steel Conduit; Current Edition, Including All Revisions.

G. UL 514B - Conduit, Tubing, and Cable Fittings; Current Edition, Including All Revisions.

H. UL 797 - Electrical Metallic Tubing-Steel; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate minimum sizes of conduits with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.

2. Coordinate the arrangement of conduits with structural members, ductwork, piping, equipment and other potential conflicts installed under other sections or by others.

3. Verify exact conduit termination locations required for boxes, enclosures, and equipment installed under other sections or by others.

4. Coordinate the work with other trades to provide roof penetrations that preserve the integrity of the roofing system and do not void the roof warranty.

5. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

B. Sequencing:

1. Do not begin installation of conductors and cables until installation of conduit is complete between outlet, junction and splicing points.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittals procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduits and fittings.

PART 2 PRODUCTS

2.1 CONDUIT APPLICATIONS

A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.

B. Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies, comply with the most restrictive requirements.

C. Concealed Within Hollow Stud Walls: Unless otherwise noted (fire alarm) use electrical metallic tubing (EMT).

D. Concealed Above Accessible Ceilings: Unless otherwise noted (fire alarm) use electrical metallic tubing (EMT).

E. Exposed, Interior: Use electrical metallic tubing (EMT).

F. Underground direct buried: Use Non-Metallic Conduit (PVC).

G. Connections to Vibrating Equipment:

1. Damp, Wet, or Corrosive Locations: Use liquid tight flexible metal conduit.

2. Maximum Length: 6 feet unless otherwise indicated.

3. Vibrating equipment includes, but is not limited to:
   a. Motors and roof mounted mechanical units.

2.2 CONDUIT REQUIREMENTS

A. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Minimum Conduit Size, Unless Otherwise Indicated:

1. Branch Circuits: 3/4 inch (16 mm) trade size.

2. Branch Circuit Homeruns: 3/4 inch (21 mm) trade size.

3. Control Circuits: 1/2 inch (16 mm) trade size.

4. Flexible Connections to Luminaires: 3/8 inch (12 mm) trade size.

D. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.3 FLEXIBLE METAL CONDUIT (FMC)

A. Description: NFPA 70, Type FMC standard wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems to be used.

B. Fittings:

1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.

2. Material: Use steel or malleable iron.

2.4 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

A. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.

B. Fittings:

1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.

2. Material: Use steel or malleable iron.

2.5 ELECTRICAL METALLIC TUBING (EMT)

A. Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.

B. Fittings:

1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.

2. Material: Use steel or malleable iron.

3. Connectors and Couplings: Use compression (gland) or set-screw type.
   a. Do not use indenter type connectors and couplings.

2.6 NON-METALLIC CONDUIT

A. PVC Plastic Conduit:

1. Manufacturers: Provide products of one of the following:
   a. Amoco Chemicals Corp.
   b. Carlon Electrical Products.
   c. Or equal.

2. Material: Schedule 80 PVC, rated for 90 degrees C, complying with NEMA TC3 and UL 514B and 651.

3. Fittings: Form elbows, bodies, terminations, expansions, and fasteners of same material and manufacturer as base conduit. Provide cement by same manufacturer as base conduit.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install conduit in a neat and workmanlike manner in accordance with NECA 1.

C. Conduit Support:

1. Secure and support conduits in accordance with NFPA 70 and Section 26 05 29 using suitable supports and methods approved by the authority having jurisdiction.

2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.

3. Installation above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.

D. Connections and Terminations:

1. Provide drip loops for liquid tight flexible conduit connections to prevent drainage of liquid into connectors.

2. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.

3. Secure joints and connections to provide maximum mechanical strength and electrical continuity.

E. Penetrations:

1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.

2. Make penetrations perpendicular to surfaces unless otherwise indicated.

3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.

4. Conceal bends for conduit risers emerging above ground.

5. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.

6. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.

7. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty. Include proposed locations of penetrations and methods for sealing with submittals.

8. Install firestopping to preserve fire resistance rating of partitions and other elements.

F. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:

1. Where conduits cross structural joints intended for expansion, contraction, or deflection.

2. Where conduits are subject to earth movement by settlement or frost.

G. Condensation Prevention: Where conduits cross barriers between areas of potential substantial temperature differential, provide sealing fitting or approved sealing compound at an accessible point near the penetration to prevent condensation. This includes, but is not limited to:

1. Where conduits pass from outdoors into conditioned interior spaces.

2. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.

3.2 CLEANING

A. Clean interior of conduits to remove moisture and foreign matter.

3.3 PROTECTION

A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.

END OF SECTION

SECTION 26 05 37

BOXES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Outlet and device boxes up to 100 cubic inches, including those used as junction and pull boxes.

1.2 RELATED REQUIREMENTS

A. Section 26 05 29 - Hangers and Supports for Electrical Systems.

B. Section 26 05 34 - Conduit:

1. Conduit bodies and other fittings.

2. Additional requirements for locating boxes to limit conduit length and/or number of bends between pulling points.

1.3 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.

B. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2010.

C. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2012.

D. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; 2013.

E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.

F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

G. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.

H. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.

I. UL 508A - Industrial Control Panels; Current Edition, Including All Revisions.

J. UL 514A - Metallic Outlet Boxes; Current Edition, Including All Revisions.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for cabinets and enclosures, boxes for hazardous (classified) locations, floor boxes, and underground boxes/enclosures.

C. Project Record Documents: Record actual locations for outlet and device boxes, pull boxes, cabinets and enclosures, floor boxes, and underground boxes/enclosures.

1.5 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

PART 2 PRODUCTS

2.1 BOXES

A. General Requirements:

1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.

2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.

3. Provide products listed, classified, and labeled as suitable for the purpose intended.

4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

5. Provide grounding terminals within boxes where equipment grounding conductors terminate.

B. Outlet and Device Boxes Up to 100 cubic inches, Including Those Used as Junction and Pull Boxes:

1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.

2. Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.

3. Use raised covers suitable for the type of wall construction and device configuration where required.

4. Use shallow boxes where required by the type of wall construction.

5. Do not use "through-wall" boxes designed for access from both sides of wall.

6. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.

7. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in a neat and workmanlike manner in accordance with NECA 1 and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.

C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

D. Box Locations:

1. Locate boxes to be accessible. Provide access panels as required where approved by the Architect.

2. Locate boxes as required for devices installed under other sections or by others.
   a. Switches, receptacles, and other wiring devices.

3. Locate boxes so that wall plates do not span different building finishes.

4. Locate boxes so that wall plates do not cross masonry joints.

E. Box Supports:

1. Secure and support boxes in accordance with NFPA 70 and Section 26 05 29 using suitable supports and methods approved by the authority having jurisdiction.

2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.

F. Install boxes plumb and level.

G. Flush-Mounted Boxes:

1. Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface more than 1/4 inch or does not project beyond finished surface.

2. Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.

3. Repair rough openings around boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that there are no gaps or open spaces greater than 1/8 inch at the edge of the box.

H. Install boxes as required to preserve insulation integrity.

I. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.

J. Install firestopping to preserve fire resistance rating of partitions and other elements.

K. Close unused box openings.

L. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.

END OF SECTION

SECTION 26 05 43.13

UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install underground ductbanks.

B. Coordination:

1. Ductbank routing on the Drawings is diagrammatic. Coordinate installation with piping and other Underground Facilities and locate ductbanks clear of interferences.

2. Review installation procedures under this and other Sections and coordinate installation of items to be installed with or before underground ductbank Work.

3. Notify other contractors in advance of installing underground ductbanks to provide other contractors with sufficient time for installing items included in their contracts that will be installed with or before underground ductbank Work.

C. Related Sections:

1. Section 26 05 26, Grounding and Bonding for Electrical Systems.

2. Section 26 05 53, Identification for Electrical Systems.

3. Section 26 05 34, Conduit.

1.2 SUBMITTALS

A. Action Submittals: Submit the following:

1. Shop Drawings:
   a. Layouts showing proposed routing of direct buried conduit.
   b. Profiles of direct buried conduit showing crossings with piping and other Underground Facilities.
   c. Typical cross sections for each direct buried conduit run.

B. Informational Submittals: Submit the following:

1. Special Procedure Submittals:
   a. Installation procedures.

2. Field Quality Control Submittals:
   a. Field test report.

C. Closeout Submittals: Submit the following:

1. Record Drawings:
   a. Include actual routing of underground direct buried conduit runs on record documents in accordance with Section 01 78 39, Project Record Documents.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Duct: Provide conduit and fittings in accordance with Section 26 05 34, Conduit. Conduit types shall be as follows:

1. Schedule 80 PVC conduits, direct buried, for power circuits. All bends, elbows, and sweeps of 45-degrees or larger shall be rigid steel.

B. Backfill: Provide backfill, including select backfill, in accordance with Section 31 23 23.

C. Grounding: Provide ground cable in accordance with Section 26 05 26, Grounding and Bonding for Electrical Systems.

D. Duct Sealing Compound:

1. Products and Manufacturers: Provide one of the following:
   a. O-Z/Gedney, Type DUX.
   b. Or equal.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine conditions under which the Work is to be installed and notify ENGINEER in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. Excavation and Backfilling:

1. Provide excavation and backfilling for direct buried conduit installation in accordance with Section 31 23 23.

2. Do not backfill with material containing large rock, paving materials, cinders, large or sharply angular substances, corrosive material, or other materials that can damage or contribute to corrosion of ducts or cables or prevent adequate compaction of backfill.

B. Ductbank Layout:

1. Top of direct buried conduit shall be a minimum of 2.5 feet below grade, unless shown or indicated otherwise on the Drawings.

2. Slope direct buried conduit runs for drainage toward manholes and away from buildings with slope of approximately three inches vertical per 100 feet of run.

C. Conduit Transitions:

1. Conduit installations shall be watertight throughout entire length of direct buried conduit run.

2. Transition from non-metallic to galvanized rigid steel conduit where conduits enter structure walls and slabs.

3. Terminate conduits in insulated grounding bushings.

4. Continue conduits inside buildings in accordance with Section 26 05 34, Conduit, and as shown or indicated in the Contract Documents.

5. Plug and seal empty spare conduits entering structures. Conduits in use entering structures shall be sealed watertight with duct sealing compound.

D. Detectable Underground Warning Tape:

1. Provide detectable underground warning tapes complying with Section 26 05 53, Identification for Electrical Systems, over the full length of each underground direct buried conduit run.

2. Install warning tapes approximately 12 inches below grade.

END OF SECTION

SECTION 26 05 53
IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Electrical identification requirements.

B. Identification nameplates and labels.

C. Wire and cable markers.

D. Voltage markers.

E. Warning signs and labels.

1.2 RELATED REQUIREMENTS

A. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables: Color coding for power conductors and cables 600 V and less; vinyl color coding electrical tape.

1.3 REFERENCE STANDARDS

A. ANSI Z535.2 - American National Standard for Environmental and Facility Safety Signs; 2011.

B. ANSI Z535.4 - American National Standard for Product Safety Signs and Labels; 2011.

C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

D. NFPA 70E - Standard for Electrical Safety in the Workplace; 2015.

E. UL 969 - Marking and Labeling Systems; Current Edition, Including All Revisions.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittals procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product.

PART 2 PRODUCTS

2.1 IDENTIFICATION REQUIREMENTS

A. Existing Work: Unless specifically excluded, identify existing elements to remain that are not already identified in accordance with specified requirements.

B. Identification for Equipment:

1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.

C. Identification for Raceways:

1. Use identification labels, handwritten text using indelible marker, or plastic marker tags to identify circuits enclosed for accessible conduits at wall penetrations, at floor penetrations, at roof penetrations, and at equipment terminations when source is not within sight.

2. Use identification labels, handwritten text using indelible marker, or plastic marker tags to identify spare conduits at each end. Identify purpose and termination location.

D. Identification for Devices:

1. For devices concealed above suspended ceilings, provide additional identification on ceiling tile below device location.

2.2 IDENTIFICATION NAMEPLATES AND LABELS

A. Identification Nameplates:

1. Manufacturers:
   a. Brimar Industries, Inc: www.brimar.com.
   b. Kolbi Pipe Marker Co: www.kolbipipemarkers.com.
   c. Seton Identification Products: www.seton.com.

2. Materials:
   a. Indoor Clean, Dry Locations: Use plastic nameplates.
   b. Outdoor Locations: Use plastic, stainless steel, or aluminum nameplates suitable for exterior use.

3. Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch; engraved text.

4. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch high; Four, located at corners for larger sizes.

B. Identification Labels:

1. Manufacturers:
   a. Brady Corporation: www.bradyid.com.
   b. Brother International Corporation: www.brother-usa.com.

2. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.

3. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.

2.3 WIRE AND CABLE MARKERS

A. Manufacturers:

1. Brady Corporation: www.bradyid.com.

2. HellermannTyton: www.hellermanntyton.com.

3. Panduit Corp: www.panduit.com.

B. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth, wrap-around self-adhesive vinyl self-laminating, heat-shrink sleeve, plastic sleeve, plastic clip-on, or vinyl split sleeve type markers suitable for the conductor or cable to be identified.

C. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.

D. Legend: Power source and circuit number or other designation indicated.

E. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.

F. Minimum Text Height: 1/8 inch.

G. Color: Black text on white background unless otherwise indicated.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:

1. Surface-Mounted Equipment: Enclosure front.

2. Flush-Mounted Equipment: Inside of equipment door.

3. Branch Devices: Adjacent to device.

4. Interior Components: Legible from the point of access.

5. Conduits: Legible from the floor.

6. Boxes: Outside face of cover.

7. Conductors and Cables: Legible from the point of access.

8. Devices: Outside face of cover.

C. Install identification products centered, level, and parallel with lines of item being identified.

D. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.

E. Mark all handwritten text, where permitted, to be neat and legible.

END OF SECTION

SECTION 26 09 24

LIGHTING CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Single space wired lighting control systems and associated components:

1. Wired occupancy sensors.
2. Lighting control modules (Room Controllers).
3. Wired load control modules with wireless communication inputs.
4. Wired wall dimmers and switches with communication inputs.
5. Wired daylight sensors.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

C. Section 26 51 00 - Interior Lighting.

1.3 REFERENCE STANDARDS

A. ASTM D4674 - Standard Practice for Accelerated Testing for Color Stability of Plastics Exposed to Indoor Office Environments; 2002a (Reapproved 2010).

B. IEC 61000-4-2 - Electromagnetic Compatibility (EMC) - Part 4-2: Testing and Measurement Techniques - Electrostatic Discharge Immunity Test; 2008.

C. IEEE C62.41.2 - Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits; 2002 (Cor 1, 2012).

D. ISO 9001 - Quality Management Systems-Requirements; 2008.

E. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.

F. NECA 130 - Standard for Installing and Maintaining Wiring Devices; National Electrical Contractors Association; 2010.

G. NEMA WD 1 - General Color Requirements for Wiring Devices; National Electrical Manufacturers Association; 1999 (R 2010).

H. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

I. UL 20 - General-Use Snap Switches; Current Edition, Including All Revisions.

J. UL 508 - Industrial Control Equipment; Underwriters Laboratories Inc.; Current Edition, Including All Revisions.

K. UL 1472 - Solid-State Dimming Controls; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the placement of sensors and wall controls with millwork, furniture, equipment, etc. installed under other sections or by others.

2. Coordinate the placement of wall controls with actual installed door swings.

3. Coordinate the placement of daylight sensors with windows, skylights, and luminaires to achieve optimum operation. Coordinate placement with ductwork, piping, equipment, or other potential obstructions to light level measurement installed under other sections or by others.

4. Coordinate the work to provide luminaires and lamps compatible with the lighting controls to be installed.

5. Notify Architect of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

B. NYSERDA, Utility or other grants related to lighting upgrades: Provide all documentation including purchasing, paid detailed invoices required for grant applications for the owner.

C. Sequencing:

1. Do not install sensors and wall controls until final surface finishes and painting are complete.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Design Documents: Lighting Control Manufacturer to provide plans indicating occupancy/vacancy and/or daylight sensor locations.

C. Product Data: Include ratings, configurations, standard wiring diagrams, dimensions, colors, service condition requirements, and installed features.

1. Occupancy/Vacancy Sensors: Include detailed basic motion detection coverage range diagrams.

2. Wall Dimmers: Include derating information for ganged multiple devices.

D. Samples:

1. Wall Controls:
   a. Show available color and finish selections.

2. Sensors: Provide one sample(s) for each product proposed for substitution upon request.

E. Manufacturer's Installation Instructions: Include application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

F. Project Record Documents: Record actual installed locations and settings for lighting control system components.

G. Operation and Maintenance Data: Include detailed information on lighting control system operation, equipment programming and setup, replacement parts, and recommended maintenance procedures and intervals.

1.6 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Manufacturer Qualifications:

1. Company with not less than ten years of experience manufacturing lighting control products using wireless communication between devices.

2. Registered to ISO 9001, including in-house engineering for product design activities.

3. Provides factory direct technical support hotline available 24 hours per day, 7 days per week.

4. Qualified to supply specified products and to honor claims against product presented in accordance with warranty.

1.7 FIELD CONDITIONS

A. Maintain field conditions within manufacturers required service conditions during and after installation.

1. Basis of Design System Requirements Eaton Room Controller, Unless Otherwise Indicated:
   a. Ambient Temperature:
      1) Lighting Control System Components, Between 32 and 104 degrees F.
   b. Relative Humidity: Less than 90 percent, non-condensing.
   c. Protect lighting controls from dust.

1.8 WARRANTY

A. See Section 01 70 00 - Execution Requirements, for additional warranty requirements.

B. Manufacturer's Standard Warranty, With Manufacturer Start-Up:

1. Manufacturer Lighting Control System Components, Except Ballasts/Drivers and Ballast Modules:
   a. First Two Years:
      1) 100 percent replacement parts coverage, 100 percent manufacturer labor coverage to troubleshoot and diagnose a lighting issue.
      2) First-available on-site or remote response time.
   b. Telephone Technical Support: Available 24 hours per day, 7 days per week, excluding manufacturer holidays.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design Manufacturer: Crestron Lighting, ZUM Wired (this system currently exists within the school district).

1. Acceptable Manufacturers: Acuity Controls nLight Wired.

B. All proposed substitutions (clearly delineated as such) must be submitted in writing for approval a minimum of 10 working days prior to the bid date and must be made available to all bidders. The Contractor shall be responsible for design modifications associated with the proposed substitution.

C. Networked Lighting Fixtures shall be able to digitally network directly to network control devices (sensors, switches, dimmers).

2.2 LIGHTING CONTROLS - GENERAL REQUIREMENTS

A. Sensor Layout and Tuning: Include as part of the base bid additional costs for Lighting Control Manufacturer's Sensor Layout and Tuning service.

1. Lighting Control Manufacturer to take full responsibility for wired sensor layout and performance for sensors provided by Lighting Control Manufacturer.

2. Lighting Control Manufacturer to analyze the reflected ceiling plans, via supplied electronic AutoCAD format, and design a detailed sensor layout that provides adequate occupancy sensor coverage and ensures occupancy sensor performance per agreed upon sequence of operations. Contractor to utilize the layouts for sensor placement.

3. During startup, Lighting Control Manufacturer to direct Contractor regarding sensor relocation, as required, should conditions require a deviation from locations specified in the drawings.

4. Lighting Control Manufacturer to provide up to two additional post-startup on-site service visits, within one calendar year from Date of Substantial Completion to fine-tune sensor calibration per the agreed upon sequence of operations.

B. Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) as suitable for the purpose indicated.

C. Unless specifically indicated to be excluded, provide all required equipment, conduit, boxes, wiring, connectors, hardware, supports, accessories, programming, etc. as necessary for a complete operating system that provides the control intent indicated.

D. Design lighting control equipment for 10 year operational life while operating continually at any temperature in an ambient temperature range of 32 degrees F to 104 degrees F and 90 percent non-condensing relative humidity.

E. Electrostatic Discharge Tolerance: Design and test equipment to withstand electrostatic discharges without impairment when tested according to IEC 61000-4-2.

F. Power Failure Recovery: When power is interrupted for periods up to 10 years and subsequently restored, lights to automatically return to same levels (dimmed setting, full on, or full off) as prior to power interruption.

G. Device Finishes:

1. Standard Colors: Comply with NEMA WD1 where applicable. Finish shall be white.

2. Visible Parts: Exhibit ultraviolet color stability when tested with multiple actinic light sources as defined in ASTM D4674. Provide proof of testing upon request.

2.3 LIGHTING SENSORS

A. Provide lighting control modules as indicated or as required to control the loads as indicated. Room controllers are required for all spaces with occupancy sensor, photo sensor and dimming, on-off control.

1. Communicates directly via Cat 5e data cable.

2. Capable of being placed in test mode to verify correct operation from the face of the unit.

B. Wired Occupancy/Vacancy Sensors:

1. General Requirements:

a. Provide dual-technology type, manual ON/automatic OFF operation.

b. Provides a clearly visible method of indication to verify that motion is being detected during testing and that the unit is communicating to compatible controllers.

c. Utilize multiple segmented lens, with internal grooves to eliminate dust and residue build-up.

d. Provide optional, readily accessible, user-adjustable controls for timeout, automatic/manual-on, and sensitivity.

e. Turns off lighting after reasonable and adjustable time delay once the last person to occupy the space vacates a room or area. Provide adjustable timeout settings of 1, 5, 15, and 30 minutes (initial setting shall be 15 minutes).

f. Capable of turning dimmer's lighting load on to an optional locked preset level selectable by the user. Locked preset range to be selectable on the dimmer from 1 percent to 100 percent.

g. Color: White.

h. Provide all necessary mounting hardware and instructions for both temporary and permanent mounting.

i. Provide temporary mounting means for drop ceilings to allow user to check proper performance and relocate as needed before permanently mounting sensor. Temporary mounting method to be design for easy, damage-free removal.

j. Sensor lens to illuminate during test mode when motion is detected to allow installer to place sensor in ideal location and to verify coverage prior to permanent mounting.

k. Ceiling-Mounted Sensors: Provide surface mounting bracket compatible with drywall, plaster, wood, concrete, and compressed fiber ceilings.

l. Wall-Switch Type: Provide line-voltage type sensors for control of lighting circuit in spaces shown. Manual ON/Automatic OFF operation, dual-technology type.

C. Wired Daylight Sensors:

1. Open-loop basis for daylight sensor control scheme.

2. Open-loop basis for daylight sensor control scheme

3. Partially shielded for accurate detection of available daylight to prevent fixture lighting and horizontal light component from skewing sensor detection.

4. Provide linear response from 2 to 150- foot candles.

5. Color: White.

6. Mounting: Provide surface mounting bracket compatible with drywall, plaster, wood, concrete, and compressed fiber ceilings. Provide all necessary mounting hardware and instructions for both temporary and permanent mounting. Provide temporary mounting means for drop ceilings to allow user to check proper performance and relocate as needed before permanently mounting sensor. Temporary mounting method to be design for easy, damage-free removal.

2.4 LIGHTING CONTROL MODULES

A. Provide lighting control modules as indicated or as required to control the loads as indicated. Room controllers are required for all spaces with occupancy sensor, photo sensor and dimming, on-off control.

B. General Requirements:

1. Delivered and installed as a listed factory-assembled panel.

2. Passively cooled via free-convection, unaided by fans or other means.

3. Mounting: Surface.

4. Connection without interface to wired:
   a. Occupancy sensors.
   b. Daylight sensors.
   c. IR receivers for personal control.

5. LED status indicators confirm communication with occupancy sensors, daylight sensors, and IR receivers.

6. Contact Closure Input:
   a. Directly accept contact closure input from a dry contact closure or sold-state output without interface to:
      1) Activate scenes.
         (a) Scene activation from momentary or maintained closure.
      2) Enable or disable after hours.
         (a) Automatic sweep to user-specified level after user-specified time has elapsed.
         (b) System will provide occupants a visual warning prior to sweeping lights to user-specified level.
         (c) Occupant can reset timeout by interacting with the lighting system.
      3) Activate or deactivate demand response (load shed). Load shed event will reduce lighting load by user-specified amount.

7. Emergency Contact Closure Input:
   a. Turn all zones to full output during emergency state via direct contact closure input from UL 924 listed emergency lighting interface, security system or fire alarm system.
   b. Allow configurable zone response during emergency state.
   c. Disable control operation until emergency signal is cleared.

8. Supplies power for control link for keypads and control interfaces.

9. Distributes sensor data among multiple lighting control modules.

10. Capable of being controlled via wireless sensors and controls.

C. 0-10V Lighting Control Modules:

1. Products:
   a. Crestron Zumlink; Model ZUMLINK-JBOX-16A-LV: 16 A continuous-use per channel. Or accepted equal.

2. Coordination Between Low Voltage Dimming Module and Line Voltage Relay: Capable of being electronically linked to single zone.

3. Single low voltage dimming module; capable of controlling following light sources:
   a. 0-10V analog voltage signal.
      1) Provide Class 2 isolated 0-10V output signal conforming to IEC 60929.
      2) Sink current per IEC 60929.

4. Switching:
   a. Rated Life of Relay: Typical of 1,000,000 cycles at fully rated 16 A for all lighting loads.
   b. Load switched in manner that prevents arcing at mechanical contacts when power is applied to and removed from load circuits.
   c. Fully rated output continuous duty for inductive, capacitive, and resistive loads.
   d. Module to integrate up to four individually controlled zones.
   e. Utilize air gap off, activated when user selects "off" at any control to disconnect the load from line supply.

2.5 LOAD CONTROL MODULES (ROOM CONTROLLERS)

A. Provide wired load control modules as indicated or as required to control the loads as indicated.

B. General Requirements:

1. Listed to UL 508 as industrial control equipment.

2. Delivered and installed as a listed factory-assembled panel.

3. Passively cooled via free-convection, unaided by fans or other means.

4. Mounting: Surface.

5. Connection without interface to wired:
   a. Occupancy sensors.
   b. Daylight sensors.
   c. IR receivers for personal control.

6. Connects to lighting management hub via RS485.

7. LED status indicators confirm communication with occupancy sensors, daylight sensors, and IR receivers.

8. Contact Closure Input:
    a. Directly accept contact closure input from a dry contact closure or solid-state output without interface to:
        1) Activate scenes.
            (a) Scene activation from momentary or maintained closure.
        2) Enable or disable after hours.
            (a) Automatic sweep to user-specified level after user-specified time has elapsed.
            (b) System will provide occupants a visual warning prior to sweeping lights to user-specified level.
            (c) Occupant can reset timeout by interacting with the lighting system.
        3) Activate or deactivate demand response (load shed).
            (a) Load shed event will reduce lighting load by user-specified amount.

9. Emergency Contact Closure Input:
    a. Turn all zones to full output during emergency state via direct contact closure input from UL 924 listed emergency lighting interface, security system or fire alarm system.
    b. Allow configurable zone response during emergency state.
    c. Disable control operation until emergency signal is cleared.

10. Supplies power for control link for keypads and control interfaces.

11. Distributes sensor data among multiple lighting control modules.

12. Capable of being controlled via wireless sensors and controls.

C. 0-10V Lighting Control Modules:

1. Product(s):
    a. Crestron Zumlink; Model ZUMLINK-JBOX-16A-LV: 16 A continuous-use per channel.

2. Coordination between Low Voltage Dimming Module and Line Voltage Relay: Capable of being electronically linked to single zone.

3. Single low voltage dimming module; capable of controlling following light sources:
    a. 0-10V analog voltage signal.
        1) Provide Class 2 isolated 0-10V output signal conforming to IEC 60929.
        2) Sink current per IEC 60929.
    b. 10V-0V analog voltage signal.
        1) Provide Class 2 isolated 0-10V output signal conforming to IEC 60929.
        2) Sink current per IEC 60929.

4. Switching:
    a. Rated Life of Relay: Typical of 1,000,000 cycles at fully rated 16 A for all lighting loads.
    b. Load switched in manner that prevents arcing at mechanical contacts when power is applied to and removed from load circuits.
    c. Fully rated output continuous duty for inductive, capacitive, and resistive loads.
    d. Module to integrate up to four individually controlled zones.
    e. Utilize air gap off, activated when user selects "off" at any control to disconnect the load from line supply.

2.6 WALL CONTROL STATIONS

A. Product(s):

1. Type 8-Button with ON/OFF/Raise/Lower Control. Coordinate exact button layout and quantity with Drawings.

2. ON/OFF Control.

B. Quantity: As indicated on the drawings.

C. Communication and low voltage power shall be delivered to each device via standard low voltage network cabling, Lutron sensor cable CBL 522S.

D. All switches shall have the ability to detect when it is not receiving valid communication and blink its LED in a pattern to visually indicate a potential wiring issue.

E. Allows for easy reprogramming without replacing unit.

F. Button Programming:

1. Single action.

G. Includes LED to indicate button press or programming mode status.

H. Mounting:

1. Faceplates: Provide concealed mounting hardware.

PART 3 EXECUTION

3.1 INSTALLATION

A. Perform work in a neat and workmanlike manner in accordance with NECA 1 and, where applicable, NECA 130, except for mounting heights specified in those standards.

B. Install and connect the networked lighting control system components according to the manufacturer's installation instructions, wiring diagrams, the project submittals and plans specifications.

C. Install products in accordance with manufacturer's instructions.

D. The successful bidder shall be responsible for testing of all low voltage network cable included in the bid. Bidder is responsible for verification of the following minimum parameters:

1. Wire Map (continuity, pin termination, shorts and open connections, etc.)

2. Length

3. Insertion Loss

E. Ensure that daylight sensor placement minimizes sensor view of electric light sources.

F. Locate ceiling-mounted and luminaire-mounted daylight sensors to avoid direct view of luminaires.

G. Identify system components in accordance with Section 26 05 53.

3.2 SYSTEM STARTUP

A. Upon completion of installation by the installer, including completion of all required verification and documentation required by the manufacturer, the system shall be started up and programmed.

B. System start-up and programming shall include:

1. Verifying operational communication to all system devices.

2. Programming the network devices into functional control zones to meet the required sequence of operation.

3. Programming and verifying all sequence of operations.

C. Initial start-up and programming is to occur on-site.

3.3 CLOSEOUT ACTIVITIES

A. Training:

1. Include services of manufacturer's certified service representative to perform on-site training of Owner's personnel on operation, adjustment, and maintenance of lighting control system as part of on-site system start-up services.

END OF SECTION

SECTION 26 24 16

PANELBOARDS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install panelboards.

B. Related Sections:

1. Section 26 05 05, General Provisions for Electrical Systems.

2. Section 26 05 53, Identification for Electrical Systems.

1.2 REFERENCES

A. Standards referenced in this Section are:

1. NEMA PB 1, Panelboards.

2. UL 67, Panelboards.

1.3 SUBMITTALS

A. Action Submittals: Submit the following:

1. Shop Drawings:
   a. Listing of panelboards to be furnished with identification of their proposed location, and all electrical characteristics, including number and rating of branch circuit breakers and enclosure type.

2. Product Data:
   a. Manufacturer's technical information for panelboards proposed for use, including product literature and specifications. Indicate options and features to be provided.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements; Comply with the following:

1. NEC Article 408, Switchboards and Panelboards.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Packing, Shipping, Handling, and Unloading:

1. Packing:
   a. Inspect prior to packing to assure that assemblies and components are complete and undamaged.
   b. Protect mating connections.
   c. Cover all openings into enclosures with-vapor inhibiting, water-repellent material.

2. Deliver materials and equipment to Site to ensure uninterrupted progress of the Work. Deliver anchorage materials to be embedded in concrete in ample time to prevent delaying the Work. Upon deliver, check materials and equipment for evidence of water that may have entered equipment during transit.

3. Comply with Section 01 65 00, Product Delivery Requirements.

B. Storage and Protection:

1. Store panelboards in a clean, dry location with controls for uniform temperature and humidity. Protect equipment with coverings and maintain environmental controls.

2. Comply with Section 01 66 00, Product Storage and Handling Requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Panelboards:

1. Manufacturers: Provide products of one of the following:
   a. ABB (GE).
   b. Eaton/Cutler-Hammer.
   c. Schneider Electric/Square D Company.
   d. Or equal.

2. Rating: Voltage rating, current rating, number of phases, number of wires and number of poles as shown or indicated on the Drawings.

3. Circuit Breakers: Molded case, bolt-in thermal magnetic type with number of poles and trip ratings as shown or indicated. Where indicated on the Drawings, circuit breakers shall be ground fault circuit interrupting type equipped with solid state sensing and five-milliamp sensitivity.

4. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals. Circuit breakers for 480-volt panelboards shall have minimum interrupting rating of 14,000 ampere RMS symmetrical, unless otherwise indicated on the Drawings. Circuit breakers for other panelboards shall have minimum interrupting rating of 10,000 ampere RMS symmetrical, unless otherwise indicated on the Drawings.

5. Bus Bars: Bus bars shall be 98 percent conductivity copper. Four-wire panelboards shall have solid neutral bar. Each panel shall have ground bus bar.

6. Main: Panelboards shall have main circuit breaker unless the Drawings specifically indicate main lugs only.

7. Connect branch circuit breakers for sequence phasing.

8. Enclosures: Panel enclosures shall be as required for the area classifications indicated in Section 26 05 05, General Provisions for Electrical Systems, unless otherwise indicated on the Drawings.

9. Construction: Code-grade steel, ample gutter space, flush door, flush snap latch and lock. Panelboards shall comply with NEMA PB 1 and UL 67.
   a. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box. Finish in manufacturer's standard gray enamel. When multiple panels are provided for a single site, provide all panes with the same key configuration. For outside locations, provide panels that allow hasp style lock in either energized or de-energized condition.
   b. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover with flush lock.

10. Trim: Surface or flush as required.

11. Directory: Typed or computer-printed card, with transparent protective cover in frame on back of door giving circuit numbers and area or equipment served.

12. Identification: Identify panelboards in accordance with Section 26 05 53, Identification for Electrical Systems. Identification shall indicate panel number and voltage.

13. Directory of Existing Panelboards: When adding or removing breakers or loads from existing panelboards, provide a new typed or computer-generated directory card, indicating the circuit numbers and equipment served.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine conditions under which the Work is to be installed and notify ENGINEER in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. Mounting: Install panelboards at locations shown or indicated. Set cabinets so that top branch circuit breaker is not over six feet above the floor.

B. Directory: Complete typewritten or computer-printed directory indicating items controlled by each circuit breaker and the size of feeder serving the panel.

C. Arrange circuits to balance the loads on the panelboards.

D. Identify panelboards in accordance with Section 26 05 53, Identification for Electrical Systems.

E. Install in accordance with Laws and Regulations, manufacturer's recommendations, and the Contract Documents. Verify proper installation prior to energizing panelboards.

END OF SECTION

SECTION 26 27 26.13

LOW-VOLTAGE RECEPTACLES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. Contractor shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install low-voltage receptacles.

B. Related Sections:

1. Section 26 05 05, General Provisions for Electrical Systems.

2. Section 26 05 53, Identification for Electrical Systems.

3. Section 26 05 37, Boxes.

1.2 REFERENCES

A. Standards referenced in this Section are:

1. UL 498, Standard for Attachment Plugs and Receptacles.

2. UL 514D, Cover Plates for Flush-Mounted Wiring Devices.

3. UL 943, Standard for Ground-Fault Circuit-Interrupters.

4. UL 1010, Standard for Receptacle-Plug Combinations for Use in Hazardous (Classified) Locations.

5. UL 1449, Standard for Surge Protective Devices.

1.3 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with the following:

1. Americans with Disabilities Act.

2. NEC Article 406, Receptacles, Cord Connectors, and Attachment Plugs (Caps).

1.4 SUBMITTALS

A. Action Submittals: Submit the following:

1. Product Data: Manufacturer's technical information for receptacles and cover plates proposed for use.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Receptacles:

1. Grounding receptacle, two-pole, three-wire, NEMA 5-20R configuration, ivory color. Extra Heavy Duty Industrial grade, with one-piece brass back strap with integral ground. Impact resistant nylon face and back body.
   a. Single:
      1) Products and Manufacturers: Provide one of the following:
         a) HBL5361I by Hubbell, Inc.
         b) 5361AI by Pass & Seymour/Legrand.
         c) Or equal.
   b. Duplex:
      1) Products and Manufacturers: Provide one of the following:
         a) HBL5362I by Hubbell, Inc.
         b) 5362AI by Pass & Seymour/Legrand.
         c) Or equal.
   c. Weather-resistant Duplex:
      1) UL-listed as weather-resistant.
      2) Products and Manufacturers: Provide one of the following:
         a) HBL5362IWR by Hubbell, Inc.
         b) WR5362A-I by Pass & Seymour/Legrand
         c) Or equal.

2. Provide Type 302 stainless steel cover-plate conforming to UL 514D. Provide weatherproof-while-in-use cover where shown on the Drawings as "WP" or "WPU", and provide where receptacles are located in wet or corrosive location.

3. Receptacles shall comply with UL 498.

B. Ground Fault Interrupting Receptacles:

1. Duplex grounding receptacle, two-pole, three-wire, NEMA 5-20R configuration, 125-volt AC, 20 amperes, gray color with ground fault circuit interrupting (GFCI) protection. Extra Heavy Duty Industrial Grade, tamper and weather resistant. Impact resistant nylon face and back body.

2. Continuous self test technology to test and monitor device functionality, and to disconnect power to receptacle if critical components are damaged and GFCI protection lost. With visual indicators to provide status of device.

3. Ground fault interrupting receptacles shall comply with UL 943.

4. Provide Type 302 stainless steel cover-plate conforming to UL 514D. Provide weatherproof-while-in-use cover where shown on the Drawings as “WP” or “WPU”, and provide where located in wet or corrosive location.

5. Products and Manufacturers: Provide one of the following:
   a. GF5362SGGY by Hubbell, Inc.
   b. 2097TRWRGRY by Pass & Seymour/Legrand.
   c. Or equal.

C. Weatherproof-While-In-Use Covers:

1. Where receptacles are installed in damp or wet locations as defined in area classification portion of Section 26 05 05, General Provisions for Electrical Systems, provide receptacles as specified in Paragraphs 2.1.A through 2.1.D of this Section, as applicable, with weatherproof-while-in-use covers as specified below.

2. Provide covers that are UL-listed, weatherproof while receptacle is in use, and are of ultraviolet-resistant construction suitable for outdoor use in accordance with NEC 406.

3. Material:
   a. Extra duty non-metallic covers. UV Rated polycarbonate. Corrosion resistant, non-conductive.
   b. Gasketed spring door type for wet and corrosive locations. Corner ball joint hinge for universal mounting capability.
   c. Stainless steel screws and hardware.

4. Products and Manufacturers: Provide one of the following:
   a. Hubbell/TayMac.
   b. Eaton/Crouse-Hinds.
   c. Leviton.
   d. Or equal.

D. Power and Special Receptacles: Provide receptacles with number of poles and voltage and current rating as shown or indicated. Coordinate with equipment plugs. Provide matching plug for each receptacle.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine conditions under which the Work is to be installed and notify Engineer in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. Non-hazardous Locations: Install receptacles at locations shown, in outlet or device boxes in accordance with Section 26 05 33.36, Outlet Boxes.

B. Install receptacles with ground pole in the down position.

C. Mount receptacles 18 inches above finished floor in non-hazardous locations and 4.5 feet above finished floor in hazardous locations, in accordance with the Americans with Disability Act, unless otherwise shown or indicated in the Contract Documents.

D. Install in conformance with Laws and Regulations.

E. Identification:

1. Identify each receptacle with circuit number and lighting panel number in accordance with Section 26 05 53, Identification for Electrical Systems.

2. Identify each receptacle with permanent phenolic tag. Tags shall include circuit number and lighting panel number.

END OF SECTION

SECTION 26 27 26.23

SNAP SWITCHES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. Contractor shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install snap switches for lighting and other systems.

B. Related Sections:

1. Section 26 05 53, Identification for Electrical Systems

2. Section 26 05 37, Boxes.

1.2 REFERENCES

A. Standards referenced in this Section are listed below:

1. UL 20, General Use Snap Switches.

1.3 QUALITY ASSURANCE

A. Regulatory Requirements

1. Americans with Disabilities Act

1.4 SUBMITTALS

A. Action Submittals: Submit the following:

1. Product Data: Manufacturer’s technical information for switches proposed for use.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Switches for Non-Hazardous Locations:

1. Single pole AC toggle switch, quiet type, 120/277-volt AC, 20 amperes, Ivory, extra heavy duty industrial grade. Nickle plated steel mounting strap.
   a. Products and Manufacturers: Provide one of the following:
      1) Catalog No. HBL1221I, by Hubbel, Inc.
      2) Catalog No. AH1221I, by Eaton/Arrow-Hart, Inc.
      3) Catalog No. PS20AC1I, by Pass & Seymour/Legrand
      4) Or equal.

2. Single pole, three-way AC toggle switch, quiet type, 120/277-volt AC, 20 amperes, Ivory, extra heavy duty industrial grade. Nickle plated steel mounting strap.
   a. Products and Manufacturers: Provide one of the following:
      1) Catalog No. HBL1223I, by Hubbell, Inc.
      2) Catalog No. AH1223I, by Eaton/Arrow-Hart, Inc.
      3) Catalog No. PS20AC3I, by Pass & Seymour/Legrand
      4) Or equal.

3. Single pole, four-way AC toggle switch, quiet type, 120/277-volt AC, 20 amperes, Ivory, extra heavy duty industrial grade. Nickle plated steel mounting strap.
   a. Products and Manufacturers: Provide one of the following:
      1) Catalog No. HBL1224I, by Hubbell, Inc.
      2) Catalog No. AH1224I, by Eaton/Arrow-Hart, Inc.
      3) Catalog No. PS20AC4I, by Pass & Seymour/Legrand
      4) Or equal.

4. Two-pole AC toggle switch, quiet type, 120/277-volt AC, 20 amperes, Ivory, extra heavy duty industrial grade. Nickle plated steel mounting strap.
   a. Products and Manufacturers: Provide one of the following:
      1) Catalog No. HBL1222I, by Hubbel, Inc.
      2) Catalog No. AH1222I, by Eaton/Arrow-Hart, Inc.
      3) Catalog No. PS20AC2I, by Pass & Seymour
      4) Or equal.

5. Switches in non-hazardous areas shall be UL-listed in accordance with UL 20.

B. Switch Covers:

1. Indoor covers shall be Type 304 stainless steel.

2. Outdoor, wet, or corrosive location covers shall be weatherproof and corrosion resistant.

C. Key Operated On-Off Switches:

1. Key operated switches shall be complete with legend plate and NEMA 4 enclosure and two keys for each switch.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine conditions under which the Work is to be installed and notify Engineer in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install switches at locations as shown or indicated in the Contract Documents in outlet or device boxes, in accordance with Section 26 05 33.36, Outlet Boxes.

B. Mount wall switches 4.0 feet above finished floor, in accordance with the Americans with Disability Act, unless otherwise noted.

C. Identify each switch with circuit number and lighting panel number. Identification shall be in accordance with Section 26 05 53, Identification for Electrical Systems.

END OF SECTION

SECTION 26 29 37

LOW-VOLTAGE COMBINATION MAGNETIC MOTOR STARTERS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install low-voltage combination magnetic motor starters.

B. Related Sections:

1. Section 26 05 05, General Provisions for Electrical Systems.

2. Section 26 05 53, Identification for Electrical Systems.

1.2 REFERENCES

A. Standards referenced in this Section are:

1. NEMA ICS 2, Controllers, Contactors and Overload Relays Rated 600 Volts.

2. NEMA 250, Enclosures for Electrical Equipment (1000 Volts Maximum).

1.3 SUBMITTALS

A. Action Submittals: Submit the following:

1. Shop Drawings:
   a. Listing of low-voltage combination magnetic motor starters to be furnished, listing for each the installation location, NEMA rating and enclosure size, and equipment to be controlled.
   b. Customized wiring diagrams for low-voltage combination magnetic motor starters.

2. Product Data:
   a. Manufacturer’s technical information, specifications, and standardized wiring diagrams for low-voltage combination magnetic motor starters proposed.

PART 2 - PRODUCTS

2.1 EQUIPMENT

A. Manufacturers: Provide products of one of the following:

1. Schneider Electric/Square D Company.
2. Allen Bradley Company.
3. General Electric Company.
4. Cutler-Hammer.
5. Or equal.

B. Design, fabricate, and test low-voltage combination magnetic motor starters in accordance with NEMA ICS 2 and NEMA 250.

C. General:

1. Type: Combination type with magnetic-only motor circuit protector with interrupting rating of not less than 65,000 ampere RMS symmetrical, unless otherwise indicated on the Drawings. Magnetic coil operated, NEMA horsepower rated, with thermal overload protection. Coil shall be rated 120 vac.
2. Enclosures: Panel enclosures shall be as required for area classifications specified in Section 26 05 05, General Provisions for Electrical Systems, unless otherwise indicated on the Drawings.
3. Functional Type: Full-voltage, single speed, non-reversing, unless otherwise shown or indicated on the Drawings.
4. Control power transformer fused and grounded on low-voltage (120 vac) side for each starter.
5. Auxiliary contacts for motor space heaters, remote status signals, and interlocks as shown or indicated on the Drawings and as required.
6. Overload Relays: Provide an overload relay for each motor starter. Overload relays shall be in accordance with:
   a. Thermal Overload Relays: Relays shall be thermal, bimetallic type, direct or current sensing. Relays shall include ambient compensation and be equipped with separate heater elements sized for full load amperes and service factor of actual motors furnished.
   b. Each overload relay shall be manual-reset type and include provisions for resetting by an insulating button on front of starter unit door.

c. Overload relay shall include normally open auxiliary contact for remote alarm purposes.
d. Size overload relay for full-load amperes and service factor of actual motors installed.

7. Provide nameplate identifying equipment controlled in accordance with Section 26 05 53, Identification for Electrical Systems.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine conditions under which Work will be installed and notify ENGINEER in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. General:

1. Install equipment in accordance with the Contract Documents, Laws and Regulations, and manufacturer's installation instructions.

2. Install equipment so that sufficient access and working space is provided for ready and safe operation and maintenance.

3. Securely fasten equipment to walls or other surfaces on which equipment is mounted. Provide suitable 1/4-inch spacers so that enclosure is not installed directly against walls. Provide supports to rigidly support equipment reasonably close to motor where no wall or surface capable of supporting equipment exists.

END OF SECTION

SECTION 26 51 00
INTERIOR LIGHTING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Interior luminaires.

B. LED lighting drivers.

C. Emergency LED Drivers.

D. Luminaire accessories.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.0

B. Section 26 05 37 - Boxes.

C. Section 26 09 24 – Lighting Controls.

1.3 REFERENCE STANDARDS

A. ANSI C82.11 - American National Standard for Lamp Ballasts - High Frequency Fluorescent Lamp Ballasts - Supplements; 2011.

B. IESNA LM-63 - ANSI Approved Standard File Format for Electronic Transfer of Photometric Data and Related Information; 2002 (Reaffirmed 2008).

C. IES LM-80 - Approved Method: Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays, and Modules; Illuminating Engineering Society; 2015.

D. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.

E. NECA/IESNA 500 - Standard for Installing Indoor Commercial Lighting Systems; 2006.

F. NECA/IESNA 502 - Standard for Installing Industrial Lighting Systems; 2006.

G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

H. NFPA 101 - Life Safety Code; 2015.

I. UL 924 - Emergency Lighting and Power Equipment; Current Edition, Including All Revisions.

J. UL 1598 - Luminaires; Current Edition, Including All Revisions.

K. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products; Current Edition, Including All Revisions.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, installed accessories, and ceiling compatibility; include model number nomenclature clearly marked with all proposed features.

1. Provide a typed index listing lighting fixture type designation, lighting fixture manufacturer, complete catalog number, quantity of LED drivers to be provided, type lens, modifications, and accessories. Arrange in order of lighting fixture designation.

2. LED Luminaires:
   a. Include estimated useful life, calculated based on IES LM-80 test data.

3. Provide electronic files of photometric data certified by a National Voluntary Laboratory Accreditation Program (NVLAP) lab or independent testing agency in IESNA LM-63 standard format for proposed substitutions.

4. For LED fixtures, provide fixtures that meet or exceed the tested total luminaire efficiency of the specified fixtures.

5. Include LED emergency drivers, including batteries and chargers.

6. Manufacturer’s verification of LED color consistency, indicating the LED source binning tolerance.

1.5 QUALITY ASSURANCE

A. Lighting Fixture Photometric Data Testing Laboratory Qualifications: Lighting fixture manufacturer's laboratory that is accredited under the NVLAP for Energy Efficient Lighting Products.

B. LED Lighting Fixture IES LM-79 Test Report: Submit test report on manufacturer's standard production model luminaire. Include all applicable and required data as outlined under "14.0 Test Report" in IES LM-79.

C. LED Lighting Fixture LM-80 Test Report: Submit report on manufacturer's standard production LED light source (package, array, or module). Include all applicable and required data as outlined under "8.0 Test Report" in IES LM-80.

D. LED Driver and Dimmer Switch Compatibility Certificate: Submit certification from the luminaire, driver, or dimmer switch manufacturer that ensures compatibility and operability between devices.

E. Each lighting fixture type shall have light sources binned within a 3-step MacAdam Ellipse to ensure color consistency among luminaires.

F. Provide materials and equipment that are products of manufacturers regularly engaged in the production of such products which are of equal material, design and workmanship. Products must have been in satisfactory commercial or industrial use for two years prior to bid opening. The two-year period must include applications of equipment and materials under similar circumstances and of similar size. The product must have been on sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the two-year period. Where two or more items of the same class of equipment are required, these items must be products of a single manufacturer; however, the component parts of the item need not be the products of the same manufacturer unless stated in this section.

1.6 WARRANTY

A. Warranty: Manufacturer and Installer agree to repair or replace components of lighting fixtures that fail in materials or workmanship within specified warranty period.

B. Warranty Period: 5 years from date of Substantial Completion, to include materials and fixture finish. Material warranty must include all drivers, and fixture replacement when more than 10 percent of LED sources in any lightbar or subassembly(s) are defective or non-starting.

PART 2 PRODUCTS

2.1 LUMINAIRE AND COMPONENTS, GENERAL REQUIREMENTS

A. Provide lighting fixtures complete with power supplies (drivers) and light sources. Provide design information including lumen output and design life in lighting fixture schedule on project plans for LED luminaires. LED lighting fixtures must meet the following minimum luminaire efficacy (LE): LED Troffers: 90 LPW

B. 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.

C. Factory-Applied Labels: Comply with UL 1598. Include recommended light sources. Locate labels where they will be readily visible to service personnel, but not seen from normal viewing angles when light sources are in place. Label shall include the following lamp characteristics: "USE ONLY" and include specific light source type, and CCT and CRI.

D. Recessed lighting fixtures shall comply with NEMA LE 4.

E. California Title 24 compliant.

F. Lighting fixtures must be listed with the DesignLights Consortium 'Qualified Products List' when falling into category of "General Application" luminaires, i.e. Interior Directional, Display Case, Troffer, Linear Ambient, or Low/High Bay. Requirements are shown in the Designlights Consortium "Technical Requirements Table" at https://data.energystar.gov/dataset/EPA-Recognized-Laboratories-ForLighting-Products/jgwf-7qrr.

G. Standards:

1. ENERGY STAR certified.

2. RoHS compliant.

3. Recessed luminaires shall comply with NEMA LE 4.

4. Provide Department of Energy 'Lighting Facts' label for each luminaire.

H. Networked Lighting Fixtures (Addressable, Wired):

1. Networked lighting fixtures shall support individual (unique) configuration of device settings and properties, with such configuration residing within the networked luminaires.

2. Networked lighting fixtures shall have distributed intelligence programming stored in non-volatile memory, such that following any loss of power the lighting control zones shall operate according to their defined default settings and sequence of operations.

3. Networked lighting fixtures located in different areas shall be able to transmit and track information within at least 128 system-wide control zones to support required sequences of operation that may span across multiple areas. Occupancy and photocell commands shall be available across a single controller, and switch commands shall be available across single or multiple controllers. These shall also be referred to as global control zones.

4. Networked lighting fixture shall have a mechanically integrated control device.

5. Networked LED lighting fixture shall have two RJ-45 ports available (via control device directly or incorporated RJ-45 splitter).

6. Networked LED lighting fixture shall be able to digitally network directly to other network control devices (sensors, photocells, switches, dimmers).

7. Networked LED lighting fixture shall provide low voltage power to other networked control devices (excluding EMG and CCT capable versions).

8. Basis of Design: Addressable Networked LED Lighting Fixtures shall be factory enabled with embedded networking capability, based on Acuity Brands nLight controls.

2.2 BASIS OF DESIGN

A. Furnish products as indicated in Lighting Fixture Schedule included on the drawings.

B. Substitutions: See Section 01 60 00 - Product Requirements, except where individual luminaire types are designated with substitutions not permitted. If substitution product and/or Manufacturer is proposed, submittal needs to clearly indicate that lighting fixture is a substitution and must clearly show compliance with being equivalent with Basis of Design product. If exceptions are taken based on nonequivalence than all exceptions must be identified in product submittal.

2.3 LUMINAIRES

A. Provide products that comply with requirements of NFPA 70.

B. Provide products that are listed and labeled as complying with UL 1598, where applicable.

C. Provide products listed, classified, and labeled as suitable for the purpose intended.

D. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, drivers, reflectors, lenses, housings and other components required to position, energize and protect the light source and distribute the light.

E. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.

F. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

2.4 LED DRIVERS

A. LED drivers must be electronic, UL Class 1, constant-current type and comply with the following requirements:

1. Output power (watts) and luminous flux (lumens) as shown in Lighting Fixture Schedule for each luminaire type to meet minimum luminaire efficacy (LE) value provided.

2. Power Factor (PF) greater than or equal to 0.9 over the full dimming range when provided.

3. Current draw Total Harmonic Distortion (THD) of less than 20 percent.

4. Class A sound rating.

5. Operable at input voltage of 120-277 volts at 60 hertz.

6. RoHS compliant.

7. Integral thermal protection that reduces or eliminates the output power if case temperature exceeds a value detrimental to the driver.

8. UL listed for dry or damp locations typical of interior installations.

9. Fully-dimmable using 0-10V control as indicated in Lighting Fixture Schedule.

2.5 LED LIGHT SOURCE

A. Correlated Color Temperature (CCT) of 3500 degrees K, unless otherwise indicated in the Lighting Fixture Schedule.

B. Minimum Color Rendering Index (CRI) R9 value of 90, unless otherwise indicated in the Lighting Fixture Schedule.

C. High power, white light output utilizing phosphor conversion (PC) process.

D. RoHS compliant.

E. Provide light source color consistency by utilizing a binning tolerance within a 3-step MacAdam ellipse.

2.6 LIGHTING FIXTURE SUPPORT

A. Comply with requirements in "Hangers and Supports for Electrical Systems" section for channel and angle iron supports and nonmetallic channel and angle supports.

B. Wires: ASTM A 641/A 641 M, Class 3, soft temper, zinc-coated steel, 12 gage (2.68 mm).

2.7 EMERGENCY LED DRIVERS

A. Description:

1. Single package that includes high temperature nickel cadmium battery, automatic charger and electronic control circuitry. Unit shall operate the scheduled light source at the specified power output for 90 minutes and then cutout to preserve battery; upon restoration of normal AC power the battery shall automatically fully recharge within 24 hours.

2. Galvanized metal case, compact design for low-profile luminaires.

3. Input shall be dual rated, 120/277 volts, approximately 4 watt normal load.

4. Output voltage shall be 15 – 52 VDC.

5. Package shall be UL listed, per UL924 - Emergency Lighting Equipment.

6. Units for shall operate LED light source, initial minimum output of 10 watts. These units shall include a test switch, an LED charging indicator, and they shall include self-testing circuitry and controls to automatically test the unit for 30 seconds every 28 days and will initiate a 90 minute discharge test once a year; should a problem be detected the indicator light shall flash at 1 to 2 second intervals and an audible alarm shall sound 4 times every 30 seconds.

B. Basis of Design: Bodine BSL310LPST.

C. Installation: Field, or factory installed by luminaire manufacturer; the LED shall be visible without opening luminaire. Contractor shall apply an adhesive 1/4 in. diameter black dot on the luminaire trim to identify the emergency units.

PART 3 EXECUTION

3.1 INSTALLATION

A. Coordinate locations of outlet boxes provided under Section 26 05 37 as required for installation of luminaires provided under this section.

B. Install products according to manufacturer's instructions.

C. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 1 (general workmanship), NECA 500 (commercial lighting), and NECA 502 (industrial lighting).

D. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.

E. Install accessories furnished with each luminaire.

F. Bond products and metal accessories to branch circuit equipment grounding conductor.

3.2 ADJUSTING

A. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by Architect. Secure locking fittings in place.

B. Aim and position adjustable emergency lighting unit lamps to achieve optimum illumination of egress path as required or as directed by Architect or authority having jurisdiction.

3.3 CLEANING

A. Clean surfaces according to NECA 500 (commercial lighting), NECA 502 (industrial lighting), and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

3.4 PROTECTION

A. Protect installed luminaires from subsequent construction operations.

END OF SECTION

DIVISION 27 – NOT USED

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

SECTION 28 46 20

ADDRESSABLE FIRE-ALARM SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes modifications and additions to existing systems.

B. The buildings currently have Siemens Cerberus fire alarm systems. The Service company is Fire Alarm Service Technology, Inc., (607) 733-0404.

1.2 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.3 SUMMARY

A. Section Includes but is not limited to:

1. Complete working fire and life safety alarm system.

2. All items indicated in this specification.

3. New items as indicated on the drawings.

4. Reuse of items as indicated on the drawings.

1.4 DEFINITIONS

A. EMT: Electrical Metallic Tubing.

B. FACP: Fire Alarm Control Panel.

C. HLI: High Level Interface.

D. NICET: National Institute for Certification in Engineering Technologies.

E. PC: Personal computer.

F. VESDA: Very Early Smoke-Detection Apparatus.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product, including furnished options and accessories.

1. Include construction details, material descriptions, dimensions, profiles, and finishes.

2. Include rated capacities, operating characteristics, and electrical characteristics.

B. Shop Drawings: For fire-alarm system.

1. Comply with recommendations and requirements in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.

2. Include plans, elevations, sections, details, and attachments to other work.

3. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and locations. Indicate conductor sizes, indicate termination locations and requirements, and distinguish between factory and field wiring.

4. Riser Wiring Diagram showing all equipment devices, device addresses, connections, control connections, remote notification connections and wire quantities and sizes.

5. Detail assembly and support requirements.

6. Include voltage drop calculations for notification-appliance circuits.

7. Include battery-size and power supply calculations.

8. Include input/output matrix.

9. Include statement from manufacturer that all equipment and components have been tested as a system and meet all requirements in this Specification and in NFPA 72.

10. Include performance parameters and installation details for each detector.

11. Verify that each duct detector is listed for complete range of air velocity, temperature, and humidity possible when air-handling system is operating.

12. Provide program report showing that air-sampling detector pipe layout balances pneumatically within the airflow range of the air-sampling detector.

13. Include plans, sections, and elevations of heating, ventilating, and air-conditioning ducts, drawn to scale; coordinate location of duct smoke detectors and access to them.
    a. Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators.
    b. Locate detectors according to manufacturer's written recommendations.
    c. Show field wiring required for HVAC unit shutdown on alarm.
    d. Show field wiring and equipment required for HVAC unit shutdown on alarm and override by firefighters' control system.

14. Include voice/alarm signaling-service equipment rack or console layout, grounding schematic, amplifier power calculation, and single-line connection diagram.

15. Include floor plans to indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits and point-to-point wiring diagrams. Clearly indicated Notification and Signaling Zones if present.

C. General Submittal Requirements:

1. Make submittals to Engineer prior to any submittal to Authority Having Jurisdiction.

2. If a Fire Alarm Construction Permit is required prior to the start of work described in this section, the permit shall be applied for and obtained after review and approved comments by the Engineer.

3. Shop Drawings shall be prepared by persons with the following qualifications:
    a. Trained and certified by manufacturer in fire-alarm system design.
    b. NICET-certified, fire-alarm technician; Level IV minimum.
    c. Licensed or certified by authorities having jurisdiction.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Seismic Qualification Data: Certificates, for fire-alarm control unit, 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.

C. Field quality-control reports.

1.7 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals.

1. In addition to items specified include the following and deliver copies to authorities having jurisdiction:
   a. Comply with the "Records" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
   b. Provide "Fire Alarm and Emergency Communications System Record of Completion Documents" according to the "Completion Documents" Article in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
   c. Complete wiring diagrams showing connections between all devices and equipment. Each conductor shall be numbered at every junction point with indication of origination and termination points.
   d. Riser diagram.
   e. Device addresses.
   f. Air-sampling system sample port locations and modeling program report showing layout meets performance criteria.
   g. Record copy of site-specific software.
   h. Provide "Inspection and Testing Form" according to the "Inspection, Testing and Maintenance" chapter in NFPA 72, and include the following:
      1) Equipment tested.
      2) Frequency of testing of installed components.
      3) Frequency of inspection of installed components.
      4) Requirements and recommendations related to results of maintenance.
      5) Manufacturer's user training manuals.
   i. Manufacturer's required maintenance related to system warranty requirements.
   j. Abbreviated operating instructions for mounting at fire-alarm control unit and each annunciator unit.

B. Software and Firmware Operational Documentation:

1. Software operating manuals.

2. Device address list.

1.8 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. Lamps for Remote Indicating Lamp Units: Quantity equal to 10 percent of amount installed, but no fewer than one unit.

2. Lamps for Strobe Units: Quantity equal to 10 percent of amount installed, but no fewer than one unit.

3. Smoke Detectors, Fire Detectors: Quantity equal to 10 percent of amount of each type installed, but no fewer than one unit of each type.

4. Detector Bases: Quantity equal to two percent of amount of each type installed, but no fewer than one unit of each type.

5. Keys and Tools: One extra set for access to locked or tamperproofed components.

6. Audible and Visual Notification Appliances: One of each type installed.

7. Fuses: Two of each type installed in the system. Provide in a box or cabinet with compartments marked with fuse types and sizes.

1.9 QUALITY ASSURANCE

A. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.

B. Installer Qualifications: Installation shall be by personnel certified by NICET as fire-alarm Level III or Level IV technician.

C. NFPA Certification: Obtain certification according to NFPA 72 by a UL-listed alarm company.

1.10 PROJECT CONDITIONS

A. Perform a full test of the existing system prior to starting work. Document any equipment or components not functioning as designed.

B. Interruption of Existing Fire-Alarm Service: Do not interrupt fire-alarm service to any facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary guard (“fire watch”) service during interruptions according to requirements indicated:

1. Notify Construction Manager no fewer than seven days in advance of proposed interruption of fire-alarm service.

2. Do not proceed with interruption of fire-alarm service without Construction Manager's written permission.

3. For systems connected to a Central Monitoring Station, provide required jumpers and bypass connections and/or programming to insure remaining systems will remain functional. Verify temporary work required with Construction Manager prior to installing devices, bypass connections or jumpers and/or making programming changes.

4. All temporary work must be tested to the satisfaction of the Construction Manager and, if required, the local Authority Having Jurisdiction (AHJ).

C. Use of Devices during Construction: Protect devices during construction unless devices are placed in service to protect the facility during construction.

D. For systems connected to a Central Monitoring Station, provide required jumpers and bypass connections and/or programming to insure remaining systems will remain functional.

1.11 SEQUENCING AND SCHEDULING

A. Existing Fire-Alarm Equipment: Maintain existing equipment fully operational until new equipment has been tested and accepted. As new equipment is installed, label it "NOT IN SERVICE" until it is accepted. Remove labels from new equipment when put into service, and label existing fire-alarm equipment "NOT IN SERVICE" until removed from the building.

1.12 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace fire-alarm system equipment and components that fail in materials or workmanship within specified warranty period.

1. Warranty Extent: All equipment and components not covered in the Maintenance Service Agreement.

2. Warranty Period: Five years minimum from date of Substantial Completion or Final Acceptance.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Source Limitations for Fire-Alarm System and Components: Components shall be compatible with, and operate as an extension of, existing system. Provide system manufacturer's certification that all components provided have been tested as, and will operate as, a system.

B. Noncoded, UL-certified addressable system, with multiplexed signal transmission and voice/strobe evacuation.

C. Automatic sensitivity control of certain smoke detectors.

D. All components provided shall be listed for use with the selected system.

E. 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.

2.2 SYSTEMS OPERATIONAL DESCRIPTION

A. Fire-alarm signal initiation shall be by one or more of the following devices:

1. Manual stations.
2. Heat detectors.
3. Smoke detectors.
4. Duct smoke detectors.
5. Carbon monoxide detectors.
6. Automatic sprinkler system water flow.
7. Fire-extinguishing system operation.
8. Fire standpipe system.

B. Fire-alarm signal shall initiate the following actions:

1. Continuously operate alarm notification appliances, including voice evacuation notices.
2. Identify alarm and specific initiating device at fire-alarm control unit.
3. Transmit an alarm signal to the remote alarm receiving station.

4. Release fire and smoke doors held open by magnetic door holders.

5. Activate voice/alarm communication system.

6. Switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.

7. Recall elevators to primary or alternate recall floors.

8. Activate elevator power shunt trip.

9. Activate emergency shutoffs for gas and fuel supplies.

10. Record events in the system memory.

11. Record events by the system printer.

12. Indicate device in alarm on the graphic annunciator.

C. Supervisory signal initiation shall be by one or more of the following devices and actions:

1. Valve supervisory switch.

2. Carbon Monoxide or Gas detection (see Zones below).

3. Elevator shunt-trip supervision.

4. Independent fire-detection and -suppression systems.

5. User disabling of zones or individual devices.

6. Loss of communication with any panel on the network.

D. System trouble signal initiation shall be by one or more of the following devices and actions:

1. Open circuits, shorts, and grounds in designated circuits.

2. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.

3. Loss of communication with any addressable sensor, input module, relay, control module, remote annunciator, printer interface, or Ethernet module.

4. Loss of primary power at fire-alarm control unit.

5. Ground or a single break in internal circuits of fire-alarm control unit.

6. Abnormal ac voltage at fire-alarm control unit.

7. Break in standby battery circuitry.

8. Failure of battery charging.

9. Abnormal position of any switch at fire-alarm control unit or annunciator.

10. Voice signal amplifier failure.

11. Hose cabinet door open.

E. System Supervisory Signal Actions:

1. Initiate notification appliances.

2. Identify specific device initiating the event at fire-alarm control unit.

3. Record the event on system printer.

4. After a time delay of 200 seconds, transmit a trouble or supervisory signal to the remote alarm receiving station.

5. Transmit system status to building management system.

6. Display system status on graphic annunciator.

2.3 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Fire-alarm control unit and raceways 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."

B. Zones – as indicated on drawings or as indicated below.

1. Unless indicated on the drawings, the entire building is a single general evacuation, notification and signaling zone.

2. Unless indicated on the drawings, an alarm event in any zone will generate a single general evacuation, which will include all notification and/or signaling zones.

3. Notification zones
   a. Notification zones are indicated on the drawings if present.
   b. If not indicated, notification zones are separated by the area that a Transponder serves.

c. Alarms in a notification zone will generate activation of the following in the notification zone:
    1) Air Handler Shutdown for air handlers supplying that notification zone.
    2) Smoke Damper activation for ducts in or serving the zone.
    3) Recall of elevators and activation of shut down or shunt trips as indicated below.
    4) Activation of gas shutoffs serving that zone.
    5) Activation of Smoke Control systems serving that Zone.
    6) Activation of flow sensing within that zone.
    7) All other activations will be general in nature.
d. Carbon Monoxide and Combustible Gas signals:
    1) These signals will be treated as Supervisory signals except in the Notification Zone where the signal is generated.
    2) Within the Notification Zone only, these signals are treated as an evacuation alarm, initiating the appropriate notification devices in the Notification Zone.
    3) Notification within the Notification Zone will be with Carbon Monoxide (“ALERT”) notification devices.

4. Signaling zones
    a. Signaling zones may be defined on the drawings, if present.

2.4 FIRE-ALARM CONDUIT AND CABLE

A. Conduit

1. All fire alarm cable may be placed in conduit as indicated.

2. Conduit shall be in accordance with NFPA 70 (NEC) and the specifications of conduit.

3. Conduit fill shall not exceed 40 percent of interior cross sectional area.

4. Cable must be separated from any open conductors of power and/or Class 1 circuits. Fire alarm cable shall not be placed in any conduit, junction box or raceway containing non-fire alarm conductors.

5. Conduit shall be 3/4 inch minimum.

B. Cable mounting

1. Cabling not indicated as required to be in conduit shall be routed in aluminum bridle rings, no more than 6 feet apart, or routed in specifically indicated cable trays, attached to structural members and shall not be draped or supported directly on mechanical, architectural or structural items.

2. Fire alarm cabling shall not be supported or draped over non-structural elements such as heating/ventilation devices.

3. All connections will be enclosed in metal junction boxes. All devices will be mounted using metal or plastic junction boxes consistent with the area of installation and routing used.

C. Wire/Cable:

1. All fire alarm system wiring shall be new except as noted on the contract drawings.

2. Wiring shall be in accordance with all state, local, national or user codes and as recommended by the manufacturer of the fire alarm system. Number and size of conductors shall be as recommended by the fire alarm system manufacturer and as approved by the Architect/Engineer. Fire Alarm system cabling shall not be less than:
   a. Fire Alarm wiring/cabling shall not be less than 18 AWG for Initialing Device Circuits (IDC).
   b. Fire Alarm wiring/cabling shall not be less than 16 AWG for Notification Appliance Circuits (NAC).
   c. Fire Alarm wiring/cabling shall not be less than 14 AWG for Relay, Power and Auxiliary Device Circuits.
   d. Fire Alarm wiring/cabling shall not be less than 18 AWG for Voice Notification Appliance Circuits.
   e. Fire Alarm wiring/cabling shall not be less than 14 AWG for remote node communications.
   f. Cabling shall be shielded/twisted pair for both IDC and NAC circuit.

3. All wire and/or cable shall be listed and/or approved by a recognized testing agency for use with a protective signaling system.

4. Fire alarm cabling and wire shall be rated as FPLP (Plenum Rated) in all locations.

D. Cabling not indicated as required to be in conduit shall be routed in aluminum bridle rings, no more than 6 feet apart, or routed in specifically indicated cable trays, attached to structural members and shall not be draped or supported directly on mechanical, architectural or structural items.

2.5 FIRE-ALARM CONTROL UNIT (FACU)

A. The existing Fire Alarm Control Unit is: Siemens Cerberus Pro. All devices shall be compatible with the existing system.

B. Initiating-Device, Notification-Appliance, and Signaling-Line Circuits:

1. Pathway Class Designations: NFPA 72, Class B.

2. Pathway Survivability: Level 0.

3. Install no more than 100 addressable devices on each signaling-line circuit.

C. Smoke-Alarm Verification:

1. Initiate audible and visible indication of an "alarm-verification" signal at fire-alarm control unit.

2. Activate an approved "alarm-verification" sequence at fire-alarm control unit and detector.

3. Record events by the system printer.

4. Sound general alarm if the alarm is verified.

5. Cancel fire-alarm control unit indication and system reset if the alarm is not verified.

6. Verify sequence with owner.

D. A “Walk Test” shall be available at the control panel and may be optionally programmed into remote annunciator panels. The actuation of the “Walk Test” mode shall cause:

1. The remote central monitoring station connection shall be bypassed.

2. Only audible and visual appliances shall be operated. Other alarm functions (elevator recall, HVAC shutdown, etc.) shall not be affected.

3. Walk Test modes shall be selectable by entire system or by circuit, circuits or zones.

4. Actual alarms received during a “Walk Test” shall cause the control panel to go into alarm and shall override the “Walk “Test” mode.

5. The control panel shall show trouble and supervisory conditions.

6. The “Walk Test” activation of any initiation device shall cause the audible signals to activate for two seconds or other Engineer approved sound.

7. The panel shall automatically reset itself after signaling is complete.

8. The control panel shall automatically return to normal condition if no activity on a “Walk Test” circuit occurs for a period of 30 minutes.

E. Notification-Appliance Circuit:

1. Audible appliances shall sound in a three-pulse temporal pattern, as defined in NFPA 72.

2. Where notification appliances provide signals to sleeping areas, the alarm signal shall be a 520-Hz square wave with an intensity 15 dB above the average ambient sound level or 5 dB above the maximum sound level, or at least 75 dBA, whichever is greater, measured at the pillow.

3. Visual alarm appliances shall flash in synchronization where multiple appliances are in the same field of view, as defined in NFPA 72.

F. Elevator Recall:

1. Elevator recall shall be initiated only by one of the following alarm-initiating devices:
   a. Elevator lobby detectors except the lobby detector on the designated floor.
   b. Smoke detector in elevator machine room.
   c. Detectors in elevator hoistway.

2. Elevator controller shall be programmed to move the cars to the alternate recall floor if lobby detectors located on the designated recall floors are activated.

3. Water-flow alarm connected to sprinkler in an elevator shaft and elevator machine room shall shut down elevators associated with the location without time delay.
   a. Water-flow switch associated with the sprinkler in the elevator pit may have a delay to allow elevators to move to the designated floor.

G. Door Controls: Door hold-open devices that are controlled by smoke detectors at doors in smoke-barrier walls shall be connected to fire-alarm system.

H. Remote Smoke-Detector Sensitivity Adjustment: Controls shall select specific addressable smoke detectors for adjustment, display their current status and sensitivity settings, and change those settings. Allow controls to be used to program repetitive, time-scheduled, and automated changes in sensitivity of specific detector groups. Record sensitivity adjustments and sensitivity-adjustment schedule changes in system memory, and print out the final adjusted values on system printer.

I. Transmission to Remote Alarm Receiving Station: Automatically transmit alarm, supervisory, and trouble signals to a remote alarm station.

J. Voice/Alarm Signaling Service: Central emergency communication system with redundant microphones, preamplifiers, amplifiers, and tone generators provided in a separate cabinet located in the fire command center.

1. Indicate number of alarm channels for automatic, simultaneous transmission of different announcements to different zones or for manual transmission of announcements by use of the central-control microphone. Amplifiers shall comply with UL 1711.
   a. Allow the application of, and evacuation signal to, indicated number of zones and, at the same time, allow voice paging to the other zones selectively or in any combination.
   b. Programmable tone and message sequence selection.
   c. Standard digitally recorded messages for "Evacuation" and "All Clear."
   d. Generate tones to be sequenced with audio messages of type recommended by NFPA 72 and that are compatible with tone patterns of notification-appliance circuits of fire-alarm control unit.

2. Status Annunciator: Indicate the status of various voice/alarm speaker zones and the status of firefighters' two-way telephone communication zones.

3. Preamplifiers, amplifiers, and tone generators shall automatically transfer to backup units, on primary equipment failure.

K. Instructions: Computer printout or typewritten instruction card mounted behind a plastic or glass cover in a stainless-steel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. Briefly describe the functional operation of the system under normal, alarm, and trouble conditions.

2.6 MANUAL FIRE-ALARM BOXES

A. Ensure appliance is compatible with Fire Alarm Control Unit.

B. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38. Boxes shall be finished in red with molded, raised-letter operating instructions in contrasting color; shall show visible indication of operation; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.

1. Double-action mechanism requiring two actions to initiate an alarm, pull-lever type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.

2. Station Reset: Key- or wrench-operated switch.

2.7 SYSTEM SMOKE DETECTORS

A. Ensure appliance is compatible with Fire Alarm Control Unit

B. General Requirements for System Smoke Detectors:

1. Comply with UL 268; operating at 24-V dc, nominal.

2. Detectors shall be four-wire type.

3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

4. Base Mounting: Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring.

5. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.

6. Integral Visual-Indicating Light: LED type, indicating detector has operated and power-on status.

7. Remote Control: Unless otherwise indicated, detectors shall be digital-addressable type, individually monitored at fire-alarm control unit for calibration, sensitivity, and alarm condition and individually adjustable for sensitivity by fire-alarm control unit.
   a. Rate-of-rise temperature characteristic of combination smoke- and heat-detection units shall be selectable at fire-alarm control unit for 15 or 20 deg F (8 or 11 deg C) per minute.
   b. Fixed-temperature sensing characteristic of combination smoke- and heat-detection units shall be independent of rate-of-rise sensing and shall be settable at fire-alarm control unit to operate at 135 or 155 deg F (57 or 68 deg C).
   c. Multiple levels of detection sensitivity for each sensor.
   d. Sensitivity levels based on time of day.

C. Photoelectric Smoke Detectors:

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.

2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
   a. Primary status.
   b. Device type.
   c. Present average value.
   d. Present sensitivity selected.
   e. Sensor range (normal, dirty, etc.).

D. Ionization Smoke Detector:

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.

2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
   a. Primary status.
   b. Device type.
   c. Present average value.
   d. Present sensitivity selected.
   e. Sensor range (normal, dirty, etc.).

E. Duct Smoke Detectors: Photoelectric type complying with UL 268A.

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.

2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
   a. Primary status.
   b. Device type.
   c. Present average value.
   d. Present sensitivity selected.
   e. Sensor range (normal, dirty, etc.).

3. Weatherproof Duct Housing Enclosure: NEMA 250, Type 4X; NRTL listed for use with the supplied detector for smoke detection in HVAC system ducts.

4. Each sensor shall have multiple levels of detection sensitivity.

5. Sampling Tubes: Design and dimensions as recommended by manufacturer for specific duct size, air velocity, and installation conditions where applied.

6. Relay Fan Shutdown: Fully programmable relay rated to interrupt fan motor-control circuit.

2.8 CARBON MONOXIDE DETECTORS

A. General: Carbon monoxide detector listed for connection to fire-alarm system.

1. Mounting: Adapter plate for outlet box mounting.

2. Testable by introducing test carbon monoxide into the sensing cell.

3. Detector shall provide alarm contacts and trouble contacts.

4. Detector shall send trouble alarm when nearing end-of-life, power supply problems, or internal faults.

5. Comply with UL 2075.

6. Locate, mount, and wire according to manufacturer's written instructions.

7. Provide means for addressable connection to fire-alarm system. Connection will allow for variable level measurement to allow for selected control of devices.

8. Test button simulates an alarm condition.

9. Provide alarm condition upon NYS Building Code concentration values unless indicated.

10. Alarm condition will activate appropriate notification devices within the area of sensing and directly outside and visible from all entrances to that area.

2.9 HEAT DETECTORS

A. Ensure appliance is compatible with Fire Alarm Control Unit.

B. General Requirements for Heat Detectors: Comply with UL 521.

1. Temperature sensors shall test for and communicate the sensitivity range of the device.

C. Heat Detector, Combination Type: Actuated by either a fixed temperature of 135 deg F (57 deg C) or a rate of rise that exceeds 15 deg F (8 deg C) per minute unless otherwise indicated.

1. Mounting: Twist-lock base interchangeable with smoke-detector bases.

2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

2.10 NOTIFICATION APPLIANCES

A. Ensure notification appliances are compatible with Fire Alarm Control Unit.

B. Notification Devices shall have built in light and sound sensors to allow for testing and confirmation of proper operation without being at location of devices.

C. General Requirements for Notification Appliances: Connected to notification-appliance signal circuits, zoned as indicated, equipped for mounting as indicated, and with screw terminals for system connections.

1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly, equipped for mounting as indicated, and with screw terminals for system connections.

D. Horns: Electric-vibrating-polarized type, 24-V dc; with provision for housing the operating mechanism behind a grille. Comply with UL 464. Horns shall produce a sound-pressure level of 90 dBA, measured 10 feet (3 m) from the horn, using the coded signal prescribed in UL 464 test protocol. Synchronize coded lights with temporal pattern, synchronized with other indicator devices, synchronized with visible output is present, and coded as required by NFPA 72.

E. Visible Notification Appliances: Xenon strobe lights complying with UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" or “ALERT” (for CO or Combustible Gas) is engraved in minimum 1-inch- (25-mm-) high letters on the lens.

1. Rated Light Output:
   a. 75 cd, unless otherwise indicated on the Drawings.
      1) Test and verify compliance with NFPA 72 after installation.

2. Mounting: Wall mounted unless otherwise indicated.

3. Flashing shall be in a temporal pattern, synchronized with other notification units and coded as required by NFPA 72. Fire alarm devices shall be Temporal 3 and Alert Devices shall be Temporal 4.

4. Strobe Leads: Factory connected to screw terminals.

5. Mounting Faceplate: Factory finished,
   a. Red for Fire with white light
   b. White for Alert with yellow light.

F. Voice/Tone Notification Appliances:

1. Comply with UL 1480.

2. Speakers for Voice Notification: Locate speakers for voice notification to provide the intelligibility requirements of the "Notification Appliances" and "Emergency Communications Systems" chapters in NFPA 72.

3. High-Range Units: Rated 2 to 15 W.

4. Low-Range Units: Rated 1 to 2 W.

5. Mounting: surface mounted.

6. Matching Transformers: Tap range matched to acoustical environment of speaker location.

7. Adjust volume for each voice/tone appliance. Test and verify compliance with NFPA 72 after installation.

8. Tones shall be in a temporal pattern, synchronized with other notification units and coded as required by NFPA 72. Fire alarm devices shall be Temporal 3 and Alert Devices shall be Temporal 4.

2.11 MAGNETIC DOOR HOLDERS

A. Description: Units are equipped for wall or floor mounting as indicated and are complete with matching doorplate.

1. Electromagnets: Require no more than 3 W to develop 25-lbf (111-N) holding force.

2. Wall-Mounted Units: Flush mounted unless otherwise indicated.

3. Rating: 24-V ac or dc. Powered from Fire Alarm System power supply.

B. Material and Finish: Match door hardware.

2.12 ADDRESSABLE INTERFACE DEVICE

A. Ensure interfaces are compatible with Fire Alarm Control Unit.

B. General:

1. Include address-setting means on the module.

2. Store an internal identifying code for control panel use to identify the module type.

3. Listed for application indicated.

C. Monitor Module: Microelectronic module providing a system address for alarm-initiating devices for wired applications with normally open contacts.

D. Control Module:

1. Operate notification devices not indicated above.

2. Initiate elevator recall.

3. Connect to elevator shunt trip for power shutdown after recall.

4. Signal to HVAC units to shut down fans as indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions for compliance with requirements for ventilation, temperature, humidity, and other conditions affecting performance of the Work.

1. Verify that manufacturer's written instructions for environmental conditions have been permanently established in spaces where equipment and wiring are installed, before installation begins.

B. Examine roughing-in for electrical connections to verify actual locations of connections before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 EQUIPMENT INSTALLATION

A. Comply with NFPA 72, NFPA 101, and requirements of authorities having jurisdiction for installation and testing of fire-alarm equipment. Install all electrical wiring to comply with requirements in NFPA 70 including, but not limited to, Article entitled, "Fire Alarm Systems."

1. Devices placed in service before all other trades have completed cleanup shall be replaced.

2. Devices installed but not yet placed in service shall be protected from construction dust, debris, dirt, moisture, and damage according to manufacturer's written storage instructions.

B. Connecting to Existing Equipment: Verify that existing fire-alarm system is operational before making changes or connections.

1. Connect new equipment to existing control panel in existing part of the building.

2. Connect new equipment to existing monitoring equipment at the supervising station.

3. Expand, modify, and supplement existing control and monitoring equipment as necessary to extend existing control and monitoring functions to the new points. New components shall be capable of merging with existing configuration without degrading the performance of either system.

C. Install wall-mounted equipment, with tops of cabinets not more than 78 inches (1980 mm) above the finished floor.

D. Manual Fire-Alarm Boxes:

1. Install manual fire-alarm box in the normal path of egress within 60 inches (1520 mm) of the exit doorway.

2. Mount manual fire-alarm box on a background of a contrasting color.

3. The operable part of manual fire-alarm box shall be between 42 inches (1060 mm) and 48 inches (1220 mm) above floor level. All devices shall be mounted at the same height unless otherwise indicated.

E. Smoke- or Heat-Detector Spacing:

1. Comply with the "Smoke-Sensing Fire Detectors" section in the "Initiating Devices" chapter in NFPA 72, for smoke-detector spacing.

2. Comply with the "Heat-Sensing Fire Detectors" section in the "Initiating Devices" chapter in NFPA 72, for heat-detector spacing.

3. Smooth ceiling spacing shall not exceed 30 feet (9 m).

4. Spacing of detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas shall be determined according to Annex A or Annex B in NFPA 72.

5. HVAC: Locate detectors not closer than 36 inches (910 mm) from air-supply diffuser or return-air opening.

6. Lighting Fixtures: Locate detectors not closer than 12 inches (300 mm) from any part of a lighting fixture and not directly above pendant mounted or indirect lighting.

F. Install a cover on each smoke detector that is not placed in service during construction. Cover shall remain in place except during system testing. Remove cover prior to system turnover.

G. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of duct. Tubes more than 36 inches (9100 mm) long shall be supported at both ends.

1. Do not install smoke detector in duct smoke-detector housing during construction. Install detector only during system testing and prior to system turnover.

H. Remote Status and Alarm Indicators: Install in a visible location near each smoke detector, sprinkler water-flow switch, and valve-tamper switch that is not readily visible from normal viewing position.

I. Audible Alarm-Indicating Devices: Install not less than 6 inches (150 mm) below the ceiling. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille. Install all devices at the same height unless otherwise indicated.

J. Visible Alarm-Indicating Devices: Install adjacent to each alarm bell or alarm horn and at least 6 inches (150 mm) below the ceiling. Install all devices at the same height unless otherwise indicated.

K. Device Location-Indicating Lights: Locate in public space near the device they monitor.

3.3 PATHWAYS

A. Pathways above recessed ceilings and in nonaccessible locations may be routed exposed.

1. Exposed pathways located less than 96 inches (2440 mm) above the floor shall be installed in EMT.

B. Exposed EMT shall be painted red enamel.

3.4 CONNECTIONS

A. For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions, comply with requirements in Section labeled "Door Hardware." Connect hardware and devices to fire-alarm system.

1. Verify that hardware and devices are listed for use with installed fire-alarm system before making connections.

B. Make addressable connections with a supervised interface device to all devices and systems shown. Install the interface device less than 36 inches (910 mm) from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.

3.5 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals.

B. Install framed instructions in a location visible from fire-alarm control unit.

3.6 GROUNDING

A. Ground fire-alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.

B. Ground shielded cables at the control panel location only. Insulate shield at device location.

3.7 FIELD QUALITY CONTROL

A. Field tests shall be witnessed by authorities having jurisdiction.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

C. Perform tests and inspections.

D. Perform the following tests and inspections with the assistance of a factory-authorized service representative:

1. Visual Inspection: Conduct visual inspection prior to testing.
   a. Inspection shall be based on completed record Drawings and system documentation that is required by the "Completion Documents, Preparation" table in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
   b. Comply with the "Visual Inspection Frequencies" table in the "Inspection" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.

2. System Testing: Comply with the "Test Methods" table in the "Testing" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.

3. Test audible appliances for the public operating mode according to manufacturer's written instructions. Perform the test using a portable sound-level meter complying with Type 2 requirements in ANSI S1.4. Verify compliance with NFPA 72.

4. Test audible appliances for the private operating mode according to manufacturer's written instructions. Verify compliance with NFPA 72.

5. Test visible appliances for the public operating mode according to manufacturer's written instructions. Verify compliance with NFPA 72.

6. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" section of the "Fundamentals" chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.

E. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances. Testing will be same as initial system testing per NFPA 72.

F. Fire-alarm system will be considered defective if it does not pass tests and inspections.

G. Prepare test and inspection reports.

H. Maintenance Test and Inspection: Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.

I. Annual Test and Inspection: One year after date of Substantial Completion, test fire-alarm system complying with visual and testing inspection requirements in NFPA 72. Use forms developed for initial tests and inspections.

3.8 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system.

END OF SECTION

DIVISION 31 – EARTHWORK

SECTION 31 10 00

SITE PREPARATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Clearing and protection of vegetation.

B. Removal of existing debris.

1.02 RELATED REQUIREMENTS

A. Section 01 10 00 - Summary: Limitations on Contractor's use of site and premises.

B. Section 01 10 00 - Summary: Sequencing and staging requirements.

C. Section 01 50 00 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.

D. Section 01 57 13 - Temporary Erosion and Sediment Control.

E. Section 01 70 00 - Execution Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products.

F. Section 31 20 00 - Earthmoving: Topsoil removal.

G. Section 31 20 00 - Earthmoving: Fill material for filling holes, pits, and excavations generated as a result of removal operations.

1.03 DEFINITIONS

A. Clearing shall be defined as the removal and disposal of trees, brush, vines, stumps, down timber, rotten wood, rubbish, any other vegetation, structures, concrete and objectionable material from surface areas within the Contractor's work area and as directed by the Owner’s Representative.

B. Topsoil Stripping shall be defined as the excavation and stockpiling on site of all topsoil necessary to complete the project.

C. Site grading consists of excavation, backfilling and grading to smoothly shape excavated slopes, embankment and fill slopes, and work areas to remove irregularities and to provide positive drainage during construction and for restoring the site.

D. Tree Protection Zone shall be defined as an area surrounding individual trees or groups of trees to be protected during construction, and defined by the drip line of individual tress or the perimeter drip line of group of trees, unless otherwise indicated.

1.04 MATERIAL OWNERSHIP

A. Except for stripped topsoil, chipped tree materials, or other materials indicated to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Site Plan: The Contractor shall submit its plan, for review by the Owner's Representative, for all clearing, topsoil stripping, and site grading as required to complete the work under this contract, also showing:

1. Vegetation removal limits.

2. Limits of existing pavement removals and replacements.

3. Limits of existing utility removals and replacements

1.06 QUALITY ASSURANCE

A. Clearing Firm: Company specializing in the type of work required.

1. Minimum of 5-years of documented experience.

1.07 PROJECT CONDITIONS

A. Occupancy: Owner may be continuously occupying buildings or areas immediately adjacent to areas of the site work. Conduct site work in a manner that will minimize need for disruption of the Owner's normal operations. Provide minimum of 72-hours advance notice to Owner of activities which will impact Owner's normal operations.

B. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. All site access shall be strictly limited to the work areas shown on Plan C-100: Removals Plan. Staging areas shall be coordinated with the Owner prior to the start of work. No other areas shall be made available for use or occupation without written consent of Owner.

2. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.

3. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

C. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.

1. All signs and light fixtures are to be salvaged and turned over to Owner.

D. Notify utility locator service for area where project is located before site clearing.

E. Protections: Provide and maintain temporary barricades and other forms of protection as required to protect Owner's personnel and general public from injury due to site work.

1. Provide and maintain protective measures as required to maintain free and safe passage of Owner's personnel and the general public to and from occupied portions of on-site buildings.

2. Protect from damage existing work that is to remain in place and becomes exposed during removal operations.

3. Protect all trees and shrubs unless noted on plans to be removed.

4. Remove protections at completion of work.

F. Do not commence site clearing operations until all required temporary erosion and sedimentation control measures are in place.

G. Damages: Promptly repair damages caused to adjacent facilities by the site work at No Additional Cost to the Owner.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 SITE INVESTIGATION

A. Visit site before bidding and inform self of site conditions affecting work. No allowance will be made in the work of this contract for failing to determine site conditions.

B. Verify locations and protect utilities and structures, whether or not shown on the drawings. Existing utilities and structures shown on the drawings are for the Contractor's convenience and locations are not guaranteed.

C. Verify survey information given on drawings. Notify the Architect and/or Engineer of any and all discrepancies prior to commencing work. Commencement of work will be construed as complete acceptance of survey information.

D. Locate and protect from disturbance existing survey monuments, pins, marker and benchmarks whether or not shown on drawings. When any disturbance or damage occurs, notify Architect and/or Engineer in writing within 24-hours. Describe nature of disturbance or damage and date first occurred. Provide copies to applicable government and municipal agencies. Pay costs for restoring monument to satisfaction of said agencies, at no additional expense to the Owner.

E. Photographic documentation: Photographically document existing features which, may be affected by the construction, inside and outside the contract limit line. Existing features include, but are not limited to: structures, pavements, curbs, utilities, lawns and vegetation, especially individual trees which are over six (6) inches in diameter and noted to remain on the drawings. Also, particular attention shall be paid to the construction access, stockpile and haul road areas. Provide an electronic copy of all photographs to the Owner's Representative prior to commencement of construction activities.

3.02 SITE CLEARING

A. Comply with other requirements specified in Section 01 70 00.

B. Protect and maintain benchmarks and survey control points from disturbance during construction. Provide erosion-control measures as specified on the erosion control and sedimentation plan.

C. Locate and clearly flag trees and vegetation to remain and protect trees and vegetation to remain in accordance with the requirements of Section 3.4 of this specification.

D. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to Owner.

E. Minimize production of dust due to clearing operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

3.03 EXISTING UTILITIES AND BUILT ELEMENTS

A. Contact all utility companies through Dig Safely New York (UFPO) at 1-800-962-7962 and the Owner which might have installations in the area to determine location of all utilities and structures. The Contractor is responsible to contact all utility owners whether or not they are part of the committee mentioned above.

B. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits. The Contract Drawings may not define all above ground or below ground utilities, structures, wells and other existing facilities at, or adjacent to the project site and work area. The Contractor shall identify, properly locate and protect all utilities, underground structures, above ground structures and appurtenances on, or adjacent to the project site. The Contractor shall also verify the location of all existing utilities prior to excavating for new work by coordinating with the Owner's Representative.

C. Protect existing utilities to remain from damage.

D. Do not disrupt public utilities without permit from authority having jurisdiction.

E. Protect existing structures and other elements that are not to be removed.

3.04 VEGETATION

A. Scope: Remove trees, shrubs, brush, and stumps in areas indicated on the project drawings.

B. Do not remove or damage vegetation beyond the limits indicated on drawings.

1. 10-feet each side of surface walkways, patios, surface parking, and utility lines less than 12-inches in diameter.

2. 15-feet each side of roadway curbs and main utility trenches.

3. Exception: Specific trees and vegetation indicated on drawings to be removed.

C. Erect and maintain a temporary, highly visible, green construction safety fence around drip line of individual trees or around perimeter drip line of groups of trees to remain. Remove fence when construction is complete:

1. Do not store construction materials, debris, or excavated material within drip line of remaining trees.

2. Do not permit vehicles, equipment, or foot traffic within drip line of remaining trees.

D. Do not excavate within drip line of trees, unless otherwise indicated.

E. Where excavation for new construction is required within drip line of trees, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.

1. Cover exposed roots with burlap and water regularly.

2. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

3. Cover exposed roots with wet burlap to prevent roots from drying out. Backfill with soil as soon as possible.

F. Vegetation Removed: Do not burn, bury, landfill, or leave on site, except as indicated.

1. Chip, grind, crush, or shred vegetation for mulching, composting, or other purposes; preference should be given to on-site uses.

2. Trees: Sell if marketable; if not, treat as specified for other vegetation removed; remove stumps and roots to depth of 18-inches.

3. Existing Stumps: Treat as specified for other vegetation removed; remove stumps and roots to depth of 18-inches.

4. Sod: Re-use on site if possible; otherwise sell if marketable, and if not, treat as specified for other vegetation removed.

5. Fill holes left by removal of stumps and roots, using suitable fill material, with top surface neat in appearance and smooth enough not to constitute a hazard to pedestrians.

G. Dead Wood: Remove all dead trees (standing or down), limbs, and dry brush within project limits; treat as specified for vegetation removed.

H. Restoration: If vegetation outside removal limits or within specified protective fences is damaged or destroyed due to subsequent construction operations, replace at no cost to Owner.

3.05 PROTECTION AND RESTORATION

A. The Contractor shall protect all utilities, manholes, trees, plant growth and other features unless stated or shown to be removed.

B. The Contractor shall protect all sidewalks and walkways along the permitted access route and in the immediate vicinity of the project. Any damage to the sidewalks and concrete shall be repaired at no cost to the Owner and to Owner's satisfaction using materials of matching color and patterns.

C. Manholes, trees, shrubs and plants, utilities, fences and other features damaged by the Contractor's operations shall be replaced by the Contractor at no additional cost to the Owner.

D. The Contractor shall not trespass beyond the Contract Limits shown on the Contract Drawings. Protect all adjacent properties and structures and use every means possible to prevent erosion, flooding, undermining, excessive excavation, or other damage during any construction or site improvement operations. Repair all damage in a manner specified by, and to the satisfaction of, the Owner's Representative.

E. The Contractor shall control dust in all work or occupied areas by sprinkling with potable water or by other methods in accordance with applicable laws and approved by the Owner's Representative. Petroleum products shall not be utilized.

F. Upon completion of work, the Contractor shall remove protective materials, enclosures and guards.

G. Provide traffic control as required, in accordance with the New York State Department of Transportation "A Manual of Uniform Traffic Control Devices".

H. Protect benchmarks, property corners and all other survey monuments from damage or displacement. Any survey markers removed by the Contractor shall be replaced by a licensed land surveyor at no cost to the Owner.

3.06 UTILITIES

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Owner Representative not less than two days in advance of proposed utility interruptions.

2. Do not proceed with utility interruptions without Owner Representative's written permission.

3.07 CLEARING

A. The Contractor shall perform clearing within the limits shown on the Contract Drawings or as directed by the Owner's Representative.

B. Do not remove or damage vegetation beyond the limits indicated on Contract Drawings.

C. Install substantial, highly visible fences at least 3-feet high to prevent inadvertent damage to vegetation to remain at vegetation removal limits.

D. Vegetation Removed: Do not burn, bury, landfill, or leave on site, except as indicated.

1. Chip, grind, crush, or shred vegetation for mulching, composting, or other purposes; preference should be given to on-site uses.

2. Fill holes left by removal of stumps and roots, using suitable fill material, with top surface neat in appearance and smooth enough not to constitute a hazard to pedestrians.

E. Restoration: If vegetation outside removal limits or within specified protective fences is damaged or destroyed due to subsequent construction operations, replace at no additional cost to OWNER.

3.08 TOPSOIL STRIPPING

A. The Contractor shall perform topsoil stripping within the areas to be filled or excavated as shown on the Contract Drawings and as directed by the Owner's Representative. The Contractor shall stockpile and maintain all excavated topsoil at a location off-site until final site quantities needed for project completion are determined. Topsoil brought on site for reuse shall be stockpiled in a location approved by the Owner's Representative. Any stockpiles in place for more than **7-days** shall be stabilized and seeded in accordance with the NYSDEC Regulations, as shown on the ESC plans, and in accordance with Section 31.

3.09 SITE GRADING DURING CONSTRUCTION

A. The Contractor shall grade work areas as necessary during construction to divert surface water runoff from excavations and to provide positive drainage. Contractor shall grade the existing sub-grades, as necessary to remove irregularities prior to construction of overlying components. The Contractor shall grade any other locations affected by the project work as directed by the Owner's Representative.

3.10 FINISH GRADING

A. On completion of the work, the Contractor shall: clean all existing ditches, swales, channels and drainage features and restore them to their pre-construction condition or better; restore and finish the site in a neat and presentable condition as approved by the Owner's Representative. Areas to be restored shall include all access roads, lay down areas, parking areas and trailer areas; and stockpile areas. All restored areas shall be re-established at previous grades or as shown.

B. The Contractor shall construct and grade all proposed drainage swales, and grade the site to provide positive drainage as shown or as directed and approved by the Owner's Representative.

3.11 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.

B. Remove pavements, and aggregate base as indicated.

1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement to remain before removing existing pavement. Saw-cut faces vertically.

3.12 DISPOSAL

A. All materials removed as a result of clearing, stripping, excavation and site grading, which are not to be reused, shall be transported to and disposed at an off-site by the Contractor. Transport and disposal shall be in accordance with applicable laws, regulations and codes.

B. The Contractor shall not burn the debris resulting from this work on the site.

3.13 QUALITY ASSURANCE

A. All subgrades will be monitored and tested as determined necessary by the Owner's Representative. The Owner will retain the services of a testing and inspection firm to complete the special inspections as required by Section 1704.7.1 of the New York State Building Code.

END OF SECTION

SECTION 31 13 16

TREE PRUNING

PART 1 - GENERAL

1.01 SUMMARY

A. Crown pruning.

B. Removal of all rubbish, debris, and other materials to be disposed of as a result of the work of this section.

1.02 RELATED REQUIREMENTS

A. The following items of related work are specified and included in other Sections of the Specifications:

1. Section 01 56 39 Tree and Plant Protection

1.03 REFERENCES

A. The following standards shall apply to the work of this Section.

1. American National Standards Institute (ANSI):

A300 Tree Care Operations; Tree, Shrub, and Other Woody Plan Maintenance, Standard Practices

Part 1, Pruning

Part 2, Fertilization

Part 3, Support Systems a. Cabling, Bracing, and Guying

2. Z133.1 Safety Requirements for Pruning, Trimming, Repairing, Maintaining and Removing Trees, and for Cutting Brush

1.04 SUBMITTALS

A. At least 90 days prior to the start of construction activities, submit to the Owner name of professional Certified Arborist hired to perform the work of this Section and proof of arborist's certification. http://www.massarbor.org/

1.05 QUALITY ASSURANCE

A. Selective pruning methods shall conform to the applicable requirements of ANSI Z133.1.

B. Work of this Section shall be completed by a professional Certified Arborist certified by the International Society of Arboriculture with a minimum five years' experience.

PART 2 – PRODUCTS

NONE

PART 3 - EXECUTION

3.01 PREPARATION

A. The Contractor shall be responsible for the protection of all existing trees and plants designated to remain for the length of the construction period, including liability for all damages as specified in Section 01 56 39.

3.02 ROOT PRUNING

A. Where construction will be in close proximity to existing trees designated to remain, roots shall be pruned prior operations. Root pruning shall be performed as early as possible before operations. Proximity shall be as determined in the field by the Owner and the Certified Arborist.

B. Root pruning is the physical cutting of tree roots to minimize root damage and promote healing. Root prune using a sharpened spade for all roots smaller than one-inch diameter. Root prune using an ax or chainsaw for all roots greater than one-inch diameter. Any method that tears roots or disturbs the soil beyond the grading limit is unacceptable. Do not use backhoe bucket or any other excavating machine to root prune.

C. Backfill root pruning trench with existing soil mixed with peat moss to a mixture of approximately 75-percent loam and 25-percent compost by volume. Tamp soil in 6-inch lifts. Each lift shall be compacted to a point at which a footprint makes only a 1/16 inch impression.

D. Apply mulch to a depth of 4 inches at minimum 10-foot to 15-foot radius around tree to reduce compaction and increase moisture retention.

3.03 TREE PRUNING

A. Trees designated to be pruned during construction shall be pruned by an approved Certified Arborist.

B. Any accidental injuries to the bark, trunk or branches of any tree shall be repaired immediately as directed by the Owner.

1. All pruning must be done in compliance with American National Standards Institute Z133 and A300 standards.

2. Prior to the start of work all trees to be pruned shall be inspected by an Arborist certified by the International Society of Arboriculture. Proof of certification is required prior to granting of contract. Any unusual safety or tree health concerns must be recorded and presented to the Owner.

3. All pruning cuts shall be made according to ANSI A300 section 5.2.5. No stubs shall be left nor shall flush cuts be made, the branch collar shall be left intact. Severed limbs shall be removed before the end of the workday. Wound dressing shall not be applied.

4. Tree branches shall be removed in a manner that does not damage the tree, other plants or property. Where necessary, ropes shall be used to lower large branches. Not more than 1/4 of the leaf surface of a tree shall be removed. Upon completion of pruning, one half or the foliage shall remain evenly distributed in the lower two thirds of the tree crown and on individual limbs.

5. The following classes of pruning shall be used as designated on the Drawings:
   a. Crown cleaning: Trees designated for crown cleaning shall have dead, dying, diseased and/or weak branches one inch in diameter and larger removed. Not more than one out of 4 water sprouts shall be removed when present. One stem of weakly attached "V-crotches" less than 4-inches in diameter shall be removed. The presence of larger V-crotches shall be noted and provided to the Owner.
   b. Crown thinning: Trees designated for crown thinning shall have all branches specified in crown cleaning removed and in addition shall have 10 to 15 percent of the live branches removed, mainly from the outer crown of the tree. Preference shall be given to the removal of branches outside the normal shape of the tree crown. The majority of the live branches to be removed shall be between 1/4 and 1 inch in diameter.
   c. Crown raising: Trees may be designated for crown raising as well as one of the two other types of pruning. Crown raising shall consist of removal of lower limbs at the trunk or the removal of smaller branches that will allow the upward movement of a lower limb to provide 8-feet of clearance.

6. All appropriate safety regulations must be followed. A ground person must be situated to direct pedestrian traffic and to maintain a safe work site.

3.04 DEADWOOD AND BRUSH REMOVAL

A. Remove all debris generated from tree pruning.

3.05 TREE REMOVAL

A. Trees designated for removal on the plans or as directed by the Owner's Representative shall be removed from the site. This work shall include the felling of the trees in such a way as to not injure trees to be saved, fencing, utility lines and poles, buildings, lawns, plantings and pavement. Tree removal also shall include the satisfactory disposal off site of all tree trunks, branches and vegetative debris produced through the tree removal operation.

B. Tree removal shall include removing the stumps to their full depth. Remove stumps from the site and dispose of stumps in a legal manner.

C. Prior to the commencement of tree removal operations the Contractor shall review with the Owner which trees shall be removed. Under no circumstances shall the tree removal operation commence without the written concurrence of the Owner.

3.06 PUBLIC HEALTH AND SAFETY:

A. Upon encountering any condition of tree work or tree health that might threaten the public health, safety or welfare and that is not directly addressed by this Section, the Certified Arborist and the Contractor shall notify the Owner immediately and shall make recommendations pertaining to the resolution of said conditions.

END OF SECTION

SECTION 31 20 00

EARTHMOVING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Stripping and stockpiling of existing, on-site topsoil.

B. Rough grading for pavements.

C. Finish grading .

1.02 RELATED REQUIREMENTS

A. Section 31 10 00 - Site Preparation.

B. Section 31 23 23 – Trenching and Backfilling: Trenching and backfilling for utilities.

C. Section 32 92 19 - Seeding: Finish ground cover.

1.03 PRICE AND PAYMENT PROCEDURES

A. Topsoil:

1. Measurement Method: By the cubic yard.

2. Includes (for on-site material): Excavating existing topsoil, transport to central location on site and stockpiling, scarifying substrate surface, placing where required, and compacting.

3. Includes (for imported material): Import, placement where required, and compaction.

B. Common Earth Fill:

1. Measurement Method: By the cubic yard.

2. Includes (for on-site material): Excavation existing common earth fill, transport to central location on site and stockpiling, scarifying substrate surface, placement where required, and compaction.

3. Includes (for imported material): Import, placement where required, and compaction.

C. Subbase Material, Select Granular Fill, Drainage Course, Stone Bedding Material, and Sand Bedding:

1. Measurement Method: By the cubic yard.

2. Includes: Import, placement where required, and compaction.

D. Stone Fill (Rip-rap):

1. Measurement Method: By the cubic yard.

2. Includes: Import, and placement where required.

E. Subbase Preparation:

1. Measurement Method: By square yard.

2. Includes: Scarifying substrate and compacting.

1.04 DEFINITIONS

A. Earth excavation is the removal of in-place overburden soils and fill materials using proper earth moving equipment. Earth materials shall include all soil deposits of any description both above and below groundwater levels. These may be naturally deposited or placed by previous construction operations.

B. Fill placement, backfilling and embankment construction are the placement and compaction of earthen materials to construct and establish all necessary slopes, site grading and drainage, piping and associated site improvements.

C. Authorized earth excavation is excavation of overburden soils, materials and rock to the excavation limits shown. It includes excavation of material considered unsuitable by the Owner's Representative and other excavation as directed by the Owner's Representative.

D. Unauthorized excavation is excavation of soil and/or rock materials beyond the limits shown that are not authorized by the Owner's Representative.

E. Unsuitable Material shall mean debris, frozen materials, topsoil, organic matter or peat, and other such soft or loose material which does not remain in position or stable when cut for excavation or which does not have sufficient bearing capacity to support the loads placed upon it without movement.

F. Loose Rock shall be shale, slate, soft sandstone, nested boulders or cobbles, boulders and such other soft rocks which are decomposed, stratified or shattered to an extent that modern power-driven equipment normally used for earth excavation will readily remove it.

G. Solid rock shall include dolomite, limestone, hard sandstone, large boulders each more than one cubic yard in volume, and other rocks which cannot be removed by power-driven equipment normally used in earth excavation except those specifically named under the definition of loose rock.

1.05 JOB CONDITIONS

A. The location of above ground and underground facilities, where shown on the Contract Drawings, are based on survey for visible above ground features and on available record mapping for underground features. The Contract Drawings may not define all above ground or below ground utilities, structures, wells and other existing facilities at, or adjacent to the project site and work area. The Contractor shall identify, properly locate and protect all utilities, underground structures, above ground structures and appurtenances on, or adjacent to the project site. The Contractor shall verify the location of all existing utilities prior to excavating for new work by contacting U.F.P.O., and by coordinating with the Owner's Representative.

B. The Contractor shall remove all excess materials from the site and dispose of them in accordance with applicable laws. The cost for removal shall be included in the amount bid. No additional payment will be made.

C. The Contractor shall stockpile and maintain all excavated topsoil on site until final site quantities needed for project completion are determined. Topsoil shall be processed to meet the material requirements of this specification prior to placement in the stockpile. Stockpiles shall be stabilized and seeded as required in the New York Standards and Specifications for Erosion and Sediment Control and as shown on the Erosion and Sediment Control (ESC) plans.

D. No frozen soil shall be placed during construction and no soil shall be placed on frozen soil.

E. Access-Ways and Staging Areas

1. The Contractor shall construct temporary access-ways as necessary to provide access to the work area, at the location shown on the Contract Drawings and as approved by the Owner's Representative.

2. The Contractor shall remove all temporary access-ways when no longer needed, and restore the site to conditions as directed and approved by the Owner's Representative.

F. Dust Control

1. The Contractor shall control dust in all work or occupied areas by sprinkling with potable water or by other methods in accordance with applicable laws and approved by the Owner's Representative. Petroleum products shall not be utilized.

2. Maintain dust control measures through dry periods until all disturbed areas are stabilized.

3. Vegetative measures shall be used on all disturbed areas not subjected to traffic. No other form of dust control will be permitted for use on these areas.

4. Sprinkling with water shall be used on haul roads and access routes, as required, until stone is applied.

5. Barriers shall be used wherever practical to achieve dust control for a distance of up to 10 times the barrier height. Preserve existing wind barrier vegetation to the fullest extent practical.

6. Mulch shall be used wherever practical, as it offers a fast effective means of controlling dust.

1.06 QUALITY ASSURANCE

A. Comply with: New York State Department of Transportation (NYSDOT) "Standard Specifications for Construction and Materials."

B. Routine testing of existing soils and compacted material for compliance with these specifications will be performed as part of Special Inspections.

C. Compacted material not meeting density requirements shall be removed or re-compacted and retested at Contractor's expense.

1.07 SUBMITTALS

A. General: Submittals shall be made according to the conditions of the Contract and Division 01 Specifications Sections.

B. The Contractor shall submit: proposed equipment; dust control procedures; off-site material sources and test data showing that proposed material sources meet the specified requirements; earthwork procedures; material handling and stockpiling procedures; and locations, material placement procedures and quality control plans as required by the Owner's Representative.

C. Specific Submittals for Materials shall include:

1. Samples: Submit samples as follows. Take the samples in the presence of the Owner's Representative, and submit to the Owner's Representative the laboratory test results for gradation, proctors and soundness tests, when required. These tests shall be performed in accordance with ASTM standards, shall be performed and signed by a certified soils laboratory, and shall be submitted as part of the original submittal. At a minimum the samples taken shall be of the following quantities:
   a. Topsoil: 50 - 60 lb. (Two samples for each proposed source).
   b. Common Earth Fill: 50 - 60 lb. (Two samples for each proposed source).
   c. Subbase Course Type 2: 50 - 60 lb. (Two samples for each proposed source).
   d. Select Granular Material: 50 - 60 lb. (Two samples for each proposed source).
   e. Drainage Course: 50 - 60 lb. (Two samples for each proposed source).
   f. Stone Bedding: 50 lb. (One sample for each proposed source).
   g. Sand Backfill: (One sample for each proposed source).

2. Quality Control Submittals:
   a. Subbase Course Type 2, Select Granular Material, Stone Bedding, and Sand Bedding: Name and location of source and the DOT Source Number. If the material is not being taken from an approved DOT Source the results of the gradation and soundness tests performed by an ASTM certified soils laboratory will be required.

   b. Stone Fill (Rip-rap): Name and location of source and the DOT Source Number. If the material is not being taken from an approved DOT Source the results of the gradation and soundness tests performed by an ASTM certified soils laboratory will be required.
   c. Drainage Stone: Name and location of source and the DOT Source Number. If the material is not being taken from an approved DOT Source the results of the gradation and soundness tests performed by an ASTM certified soils laboratory will be required.
   d. Topsoil and Common Earth Fill: If the material is not being taken from onsite, name and location of proposed source. Verification shall also be submitted that the materials are not from contaminated sites or sources.
   e. Excavation Procedure: Submit a lay out drawing or detailed outline of intended excavation procedure for the Owner's Representative information. This submittal will not relieve the Contractor of responsibility for the successful performance of intended excavation methods.
   f. Upon completion of grading operations contractor shall supply an as-built map showing compliance with proposed grades and showing the installed locations of all constructed features.

3. As-built survey mapping: Upon completion of the installation of all proposed features, the contractor shall provide an as-built survey map showing all features within the project limits. Surveyed features shall include but not be limited to all installed pavements, curbing, fences, signage, plantings, underground utilities, aboveground utilities, contours depicting the grades constructed, and existing features that abut to the installed features. Mapping shall also include rims and inverts for installed utility structures.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Topsoil - for landscaped areas.

1. Topsoil shall meet the material requirements of NYSDOT §713-01, Topsoil, and as required below. On site material shall be permitted in accordance with this specification. The Contractor shall import a sufficient amount of material to complete the work if there is not enough on site material to meet the project requirements.

2. Topsoil shall be free of refuse, snow, ice, any material toxic to plant growth, subsoil, woody vegetation and stumps, roots, brush, stones, clay lumps, and objects larger than 2-inches in greatest dimension. Sod and herbaceous growth such as grass and weeds need not be removed but shall be thoroughly broken up and mixed with the soil during handling operations.

3. Topsoil shall meet the following requirements, and as approved by the Owner's Representative:
   a. The pH of the material shall be between 5.5 and 7.6.
   b. The organic content shall be not less than 6 percent or more than 12 percent.
   c. It shall be well graded with a maximum particle size equivalent to a No. 10 sieve with 90 to 100 percent passing the No. 10 sieve, with 45 to 80 percent passing the No. 40 sieve, with 25 percent to 70 percent by weight passing a No. 200 sieve, and with 5 to 35 percent passing the 2 micron sieve.

B. Common Earth Fill - for general grading in landscape areas, pavement subgrade material, and trench backfill in non-pavement areas.

1. Common Earth Fill shall be on-site excavated material consisting of any natural inorganic soil (gravel, sand, silt and clay mixture), or manmade crusher run stone, or gravel and sand product, including mixtures thereof. No aggregate shall be larger than 4-inches in size.

2. Determination of whether a specific material is suitable shall be made by the Owner's Representative based on appropriate quality assurance test results provided by the Contractor. Fill shall be free of frozen material, boulders, trash, cinders, ashes, asphalt, and foreign debris. Material containing vegetation or significant organic matter, such as peat or organic silt, sod, ice, snow or other deleterious material, is not acceptable. Topsoil and organic silt may be used in landscaped areas and areas where overlying construction is not proposed.

3. If the excavated material on site is suitable to the Owner's Representative for backfilling purposes, it shall be used and the surplus properly disposed of.

C. Subbase Type 2 (Crusher Run Stone) - for subbase under all pavements such as parking lots, dumpster slab, walkways, and sidewalks, or for use as Select Granular Fill.

1. The material used shall be angular crusher-run stone as delivered unsorted from the crusher. The material shall be clean, well graded, durable, and composed of rock pieces, chips and fines. The minimum size shall be sufficient to fill all voids between large stones when the material is compacted. The material shall conform to NYSDOT Specification 304, Type 2 and have the following gradation requirements.

Sieve Size	**Percent Passing**
2-inch	100
¼-inch	25 – 60

No. 40	5 – 40
No. 200	0 - 10

2. The material shall also meet the following material requirements.
   a. Magnesium Sulfate Soundness Test: 20 percent maximum loss by weight after 4 test cycles.
   b. Plasticity Index: The plasticity index of the material passing the No. 40 mesh sieve shall not exceed 5.0.
   c. Elongated Particles: Not more than 30 percent, by weight, of the particles retained on a ½-inch sieve shall consist of flat or elongated particles. A flat or elongated particle is defined as one which has its greatest dimension more than 3 times its least dimension.

D. Select Granular Fill (Run of Bank) - for undercuts up to Subbase courses, for trench bedding between top of Stone Bedding and pavement.

1. The material shall be a mixture of hard, durable stone and coarse sand, practically free from silt, clay, organic matter or other foreign matter. No gravel shall be used on this project until acceptance is obtained from the Owner's Representative and only gravel from approved sources shall be used.

2. This material, referred to as "Run Of Bank" gravel or "R.O.B." gravel shall be well-graded conforming to NYSDOT Specification 304, Type 4 and have the following gradation:

Sieve Size	**Percent Passing**
2-inch	100
¼-inch	30 – 65
No. 40	5 – 40
No. 200	0 - 10

3. The material shall also meet the following material requirements.
   a. Magnesium Sulfate Soundness Test: 20 percent maximum loss by weight after 4 test cycles.
   b. Plasticity Index: The plasticity index of the material passing the No. 40 mesh sieve shall not exceed 5.0.
   c. Elongated Particles: Not more than 30 percent, by weight, of the particles retained on a ½-inch sieve shall consist of flat or elongated particles. A flat or elongated particle is defined as one which has its greatest dimension more than 3 times its least dimension.

E. Drainage Course: Narrowly graded mixture of washed crushed stone or gravel; ASTM D 448; coarse-aggregate grading AASHTO Size #2; with 100 percent passing a 3-inch sieve, 90-100% passing the 2 ½-in sieve, 35-70% passing the 2-in. sieve, 0-15% passing the 1 ½-in sieve and 0-5 percent passing a ¾-in. sieve.

F. Stone Bedding (Pipe Bedding or Crushed Stone) – for bedding of utility conduits, pipes, and mains, or for use as Select Granular Fill.

1. The material used shall be clean, sound crushed stone of uniform quality. It shall be a 50-50 mixture of NYSDOT size designation #1 and #2 stone conforming to NYSDOT Item 703-2, Gradation Table 703-4.

G. Stone Fill (Riprap) - for protection of storm sewer outlets, channel outlets, and other areas susceptible to erosion.

1. This material shall be well graded stone placed as protective material on stream-banks, in channels, and as specified on the Contract Drawings, or as required by the Qualified Professional for storm water pollution prevention. The material shall conform to NYSDOT Specification 620-2.02 and meet the gradation requirements of Figure 620-1 for Fine, Light, Medium, or Heavy Stone Fill, as specified on the Contract Drawings or as determined necessary by the Qualified Professional.

H. Sand Bedding - for base and leveling course beneath unit pavers.

1. This material shall comply with the material requirements of NYSDOT Article 703-03 Mortar Sand and shall be meet the following gradation requirements:

Sieve Size	**Percent Passing**
No. 4	100
No. 8	95 – 100
No. 50	10 – 40
No. 100	0 - 15

2.02 SOURCE OF MATERIALS

A. All materials shall be provided by the Contractor from sources that demonstrate, through appropriate sampling and testing, that they can produce the materials as specified. On-site excavated materials may be used for Topsoil, and Common Earth Fill providing these materials comply with the contract requirements.

B. Offsite sources shall be identified to the Owner's Representative for review and approval prior to delivery to and use at the site. No materials shall be delivered or used until completion of the quality assurance and control testing and such materials are approved by the Owner's Representative.

PART 3 - EXECUTION

3.01 LAYOUT

A. The provisions of NYSDOT Standard Specification §203 shall apply to all earth excavation, filling and backfilling.

B. The Contractor must accurately locate and maintain location of all buildings, roads, utilities, other features, and advise the Owner's Representative of any discrepancies prior to commencing work. The contractor shall contact U.F.P.O. to confirm underground facilities locations prior to excavating.

C. Work shall be scheduled so the deepest elements are completed first when undermining of shallower elements could occur.

3.02 PROTECTION OF SUBGRADES AND FILL GRADES

A. The subgrade soils may be sensitive to disturbance from construction activity and when in the presence of moisture. Water shall not be allowed to collect on earthen fill surfaces. The Contractor shall also properly drain and protect all grades.

B. Failure of the Contractor to properly excavate and protect approved subgrades resulting in additional excavation and backfill to attain a suitable subgrade in accordance with these specifications shall be at no cost to the Owner.

C. The Contractor shall maintain both work in progress and completed work until the construction is complete and accepted by the Owner's Representative. Any erosion or degradation of the Contractor's work shall be repaired by the Contractor at no cost to the Owner.

3.03 DEWATERING

A. Prevent surface and subsurface water from flowing into excavations and trenches and from flooding the site and surrounding area.

B. Do not allow water to accumulate in excavations or trenches, or on prepared subgrades or previously placed earth materials. Remove water from all excavations immediately to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to the stability of subgrades and foundations. Furnish and maintain pumps, sumps, suction and discharge piping systems, and other system components necessary to convey the water away from the Site.

C. All pumps and water removal methods shall be designed, installed, and operated in a manner that does not result in loss of ground or removal of fines during operation and that is consistent with Section 31 23 19 Dewatering. Should loss of fines be noted, water removal shall cease immediately and the Owner's Representative notified. The Contractor shall modify the water removal methods as necessary to eliminate further loss of ground, and shall repair any such loss of ground to the satisfaction of the Owner's Representative.

3.04 EQUIPMENT

A. It is the responsibility of the Contractor to select, furnish and properly maintain equipment which will excavate and compact subgrade and fill materials uniformly to the required density.

3.05 STRIPPING TOPSOIL

A. Stripping: Prior to starting general excavation, all topsoil within the limits of the existing lawn areas shall be stripped to its full depth and stockpiled in approved locations for later reuse. **Do not strip topsoil when it is in a wet or moist condition. Wait to move until the water has drained out of the topsoil.** All stockpiled topsoil shall be protected from wind and water erosion as specified.

B. Contractor shall have the existing topsoil tested for reuse as specified in this Section, and submit the results to the Engineer for approval.

C. Contractor shall not remove existing topsoil from the contract limits of Work without the written approval of the Engineer.

3.06 EARTH EXCAVATION AND GRADING

A. All excavation and grading work shall be executed to the lines and grades shown on the Contract Drawings, unless directed otherwise by the Owner's Representative. All excavation shall be performed in such a manner as to minimize disturbance and maintain stability of subgrade soils and slopes. Special care shall be taken not to disturb the bottom of excavations and proposed bearing elevations and surfaces. Excavation to the final subgrade levels must be done by methods that minimize traffic on or disturbance to the subgrade.

B. The excavation equipment must be of such size and capacity sufficient to excavate the materials encountered and to the specified depths as shown.

C. The Contractor shall be responsible at all times for safe and prudent excavation operations so as to protect the workmen, utilities, structures, and adjacent property. The Contractor shall perform all excavation in accordance with OSHA standards. The Contractor shall observe all applicable local, state and federal requirements and acquire all necessary permits.

D. The Contractor shall bench or cut back excavated slopes, dewater and sheet, as necessary for stability, safety and protection of adjacent utilities, structures, and properties.

E. Subgrades and slopes which have been damaged or degraded as a result of Contractor's activities, or failure of the Contractor to properly protect them shall be repaired at the Contractor's expense as directed by the Owner's Representative.

F. Subgrades in which soft or unsuitable materials are encountered that are not a result of Contractor's operations or failure to protect subgrades shall be undercut and backfilled with appropriate fill as directed by the Owner's Representative.

G. All subgrades will be monitored and tested, at the Owner's expense, as determined necessary by the Owner's Representative. The Contractor, at the direction of the Owner's Representative, shall be required to proof roll subgrades. All proof rolling, if required, shall be done in the presence of the Owner's Representative, as follows:

1. Notify the Owner's Representative of the proposed date for beginning proof rolling at least seven (7) working days prior to commencing proof rolling.

2. Proof rolling operations shall not occur within 36-hours after a rain event. Work areas shall be protected from rain or given sufficient time to dry prior to commencing proof rolling.

3. Proof roll the prepared subgrade surface with at least four (4) passes of a suitable compaction equipment; a vibratory drum compactor having a minimum unsprung drum weight of 7-tons or a vibratory roller operated in static mode weighing approximately 15-tons.

H. The proof rolling operations shall be observed by the Owner's Representative and Inspector. No materials beyond the limits of subgrade shall be excavated or fill materials placed by the Contractor until the subgrades are observed and tested by the Owner's Representative.

I. Subgrades shall be graded at a slope that will match the slope of the proposed finished surface grades.

3.07 FILLING AND BACKFILLING

A. The Contractor shall not place fill or backfill until underlying subgrades have been observed and tested as required by the Owner's Representative. Notify the Owner's Representative at least three (3) working days in advance of all phases of filling and backfilling operations for scheduling of testing.

B. Materials shall be placed at the locations shown on the Contract Drawings, and as directed by the Owner's Representative.

C. Delivery and compaction of materials shall be made during the presence of the Owner's Representative and shall be subject to its review. This inspection by no means absolves the Contractor from responsibility to properly compact and test as specified.

D. Acceptance and/or rejection of materials placed and compacted shall be based upon in-place density test result requirements and other requirements as stated in these specifications.

3.08 PLACEMENT AND COMPACTION

A. Compaction density tests will be required for all types of materials used on this project. Areas for testing will be randomly selected by the Owner's Representative and can be in any construction area. Frequency of tests shall be in accordance with Section 3.09 herein.

B. Methods and equipment proposed for compaction shall be selected by the Contractor and shall be subject to the prior approval of the Owner's Representative. If compacting by rolling or operation of heavy equipment near structures and utilities, displacement of or injury to pipe and structures shall be avoided. Movement of in-place structures or pipe shall be at the Contractor's risk. Any pipe or structure damaged thereby shall be replaced or repaired as directed by the Owner's Representative at no additional cost to the Owner.

C. If compaction tests do not meet the specifications herein, the Contractor shall change their methods of operation and, or their backfill materials, until satisfactory test results are achieved and all such changes shall be at no additional cost to the Owner.

D. All fill shall be placed in lifts of generally uniform thickness and lifts shall be placed in a horizontal orientation.

E. Moisture Control:

1. Where fill or backfill must be moisture conditioned before compaction, uniformly apply water to the surface and to each layer of fill or backfill. Prevent ponding or other free water on surface subsequent to, and during compaction operations.

2. Remove and replace, or scarify and air dry, soil that is too wet to permit compaction to specified density. Soil that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing, until moisture content is reduced to a value which will permit compaction to the percentage of maximum density specified.

3. **Do not spread topsoil when it is in a wet or moist condition. Cover topsoil stockpiles with tarpaulins or other impervious materials to prevent water from accumulating in the soil. If topsoil is wet or moist at the time of finish grading, leave topsoil to dewater before moving and spreading topsoil. Failure by the Contractor to protect topsoil from becoming wet/moist will not relieve the Contractor from meeting project schedule deadlines.**

F. Inadequate compaction shall be cause for the Owner's Representative to issue a stop work order to the Contractor.

1. Topsoil
   a. The Contractor shall scarify or till the surface of the subgrade to a depth of 4-inches and moisten it before topsoil is placed to support bonding of the topsoil with the subsoil. Tillage by discing, harrowing, raking or other approved methods shall be accomplished in such a manner that depressions and ridges formed by tillage shall be parallel to the contours. Rocks and debris larger than 1-inch shall be removed by screening or other approved methods.
   b. Topsoil in an unworkable condition due to excessive moisture, frost or other conditions shall not be placed until it is suitable for spreading. Topsoil shall be placed and spread on the designated area and graded to the minimum thickness specified in the specification sections referenced herein and on the Contract Drawings, unless otherwise directed by the Owner's Representative. After the topsoil is spread, all large stiff clods, rocks, roots or other foreign matter shall be cleared and disposed of by the Contractor as approved so that the finished surface will be acceptable for subsequent compaction and seeding.
   c. Topsoil shall be compacted sufficiently to avoid settlement in excess of 1-inch. However, compaction shall not exceed 85% of the maximum dry density, as determined by ASTM D1557.

2. Common Earth Fill
    a. Fill shall be placed in maximum loose lift thicknesses of 9-inches for compaction with heavy equipment or in maximum lifts of 6-inches where the use of hand compaction equipment is necessary. Lifts shall be placed in nearly horizontal orientation. Fill shall be compacted to a minimum of 90-percent of the maximum dry density, as determined by ASTM D1557, except under pavement areas where it shall be compacted to a minimum of 95-percent of the maximum dry density.
    b. Equipment used to compact fill must be compatible with the material type, lift thickness, and constraints posed by size and configuration of excavated area being filled.
    c. If a compacted layer fails to meet the specified percentage of maximum density, the layer shall be re-compacted and will be retested. No additional material may be placed over a compacted layer until the specified density is achieved.

3. Subbase
    a. Subbase shall be placed in maximum loose lift thicknesses of 9-inches for compaction with heavy equipment or in maximum lifts of 6-inches where the use of hand compaction equipment is necessary. Lifts shall be placed in nearly horizontal orientation. Place Types 2 or 4 subbase so that after compaction the top surface of the course does not extend more than 1/4-in above nor more than 1/4-in below true grade for the course at any location.
    b. Subbase shall be compacted to a minimum of 95-percent of the maximum dry density, as determined by ASTM D1557. Equipment used to compact subbase must be compatible with the material type, lift thickness, and constraints posed by size and configuration of excavated area being filled.
    c. If a compacted layer fails to meet the specified percentage of maximum density, the layer shall be re-compacted and will be retested. No additional material may be placed over a compacted layer until the specified density is achieved.
    d. After subbase layer has been placed, compacted, and approved, construction vehicle traffic over the approved surface shall be limited or the Contractor shall install a protective 2-inch layer of stone at No Additional Cost to the Owner. Prior to paving, the 2-inch layer of stone would then be removed and the exposed surface prepared and compacted to receive pavement.
    e. If subbase is damaged or mixed with subgrade or any other material due to Contractor's operation, remove such material and replace it with the appropriate subbase material at No Additional Cost to the Owner.

4. Select Granular Fill
    a. Select fill shall be placed in maximum loose lift thicknesses of 9-inches for compaction with heavy equipment or in maximum lifts of 6-inches where the use of hand compaction equipment is necessary. Lifts shall be placed in nearly horizontal orientation. Fill shall be compacted to a minimum of 95-percent of the maximum dry density, as determined by ASTM D1557.
    b. Equipment used to compact fill must be compatible with the material type, lift thickness, and constraints posed by size and configuration of excavated area being filled.
    c. If a compacted layer fails to meet the specified percentage of maximum density, the layer shall be re-compacted and will be retested. No additional material may be placed over a compacted layer until the specified density is achieved.

5. Stone Bedding
    a. Bedding shall be placed in maximum loose lift thicknesses of 9-inches for compaction with heavy equipment or in maximum lifts of 6-inches where the use of hand compaction equipment is necessary. Lifts shall be placed in nearly horizontal orientation. Bedding fill shall be compacted to a minimum of 95 percent of the maximum dry density, as determined by ASTM D1557.

    b. Equipment used to compact bedding must be compatible with the material type, lift thickness, and constraints posed by size and configuration of excavated area being filled.
    c. If a compacted layer fails to meet the specified percentage of maximum density, the layer shall be re-compacted and will be retested. No additional material may be placed over a compacted layer until the specified density is achieved.

6. Stone Fill
    a. Shall be placed as described in the NYSDOT Standard Specifications, latest edition, Section 620-3.02.

7. Sand Bedding
    a. Sand bedding shall be placed in maximum loose lift thicknesses of 9-inches for compaction with heavy equipment or in maximum lifts of 6-inches where the use of hand compaction equipment is necessary. Lifts shall be placed in nearly horizontal orientation. Fill shall be compacted to a minimum of 95-percent of the maximum dry density, as determined by ASTM D1557.
    b. Equipment used to compact fill must be compatible with the material type, lift thickness, and constraints posed by size and configuration of excavated area being filled.
    c. If a compacted layer fails to meet the specified percentage of maximum density, the layer shall be re-compacted and will be retested. No additional material may be placed over a compacted layer until the specified density is achieved.

3.09 QUALITY ASSURANCE AND CONTROL TESTING

A. The Owner will retain the services of a testing and inspection firm to complete the special inspections required by Section 1704.7 of the New York State Building Code. The special inspector shall provide visual observations and document these observations in accordance with Section 1704.7 of the New York State Building Code for special inspection services necessary for subgrade preparation (1704.7.1). The qualifications of the individuals performing the special inspections shall be in accordance with the requirements of the New York State Building Code.

B. Services and quantities of testing, as specified herein, are approximate and provided for information. Additional testing may be required by the Owner's Representative if in the opinion of the Owner's Representative, substantial variation in the nature and consistency of the soil materials are observed during construction or if material sources change.

C. The types of tests that are to be conducted include, but are not limited to:

Test Number	Test Description
1	Natural Moisture Content (ASTM D-2216)
2	Grain Size Analysis (ASTM D-422)
3	Liquid and Plastic Limits (ASTM D-4318)
4	Moisture-Density Relationship (ASTM D-1557) or other appropriate test determined by the Owner's Representative where material gradation does not permit use of ASTM D –1557
5	In-Place Density (ASTM D-1556 or ASTM D-2922)
6	Soil pH (ASTM D-2976)
7	Organic Content (ASTM D-2974)

D. Pre-Construction Tests: Before delivery of materials to or use at the site, the Contractor shall submit adequate quantities of each proposed material to the Owner's Testing Laboratory for performing the above stated tests on the required minimum number of samples obtained from each proposed source, as follows

Material	Test Number	Test Frequency (per proposed source)
Topsoil	1, 2, 6 and 7	2
Common Earth Fill	1,2, 3, and 4	2
Subbase Type 2	1,2, and 4	2
Select Granular Fill	1,2, and 4	2
Stone Bedding	1,2, and 4	2
Stone Fill	2 (visual)	1
Sand Bedding	1,2, 3, and 4	2

E. During Construction Tests: During construction, the Testing Laboratory shall perform the above listed tests, verify the material types being used, and lift thickness, as requested by and reimbursed through the Owner, in accordance with the following:

Material	Test Number	Test Frequency
Topsoil	1, 2, 6 and 7	1, 2, 6 & 7 Every 10,000 cy of material used but, not less than 2 tests.
Common Earth Fill	1, 2, 3, 4, and 5	1,2, & 3 Every 10,000 cy of material used but, not less than 2 tests. 2 & 4 at visible changes in material. 5 every 250 cy placed and/or one (1) test per lift of placed material.
Subbase Type 2	1, 2, and 5	1and 2 Every 5,000 cy of material used but, not less than 2 tests per lift. 2 & 4 at visible change in material or source change. 5 Every 150 cy placed and/or one (1) test per lift of placed material
Select Granular Fill	1, 2, and 5	1 and 2 Every 5,000 cy of material used but, not less than 2 tests per lift. 2 & 4 at visible change in material or source change. 5 Every 150 cy placed and/or one (1) test per lift of placed material.
Stone Bedding	1, 2, 4, and 5	1 and 2 Every 5,000 cy of material used but, not less than 2 tests per lift; 2 & 4 at visible change in material or source change. 5 1 per lift for every 500 linear feet of pipe but, not less than 1 per lift for each trench or every 150 cy placed if beneath slabs and pavement.
Sand Bedding	1, 2, 4, and 5	1,2, & 3 Every 5,000 cy of material used but, not less than 2 tests per lift; 2 & 4 at visible changes in material or source change. 5 Every 150 cy placed. and/or one (1) test per lift of placed material

The test frequency shown above may be increased at the discretion and direction of the Owner's Representative.

3.10 MAINTENANCE AND RESTORATION

A. Restore grades to indicated levels where settlement or damage due to performance of the Work has occurred. Correct conditions contributing to settlement. Remove and replace improperly placed or poorly compacted fill materials at No Additional Cost to the Owner.

B. Restore pavements, walks, curbs, lawns, and other exterior surfaces damaged during performance of the Work to match the appearance and performance of existing corresponding surfaces as closely as practicable.

C. Topsoil and seed or sod damaged lawn areas outside the Grading Limit Line and the new lawn areas inside the Grading Limit Line. Water as required in accordance with Section 32 92 19 Seeding.

3.11 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Transport surplus satisfactory soil to designated storage areas on Owner's property. Stockpile or spread soil as directed by Owner's Representative.

B. Remove waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION

SECTION 31 23 19

DEWATERING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Surface water management.

B. Management of water in excavations.

1.02 RELATED REQUIREMENTS

A. Section 01 57 13 - Temporary Erosion and Sedimentation Control: Slope protection and erosion control.

1.03 SUMMARY

A. This section specifies dewatering that consists of performing all work necessary to remove snow, ice, surface water, and/or control other water infiltration in order that all excavation and construction is performed in the dry. The Contractor shall maintain and operate adequate surface and subsurface drainage methods to the satisfaction of the Owner's Representative in order to keep the construction site dry and excavation side slopes and bottom stable such that all construction can proceed unhindered by saturation and degradation of the area in accordance with the plans and specifications and to the satisfaction of the Owner's Representative.

B. Dewatering work shall include all design installation, operation, maintenance, supervision, dismantling and removal from the site, including proper site restoration of dewatering systems required to perform the work as shown and specified herein.

C. The required dewatering system should be designed by a Professional Engineer licensed to practice engineering in New York State.

1.04 GENERAL

A. The Contractor must become familiar with the potential for precipitation, the site conditions, and the subsurface conditions.

B. The Contractor shall have on site such equipment as pumps, hoses, etc., as necessary to deal with dewatering. Dewatering system(s) shall be properly designed and constructed to prevent removal of soil fines from the site during dewatering operation. The Contractor shall monitor the dewatering system and should loss of fines be noted water removal shall cease immediately and the Owner's Representative notified. The Contractor shall modify the water removal methods as necessary to eliminate further loss of ground, and shall repair any such loss of ground to the satisfaction of the Owner's Representative.

C. If ponded water, from any source, surface or subsurface, accumulates or collects on prepared subgrades, in excavations, or on fill surfaces, the subgrade surfaces shall be excavated and replaced as directed by the Owner's Representative, at no additional cost to the Owner.

1.05 SUBMITTALS

A. General: Submittals shall be made according to the conditions of the Contract and Division 01 Specifications Sections.

B. Submit and review proposed dewatering methods with the Owner's Representative prior to commencing dewatering operations.

C. Submit proposed procedures and material specifications for all erosion control materials prior to commencing field activities.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Straw bales, as required by the Owner's Representative.

B. Silt fencing and associated materials shall be as shown on the Contract Drawings. Filter cloth shall be Geotex 701, Mirafi 170N, Winfab 800N or approved equal.

C. Earth materials shall be as specified in Earthmoving, Section 31 20 00.

D. Temporary Seeding shall as specified in Seeding, Section 32 92 19.

E. Dust Control shall consist of vegetative covers, sprinkling (water), barrier material (silt fence), mulch, and acrylic polymer, latex emulsion, or resin in water spray adhesives. All dust control shall be in accordance with 31 20 00 Earthmoving.

PART 3 - EXECUTION

3.01 SURFACE DRAINAGE

A. Maintain and operate adequate surface drainage methods to keep the construction site dry and excavation side slopes and bottom stable such that all construction, as required, can proceed unhindered by saturation and degradation of the area.

B. Surface water shall be controlled so that the stability of excavations and constructed slopes or bottoms are not adversely affected by water, erosion is prevented, and flooding of excavations does not occur.

C. Surface water must be intercepted and drained away from excavations to protect proposed bearing surfaces.

D. Surface water shall not pond on subgrades, in excavations, or on fill.

E. The design and installation of all surface water control features shall be as shown on the Contract Drawings and conform to the NYS Standards and Specifications for Erosion and Sediment Control and the project Erosion and Sediment Control Plan, unless otherwise directed by the Owner's Representative.

3.02 SUBSURFACE DRAINAGE

A. Prevent groundwater from flowing into excavations and trenches and from flooding prepared subgrades and excavations.

B. Do not allow water to accumulate in excavations or trenches. Remove water from all excavations immediately to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to the stability of subgrades and foundations. Furnish and maintain pumps, sumps, suction and discharge piping systems, and other system components necessary to convey the water away from the Site.

C. All pumps and water removal methods shall be designed, installed, and operated in a manner that does not result in loss of ground or removal of fines during operation. Should loss of fines be noted, water removal shall cease immediately and the Owner's Representative notified. The Contractor shall modify the water removal methods as necessary to eliminate further loss of ground, and shall repair any such loss of ground to the satisfaction of the Owner's Representative.

3.03 DISPOSAL OF SURFACE WATER and GROUNDWATER

A. Develop plans to properly collect and discharge surface water and groundwater.

B. Dispose of all water removed from the excavation and site in a manner that will not endanger public health, property or portions of the work under construction or completed. Dispose of water properly and in a manner that will not inconvenience others engaged in work at the site and/or adjacent property owners. Dispose of water in conformance with the NYS Standards and Specifications for Erosion and Sediment Control, and the project Erosion and Sediment Control Plans.

C. All water removed from excavations shall be conveyed in closed conduits or pipes, to appropriate discharge locations. Trenches or other excavations shall not be used for temporary drainage ditches for removal of accumulated surface water.

D. Provide and maintain appropriate erosion and sediment controls in accordance with the NYS Standards and Specifications for Erosion and Sediment Control, and the project Erosion and Sediment Control Plans, and as directed by the Owner's Representative.

3.04 RESTORATION

A. Remove and restore all temporary drainage devices, ditches, sumps, catch basins and drainage piping when no longer needed. All restoration shall be completed to the satisfaction of the Owner's Representative and all costs shall be included as part of the base bid.

END OF SECTION

SECTION 31 23 23

TRENCHING AND BACKFILLING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Trenching for utilities outside the building to utility main connections.

B. Backfilling for underground utilities.

1.02 RELATED REQUIREMENTS

A. Section 01 57 13 - Temporary Erosion and Sedimentation Control: Slope protection and erosion control.

B. Section 01 70 00 - Execution Requirements: General requirements for dewatering of excavations and water control.

C. Section 31 50 00 - Excavation support and protection.

D. Section 31 20 00 - Earthmoving: Soil removal from surface of site, grading, filling, and compacting.

1.03 SUMMARY

A. This section pertains to excavating and backfilling of underground utilities. The Contractor shall verify the location of all existing utilities prior to excavating for new work by contacting Dig Safe NY (811), and by coordinating with the Owner's Representative.

B. The Contractor shall excavate, protect and backfill all trenches that may be necessary for completing the work to be done under this contract as specified herein and on the Contract Drawings. All excavations shall be in open trenches, except where and to such extent as the Owner may authorize or require that the same be done by tunneling, boring or jacking. Trenches may be in general excavated or backfilled either by machinery or by hand as the Contractor may elect; provided, however, that the Owner shall be empowered, wherever he/she shall decide that such necessity exists, to require that hand excavation be employed and that backfilling by hand shall be done to the extent required at no additional cost to the Owner.

C. The Contractor shall perform all excavation of every description and of whatever substance encountered, to the depths indicated on the Contract Drawings, as specified herein, or as required by the Owner. All excavated material not required for backfill shall be removed and wasted or otherwise disposed of as required or specified.

D. Excavation support methods as specified in Section 31 50 00, shall be designed by a Professional Engineer licensed to practice engineering in New York State.

1.04 DEFINITIONS

A. Excavation shall be classified as follows:

1. Earth Trench Excavation- The removal to required elevations of all clay, silt, loam, sand, gravel hardpan, pavements of all kinds, loose stone and all boulders measuring less than one (1) cubic yard in volume.

2. Rock Trench Excavation- The removal of ledge rock, mass concrete structures and boulders measuring more than one (1) cubic yard in volume.

B. Excavation

1. All procedures and requirements of Section 31 20 00 Earthmoving shall be applicable for trench excavation and protection of bearing surfaces.

2. Underpin or otherwise support in a suitable manner, adjacent structures which may be damaged by excavating work, including utilities and pipe chases.

3. Excavate to accommodate new structures and construction operations.

4. Notify Owner's Representative or Owner of unexpected subsurface conditions and discontinue affected work in area until notified to resume work.

5. Work shall be scheduled so the deepest elements are completed first when undermining of shallower elements could occur.

6. Excavation cuts shall be sloped sufficiently to prevent material from sliding into the excavation and to comply with local, state, and Federal codes and regulations. Sheeting and bracing shall be placed as conditions warrant per OSHA Standards.

7. Materials shall not be placed adjacent to the sides of open excavations within a distance equal to two times the maximum depth of the excavation. Stockpiling material over the existing utilities, structures, sewers, force mains or water lines shall not be permitted

8. Excavation shall not continue in trenches where standing water is observed in the work area.

9. Cut utility trenches wide enough to allow inspection of installed utilities.

10. The bottom of excavations shall be protected from frost action and surface drainage. Frozen material shall be removed and replaced with granular fill or concrete.

11. All rock surfaces shall be level and cleaned of loose material. Depressions or cracks in rock shall be square cut and filled with concrete. Over excavation shall be filled with concrete at no additional cost to the Owner.

12. Correct areas that are over-excavated and load-bearing surfaces that are disturbed.

13. Remove excavated material that is unsuitable for re-use from site.

14. Remove excess excavated material from site.

1.05 EXCAVATION LIMITS

A. The Contractor shall provide temporary sheeting, bracing, shoring or trenches as necessary to protect adjacent structures and provide safe working conditions.

B. Rock and boulders shall be removed to provide a clearance of six inches (6-in.) below and one foot (1-ft.) on each side of all pipes.

C. Limits of trench excavation shall be as shown on the applicable trench details given on the Contract Drawings. Unstable and/or unsuitable soils revealed at the trench bottom shall be removed and replaced with specified material as direct by the Owner's Representative.

1.06 REMOVAL AND STORAGE OF MATERIALS

A. In the event more material is excavated from any trench than can be backfilled over the completed pipe or can be stored within the project limits leaving space for drainage, the excess material shall be removed to some convenient place, provided by the Contractor. The Contractor shall bring back as much of the material so removed as may be required to properly backfill the trench, if of the proper kind; or if so required, the Contractor shall furnish such other suitable materials as may be necessary, as part of its base bid.

B. When it is necessary to haul soft or wet materials over the roads, the Contractor shall provide suitable tight vehicles to prevent spillage.

C. All topsoil shall be removed from the limits of trenches before the commencement of trench excavation. After the trenches are backfilled, the topsoil shall be replaced. No additional compensation will be made to the Contractor for this removal and replacement of topsoil. No topsoil shall be removed from the site.

PART 2 - PRODUCTS

2.01 FILL AND BACKFILL MATERIALS

A. Materials required for backfilling shall be as specified in Section 31 20 00 - Earthmoving and as shown on the Contract Drawings, unless otherwise directed by the Owner's Representative.

B. Material testing requirements for bedding and backfill shall be as specified in Section 31 20 00; Earthmoving. The Owner's Representative reserves the right to inspect proposed sources of off-site material and to order such tests of the material deemed necessary to ascertain its quality and gradation of particle size. If similar tests of the material from a particular source were performed previously, the Contractor may submit results of these tests to the Owner's Representative for consideration.

C. No backfill material shall be used on this project until approval is obtained from the Owner's Representative and only material from approved sources shall be used.

PART 3 - EXECUTION

3.01 PIPE BACKFILL REQUIREMENTS

A. Trenches shall be backfilled immediately after installing the pipe. The pipe laying operation may be held up by the Owner's Representative if the backfill operation does not follow immediately.

B. Bedding and Backfill Around Pipe

1. All pipe beds shall be hand shaped and of the material as shown on the detail sheet.

2. When conditions warrant, bedding material shall be used within rock, unstable trench bottom conditions, and areas of over excavation.

3. Bedding material shall be deposited up to the springline of the pipe, completely encasing the lower half of the pipe. The material shall then be thoroughly hand compacted to the specified density out to the side of the trench wall.

4. Bedding and backfill shall be placed in maximum loose lift thicknesses of 6-inches where the use of hand compaction equipment is necessary. Lifts shall be placed in nearly horizontal orientation.

C. Trench Backfill and Maintenance

1. Backfill material shall be deposited in nine-inch (9-inch) maximum lifts and thoroughly compacted to the densities as specified. Lifts shall be placed in nearly horizontal orientation.

2. It is important that the trench is relatively dry during the backfill operation and that the trench be backfilled immediately after installation and backfill around the pipe is completed. The method of consolidation shall be dependent upon the type of backfill material and the finished ground surface above the trench.

D. Special Backfill Requirements

1. Where existing utilities are exposed during construction, the Owner's Representative may require that a timber or steel beam be installed under the exposed line with both ends set on undisturbed ground and intermediate supports and blocking set as directed.

3.02 COMPACTION AND TESTING

A. Backfill shall be compacted in accordance with Section 31 20 00 - Earthmoving.

B. Quality control testing shall be in accordance with Section 31 20 00 - Earthmoving.

3.03 WASTE MATERIAL DISPOSAL

A. Excess excavated material, debris, waste construction materials shall be properly disposed of. The Contractor shall transport and dispose of all excess material at an approved site and shall be responsible for all transportation and disposal costs.

3.04 SITE GRADING

A. Unless otherwise indicated on the plans, the construction site shall be returned to original ground surface elevations or the grades shown on the Contract Drawings.

B. Lawn areas disturbed shall be backfilled to within the specified distance of the original grade and filled the remainder of the way with topsoil, previously stockpiled from the area or imported from an approved source.

C. Seeding and final site restoration shall be in accordance with the Contract Drawings and section 32 92 19 - Seeding.

END OF SECTION

SECTION 31 50 00

EXCAVATION SUPPORT AND PROTECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Requirements for safety for workers and public.

B. Guidelines for excavation safety.

1.02 RELATED REQUIREMENTS

A. Section 31 23 23 – Trenching and Backfilling.

B. Section 31 20 00 - Earthmoving.

1.03 SUMMARY

A. This section specifies requirements for the Contractor's activities such that they provide for the safety of workers and the public. All activities shall be conducted in accordance with pertinent OSHA regulations and the Contractor shall observe all applicable local, state and federal requirements and acquire all necessary permits.

B. The Contractor shall bench or cut back excavated slopes, dewater and sheet, as necessary for stability, safety and protection of adjacent properties, utilities and structures.

C. Sheeting, where utilized, shall be in conformance with pertinent OSHA Regulations to protect employees and to satisfactorily complete the work without causing subsidence and to prevent damage to adjacent ground and structures. If removal of temporary sheeting can potentially damage the existing appurtenances and structures, and/or the new construction, the sheeting and bracing as necessary, must remain in-place permanently.

D. These requirements are minimum standards and shall be increased as necessary depending on the hazard or if directed by the Owner's Representative..

1.04 DESIGN CRITERIA

A. The Contractor shall be responsible for the design of all excavation support systems, regardless of review of the plans or methods of construction, by the Owner's Representative. The Contractor shall design and construct support systems in accordance with the following criteria:

1. Design of excavation support shall be made by a Registered Engineer licensed in the State of New York and experienced in the design of earth support systems. The Contractor shall submit sheeting and bracing plans bearing the stamp of the Professional Engineer for review by the Owner's Representative.

2. Each member shall be designed with a proper factor of safety to support the maximum loads that can occur during construction including all potential live loads and surcharge loads.

3. Carry the bottom of the support system to a depth below the main earth excavation adequate to resist design soil pressures. The design shall account for potential undercutting of the excavation bottom due to the presence of unsuitable subgrade soils.

1.05 SUBMITTALS

A. General: Submittals shall be made according to the conditions of the Contract and Division 01 Specifications Sections.

B. Working Drawings:

1. Submit Excavation Support System working Drawings in accordance with the requirements of Division 01 and the Agreement.

2. Include the following on the Drawings:
   a. Details, arrangement and method of construction of the proposed system.
   b. The method of preloading, if required and bracing.
   c. The elevation of struts and shores, as applicable, and permissible depth to which excavation may be carried before such supports are installed and preloaded.
   d. The full excavation depths, the depths below the main excavation to which the support system will be installed and the maximum design load to be carried by the various members of the support system, and preloads.
   e. Design calculations including references to design methods used, assumptions, design parameters, material properties, allowable stresses and other pertinent information.
   f. Excavation support system deflection tolerances and monitoring requirements.

PART 2 – PRODUCTS

NOT USED

PART 3 - EXECUTION

3.01 INSTALLATION

A. Installation of earth support systems shall be performed without causing damage to adjacent ground, structures and utilities.

B. If unstable material is encountered during excavation, suitable measures must be taken to contain it in place and prevent ground displacement, which may cause damage.

C. Do not continue excavation in running ground. Implement proper dewatering procedures prior to continued excavation. Employ a positive means of containing the material behind the excavation support system, if present, before excavation continues.

D. Materials shall not be placed adjacent to the sides of sheeted or open excavations within a distance equal to two times the maximum depth of the excavation. Stockpiling material over the existing utilities, structures, sewers, force mains or water lines shall not be permitted.

3.02 REMOVAL AND RESTORATION

A. The removal of the support system shall be done in a manner such that the constructed structure remains undisturbed and that no disturbance or damage shall occur to adjacent structures, utilities, or other appurtenances. If removal of temporary support system may potentially damage adjacent features, then the support system must remain permanently.

B. If soil is retained on the temporary support elements during removal, the extraction and removal shall be terminated such that overlying structures and features are not damaged.

C. Support systems left in place shall be cutoff at least 3-feet below adjacent finished grades, and as directed by the Owner's Representative.

D. The Contractor shall repair all damage to property resulting from installation or removal of the support system at no additional cost to the Owner.

END OF SECTION

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 32 05 19.13

GEOTEXTILES FOR EXTERIOR IMPROVEMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. This section specifies the material and construction requirements for geotextiles.

1.02 RELATED REQUIREMENTS

A. Site Preparation, Section 31 10 00;

B. Earthmoving, Section 31 20 00;

C. Dewatering, Section 31 23 19.

1.03 SUBMITTALS

A. Contractor shall submit proposed geo-textile fabric product data, including manufactures name, material specifications, and installation instructions. The Contractor shall also furnish a manufacturer's certificate stating that the material supplied conforms to the specifications.

B. General: Submittals shall be made according to the conditions of the Contract and Division 1 Specifications Sections.

1.04 DELIVERY, STORAGE AND HANDLING

A. Geo-textiles shall be provided in rolls wrapped with protective covering to protect the fabric from sunlight, mud, dirt, dust, debris during transport and storage. The fabric shall be free of defects or flaws which significantly affect its physical properties. Each roll of fabric in the shipment shall be labeled with a number or symbol to identify the production run.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Geo-textile fabrics shall meet the requirements specified in the NYSDOT Materials Bureau most current Approved List, as specified below:

1. Geo-textile fabric for undercut (UC) shall consist of a woven, polypropylene fabric as listed in the NYSDOT Approved List.

2. Woven geo-textile shall meet NYSDOT Strength Code No. 1. Acceptable products include US 270 by US Fabrics, WINfab 270W by WINFab, Mirafi 550X by Tencate, or approved equal.

3. Non-woven Stabilization/Drainage geotextile shall meet NYSDOT Strength Code No. 1. Acceptable products include US 180NW by US Fabrics; WIN Fab 1200N by WINFab, Mirafi 180N by Tencate.; or accepted equivalent.

PART 3 - EXECUTION

3.01 INSTALLATION

A. The following provision shall apply, except where in conflict with the manufacturer's recommendations.

B. Geo-textile shall be installed at the location shown on the Drawings. Geo-textile fabrics shall be installed in accordance with: the procedures of NYSDOT §207-Geotextile; as shown on the Drawings; and the manufacturer's recommendations.

C. Geo-textile may be joined by either sewing or overlapping as per the manufacturer's recommendations but, end and side laps shall not be less than 12-inches.

D. The methods and materials for seaming or overlapping shall be subject to the approval of the Owner's Representative.

E. Traffic or construction equipment will not be permitted on the geo-textile.

F. The geo-textiles shall be placed and anchored on a prepared surface approved by the Owner's Representative. The fabric shall be laid loosely so that placement of the overlying materials shall not stretch or tear the geo-textile.

G. At the time of installation, geo-textile shall be rejected if it has defects, rips, holes, flaws, deterioration or damage incurred during manufacture, transportation or storage.

H. The fabric shall be protected at all times during construction from damage resulting from sunlight, excessive surface water, construction traffic, improper installation procedures, or any other condition which can result in damage to the fabric. Geo-textile found to be damaged as a result of improper construction procedures or inadequate protection, shall be replaced by the Contractor at no cost to the Owner.

END OF SECTION

SECTION 32 10 00

AGGREGATE BASES AND PAVEMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Aggregate base course.

B. Paving aggregates.

C. Bituminous Paving.

1.02 RELATED REQUIREMENTS

A. Section 31 20 00 - Earthmoving: Preparation of site for base course.

B. Section 31 23 23 - Trenching and Backfilling: Compacted fill over utility trenches under base course.

C. Section 31 20 00 - Earthmoving: Topsoil fill at areas adjacent to aggregate base course.

D. Section 31 20 00 - Earthmoving: Compacted fill under base course.

E. Section 33 05 13 - Manholes and Structures: Manholes including frames.

1.03 SUMMARY

A. The Contractor shall provide all labor, materials, equipment, and services necessary to install asphalt concrete pavement and subbase as shown on the Contract Drawings and as specified herein.

B. Pavement and subbase shall be placed to the lines, grades, thicknesses and configurations shown on the Contract Drawings.

1.04 REFERENCE STANDARDS

A. AASHTO M 147 - Standard Specification for Materials for Aggregate and Soil-Aggregate Subbase, Base and Surface Courses; American Association of State Highway and Transportation Officials; 1965 (2004).

B. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18 in.) Drop; American Association of State Highway and Transportation Officials; 2010

C. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2006.

D. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3); 2012.

E. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method; 2007.

F. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)); 2012.

G. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2008.

H. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2011.

I. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth); 2005.

J. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils; 2010.

K. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2010.

L. AI MS-2 - Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types; The Asphalt Institute; 1997.

M. AI MS-19 - A Basic Asphalt Emulsion Manual; The Asphalt Institute; Fourth Edition.

N. ASTM D946 - Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction; 2009a.

1.05 SUBMITTALS

A. General: Submittals shall be made according to the conditions of the Contract and Division 01 Specifications Sections.

B. The Contractor shall submit the name of the asphalt concrete supplier. The Supplier shall be a plant currently approved by the New York State Department of Transportation (NYSDOT).

C. The Contractor shall submit certification(s) from the asphalt concrete supplier that the asphalt concrete materials are in compliance with the referenced NYSDOT Standard Specifications.

D. The Contractor shall submit a list of equipment, off-site material sources, and test data showing that proposed subbase material source(s) meet the specified requirements, earthwork procedures, material handling and stockpiling procedures and locations, material placement procedures and quality control plans as required by the Owner's Representative. Samples of subbase materials shall be provided to the Owner's Representative as directed.

1.06 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.

B. When aggregate materials need to be stored on site, locate where indicated on drawings.

C. When aggregate materials need to be stored on site, locate where directed by Owner.

D. Aggregate Storage, General:

1. Separate differing materials with dividers or stockpile separately to prevent intermixing.

2. Prevent contamination.

3. Protect stockpiles from erosion and deterioration of materials.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Subbase Type 2: Subbase Type 2 shall meet the requirements of NYSDOT §304-Type 2 and conform to the requirements as set forth in specification section 31 20 00 - Earthmoving.

B. Asphalt Concrete Base: Asphalt concrete base shall be dense with relatively low permeability and meet all requirements of NYSDOT §401. The composition of the bituminous plant mixture is Base Type 1 NYSDOT meeting the following gradation requirements:

Sieve Size	**Percent Passing**
2-inch	100
1 ½-inch	90-100
1-inch	78-95 (+/- 5)
½ -inch	57-84 (+/- 6)
¼ -inch	40-72 (+/- 7)
1/8 -inch	26-57 (+/- 7)
No. 20	12-36 (+/- 7)
No. 40	8-25 (+/- 7)
No. 80	4-16 (+/- 4)
No. 200	2-8 (+/- 2)
Asphalt Content	4.0-6.0 (+/- 0.4)

C. Asphalt Concrete Binder: Asphalt concrete binder shall be dense intermediate course with a relatively low permeability and meet all requirements of NYSDOT §702. The composition of the bituminous plant mixture is Type 3 Binder PG64-28 - NYSDOT meeting the following gradation requirements:

Sieve Size	**Percent Passing**
1 ½-inch	100
1-inch	95-100

½ -inch	70-90 (+/- 6)
¼ -inch	48-74 (+/- 7)
1/8 -inch	32-62 (+/- 7)
No. 20	15-39 (+/- 7)
No. 40	8-27 (+/- 7)
No. 80	4-16 (+/- 4)
No. 200	2-8 (+/- 2)
Asphalt Content	4.5-6.5 (+/- 0.4)

D. Asphalt Concrete Top: Asphalt concrete top shall be a dense smooth gritty texture which meets the requirements of NYSDOT §401. The composition of the bituminous plant mixture is Top Type 7 meeting the following gradation.

Sieve Size	**Percent Passing**
½ -inch	100
¼ -inch	90-100
1/8 -inch	45-70 (+/- 6)
No. 20	15-40 (+/- 7)
No. 40	8-27 (+/- 7)
No. 80	4-16 (+/- 4)
No. 200	2-6 (+/- 2)
Asphalt Content	6.0-8.0 (+/- 0.4)

E. Asphalt Tack Coat: Asphalt tack coat shall consist of asphalt emulsion which meets the requirements of NYSDOT §702-6 (Table 702-9) Item 407.0101, Grade HFMA-2H.

F. Asphalt Joint Filler/Sealer shall consist of liquid asphalt that meets the requirements of NYSDOT §702-0700, Asphalt Filler. Pre-molded bituminous filler shall conform to NYSDOT specifications section 705-07.

2.02 SOURCE QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for testing and analysis of aggregate materials.

B. Provide materials of each type from same source throughout the Work.

PART 3 - EXECUTION

3.01 EXCAVATION

A. Perform excavation in accordance with Section 31 10 00 - Site Preparation; and Section 31 20 00 - Earthmoving.

3.02 SUBGRADE PREPARATION

A. Subgrades in which soft or unsuitable materials are encountered that are not a result of Contractor's operations or failure to protect subgrades shall be undercut and backfilled with granular subbase as directed by the Owner’s Representative.

B. All subgrades will be monitored and tested as determined necessary by the Owner's Representative. The Contractor shall proof roll subgrades in accordance with Section 31 20 00 - Earthmoving. All proof rolling shall be done in the presence of the Owner's Representative. Areas which are determined to be soft, wet and/or unstable shall be undercut and/or stabilization fabric or geo-grid placed as directed by the Owner's Representative. Fill materials placed in undercut areas or immediately over stabilization fabric or geo-grid shall be granular subbase as directed by the Owner's Representative and in accordance with Section 31 20 00 - Earthmoving.

C. The Contractor shall place no materials or fill until the subgrades are observed and tested as directed by the Owner's Representative.

3.03 PAVEMENT CONSTRUCTION

A. The Contractor shall not place subbase fill or place asphalt concrete until underlying subgrades have been observed and tested as directed by the Owner's Representative.

B. The materials shall be placed at the locations and to the lines and grades, and thicknesses shown on the Contract Drawings.

C. Placement and Compaction:

1. Subbase
   a. Refer to Section 31 20 00 - Earthmoving.

2. Asphalt Concrete Base
   a. Asphalt Concrete Base shall be constructed on a prepared subbase in accordance with the requirements of NYSDOT §404 and in conformity with the required lines, grades, thickness and typical sections shown and specified herein or as directed by the Owner's Representative.

3. Asphalt Concrete Binder
   a. Asphalt Concrete Binder shall be constructed over the completed asphalt base in accordance with the requirements of NYSDOT §404 and in conformity with the required lines, grades, thickness and typical sections shown and specified herein or as directed by the Owner's Representative.

4. Asphalt Concrete Top
   a. Asphalt Concrete Top shall be constructed over the completed asphalt binder course in accordance with the requirements of NYSDOT §404 and in conformity with the required lines, grades, thickness and typical sections shown and specified herein or as directed by the Owner's Representative.

5. Asphalt Emulsion Tack Coat
   a. Asphalt Emulsion Tack Coat shall be placed in accordance with NYSDOT Standard Specifications 702-8. Asphalt Emulsion Tack Coat shall be placed at the locations shown on the Contract Drawings and in accordance with the requirements of NYSDOT §407 Tack Coat.

6. Asphalt Joint Filler
   a. Asphalt Joint Filler shall be placed in accordance with the requirements of NYSDOT §633 Conditioning of Pavement.

7. Joints
   a. Joints shall be constructed in accordance with the requirements of NYSDOT §404-3.09 Joints.

D. Frozen or Unsuitable Subgrades: Fill materials and asphalt concrete shall not be placed over frozen, wet, or unsuitable subgrades.

3. 04 FIELD QUALITY CONTROL

A. General: Comply with NYSDOT Standard Specifications 401 and 404 for asphalt types specified.

B. Portions of completed pavement that are defective in finish, compaction or elevation, or that do not comply in all respects with the requirements of the contract documents, shall be taken up, removed and replaced with suitable material, and properly installed in accordance with the contract documents, at No Cost to the Owner.

C. Thickness and Density: In-place compacted thickness will not be acceptable when it is less than 95% of the total shown on the drawings.

D. Joints: Ensure the finished pavement at all joints complies with the surface tolerance requirements and exhibits the same uniformity of texture and compaction as other sections of the pavement course. Do not pass rollers over the unprotected edges of freshly laid mixtures unless approved by the Owner's Representative.

E. Surface Smoothness: The finished asphalt surfaces shall be uniform and without ruts or visible irregularities, as determined by the Owner's Representative. The Contractor shall repair any areas that settle or otherwise do not meet the standards for surface smoothness as directed by the Owner's Representative, and at no cost to the Owner. Each course shall be tested for surface smoothness using a 10-ft straight edge applied parallel with, and at right angles to the centerline of paved areas. Surfaces will not be accepted when exceeding the following tolerances for smoothness and shall be entirely removed and brought to proper grade and repaired, to the satisfaction of the Owner's Representative.

1. For Asphalt Concrete:
   a. Base Course Surface: 3/8-in.
   b. Binder Course Surface: 1/4-in.
   c. Wearing Course Surface: 1/8-in.

F. Check the surface grades and drainage patterns. Small ponding areas (bird baths) larger than two (2') feet in any dimension are not acceptable. When this test proves that surface conditions are not acceptable, the Contractor will be responsible for correcting the problems, at no additional cost to the Owner.

G. All pavement shall be warranted as to workmanship and materials for the period of one-year following final acceptance of the entire project. Any change of acceptance date shall be executed and administered, in writing, by the Owner's Representative.

H. Visual inspection of the subgrades will be performed by the Owner's Representative. If "soft" spots are identified, the Contractor shall remove them as directed by the Owner's Representative and be reimbursed based on Unit Cost. Compaction testing may be required by the Owner's Representative to ascertain the compacted density of the subgrade prior to allowing placement of subbase. If a compacted layer fails to meet the specified percentage of maximum density, the layer shall be re-compacted and retested. Subbase may then be applied in accordance with Section 31 20 00 - Earthmoving. Finished subbase surfaces shall be uniform and without ruts or visible irregularities, as determined by the Owner's Representative. Subbase not installed to the lines and grades specified shall be repaired by the Contractor at no additional cost to the Owner.

END OF SECTION

SECTION 32 13 13

CONCRETE PAVING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Concrete sidewalks, stair steps, integral curbs, gutters, and median barriers.

1.02 RELATED REQUIREMENTS

A. Section 32 13 73 - Joint Sealants: Sealing joints.

B. Section 31 20 00 - Earthmoving: Preparation of site for paving and base and preparation of subsoil at pavement perimeter for planting.

1.03 PRICE AND PAYMENT PROCEDURES

A. Concrete Pavement Mix (Wearing Course): Measurement by the cubic yard. Includes mix design, supplying to site, testing.

B. Concrete Placed: Measurement by the square yd. per inch thickness. Includes preparing base, placing, floating and finishing, testing.

1.04 REFERENCE STANDARDS

A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; American Concrete Institute International; 1991 (Reapproved 2009).

B. ACI 301 - Specifications for Structural Concrete; American Concrete Institute International; 2010 (Errata 2012).

C. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; American Concrete Institute International; 2000.

D. ACI 305R - Hot Weather Concreting; American Concrete Institute International; 2010.

E. ACI 306R - Cold Weather Concreting; American Concrete Institute International; 2010.

F. ASTM A185/A185M - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete; 2007.

G. ASTM A497/A497M - Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete; 2007.

H. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2015.

I. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2015.

J. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2013.

K. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2014.

L. ASTM C150/C150M - Standard Specification for Portland Cement; 2012.

M. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2014.

N. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a.

O. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2013.

P. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2012.

Q. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing; 2014.

R. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types); 2004 (Reapproved 2013).

S. ASTM D1752 - Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction; 2004a (Reapproved 2013).

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data:

1. Concrete Design Mix: Submit proposed concrete design mix together with name and location of batching plant at least 28-days prior to the start of concrete work.

2. Portland Cement: Brand and Manufacturer’s name.

3. Air-entraining Admixture: Brand and manufacturer’s name.

4. Water-reducing or High Range Water-reducing Admixture: Brand and manufacturer’s name.

5. Curing and Anti-Spalling Compound: Manufacturer's specifications and application instructions.

6. Joint Filler

C. Samples: Fabric Reinforcement: Two square feet.

D. Design Data: Indicate pavement thickness, designed concrete strength, reinforcement, and typical details.

PART 2 - PRODUCTS

2.01 PAVING ASSEMBLIES

A. Comply with applicable requirements of ACI 301.

B. Design paving for walkways and steps.

C. Concrete Sidewalks, Steps and Median Barrier: 5,000 psi 28 day concrete, 6-inches thick, Natural Grey color Portland cement, light broom finish.

2.02 FORM MATERIALS

A. Form Materials: Conform to ACI 301.

B. Forms:

1. Forms shall be well matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.
   a. Plywood: Sound, undamaged sheets with straight edges. Minimum thickness of 3/4-inch, U.S. Product Standard PS-1 B-B plyform or HDO plyform.
   b. Lumber: Stamp clearly visible, indicating species and grade.
   c. Steel: Minimum 16-gauge.
   d. Metal Frame and Plywood Face Combination: 5/8-inch facing.

2. Unexposed Concrete: Form concrete surfaces that will be unexposed in finished structure with plywood, lumber, metal or other acceptable materials. Provide lumber dressed on at least two edges and one side for tight fit.

3. Chamfer Strips: 1/2-inch, 45 degree prefabricated extruded "PVC" or milled poplar wood strips, nailed 6-inches on center, and installed in inside corners of all forms.

4. Ties for foundation walls shall be snap-ties with removal cones and shall incorporate water seal washer. Ties shall be arranged in a symmetrical manner.

5. Form Coatings/Release Agents: Provide VOC compliant, non-bonding, non-staining commercial formulation form coating compounds.

C. Joint Filler: Preformed; non-extruding bituminous type ASTM D1751.

1. Thickness: 1/2-inch.

2. Product: In accordance with NYSDOT Specification Section 705.

2.03 REINFORCEMENT

A. Reinforcing Steel: ASTM A615, Grade 60 (60,000) psi yield strength; deformed billet steel bars; unfinished.

B. Steel Welded Wire Reinforcement: Plain type, W2.9 x W2.9 ASTM A185; in flat sheets of 6 x 6; unfinished.

C. Dowels: ASTM A615, Grade 40 - 40,000 psi yield strength; deformed billet steel bars; unfinished finish.

2.04 CONCRETE MATERIALS

A. Obtain cementitious materials from same source throughout.

B. Concrete Materials: Provide in accordance with NYSDOT standard specifications. Normal weight, air-entrained concrete with minimum compressive strength of 5,000 psi at the end of 28-days.

C. Cement: ASTM C150 Normal - Type I Portland type, grey color, Minimum 6.5 bags or 611 pounds per cubic yard.

D. Fine and Coarse Mix Aggregates: ASTM C33.

1. Course aggregate shall be stone meeting the requirements of NYSDOT 501-2.02 and have the following gradation requirements:

Sieve Size	Percent Finer by Weight
1 1/2-inch	100
1-inch	93-100
1/2-inch	27-58
1/4-inch	0-8

E. Water: Potable, clean, and not detrimental to concrete.

F. Design Air Content: ASTM C260, and on NYSDOT current “Approved List”; 6 percent by volume plus or minus 1.5 percent.

G. Air-Entraining Admixtures: ASTM C260.

H. Slump: Between 2 and 4-inches; except when a water-reducing admixture is used, maximum slump shall be 6-inches. And when a high range water reducing admixture is used, maximum slump shall be 8-inches.

I. Chemical Admixtures: ASTM C494 and on the NYSDOT current "Approved Lists", Type A - Water Reducing, and Type F - Water Reducing, High Range and Retarding.

1. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

J. Chemical Curing and Anti-Spalling Compound: ASTM C-309, Type 1D, Class B, Clear, styrene acrylate type liquid compound with fugitive dye, minimum 18 percent total solids (by weight of compound), ready for use by spray apparatus.

1. VOCOMP 20 by W.R. Meadows, Inc.; wrmeadows.com; (800) 342-5976.

2. Spray Cure & Seal 25A. by ChemMasters, Inc.; chemmasters.net, (440) 428-2105.

3. Lin-Seal by W.R. Meadows, Inc.; wrmeadows.com; (800) 342-5976.

4. Silencure-A (J-22) by by ChemMasters, Inc.; chemmasters.net, (440) 428-2105.

5. Acrylseal HS by Master Builders, Inc., 23700 Chagrin Blvd., Cleveland, OH 44122, (800) 628-9990.

2.05 MIXING

A. Transit Mixers: Comply with ASTM C94/C94M.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify compacted subgrade is acceptable and ready to support paving and imposed loads.

B. Verify gradients and elevations of base are correct.

3.02 SUBBASE

A. Prepare subbase in accordance with Section 31 20 00 - Earthmoving.

3.03 PREPARATION

A. Moisten base to minimize absorption of water from fresh concrete.

B. Coat surfaces of manhole frames with oil to prevent bond with concrete pavement.

C. Notify Owner's Representative minimum 24-hours prior to commencement of concreting operations.

3.04 FORMING

A. Place and secure forms to correct location, dimension, profile, and gradient.

B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.

C. Space expansion joints equally at not more than 40-ft on center unless otherwise indicated on plans.

D. Place joint filler vertical in position, in straight lines, where new concrete abuts existing concrete paving and at fixed structures or appurtenances. Secure to formwork during concrete placement. Protect the top edge of the joint filler during concrete placement with a temporary cap and remove after concrete has been placed.

3.05 REINFORCEMENT

A. Prior to placement, clean reinforcement thoroughly of mill and rust scale and of coatings which could destroy or reduce bond.

B. Install fabric reinforcement midway between the top and bottom of the concrete slab. To ensure the final location of reinforcement at the mid-slab location:

1. Prior to placing concrete, place fabric reinforcement midway between top and bottom of the slab and secure against displacement with the use of chair carriers, or other approved materials.

C. Lap edges and ends of adjoining sheets of fabric reinforcement at least half the mesh width. Offset end laps in adjacent sheets to prevent continuous joints at ends. Interrupt reinforcement at expansion joints, stopping 2-inches from edges.

D. Place other reinforcement as indicated.

E. Interrupt reinforcement at contraction joints.

F. Place dowels to achieve pavement and curb alignment as detailed.

3.06 COLD AND HOT WEATHER CONCRETING

A. Follow recommendations of ACI 305R when concreting during hot weather.

B. Follow recommendations of ACI 306R when concreting during cold weather.

C. Do not place concrete when base surface temperature is less than 40-degrees F, or surface is wet or frozen.

3.07 PLACING CONCRETE

A. Place concrete in accordance with NYSDOT standards.

B. Do not place concrete when base surface is wet.

C. Place concrete using the slip form technique.

D. Ensure reinforcement, inserts, embedded parts, and formed joints are not disturbed during concrete placement.

E. Place concrete continuously over the full width of the panel and between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.

F. Consolidate concrete by spading, rodding, forking, or using an approved vibrator eliminating all air pockets, stone pockets, and honeycombing. Work and float concrete surface so as to produce a uniform texture.

G. Apply surface retarder to all exposed surfaces in accordance with manufacturer's instructions.

3.08 JOINTS

A. Align curb, gutter, and sidewalk joints.

B. Place 3/8-inch wide expansion joints at 20-foot average (40-ft maximum) intervals and to separate paving from vertical surfaces and other components and in pattern indicated.

1. Form joints with joint filler extending from bottom of pavement to within 1/2-inch of finished surface.

2. Secure to resist movement by wet concrete.

C. Provide scored joints.

1. At between 5-feet to 8-feet intervals. (See plans.)

2. Between sidewalks and curbs.

3. Between curbs and pavement.

D. Provide keyed joints as indicated.

E. Saw cut contraction joints 3/16-inch wide at an optimum time after finishing. Cut 1/3 into depth of slab.

3.09 FINISHING

A. Area Paving: Light broom, texture perpendicular to pavement direction.

B. Sidewalk Paving: Light broom, texture perpendicular to direction of travel with troweled and radiused edge 1/2-inch radius.

C. Median Barrier: Light broom, texture perpendicular to direction of travel with troweled and radiused edge 1/2-inch radius.

D. Curbs: Light broom, texture parallel to pavement direction.

E. Place sealer on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.

3.10 TOLERANCES

A. Maximum Variation of Surface Flatness: 1/4-inch in 10-ft.

B. Maximum Variation From True Position: 1/4-inch.

3.11 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00 - Quality Requirements.

1. Provide free access to concrete operations at project site and cooperate with appointed firm.

2. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.

3. Tests of concrete and concrete materials may be performed at any time to ensure conformance with specified requirements.

B. Compressive Strength Tests: ASTM C39/C39M; for each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cu yd or less of each class of concrete placed.

1. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

2. Perform one slump test for each set of test cylinders taken.

C. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

3.12 PROTECTION

A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.

B. Do not permit pedestrian traffic over pavement for 7-days minimum after finishing.

C. Do not permit vehicular traffic over pavement until 75 percent design strength of concrete has been achieved.

END OF SECTION

SECTION 32 13 73

CONCRETE PAVING JOINT SEALERS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Joint Sealers for Concrete Paving and Walks.

1.02 RELATED REQUIREMENTS

A. Section 32 13 13 – Concrete Paving.

B. Section 32 16 13 – Concrete Curbing.

1.03 SUMMARY

A. Provide joint sealers that have been produced and installed to establish and maintain watertight continuous seals at designated locations.

1.04 QUALITY ASSURANCE

A. Single Source Responsibility for Joint Sealer Materials: Obtain joint sealer materials from a single manufacturer for each different product required.

B. Preconstruction Joint Sealer-Substrate Tests: Submit substrate materials representative of actual joint surfaces to be sealed to manufacturer of joint sealer products for laboratory testing of sealants for adhesion to primed and unprimed substrates and for compatibility with secondary seals, if required, as indicated below:

1. Use test methods standard with manufacturer to determine if priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealers to joint substrates under environmental conditions that will exist during actual installation.

2. Testing will not be required when joint sealer manufacturer is able to submit joint preparation data required above which is acceptable to Architect and is based on previous testing of current sealant products for adhesion to, and compatibility with, joint substrates matching those submitted.

C. Preconstruction Field Tests: Prior to installation of joint sealants, field-test their adhesion to joint substrates as follows:

1. Install joint sealants in 5-feet joint lengths using same materials and methods required for completed work. Allow sealants to cure before testing. Test adhesion to joint substrates by manually trying to pull joint sealant out of joint.

2. Locate test joints where indicated or, if not indicated, as directed by Owner's Representative.

3. Perform field tests for each type of elastomeric sealant and joint substrate application indicated.

4. Perform tests in presence of Owner's Representative.

1.05 SUBMITTALS

A. General: Submittals shall be made according to the conditions of the Contract and Division 01 Specifications Sections.

B. Product Data: Submit manufacturer's technical data for each joint sealer product required, including instructions for joint preparation and joint sealer application.

C. Samples for Initial Selection Purposes: Submit manufacturer's standard bead samples (three sets) consisting of strips of actual products showing full range of colors available, for each product exposed to view.

D. Test Reports: Submit the following test reports:

1. Preconstruction joint sealer-substrate test results including recommendations of joint sealer manufacturer for joint preparation and application of joint sealers applicable to project conditions.

2. Certified test reports for elastomeric sealants evidencing compliance with requirements specified based on comprehensive testing of current product formulations within a 24-month period preceding date of submission of test reports to Owner's Representative. Include test results for aged performances including hardness, stain resistance, adhesion and cohesion under cyclic movement, low-temperature flexibility, modulus of elasticity at 100% strain, effects of heat aging, and effects of accelerated weathering.

E. Certificates from manufacturers of joint sealers attesting that their products comply with specification requirements and are suitable for the use intended.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to project site in original unopened containers or bundles with labels informing about manufacturer, product name and designation, color, expiration period for use, pot life, curing time and mixing instructions for multicomponent materials.

B. Store and handle materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.07 PROJECT CONDITIONS

A. Environmental Conditions: Do not proceed with installation of joint sealers under the following conditions.

1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealer manufacturers.

2. When joint substrates are wet due to rain, frost, condensation or other causes.

B. Joint Width Conditions: Do not proceed with installation of joint sealers when joint widths are less than allowed by joint sealer manufacturer for application indicated.

C. Joint Substrate Conditions: Do not proceed with installation of joint sealers until contaminants capable of interfering with their adhesion are removed from joint substrates.

D. Protect all surfaces adjacent to sealants with non-staining removable tape or other approved covering to prevent soiling or staining.

PART 2 - PRODUCTS

2.01 MATERIALS, GENERAL

A. Compatibility: Provide joint sealers, joint fillers and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by testing and field experience.

B. Colors: Provide color of exposed joint sealers indicated or, if not otherwise indicated, as selected by Owner's Representative from manufacturer's standard colors.

2.02 JOINT SEALERS

A. Joint Sealant Standard: Provide manufacturer's standard chemically curing, elastomeric sealant of base polymer indicated which complies with ASTM C 920 requirements, including those for Type, Grade, Class and Uses.

B. Horizontal Joint Sealant: One-component, cold-applied, self-leveling polyurethane joint sealant. Horizontal joint sealant shall have the following characteristics:

1. ASTM C 920-11: Type S; Grade P; Class 25; Uses T1, T2, NT, O, M and, G.

2. Consistency: Liquid, Self-leveling.

3. Skin Formation Time (74^{o} F – 50% RH): 60-120 minutes.

4. Water and Salt Spray Resistance: Excellent

5. Modulus at Break, ASTM D412: >0.6 MPa.

6. UV Resistance: Good.

7. Resistance to Dilute Acids and Bases: Average

8. Temperature Resistance: -40 – 176^{o} F

9. VOC: 24g/L

10. Non-Bubbling formula; may be applied to green concrete.

C. Vertical Joint Sealant, One-component, non-sag polyurethane joint sealant. Non-sag Joint Sealant shall meet the following: ASTM C920-11, Type S, Grade NS, Class 35, Use T1, T2, NT, O, M, or G.

D. Products: Subject to compliance with requirements, provide one of the following:

1. Horizontal Joint Sealants:
   a. "Pourthane SL", by W.R.Meadows Corp.
   b. "Sikaflex 1cSL", by Sika Corp.
   c. "Eucolastic 1SL", by Euclid Chemical Corp.
   d. "MasterSeal SL1", by BASF Corp.
   e. "955-SL", by Bostik Corp.

2. Vertical Joint Sealants:
   a. "Pourthane SL", by W.R. Meadows Corp.
   b. "Sikadur -51 NS", by Sika Corp.
   c. "Eucolastic 1NS", by Euclid Chemical Corp.
   d. "MasterSeal NP 1", by BASF Corp.

2.03 JOINT SEALANT BACKING

A. General: Provide sealant backings of material and type which are non-staining; are compatible with joint substrates, sealants, primers and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Plastic Foam Joint-Fillers: Preformed, compressible, resilient, non-waxing, non-extruding strips of plastic foam of material indicated and of size, shape and density to control sealant depth and otherwise contribute to producing optimum sealant performance: Closed-cell polyethylene foam, non-gassing.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing bond between sealant and joint filler or other materials at back (3rd) surface of joint. Provide self-adhesive tape where applicable.

2.04 MISCELLANEOUS MATERIALS

A. Primer: Provide type recommended by joint sealer manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint sealer substrate and field tests.

B. Cleaners for Nonporous Surfaces: provide non-staining, chemical cleaner of type acceptable to manufacturer of sealant and sealant backing materials which are not harmful to substrates and adjacent nonporous materials.

C. Masking Tape: Provide non-staining, non-absorbent type compatible with joint sealants and to surfaces adjacent to joints.

PART 3 - EXECUTION

3.01 INSPECTION

A. Require Installer to inspect joints indicated to receive joint sealers for compliance with requirements for joint configuration, installation tolerances and other conditions affecting joint sealer performance. Obtain Installer's written report listing any conditions detrimental to performance of joint sealer work. Correct unsatisfactory conditions before joint sealer work proceeds.

3.02 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealers to comply with recommendations of joint sealer manufacturers and the following requirements.

1. Remove all foreign material from joint substrates which could interfere with adhesion of joint sealer, including dust, dirt, rust, oils, paints, or other foreign matter that will impair the performance of materials installed under this Section; except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer.

2. Clean concrete, masonry, unglazed surfaces of ceramic tile and similar porous joint substrate surfaces, by brushing, grinding, mechanical abrading or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealers. Remove loose particles remaining from above cleaning operations by vacuuming.

3. Remove laitance and form release agents from concrete.

4. Clean metal, glass, porcelain, enamel, glazed surfaces of ceramic tile and other non-porous surfaces by chemical cleaners or other means which are not harmful to substrates or leave residues capable of interfering with adhesion of joint sealers.

B. Joint Priming: Prime joint substrates where indicated or where recommended by joint sealer manufacturer based on preconstruction joint sealer-substrate tests or prior experience. Apply primer to comply with joint sealer manufacturer's recommendations. Confine primers to areas of joint sealer bond, do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: use masking tape where required to prevent contact of sealant with adjoining surfaces which otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.03 INSTALLATION OF JOINT SEALERS

A. General: Comply with joint sealer manufacturer's printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.

B. Elastomeric Sealant Installation Standard: Comply with recommendations of ASTM C 962 for use of joint sealants as applicable to materials, applications and conditions indicated.

C. Acoustical Sealant Application Standard: Comply with recommendations of ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications and conditions indicated.

D. Installation of Sealant Backings: Install sealant backings to comply with the following requirements:

1. Install joint fillers of type indicated to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths which allow optimum sealant movement capability.
   a. Do not leave gaps between ends of joint-fillers.
   b. Do not stretch, twist, puncture or tear joint-fillers.
   c. Remove absorbent joint-fillers which have become wet prior to sealant application and replace with dry material.

2. Install bond breaker tape between sealants and joint-fillers, compression seals or back of joints where required to prevent third-side adhesion of sealant to back of joint.

3. Install compressible seals serving as sealant backings to comply with requirements indicated above for joint fillers.

E. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration and providing uniform, cross-sectional shapes and depths relative to joint widths which allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants:

1. Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents which discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

2. Concave joint configuration per Figure 6A in ASTM C 962, unless otherwise indicated.

3.04 PROTECTION AND CLEANING

A. Protect joint sealers during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of substantial completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealers immediately and reseal joints with new materials to produce joint sealer installations with repaired areas indistinguishable from original work.

B. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealers and of products in which joints occur.

END OF SECTION

SECTION 32 31 33

SITE RAILINGS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Stair railings and guardrails.

B. Free-standing hand railings at steps.

C. Galvanizing and powder coating of handrails and guardrails.

1.02 REFERENCE STANDARDS

A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2012.

B. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings; 2000 (Reapproved 2006).

C. ASTM E985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings; 2000 (Reapproved 2006).

D. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); The Society for Protective Coatings; 2002 (Ed. 2004).

1.03 SYSTEM DESCRIPTION

A. General: Engineer handrail and railing systems to withstand structural loads indicated. Determine allowable design working stresses of railing materials based on the following:

1. For Aluminum: The Aluminum Association's specification for Aluminum Structures.

B. Structural Performance of Handrails and Railing Systems: Engineer, fabricate, and install handrails and railing systems to withstand the following structural loads without exceeding the allowable design working stress of the materials for handrails, railing systems, anchors, and connections. Apply each load to produce the maximum stress in each of the respective components comprising handrails and railing systems.

1. Top Rail of Guardrail Systems: Capable of withstanding the following loads applied as indicated:
   a. Concentrated load of 200 pounds applied at any point and in any direction.

b. Uniform load of 50 pounds per linear foot applied horizontally and concurrently with uniform load of 100 pounds per linear foot applied vertically downward.
c. Concentrated load need not be assumed to act concurrently with uniform loads.

2. Handrails Not Serving as Top Rails: Capable of withstanding the following loads applied as indicated:
   a. Concentrated load of 200 pounds applied at any point and in any direction.
   b. Uniform load of 50 pounds per linear foot applied in any direction.
   c. Concentrated and uniform loads need not be assumed to act concurrently.

3. Infill Area of Guardrail Systems: Capable of withstanding a horizontal concentrated load of 200 pounds applied to 1 ft^2 at any point in the system.

4. Above load need not be assumed to act concurrently with loads on top rails of railing systems in determining stress on guard.

C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

D. Thermal Movements: Allow for thermal movement resulting from the following maximum change (range) in ambient temperature in the design, fabrication, and installation of handrails and railings to prevent buckling, opening up of joints, overstressing of components, connections and other detrimental effects. Base design calculation on actual surface temperatures of materials due to both solar heat gain and nighttime sky heat loss.

1. Temperature Change (Range): 100 degrees F ambient; 150 degrees F material surfaces.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, accessories, and finish.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum 5-year experience manufacturing similar products.

B. Installer Qualifications: Minimum 2-year experience installing similar products.

C. Single Source Responsibility: Obtain handrails and railing systems from a single fabricator/manufacturer.

D. Engineering Responsibility: Engineer hand railing and railing systems by the fabricator/manufacturer unless sizes and configurations are specifically called out on the drawings.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.

B. Store handrails and railing systems in clean, dry location, away from uncured concrete and masonry, protected against damage.

C. Handling: Handle materials to avoid damage.

1.07 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.08 SEQUENCING

A. Field Measurements: Where handrails and railings are indicated to fit to other construction, check actual dimensions of other construction by accurate field measurements before fabrication; show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay of Work.

1. Where field measurements cannot be made without delaying the Work, obtain guaranteed dimensions in writing and proceed with fabrication of products without field measurements if specifically requested to do so by architect, owner or contractor.

PART 2 - PRODUCTS

2.01 RAILINGS - GENERAL REQUIREMENTS

A. Allow for expansion and contraction of members and building movement without damage to connections or members.

B. Dimensions: See drawings for configurations and heights.

1. Top Rails and Wall Rails: 1 1/4-inches Schedule 40 (1 5/8-inch OD) pipe, round.

2. Intermediate Rails: 1 1/4-inches Schedule 40 (1 5/8-inch OD) pipe, round.

3. Posts: 1 1/4-inches Schedule 40 (1 5/8-inch OD) pipe, round.

4. Balusters: 5/8-inch OD 16 ga steel tube.

C. Provide anchors and other components as required to attach to support structure, made of stainless steel unless otherwise indicated.

2.02 ALUMINUM RAILING SYSTEM

A. Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, with not less than the strength and durability properties of the alloy and temper designated below for each aluminum form required:
   1. Structural extrusions such as posts shall be 6061-T6 or 6005-T5 Alloy/Temper.

   2. All other extrusions such as Caps, Pickets, Mid and Bottom Rails shall be at least 6063-T5.

   3. Castings: To be high quality prime material or materials re-melted from prime extrusions.

2.03 GROUT AND ANCHORING CEMENT

A. Non-shrink, Nonmetallic Grout: Premixed, factory-packaged, non-staining, noncorrosive, nongaseous grout complying with CE CRD-C 621. Provide grout specifically recommended by manufacturer for interior and exterior applications.

B. Erosion-Resistant Anchoring Cement: Factory-prepackaged, non-shrink, non-staining, high strength cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure or provide a sealer or waterproof coating recommended for exterior use.

2.04 WELDING MATERIALS, FASTENERS, AND ANCHORS

A. Welding Electrodes and Filler/Metal: Provide type and alloy of filler metal and electrodes as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.

B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of the type, grade, and class required to produce connections that are suitable for anchoring railing to other types of construction indicated and capable of withstanding design loadings.

   1. For aluminum railings in coastal environments provide fasteners fabricated from stainless steel or aluminum only.

C. Fasteners for Interconnecting Railing Components: Use fasteners of same basic metal as the fastened metal, unless otherwise indicated. Do not use metals that are corrosive or incompatible with materials joined.

2.05 FABRICATION

A. General: Fabricate handrails and railing systems to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of hollow members, post spacings, and anchorage, but not less than those required to support structural loads.

B. Preassemble railing systems in shop to greatest extent possible assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for field assembly and coordinated installation. Use connections that maintain structural value of joined pieces.

C. Assembly shall be in a neat workmanlike manner using M.I.G. or T.I.G. Welding Processes as required. Horizontal channels shall be punched to receive pickets and welds in this application shall be concealed from view.

1. Channels to receive a snap cover only when specifically required and noted on drawings.

2. Posts shall be structurally welded to Top Rail and Mid and Lower Horizontal Members to assure fixed fastening for the life of the rail.

3. Corners shall be hairline fitted by mitre and further welded as required to obtain maximum assurance of strength through the railing's useful life.

4. Splices shall be accomplished by butting one Top Rail to the next with a structural sleeve insert extending from one Top Rail to the next and further secured by means of a Stainless Steel, Aluminum or other proper screw or pop-rivet. Butt splices to be properly gapped to provide for proper expansion and contraction movement. For expansion joints be sure that only one side of the sleeve insert is fastened to the top rail.

5. End connections required to fasten to the building structure require either a welded end clip or a separate slide clip.

6. Provide weep holes when necessary to drain closed sections from pretreatment immersion and sprays also for moisture from condensation to escape.

2.06 ALUMINUM FINISH

A. Aluminum railings to receive a baked-on painted finish over full pretreatment except when specified to be natural or mill finish or when anodizing is specified. Anodizing is not recommended for welded railings due to the likelihood of discoloration from:

1. Dissimilar alloys.

2. Dissimilar tempers.

3. Oxidation.

4. Welding Filler Metals.

5. Weld heat zones.

6. Marring caused during fabrication and handling.

B. Pretreatment Process: A multi-stage pretreatment process is required prior to shop painting.

1. The railing shall be dipped or sprayed in a concentrated alkaline cleaner then rinsed in clear water. This process provides cleaning, degreasing and deep etching on the surface.

2. The product shall then be dipped or sprayed in a concentrated acidic treatment to deoxidize, desmut and neutralize the surface then rinsed in clear water.

3. The product shall then be dipped or sprayed in an acidic conversion coating to act as a bonding coating for paint adhesion.

4. The product shall be completely dried before painting.

C. Painting:

1. E.S.P. applied thermosetting powder paint over pretreatment bond coating. TWO COAT SYSTEM with paint to a total minimum 3.5 mills. D.F.T. Paint shall be baked on at approx. 400 degrees F for a minimum of 10 minutes duration. Paint to be similar to TIGER DRYLAC SERIES 28. Note: This system available only in manufacturers standard colors. This system meets or exceeds the performance requirements of AAMA. 605.2-92 specification.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

A. Supply items required to be cast into concrete, embedded in masonry, or placed in partitions with setting templates, for installation as work of other sections.

3.03 INSTALLATION

A. Fit exposed connections accurately together to form tight, hairline joints, except as required for expansion.

B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installation of handrails and railings. Set handrails and railings accurately in location, alignment, and elevation, measured from established lines and levels and free from rack.

1. Set posts plumb within a tolerance of 1/16 inch to 12 inches.

2. Align rails so that variations from level for horizontal members and from parallel with rake of steps and ramps for sloping members do not exceed 1/32 inch in 12 inches.

C. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of paint or epoxy.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing handrails and railings to in-place construction.

3.04 ANCHORING POSTS

A. Anchor post in concrete by means of preset sleeves into concrete. After posts have been inserted into sleeves, fill space between post and sleeve solid with the following anchoring material, mixed and placed to comply with anchoring material manufacturer's directions.

B. Anchor posts in concrete by core drilling holes not less than 3 inches deep and 1 inch greater than outside diameter of post. Clean holes of all loose material, insert posts, and fill space between post and concrete with the following anchoring material, mixed and placed to comply with anchoring material manufacturer's directions.

1. Non-shrink, nonmetallic grout.

2. Non-shrink, nonmetallic grout or anchoring cement.

C. Leave anchoring material down approximately 1/2 inch to allow for final topping with a waterproof material matching the surrounding areas by others. Whenever possible fill hole with waterproof topping slightly higher than the adjacent surfaces and taper and taper away from the post.

3.05 CLEANING, PROTECTION, AND TOUCH-UP PAINTING

A. On delivery all railing will have protective cover over cap only. Immediately upon completion of installation of railing installer shall remove cap cover and clean all work for inspection and approval.

B. After installation the General Contractor or Owner shall be responsible for protecting the railings during the balance of construction.

C. Painted aluminum surfaces shall be cleaned with plain water containing a mild soap or detergent. No abrasive agents or harsh chemicals are to be used.

END OF SECTION

SECTION 32 92 19

SEEDING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Preparation of subsoil.

B. Placing topsoil.

C. Hydroseeding, mulching and fertilizer.

D. Maintenance.

1.02 RELATED REQUIREMENTS

A. Section 31 20 00 - Earthmoving: Topsoil material.

B. Section 31 20 00 - Earthmoving: Preparation of subsoil and placement of topsoil in preparation for the work of this section.

1.03 SUMMARY

A. The extent of the lawn work is shown on the drawings. The lawn work limits equal the Contract Limit Line except as noted on the drawings. Non-paved, non-roofed areas within the Contract Limit Line shall receive specified settled depth of topsoil and lawn seed or sod. Existing lawn areas that are not disturbed require no additional work.

1. TYPE 1 Lawn: (Sod Lawn) shall have 6-inch minimum depth topsoil, fine grade, and sod.

2. TYPE 2 Lawn: (Standard Lawn) shall have 6-inch minimum depth topsoil, fine grade and seed.

3. TYPE 3 Lawn: (Temporary Seed) - Erosion and sediment control.

B. Lawn work includes, but is not limited to, the following:

1. Placing and spreading stockpiled topsoil

2. Sod bed preparation

3. Seed bed preparation

4. Temporary Seeding

5. Seeding and sodding lawns

6. Mulching and fertilizing

7. Jute Mesh

8. Maintenance: See watering, mowing, fertilizing, core aerating, weed control and other specific requirements.

9. Clean Up

C. Provide materials, labor, equipment, and services required to accomplish related work in accordance with the drawings and specifications.

1.04 PRICE AND PAYMENT PROCEDURES

A. Topsoil:

1. Basis of Measurement: By the cubic yard.

2. Basis of Payment: Includes topsoil, placing topsoil.

B. Grassed Areas:

1. Basis of Measurement: By the square yard.

2. Basis of Payment: Includes preparation of subsoil, placing topsoil, seeding, sodding, fertilizing, watering and maintenance to specified time limit. (Contractor is responsible for supplying all water necessary to establish lawns. If on-site water is used, Contractor is responsible for supplying meters and paying the cost of the water used.)

1.05 DEFINITIONS

A. Weeds: Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

1.06 SUBMITTALS

A. Furnish name of Landscape Contractor or Nurseryman to perform lawn work and obtain Owner’s Representative's approval.

B. Provide Material Certificates for:

1. Sod species and source, location for sod producer

2. Seed species and source

3. Limestone

4. Fertilizers

5. Hydromulch

6. Bonded Fiber Matrix

7. Erosion Control Matting

8. Chemical Treatments (if Approved by the School Board)
   a. Herbicides, fungicides, grub controls, insect controls
   b. Certificates showing composition, analysis, dilution and application rates
   c. Maintain and submit Log of Use of chemical treatments, include 1) Product applied, 2) Date of application, 3) Quantity applied at each application.

9. All additives needed to amend a specific soil in order to meet the requirements of this Section.

C. Written certification that specified turf-type grass cultivars conform to the specified requirements for NTEP ratings as specified in this Section.

D. Provide Topsoil Test Report: Prior to placement of any topsoil, the Contractor shall provide test results for any topsoil to be imported to the project site. For on-site topsoil to be re-used, the Owner will engage an independent qualified soil testing service. Pay for topsoil analysis and resulting recommendations. Report shall:

1. Certify soil texture and content, pH value, sieve, chemical composition, and nutrient analysis (organic content).

2. Provide specific recommendations on liming (or acidifying), composting, and fertilizing (nitrogen, phosphate and potash).

E. Provide letter on Contractor’s letterhead certifying that only topsoil from the above tested source was used on the project.

F. Lawn Seed Mix: Submit one (1 lb.) pound seed sample for each mix specified in vendor's unopened package with label clearly showing the following:

1. Name and address of labeler

2. Lot number

3. Kind and variety of turfgrass seed listed in order of predominance

4. Percent by weight of pure seed of each species and variety (percent purity)

5. Germination percentage (percent viable seed)

6. Percent by weight of other crop seed

7. Percent by weight of weed seed

8. Percent undesirable grass seed

9. Percent by weight of inert matter

10. Date on which the germination test was conducted

G. Submit to the Owner's Representative seed tags from all used or partially used seed bags.

H. Schedule: Prior to construction, provide a schedule which addresses the following lawn thresholds involving erosion control stabilization and complete grow in of lawns:

1. Seeding and Sodding Installation: The Contractor may invoice for 50% of the approved schedule of value breakdown at the time of acceptable installation.

2. Substantial Completion: The Contractor may invoice for 25% of the approved schedule of value breakdown at the time of substantial completion. At this time, the Owner's Representative may issue the Notice of Termination to satisfy the NYS DEC stabilization requirements. The date of substantial completion of lawns is anticipated approximately 60 days after lawn installation presuming all Contractor maintenance operations have been vigorously performed.

3. Final Acceptance: The Contractor may invoice for the final 25% of the approved schedule of value breakdown at the time of final acceptance. The date of final acceptance is anticipated approximately 30 days after substantial completion presuming all Contractor maintenance operations have been vigorously performed.

4. Owner Maintenance: After final acceptance of the lawns, the Owner will assume maintenance.

I. Maintenance Log: Contractor shall maintain a log of maintenance activities throughout the construction timeframe that documents weekly rainfall rates, dates of seeding and mulching, dates of watering, dates of mowing, dates of fertilizing, dates of core aeration, and all other lawn maintenance activities required by the contract. Log shall be submitted to the Owner's Representative prior to final inspection of lawn areas. If lawn areas do not meet the minimum 80% rate of vegetative cover, then contractor shall continue maintenance activities and update the maintenance log accordingly.

1.07 QUALITY ASSURANCE

A. Lawn Contractor: Work shall be contracted to a single, established Landscape Contracting or Nursery firm having sufficiently experienced crews, supervisor(s), specialized equipment, and an excellent record of performance on completed lawn projects of comparable size, scope, and quality. Provide expert turfman to direct the work in the field on a regular, daily basis.

B. Sod Standards: Comply with the American Sod Producers Association (ASPA) class of sod materials.

C. Nomenclature: Seed names shall conform to the National Turfgrass Federation, Inc.

D. Cultivars of Turf-type grasses shall conform to the specified ratings of the NTEP: National Turfgrass Evaluation Program, Beltsville Agricultural Research Center – West, Beltsville MD 20705.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable. Deliver seed mixture in containers showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging.

B. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

C. Cut, deliver, and install sod within a 24-hr period.

D. Do not harvest or transport sod when moisture content may adversely affect sod survival.

E. Protect sod from sun, wind, and dehydration prior to installation.

F. Do not tear, stretch or drop sod during handling and installation.

1.09 JOB CONDITIONS

A. Inspect areas to be prepared and seeded before starting work and any defects such as overly compacted soils or surface drainage problems and make written report of such to the Owner's Representative prior to beginning this work. The commencement of work shall indicate Landscape Contractor's acceptance of the areas to be improved, and assumption of full responsibility for the work of this Section.

B. The Contractor shall be solely responsible for judging the full extent of work requirements involved.

C. Lawn Seeding:

1. Unless otherwise directed in writing by the Engineer, seed lawns from March 15 to June 15, and from August 15 to September 15. Seeding between June 16 and August 14 is not acceptable unless adequate water supply is available.

2. Proceed with and complete seeding as rapidly as portions of the site become available, working within the seasonal limitations for each kind of landscape work required.

3. Perform seeding after planting, fine grading and other work affecting the ground surfaces in the work areas has been completed satisfactorily.

4. Provide lawn seed mixes as specified. Substitutions not permitted, unless approved in writing by the Engineer.

5. Provide water, meters, labor, hoses, sprinklers and watering equipment.

6. For Lawn Type 2, perform lawn seeding using mechanical and hand seeding methods within twenty (20) feet of buildings and pavement edges. Hydro-seeding is not permitted within twenty (20) feet of buildings and pavement edges. Mechanical, hand operation and hydro-seeding is permitted in other lawn areas.

7. For Lawn Type 3 perform lawn seeding using hydroseeding without limitations except as noted in this Section.

D. Sodding:

1. Unless otherwise directed in writing by the Engineer, sod lawns from March 15 to June 1 and August 15 to October 1. Sodding between June 2 and August 14 is not acceptable unless adequate water supply is available.

2. Place sod only when ground surface is free of frost.

3. Proceed with and completed sodding work as rapidly as portions of the site become available, working within seasonal limitations for each kind of landscape work required.

4. Perform sodding after planting, fine grading, and other work affecting the ground surfaces in the work areas has been completed satisfactorily.

5. Provide sod as specified. Substitutions not permitted, unless approved in writing by the Engineer.

6. Provide water, meters, labor, hoses, sprinklers and watering equipment.

E. Temporary Seeding: Start permanent seeding within seven (7) days calendar days of rough grading. When this is not possible, provide temporary seeding as specified under 2.4. When adverse weather conditions prevent adequate germination, repeat seeding as directed by the Owner's Representative until the area is stabilized. Till under temporary grass and fine grade when preparing for final seeding.

F. Construction Review:

1. Upon completion of topsoil spreading and sod and/or seed bed preparation, notify the Owner's Representative to review work.

2. The Owner's Representative may review string graded areas by the Contractor to check for surface smoothness and general compliance with grading requirements. Fill or cut by hand raking or other acceptable means to achieve smooth, even well-draining lawn surfaces free of "bird baths" and breaks in grade as directed by the Owner's Representative at no additional expense to the Owner.

3. Review by string grading shall not alleviate the Contractor of his responsibility for conforming to the required grades as shown on the drawings, nor be misconstrued as final acceptance of lawn work.

PART 2 – PRODUCTS

2.01 SOD MIXTURES

A. Sod shall conform to NYSDOT Item 713-14. Approved nursery grown pasture sod with majority Kentucky Bluegrass and minority Red Fescue blend.

B. Provide well-rooted, healthy sod, free of diseases, nemotodes and soil borne insects. Provide sod uniform in color, leaf texture, density, and free of weeds, undesirable grasses, stones, roots, thatch and extraneous material viable and capable of growth and development when planted. Sod is considered free of weeds when less than five (5) weeds are found per one hundred (100 sf) square feet.

C. Mowing Height: Before stripping, sod shall be mowed uniformly at a height of 1 to 1-1/2 inches.

D. Thickness of Cut: Sod shall be machine cut at a uniform soil thickness of 5/8 inch, plus or minus ¼ inch, at the time of cutting. Measurement for thickness shall exclude top growth and thatch.

E. Thatch: Sod shall be relatively free of thatch, up to 1-2 inch allowable (un-compressed).

F. Pad size: Individual pieces of sod shall be cut to the supplier's standard width and length. Maximum allowable deviation from standard widths and lengths shall be plus or minus ½ inch on width and plus or minus 5% on length. Broken pads and torn or uneven ends will not be acceptable.

G. Strength of Sod Sections: Standard size sections of sod shall be strong enough to support their own weight and retain their size and shape when suspended vertically from a firm grasp on the upper 10% of the section.

2.02 SEED MIXTURES – GENERAL

A. Tall Fescue shall be a cultivar with a Mean rating of 5.9 or better in accordance with Table 3. MEAN TURFGRASS QUALITY RATINGS OF TALL FESCUE CULTIRVARS GROWN AT FOUR LOCATIONS IN THE NORTHEAST REGION, 2007 – 2011 DATA, NTEP. Cultivar shall be in the top 2/3rds of ratings for Frost Tolerance Drought (Table 25) and Tolerance (Recovery – Table 30).

B. Strong Creeping Red Fescue shall be a cultivar with a quality rating of 5.9 or better for New Jersey (NJ2), New York (NY1), Pennsylvania (PA1) and Rhode Island (RI1) in accordance with the applicable tables of the 2008 National Fineleaf Fescue Test – 2009-13 data, NTEP.

C. Bluegrass shall be a cultivar with a quality rating of 5.9 or better for Illinois (IL1, IL2), Massachusetts (MA1), New Jersey (NJ1, NJ2, NJ3) in accordance with the 2011 National Kentucky Bluegrass Test – 2014 data, NTEP.

D. Ryegrass shall be a cultivar with a quality rating of 5.9 or better for Illinois (IL1), Massachusetts (MA1), New Jersey (NJ2, NJ3) Pennsylvania (PA1, PA2) in accordance with the 2010 National Perennial Ryegrass Test – 2011-14 data, NTEP.

2.03 SEED MIXTURE

A. Seed mixture shall be fresh, clean, new crop seed. Grass shall be of the previous year's crop and in no case shall the weed seed content exceed 0.25% by weight. The seed shall be furnished and delivered in the proportion specified below in new, clean, sealed and properly labeled containers.

B. All seed shall comply with State and Federal seed laws and shall carry 'Certified State of Origin' tags on their bags or containers at the time of seeding. Seed shall conform to applicable state seed laws and standards of minimum purity, minimum germination, maximum crop seed, maximum weed seed, and be free of noxious weed seed as specified in this Section.

C. Seed that has become wet, moldy or otherwise damaged shall not be acceptable.

D. Fescues shall contain Acromonium endophytes. Seed containing endophyte must be kept cool and dry at all times; do not stockpile in the sun.

E. Provide the following lawn seed mix:

1. Lawn (Type 2): 5 lbs/ 1,000 sf (Standard Lawn)

Amount by Weight	Species or Variety	Purity	Percentage Germination
55% (Min.)	Strong Creeping Red Fescue	97%	85%
15% (Min.)	Perennial Ryegrass	95%	80%
30% (Min.)	Kentucky Bluegrass	97%	85%
100%			

(Provide no less than three (3) cultivars of Strong Creeping Red Fescue, two (2) cultivars of Perennial Ryegrass, and two (2) cultivars of Kentucky Bluegrass)

2.04 TEMPORARY SEEDING (TYPE 3 LAWN)

A. Temporary seeding shall be applied in accordance with the SWPPP or as designated by the Owner's Representative. Refer to Section 01 57 13, Temporary Erosion and Sediment Control.

B. Provide temporary seeding within seven (7) days on disturbed areas and/or as shown on the drawings and as directed by the Owner's Representative.

C. Rye grass (annual and perennial) shall be applied at 30 lbs. per acre (0.7 lbs. per 1,000 s.f.).

D. Certified "Aroostook" Winter Rye (cereal rye) shall be applied at 100 lbs. per acre (2.5 lbs per 1,000 s.f.) if seeding after October 15th.

E. Alternate temporary seed mixtures necessary due to seasonal conditions may be substituted upon approval by the Owner's Representative.

2.05 SOIL MATERIALS

A. Topsoil: As specified in section 31 20 00, Earthmoving.

B. Topsoil: Excavated from site and free of weeds.

2.06 LIMESTONE

A. Shall be ground limestone in the producer's standard bags containing not less than 85% total carbonates and conforming to the following gradations:

Sieve Designation	% Passing
No. 100	50-100
No. 20	100

2.07 TACKIFIER FOR SEEDED LAWNS

A. Shall be liquid concentrate diluted with drinkable water forming a transparent three-dimensional film-like crust permeable to water and air, containing no agents toxic to seed germination to hold straw mulch in place. Standard of quality shall be Terra Tack or Owner's Representative approved equal.

2.08 FERTILIZER

A. For Starter Fertilization: Immediately prior to seeding fertilizer with a commercial starter fertilizer, granular, non-burning product, with not less than 50% organic slow acting, micro nutrients and 1% iron, guaranteed analysis commercial fertilizer. Fertilizer shall contain: 15% nitrogen, 24% available phosphorus and 19% water soluble potash (15-24-19). Apply at a rate of 4 lbs/1,000 sf or 175 lbs. /acre.

B. For Subsequent and Final Fertilizations: Apply commercial fertilizer, granular non-burning product with not less than 50% organic slow acting, guaranteed analysis

1. For Spring Lawn Work: Fertilizer shall contain: 10% nitrogen, 6% available phosphorus, and 4% water soluble potash (10-6-4). Apply at rate of 10 lbs/1,000 s.f. or 400 lbs. /acre for Type 1.

2. For Fall Lawn Work: Fertilizer shall contain: 5% nitrogen, 10% available phosphorus, and 5% water soluble potash (5-10-5). Apply at rate of 10 lbs/1,000 s.f. or 400 lbs/acre for Type 1.

2.09 MULCH FOR SEEDED LAWNS

A. When not hydro-seeding, shall be straw consisting of clean stalks of oats, wheat, rye or other approved crops well-seasoned before baling which are free of noxious weed seeds and roots. When hydro-seeding, shall be hydro-mulch containing 90% recycled wood and 10% post- consumer waste newspaper. Standard of quality shall be Hydro-mulch 90/10 as manufactured by Conwed Environmental or Owner's Representative approved equal.

2.10 WATER

A. Contractor is responsible for supplying all water necessary to establish lawns in areas disturbed by project activities.

B. Water supplied shall be free of substances harmful to lawn and other plants.

2.11 HYDRAULICALLY APPLIED BONDED FIBER MATRIX

A. Mulch to cover hydroseeded areas with slopes 5H:1V or steeper shall be Bonded Fiber Matrix (BFM).

B. BFM shall be a hydraulically-applied, 100% biodegradable, United States-manufactured matrix composed of 100% recycled thermally refined wood fibers and naturally derived cross-linked biopolymers. The BFM shall be phyto-sanitized, free from plastic netting, and when cured shall form an intimate bond with the soil surface to create a continuous, porous, absorbent and flexible erosion resistant blanket that allows for rapid germination and accelerated plant growth.

C. The BFM product shall have a cure time of approximately 24 to 48 hours with a manufacturer's specified application rate from 3,000 to 4,000 pounds per acre based on slope length and inclination. BFM product shall be greater than 90 percent effective at reducing erosion when subjected to a 5-inches-per hour rain event for durations of 60 minutes. It shall have Wet Bond Strength of 6 lb/ft in accordance with ASTM D6818, water-holding capacity of 1,400-percent per ASTM D7367. It shall be 100-percent biodegradable in accordance with ASTM D5338.

D. BFM product shall conform to Testing Protocols and Procedures as developed by the Erosion Control Technology Council (ECTC), www.etc.org.

E. The primary goal for selecting and using the hydraulically applied BFM product shall be erosion control during extended period of inclement weather. The additional benefit of establishing permanent turf shall also be weighed in selecting and approving the recommended product, especially in light of the schedule of site stabilization and schedule of completion.

2.12 EROSION CONTROL BLANKETS FOR SEEDED LAWNS

A. Erosion control blankets shall be 100% biodegradable, woven mesh blankets designed specifically to nurture seed germination and growth and prevent water born erosion.

B. Erosion control blankets shall be BioNet by North American Green, Curlex NetFree by American Excelsior Company, or BioD-OCF by Rolanka International, Inc. or approved equal. Synthetic netting shall not be permitted.

C. Wire Staples: Twelve inch lengths of No. 11 gauge wire bent to form a "U", or other wire staples as approved by the Owner's Representative.

2.13 HERBICIDES, CHEMICALS AND INSECTICIDES

A. Provide chemicals and insecticides as needed for fungus or pest control. All chemicals and insecticides shall be approved by the state's equivalent of a Department of Food and Agriculture for the intended uses and application rates. If chemical use on School campuses is required, Contractor must first present information to School Board for approval prior to proceeding with application of said chemicals.

B. White Grub Control Chemicals:

1. Short-term curative controls: insecticides such as carbaryl and trichlorfon to control white grubs. Insecticides shall be selectively toxic to large insects through direct application or by injections. Insecticides shall either interfere with the cholinergic nervous system of white grubs and cause death because the effects of the neurotransmitter acetylcholine cannot be terminated by caramoylated acetylcholinesterase or they shall interfere with an essential nervous system enzyme, such a cholinesterase.

2. Long-term preventative controls of white grub shall be chloranthraniliprole or approved equal chemical, that regulate the flow of calcium into the cell cytoplasm to control muscle contraction and affecting the ryanodine receptors in the insects' muscle fiber, resulting in muscle paralysis leading to death.

C. Pre-emergent crabgrass control

1. Pre-emergent crabgrass control shall be Dithiopry (Dimension by DOW AgroScience or approved equal product), which alters microtubule polymerization and stability by 'interacting with microtubule associated proteins and or microtubule organizing centers.

2. Pre-emergent crabgrass control shall be Prodiamine by Syngenta or approved equal. Control chemical shall work by inhibiting mitotic processes in plants and controling susceptible weeds by preventing growth and development of newly germinated weeds.

D. Herbicide to eradicate non-grass species, include post-emergent crabgrass.

1. Herbicide shall be Tenacity (Mesotrione) as manufactured by Syngenta, or approved equal, to inhibit plant enzymes essential to photosynthesis and preventing formation of carotenoids in susceptible plant species, whereby light energy and by-products of photosynthesis destroy chlorophyll and cell membranes, causing bleaching of leaves, followed by necrosis and death of the plant.

2. Liquid application, using dilution and application rates per manufacturer's product literature.

PART 3 - EXECUTION

3.01 TURF ESTABLISHMENT – GENERAL

A. It is an essential aspect of this Contract to establish a full and healthy turf landscape meeting the needs of the Owner, in accordance with the requirements of this Specification and as directed by the Landscape Architect.

B. Contractor shall obtain Owner's written approval of fine grading work before doing any seeding.

C. All turf areas disturbed by the contractor that is the result of negligence of the contractor or any of his assigns outside the limit of seeding shall be prepared and seeded as specified herein and as directed by the Owner at no additional cost.

3.02 GENERAL SEEDING PRINCIPLES

A. The following principles shall be applied to all seeding activities.

1. Protect all planting soils against erosion and sedimentation. Schedule seeding operations to avoid loss of planting soil.

2. The seedbed shall be weed free, clod-free, smooth, firm but not overly compacted and moist but not wet.

3. Apply seed at times of the year when weed competition is at its lowest.

4. Apply seed in a manner that provides direct seed to soil contact. Seed application system employed by the Contractor that does not apply seed directly to the surface of the soil or cultivates the seed into the soil shall be rejected.

5. Keep seed moist throughout the germination period.

6. Light and temperature play a key role in successful germination. Manage seeding operations to utilize light and temperature to the greatest advantage.

3.03 EXAMINATION

A. Verify limits of lawn and other types of ground cover materials in the field with drawings. Also any imported and screened topsoil areas. Notify Owner's Representative of discrepancies prior to proceeding with lawn work.

B. Examine finish surfaces, grade, topsoil quality, and depth.

C. Do not start lawn work until unsatisfactory conditions are corrected. Prevent excess compaction of lawn areas throughout the construction period.

3.04 SPREAD TOPSOIL

A. Limit preparation to areas which will be immediately seeded.

B. Perform topsoil spreading operations only during dry weather.

C. To insure a proper bond with the topsoil, disc, harrow, or otherwise scarify and loosen the lawn subgrade to a depth of four (4) inches before spreading topsoil.

D. Spread topsoil to ensure a minimum settled depth as specified in lawn areas. Use only equipment with low ground pressure for the placement and grading of soil. (Maximum compaction level for placed topsoil shall not exceed 85% standard proctor.)

3.05 PREPARE LAWN AREAS TYPE 1, 2, AND 3

A. Perform a pH test, sieve, chemical composition, and nutrient analysis of the topsoil and advise the results to the Owner's Representative prior to adding limestone or other soil amendments.

B. Grade lawn areas to a smooth, free draining even surface with a loose, moderately coarse texture. Roll, scarify, rake, and level as necessary to obtain true, even lawn surfaces and fill depressions as required to drain. Correct irregularities in the surface resulting from tillage operations to prevent formation of depressions or water pockets.

C. Remove debris. Remove stone 3/4-inch or larger by handpicking, fine tooth aluminum grading rakes, and/or mechanized stone picker. When topsoil has hardened, cultivate soil to a four (4) inch depth by plowing, discing, harrowing, or otherwise scarifying and loosening the topsoil.

D. Rake area with fine toothed aluminum grading rake before placing sod or seed to obtain a smooth surface at the proper elevation. Drag area with a wood float to level out minor humps and hollows. Beds shall have a smooth friable uniform surface, free of areas ponding water.

E. Provide adjusted rate of application as recommended in Topsoil Test Report submittal when rate differs from the following: Add ground limestone at the rate of 100 lbs. per 1,000 S.F. or equivalent acidifier as directed by the Owner's Representative.

F. Do not move heavy objects except necessary lawn making equipment over the lawn areas after the soil is prepared unless it is again loosened and graded. Level undulations and irregularities in the surface.

G. Place starter fertilizer at the rate of 4 lbs. per 1,000 S.F. and mix into full depth of topsoil.

3.06 LAWN SEEDING – APPLICATION RATES

A. Notify Owner's Representative when seed bed is ready for review as specified in Job Conditions. Obtain Owner Representative's approval prior to seeding.

B. Seed lawns immediately after preparation of bed and Owner Representative's approval.

C. For Lawn Type 2, seed at the rate of 6 lbs. per 1,000 S.F. When hydro-seeding, apply as indicated in 3.4, D, below.

D. For Lawn Type 2 when within 20-ft of buildings or pavement surfaces, seed at the rate of 6 lbs. per 1,000 S.F. Seed 1/2 of the amount needed in one direction and seed the remaining 1/2 at 90° to the first seeding. Seed shall be mechanically applied by use of a drill type seeder. Hydro-seeding is not allowed.

3.07 SEEDING

A. The season for seeding shall be from March 15 to June 15 and from August 15 to September 15. The actual planting of seed shall be done, however, only during periods within this specified fall season that are normal for such work as determined by weather conditions, by accepted practice in this locality and as approved by the Owner. If work is intended to continue the following spring season, then Contractor shall schedule temporary seeding operations and placement of erosion control blankets by November 15th to ensure stabilization of ground surfaces prior to winter.

B. To prevent loss of soil via water and wind erosion and to prevent the flow of sediment, fertilizer, and pesticides onto roadways, sidewalks, and into catch basins, seed turf areas within 5 Days of spreading and fine grading the planting soil.

C. Seed only when the bed is in a friable condition, not muddy or hard.

D. Limit of grading and earthwork shall be limit of seeding unless otherwise indicated on the Contract Documents. All landscape areas disturbed outside the limit of seeding shall be prepared and seeded as specified herein at no additional cost to the Owner.

E. Means and methods of seeding shall be determined by the Contractor based on his/her experience, site conditions, season of seeding, weather conditions and any, all or other environmental conditions. Seeding of turf may be by Conventional Seeding Method, Hydroseeding, Drill Seeding or other method selected by the Contractor to insure full seed to soil contact.

F. Following application of seed apply bonded fiber matrix to the all seeded areas on slopes at rates established by the manufacturer's written instructions. Wood fiber mulch may be used on relatively flat areas within the project limits located a minimum of 10-ft away from buildings and site pavements.

1. For slopes that are steeper than five to one (5H:1V), apply a separate application of bonded fiber matrix immediately following the sowing of seed. Apply the Bonded Fiber Matrix at the manufacturer's recommended application rate.

2. Do not apply the bonded fiber matrix in advance of rainfall. Install bonded fiber matrix to ensure that it dries completely for a minimum of 24 hours prior to rainfall. In the event of rainfall during the required 24-hour drying period, reapply additional seed and bonded fiber matrix to all eroded, slumping or water affected areas as directed by the Owner's Representative.

3.08 MULCHING SEEDED AREAS

A. Mulch immediately after seeding.

B. Place mulch by hand or by machine at a rate of one bale/1,000 sq. ft. to produce a light even mulch cover so that 50% of soil is visible through the mulch layer.

C. Anchor mulch by thorough heavy coat of tackifier over entire area and watering.

D. Protect seed bed from washout, wind erosion, rutting and drying out. Do not use machinery that leaves ruts in the seed bed. It is the Contractor's responsibility to add or remove mulch as needed to encourage optimum seed germination and growth.

3.09 INSTALLATION OF EROSION CONTROL BLANKETS

A. Install jute mesh on slope 1V:3H or greater.

B. Erosion control blankets (ECBs) shall be installed as directed or as indicated on the plans immediately upon placement of planting soil and seed. Provide minimum 10-foot width such that the blankets extend down slope either side of the level spreader sufficiently to control high water event erosion of the level spreader landform.

C. ECBs shall also be installed at all locations of topsoil and seeding where erosion has prevented seed from germinating.

D. Install ECBs in accordance with manufacturer guidelines.

E. Maintenance shall consist of repairs made necessary by erosion, wind, or any other cause. Maintain, protect, repair, or replace the erosion control material until the Termination of the Plant and Warranty Period.

3.10 WATERING OF TURF AREAS

A. Establish turf. To that end, application of supplemental irrigation water will be required. Monitor available soil moisture to determine whether supplemental, off-site water is required to supplement rainfall and meet the required turf establishment deadline.

B. Apply water to the turfs areas immediately following sowing at a rate sufficient to ensure thorough wetting of the soil to a depth of at least 3-inches. Supervise watering operation to prevent run-off. Supply all pumps, hoses, pipelines, and sprinkling equipment. Repair all areas damaged by water operations.

3.11 TEMPORARY SEEDING

A. Provide temporary seeding on all disturbed areas not paved or non-roofed when left exposed for seven (7) days or as directed by the Owner's Representative. Temporary seeding shall include topsoil stockpile area and exposed slopes.

3.12 SODDING

A. Notify Owner's Representative that sod bed is ready for review as specified in Job Conditions. Obtain Owner's Representative's approval prior to sodding.

B. Moistening the Soil: During periods of higher than optimal temperature for species being specified and after unevenness in the soil surface has been corrected, the soil shall be lightly moistened immediately prior to laying the sod.

C. Sod immediately after preparation of the bed and Owner Representative's approval.

D. Lay sod to form a solid mass with tightly-fitted joints in strips parallel to contours. Butt ends and sides of sod strips. Do not overlap edges. Stagger strips to offset joints in adjacent courses. Remove excess sod to avoid smothering of adjacent grass. Provide sod pad top flush with finish grade of adjacent curbs, pavements, drainage structures, and seeded areas.

E. Do not lay dormant sod or install sod on soils surfaces that are hot, dry, saturated, or frozen.

F. When sodding slopes, install initial row of sod in a straight line, beginning at bottom of slope. Place subsequent rows parallel to and lightly against previously installed row.

G. Sod strips laid in drainage ways must meet the finished grades shown on the drawings.

H. Stake sod in lawn swales and on lawn slopes 3H to 1V (horizontal to vertical) and steeper to prevent slippage. Use two (2) stakes per square yard of sod. Stakes are to have their flat sides against the slope and be driven flush with sod surface.

I. Roll with light lawn roller to ensure contact with subgrade.

J. Water sod thoroughly with a fine spray immediately after laying. Do not allow sod to dry out.

3.13 MAINTENANCE

A. Maintenance by Contractor begins as soon as lawns are sodded or seeded. Protect lawns from drought, washout and wind erosion. In general, maintain new installed lawn areas, including watering, fertilizing, core aerating, spot weeding, mowing, applications of (herbicides, fungicides, insecticides if approved by the School Board), and re-sodding/re-seeding until a full, uniform, healthy, vigorous stand of grass free of weed, undesirable grass species, disease, and insects is achieved and accepted by the Owner's Representative. Specifically:

1. Watering Sodded/Seeded Lawns: Provide rain gauge, water, meters, labor, hoses, sprinklers and watering equipment needed to promptly germinate the lawn seed, preventing it from drying out, and keeping it in a healthy, growing condition until final acceptance. Lawn areas shall receive a minimum of one (1) inch of water per week, by natural rainfall, irrigation or a combination of both. This will be rigorously enforced to insure proper irrigation. Take necessary precautions to prevent water from soaking adjacent building facades.

2. Second and Subsequent Weeks: Provide rain gauge, water, meters, labor, hoses, sprinklers and watering equipment as required to maintain adequate moisture, in the upper four (4) inches of soil, necessary for the promotion of deep root growth until final acceptance. Lawn areas shall receive a minimum of one (1) inch of water per week, by natural rainfall, irrigation or a combination of both. This will be rigorously enforced to insure proper irrigation. Take necessary precautions to prevent water from soaking adjacent building facades.

3. Protect: Protect lawn areas against trespass, vandalism and routine student pedestrian traffic by temporary fencing or other means.

4. Repair: Repair, re-work, and re-sod or reseed (as originally specified for that area) areas that have washed out, eroded, do not germinate and are vandalized or otherwise damaged.

5. Mow Type 1 Lawns Only: Initial mowing shall begin when the blade height reaches 2-inch and the soil will bear the weight of the lawn mower. Use mowers with low impact tires. For the first 3 mowings cut the grass blades to 1.5- inches. After the first 3 mowings cut the grass when it reaches a height of about 3.5-inch to a height of about 2.5-inches. Never remove more than 1/3 of the grass blade at any one mowing. A minimum of eight (8) to ten (10) mowings are required (approximately once per week after the initial germination period to final acceptance). Notify the Owner's Representative of dates in writing as mowing is performed. Excess clippings shall be carefully raked so as not to remove healthy grasses, and removed.

6. Core Aerating: Between mowings seven (7) and eight (8) core aerate lawns about three (3) inches on center minimum three (3) inches deep to ensure aggressive root growth. This will require multiple passes at different directions to achieve 16 to 20 holes 3/4-inch to 1-inch diameter per square foot. Sweep scattered plugs off paved areas onto adjacent lawn areas. Pulverize plugs during subsequent mowing operations. Provide additional core aerating after the 10th mowing as directed by the Owner's Representative to expedite the lawn maturation process. Moisten lawns by thoroughly watering the topsoil profile, several days in advance of coring to facilitate proper penetration of the topsoil.

7. Fertilizer: Prior to placement of seed, apply starter fertilizer. Immediately after core aerating, between mowings seven (7) and eight (8) apply subsequent fertilizer at the rate indicated. Provide additional fertilizer after the 10th mowing as directed by the Owner's Representative to expedite the lawn maturation process. Apply a final fertilizer just prior to final acceptance at the same application rate.

8. Weed and Pest Control: When infestation of pests, weeds or crabgrass develops, treat infestation by hand weeding, pesticide application, or herbicides control appropriate to the area. Furnish and install weed chemical control as recommended by manufacturer. Herbicides controls must be acceptable to the Owner. Obtain and pay for permits. Use as directed by the manufacturer and applicable laws, codes, ordinances and regulatory requirements.

B. Maintenance by the Contractor continues through the certificate of substantial completion to final acceptance by the Owner's Representative as described below. Contractor shall maintain a log of maintenance activities to be presented to the Owner's Representative prior to Final Inspection. Maintenance by Owner begins after final acceptance of the lawn.

3.14 STANDARDS FOR SUBSTANTIAL COMPLETION OF LAWNS

A. Review to determine substantial completion of lawns will be made by the Owner's Representative, upon request. Provide notification at least five (5) working days before requested review date.

B. Lawn areas will be substantially complete provided requirements, including maintenance, have been complied with. A healthy, vigorous, uniform, partially mature stand of lawn is established free of weeds, undesirable grass species, disease, and insects. This will culminate after an approximate 60 day period with average temperatures above 40°F of maintenance including watering, protection, repair, mowing, core aerating, weed control, and fertilizing as noted above. Grass roots shall have matured to a minimum of 1½-inch depth as determined by the Owner's Representative when core samples are taken.

C. Lawn areas shall not have more than 10% dead/bare spots. No dead or bare spot shall be greater than one palm print of an averaged sized man

D. The Owner's Representative will prepare a written punch list of items which need correction prior to final acceptance.

3.15 STANDARDS FOR FINAL ACCEPTANCE OF LAWNS

A. Review to determine final acceptance of lawns will be made by the Owner's Representative, upon request. Provide notification at least five (5) working days before requested review date.

B. Lawn areas will be acceptable provided requirements, including maintenance, have been complied with. A healthy, vigorous, uniform, full stand of lawn is established free of weeds, undesirable grass and weed species, disease, and insects. Grass roots shall have matured to a minimum of 2-inch depth as determined by the Owner's Representative when core samples are taken.

C. Any lawn which contains disease, more than 2% dead/bare spots, or any dead/bare area greater than one square foot shall be rejected and the unacceptable area(s) repaired as originally specified at no additional cost to the Owner.

D. In the event the Contractor fails to complete the punch list items within a 30 day period with average temperatures of 40°F after the time of Substantial Completion, the Contractor shall be liable to the Owner for any additional costs including those charged by the Owner's Representative.

3.16 CLEAN UP

A. During the contract and at intervals as directed by the Owner's Representative and as lawn work is completed, clear the site of extraneous materials, rubbish, and debris. Leave the site in a clean, safe, neat, well-draining condition.

END OF SECTION

DIVISION 33 – UTILITIES

SECTION 33 05 13

MANHOLES AND STRUCTURES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Monolithic concrete manholes with masonry transition to lid frame, covers, anchorage, and accessories.

B. Modular precast concrete manhole sections with tongue-and-groove joints with masonry transition to lid frame, covers, anchorage, and accessories.

C. Monolithic FRP manholes with transition to lid frame, covers, anchorage, and accessories.

D. Masonry manhole sections with masonry transition to lid frame, covers, anchorage, and accessories.

1.02 PRICE AND PAYMENT PROCEDURES

A. Manhole: By the unit. Includes excavating, concrete base pad, concrete manhole sections, FRP manhole sections, brick masonry manhole construction, brick masonry transition to cover frame, cover frame and cover, to indicated depth, forming and sealing pipe inlets and outlets.

1.03 REFERENCE STANDARDS

A. ACI 530/530.1/ERTA - Building Code Requirements and Specification for Masonry Structures and Related Commentaries; American Concrete Institute International; 2011.

B. ASTM A48/A48M - Standard Specification for Gray Iron Castings; 2003 (Reapproved 2012).

C. ASTM C55 - Standard Specification for Concrete Building Brick; 2011.

D. ASTM C62 - Standard Specification for Building Brick (Solid Masonry Units Made From Clay or Shale); 2013.

E. ASTM C478 - Standard Specification for Precast Reinforced Concrete Manhole Sections; 2013.

F. ASTM C923 - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals; 2008 (Reapproved 2013).

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate manhole locations, elevations, piping sizes and elevations of penetrations.

C. Product Data: Provide manhole covers, component construction, features, configuration, and dimensions.

D. Manufacturer's Qualification Statement.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.06 FIELD CONDITIONS

A. Cold and Hot Weather Requirements: Comply with requirements of ACI 530/530.1/ERTA or applicable building code, whichever is more stringent.

B. Maintain materials and surrounding air temperature to minimum 50 degrees F prior to, during, and 48 hours after completion of masonry work.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Mortar shall conform the requirements of NYSDOT §705-22 Portland Cement Mortar for Bonding Grout.

B. Precast Reinforced Concrete Manhole Riser Sections, Catch Basin Riser Sections, Field and Standard Gutter Inlets, and Eccentric Flat Slab Covers shall conform to the requirements of ASTM C478.

C. Joints between Riser Sections shall be tongue and groove with Super 40 Rubber Joint Gaskets that conform to ASTM C443; Bitumastic sealing tape.

D. Manhole bases may be pre-cast or cast in-place.

E. All manholes and catch basins shall be sealed inside completely with two (2)-coats of heavy duty repellant protective coating made of coal tar. Bitumastic coatings shall be applied at the location of manufacture for all pre-cast components. Field coatings shall be applied as directed by the Owner’s Representative to repair damaged coatings.

F. Non-shrink grout shall be in accordance with NYSDOT §701-05 Concrete Grouting Material, or as directed by the Owner’s Representative.

G. Pipe-to-Manhole/Drainage Structure Connections - one of the following:

1. A-Lok Flexible Connector by A-Lok Products, Inc., 697 Main St., Tullytown, PA 19007, (215) 547-3366.

2. Lockjoint Flexible Connector by Chardon Rubber Company, 373 Washington St., Chardon, OH 44024, (216) 285-2161.

3. Kor-N-Seal Flexible Connector by NPC, Inc., 250 Elm St., Milford, NH 03055, (601) 673-8680.

4. Link-Seal Flexible Connector by Thunderline Link-Seal, Inc., 6525 Goforth St., Houston, TX 77021, (713) 747-8819.

5. Cement mortar in accordance with ASTM C270.

H. Cast-in-place concrete for manhole inverts and other system elements shall conform to the requirements of Class A, NYSDOT §501 - Portland Cement Concrete. Concrete shall have a 28-day compressive strength of 4,000 pounds per square inch (psi) or as shown on the Contract Drawings.

I. Bar reinforcement and wire fabric for concrete reinforcement shall conform to the requirements of NYSDOT §709 - Reinforcing Steel. Material sizes and placement requirements shall be as shown on the Contract Drawings.

J. Precast concrete spacers shall conform to the requirements of Class A, NYSDOT §501 - Portland Cement Concrete. Concrete shall have a 28-day compressive strength of 3000 pounds per square inch (psi) or as shown on the Contract Drawings.

K. Brick shall conform to the requirements of NYSDOT §704-01 Common Brick or NYSDOT §704-02 Concrete Brick.

L. Steps shall be provided in manholes and be capable of withstanding a 300 pound concentrated live load without permanent distortion and with rungs a minimum 10-inches wide designed to prevent feet from slipping off the ends. All manhole rungs and steps shall conform to the requirements of NYSDOT §725-02.01 - Steps for manholes. Ferrous metal manhole rungs shall consist of Cast Iron Steps in accordance with Neenah R-1980-1 or approved equal. Reinforced plastic steps shall conform to Steel reinforced co-polymer polypropylene ASTM 2146-82, Type 2, grade 43758,

M. ASTM C478-85A. Non-corrodible aluminum magnesium ladders with intermediate supports at 5-foot intervals on forged aluminum with drop front design and grooved thread surface may also be used.

N. Manhole frames and covers for stormwater sewers shall consist of cast iron frame and cover, Neenah R-1590 or approved equal. Frames and covers shall be heavy duty, suitable for highway traffic HS-20 wheel loads as shown and specified on Contract Drawings, and shall comply with the requirements of NYSDOT §655 – Frames, grates and covers. All solid covers shall bear the word “Storm”, as appropriate.

O. Open grating for standard stormwater inlets (within pavement areas) shall be in accordance with the requirements of NYSDOT §655 – Frames, grates and covers and as specified on the Contract Drawings. Acceptable manufactures include East Jordan Iron Works V-5622 or approved equal.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify items provided by other sections of Work are properly sized and located.

B. Verify that built-in items are in proper location, and ready for roughing into Work.

C. Verify excavation for manholes is correct.

3.02 PREPARATION

A. Coordinate placement of inlet and outlet pipe or duct sleeves required by other sections.

B. Pipe Openings in Pre-cast Concrete Manhole Riser shall be a groove for the pipe penetration seal that shall be installed when the manhole section is cast.

3.03 MANHOLES

A. Cast-in-place concrete construction shall be in accordance with the requirements of NYSDOT §555 - Structural Concrete.

B. Build structures to the shapes and dimensions shown with pre-cast reinforced riser sections to the dimensions shown on the Contract Drawings. Seal joints between pre-cast riser sections with material specified. Steps shall be installed 12-inches on center from top to bottom and in a manner capable of withstanding a lateral pull of 1,000 pounds, where shown on the Contract Drawings.

C. The base structures shall be placed on the bedding material to the lines and grades specified on the Contract Drawings. The Contractor shall take precautions to avoid cracking or causing other damage to the structure base or riser sections. Any damage done to the base or riser sections shall result in the structures being replaced at the Contractor's own expense.

D. Seal openings around pipe laterals with pipe penetration seals, and non-shrink grout. Protect clamp outside of manhole with minimum 2-inch wide (final applied width) heat shrink tape. Pipe penetration into the manhole shall be at least six (6) inches and no more than ten (10) inches beyond the inside wall of the catch basin at the spring lines of the pipe.

E. Attach mounting Frames and Covers in accordance with manufacturers' recommendations and as shown on the shop Drawings. Provide watertight seal between cover frame and concrete surface of manholes for sanitary and stormwater sewers.

3.04 INSTALLATION OF SEWER PIPES INTO EXISTING MANHOLES

A. Excavation and backfilling shall be as specified in Section 31 23 23.

B. The Contractor shall neatly core existing manholes in such a way as to not damage the structure and allow pipe installation. The core procedure shall be submitted to the Owner's Representative for review.

C. The existing manhole shall be repaired after installation of the new pipe. The manhole repair shall be made with non-shrink cement-based grout.

D. Repaired manholes shall not be backfilled until the concrete has achieved the specified strengths.

E. Pavement around the manhole shall be repaired as specified in Section 32 10 00 and as shown on the Contract Drawings.

3.05 MASONRY WORK

A. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

B. Lay masonry units in running bond. Course one unit and one mortar joint to equal 8 inches.

C. Form concave mortar joints.

D. Lay masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

E. Install joint reinforcement 16-inches on center.

F. Place joint reinforcement in first and second horizontal joints above base pad and below lid frame opening.

3.06 SCHEDULES

A. Storm Sewer Manholes: Precast concrete sections, galvanized steel steps, 48-inch inside dimension, to depth indicated, with bolted lid.

END OF SECTION

SECTION 33 41 11

SITE STORM UTILITY DRAINAGE PIPING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Storm drainage piping, fittings, and accessories.

B. Connection of drainage system to municipal sewers.

1.02 RELATED REQUIREMENTS

A. Section 32 13 13 – Concrete Paving: Concrete for cleanout base pad construction.

B. Section 31 23 23 - Excavation: Excavating of trenches.

C. Section 31 23 23 - Trenching: Excavating, bedding, and backfilling.

D. Section 31 23 23 - Fill: Bedding and backfilling.

E. Section 33 05 13 - Manholes and Structures.

1.03 PRICE AND PAYMENT PROCEDURES

A. Pipe and Fittings:

1. Basis of Measurement: By the linear foot.

2. Basis of Payment: Includes hand trimming excavation, bedding and backfilling, pipe and fittings, connection to building service piping and to municipal sewer.

1.04 DEFINITIONS

A. Bedding: Fill placed under, beside and directly over pipe, prior to subsequent backfill operations.

1.05 REFERENCE STANDARDS

A. AASHTO M 252 - Standard Specification for Corrugated Polyethylene Drainage Pipe; 2009.

B. AASHTO M 294 - Standard Specification for Corrugated Polyethylene Pipe, (12- to 60- in.) Diameter; 2013.

C. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

D. ASTM A48/A48M - Standard Specification for Gray Iron Castings; 2003 (Reapproved 2012).

1.06 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate the installation of piping with size, location and installation of service utilities.

B. Pre-installation Meeting: Conduct a pre-installation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

C. Sequencing: Ensure that utility connections are achieved in an orderly and expeditious manner.

1.07 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating pipe, and pipe accessories.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

D. Manufacturer's Installation Instructions: Indicate special procedures required to install Products specified.

E. Field Quality Control Submittals: Document results of field quality control testing.

F. Project Record Documents:

1. Record location of pipe runs, connections, catch basins, cleanouts, and invert elevations.

2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.08 REGULATORY REQUIREMENTS

A. Conform to applicable code for materials and installation of the Work of this section.

PART 2 - PRODUCTS

2.01 SEWER PIPE MATERIALS

A. Provide products that comply with applicable code(s).

B. HDPE stormwater sewer and culvert piping shall be as required to meet the requirements of NYSDOT Specification §706-12 Smooth Interior Corrugated Polyethylene Pipe and conform to AASHTO M-294 (12 to 36-inch diameter), unless specified otherwise on the Contract Drawings.

C. Plastic Pipe (4-inch and 6 inch Diameter, Solid and Perforated) for Building Drains, Cleanout Pipes, Discharge Lines, Leaching Fields, Drain Tiles, etc: PVC meeting ASTM D 2241 or SR (Styrene Rubber) meeting ASTM D 2852.

D. Solvent cements used for joining plastic pipe and fittings shall meet ASTM designation D 2564.

E. All material specified in this section shall be new, unused, and free from defects. All pipe and fittings shall have the brand name, size, AASTHO Type or rating, ASTM criteria and other appropriate manufacturing information printed on the exterior surface.

F. Acceptable Manufacturer's include:

1. HDPE: Advanced Drainage Systems, Inc.; 3300 Riverside Dr., Columbus, OH 43221; (614) 457-3051.

2. HDPE: Hancor, Inc.; 401 Olive St., Findlay, OH 45840; (800) 847-5880.

3. PVC: Thermal Pipe Systems, Inc.; 5205 W. Woodmill Dr., Wilmington, DE 19808; (302) 999-1588.

4. Or Approved Equivalent.

G. Pipe-to-Manhole/Drainage Structure Connections - one of the following:

1. A-Lok Flexible Connector by A-Lok Products, Inc., 697 Main St., Tullytown, PA 19007, (215) 547-3366.

2. Lockjoint Flexible Connector by Chardon Rubber Company, 373 Washington St., Chardon, OH 44024, (216) 285-2161.

3. Kor-N-Seal Flexible Connector by NPC, Inc., 250 Elm St., Milford, NH 03055, (601) 673-8680.

4. Link-Seal Flexible Connector by Thunderline Link-Seal, Inc., 6525 Goforth St., Houston, TX 77021, (713) 747-8819.

5. Cement mortar in accordance with ASTM C270.

H. Coupling Bands: Galvanized steel, 0.052 inches thick x 10 inches wide; connected with two neoprene "O" ring gaskets and two galvanized steel bolts.

2.02 PIPE ACCESSORIES

A. Pipe Joints: Mechanical clamp ring type, stainless steel expanding and contracting sleeve, neoprene ribbed gasket for positive seal.

B. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations required.

C. Filter Fabric: Non-biodegradable, woven. Provide Mirafi 550X manufactured by Tencate, or approved equivalent.

D. Trace Wire: Magnetic detectable conductor, clear plastic covering, imprinted with "Storm Sewer Service " in large letters.

2.03 ATHLETIC FIELD DRAINAGE MATERIALS

A. Flat panel drains: panel drains shall consist of geo-composite panels meeting the following criteria:

1. Geotextile – Needle punched, non-woven with elongation (ASTM D-4632-91) 50%; Grab Tensile (ASTM D-4632-92) 120 lbs; Flow Rate (ASTM D-4491) 135 gal/min/ft^2.

2. Core HDPE with Compressive strength (ASTM D-695/1621) 11,400 PSF; Flow Rate (ASTM D-47162) 21 GPM/ft width; and Peel Strength (ASTM D-1876) 50 lbs/ft width.

2.04 BEDDING AND BACKFILL MATERIALS

A. Bedding: As specified in Section 31 23 23 – Trenching and Backfilling.

B. Backfill: As specified in Section 31 23 23 – Trenching and Backfilling.

PART 3 - EXECUTION

3.01 TRENCHING

A. All excavation shall be to the lines and grades shown on the Contract Drawings.

B. Any suitable excavation methods may be used but sewer trenches shall be confined to the smallest area practical for proper construction and inspection. Hand methods shall be employed where it is deemed necessary by the Owner's Representative. Where necessary, sheeting and/or bracing shall be used to provide support and stability to trench walls. Sheeting and bracing, if required, shall be designed and installed in accordance with Section 31 50 00 - Excavation Support and Protection.

C. See Section 31 23 23 - Trenching for additional requirements.

D. Hand trim excavation for accurate placement of pipe to elevations indicated.

E. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.

3.02 INSTALLATION - PIPE

A. All sewers, sewer laterals and related structures shall be constructed to the lines and grades shown on the Contract Drawings and in accordance with the procedures shown on the Contract Drawings and installation methods described in the NYSDOT Standard Specifications for the specified materials.

B. Pipe bedding and backfill shall be placed in accordance with the procedures and at the locations shown on the Contract Drawings and in conformance with the material specifications contained in Section 31 23 23 - Trenching and Backfilling.

C. All pipes and fittings shall be handled carefully. Pipes and fittings shall not be dumped or dropped while unloading or during placement in the trench.

D. The Contractor shall take all necessary precaution to insure the stability of any stockpile or individual length of pipe that is stored. Pipe stored along a road or sidewalk shall be placed so that it does not create a safety hazard or impair the free flow of traffic.

E. Materials shall be stored neatly and protected against deterioration. Materials which are rejected by the Owner's Representative shall be immediately removed from the site.

F. The interior of each pipe shall be cleaned before adding the next length.

G. The joint surfaces of all pipes and fittings shall be clean, and shall fit together to form a tight joint. When setting pipe the workmanship and tools used shall be such that the quality and strength of the pipe is not impaired.

H. Jointing shall be accomplished in conformance with the manufacturer's recommendations. Lubricant used at the joint shall be water soluble, non-toxic, non-supporting of bacteria growth and have no deteriorating effects on the pipes or gaskets. Sewer pipe shall be laid upgrade with spigots placed in the direction of the flow. The pipes shall be fitted together to form a smooth, even invert. Sewer pipe shall be laid in a straight line with a constant grade between manholes. Each pipe shall be checked for line and grade as it is laid, before the joint is made. Pipes disturbed after having been laid shall be taken up and re-laid.

I. All pipes shall be laid true to line and grade with bells up-stream and shall have a full, firm and even bearing. Boulders or other natural obstructions shall not be considered cause for varying from true line and grade.

J. The pipe shall be set carefully to line and grade using laser type grade control. Laser equipment shall be set up using at least two grade stakes as elevation and alignment references.

K. No pipe shall be laid during adverse weather conditions, as determined by the Owner's Representative. In no case shall pipe be laid in water. In cases where sewers are being installed in wet conditions or below the ground-water table so that installed pipes become submerged overnight, sufficient backfill shall be placed to prevent the pipe from becoming buoyant.

L. The ends of all laterals shall be plugged or capped to hold pressure while testing, and marked with a 2-inch x 4-inch witness stake extending from the pipe to a point 2-feet above the ground. The top of witness stake shall be painted green.

M. A record shall be kept of the location of all laterals and this information shall be shown on the "**As-built**" plans.

N. Pipe cleanouts and caps shall be placed at the locations shown on the Contract Drawings. Top of the cleanout or cast iron cover shall be installed flush with finished grade.

3.03 FIELD QUALITY CONTROL

A. The Contractor shall provide all necessary materials, equipment, and qualified personnel to conduct testing on all installed sewers, manholes, and existing structures modified for connection, as specified in Paragraphs D and E below. The Contractor shall give the Owner's Representative notice at least three (3) working days prior to scheduling any testing.

B. Testing shall be in accordance with the specifications herein and Section 33.85 of the "Recommended Standards for Waste Water Facilities", 2004 Edition and subsequent editions.

C. Test sections shall be no greater than 300-feet in length.

D. To ensure proper alignment, laser or lamping of all sewers shall be performed.

E. Sewers shall be checked to determine whether any displacement of the pipe has occurred. The test shall be conducted after the final backfill has been in place at least 30-days. No pipe shall exceed a deflection of 5%. If the deflection tests are to be run using a riding ball or mandrel, it shall have a diameter equal to 95% of the inside diameter of the pipe. The test shall be performed without mechanical pulling devices.

F. After the above tests are satisfied, a video tape recording of the sewers shall be created. A copy of the tape shall be submitted to the Owner for its inspection and records.

G. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

3.04 REJECTION AND REPAIR

A. Any section of sanitary sewer piping which does not meet the specified leakage test shall be repaired.

B. The Contractor shall make all necessary repairs and retest all repaired sewers and manholes, at no additional cost to the Owner.

3.05 PROTECTION

A. Care shall be taken at all times to avoid entrance of mud and water into existing sewers. When connecting to an existing manhole, the connection shall be tightly plugged until completion of the work. At that time, the plug shall be removed and the accumulated water and mud pumped out of the manhole under the observation of the Owner's Representative. The cost of any necessary cleaning or flushing of existing facilities caused by failure to comply with this specification or for other reasons shall be at the Contractor's expense.

B. At the end of each working day (or any other time of work stoppage), the upstream end of the pipe shall be tightly plugged to prevent entrance of mud, silt or muddy water.

END OF SECTION

DIVISION 34 – NOT USED