PROJECT MANUAL AND SPECIFICATIONS FOR:

2023 Capital Improvements – Phase 3

Union-Endicott CSD

SED NO. 03-15-01-06-0-011-049 – Senior High School

VOLUME 1 of 1

Arcadis
59-61 Court Street, Suite 300
Binghamton, New York 13901
tel 607-772-0007
website www.arcadis.com

Exp. 11/30/2027

Document Set No.

DATE: October 1, 2025
SED APPROVAL DATE: October 15, 2025

ARCADIS PROJECT NO. 143846

PROJECT MANUAL AND SPECIFICATIONS FOR:

2023 Capital Improvements – Phase 3

Union-Endicott Central School District

SED Nos. 03-15-01-06-0-011-049 – Senior 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
Arcadis
59-61 Court Street, Suite 300
Binghamton, New York 13901
Telephone: 607-772-0007
Website: www.arcadis.com

Exp. 11/30/2027

Date: October 1, 2025 SED
Approval Date: October 15, 2025

Arcadis Project No. 143846

PROJECT MANUAL AND SPECIFICATIONS TABLE OF CONTENTS

DATE: October 1, 2025

PROJECT NAME: UNION-ENDICOTT CSD
2023 CAPITAL IMPROVEMENTS – PHASE 3

ARCHITECT: ARCADIS
59-61 COURT STREET, SUITE 300
BINGHAMTON, NY 13901
TELEPHONE: 607-772-0007

DIVISION 00 - BIDDING AND CONTRACT REQUIREMENTS

00 11 13	Invitation to Bid	00 11 13-1 - 3
00 21 13	Instructions to Bidders	00 21 13-1 - 11
00 31 00	Information Available to Bidders	00 31 00-1 - 2
00 41 00	Bid Form:	
	Contract No. 1 – General Construction	00 41 00-GC-1 - 8
	Contract No. 2 – Mechanical Construction	00 41 00-MC-1 - 8
	Contract No. 3 – Electrical Construction	00 41 00-EC-1 - 8
00 50 00	Agreement Forms	00 50 00-1 - 2
	AIA Document A132	1 - 6
00 60 00	Bonds and Certificates	00 60 00-1 - 3
	AIA Document A312-Performance Bond	1 - 4
	AIA Document A312-Payment Bond	1 - 4
	Acord-Certificate of Liability Insurance	1
	AIA Document A305-Contractor's Qualification Statement	1
	Exhibit A – General Information	1 - 3
	Exhibit B – Financial and Performance Information	1 - 2
	Exhibit C – Project Specific Information	1 - 3
	Exhibit D – Contractor's Past Project Experience	1
00 72 00	General Conditions	00 72 00-1
	AIA Document A232	1 - 36
00 73 00	Supplementary General Conditions of the Contract	00 73 00-1 - 9
00 82 00	Prevailing Wage Rates	00 82 00-1 - 59

DIVISION 01 - GENERAL REQUIREMENTS

01 10 00	Summary	01 10 00-1 - 5
01 21 00	Price and Payment Procedures	01 21 00-1 - 6
01 30 00	Administrative Requirements	01 30 00-1 - 10
01 33 00	Submittal Procedures	01 33 00-1 - 7
01 40 00	Quality Control	01 40 00-1 - 5
01 41 00	Regulatory Requirements	01 41 00-1 - 6
01 45 33	Code Required Special Inspect and Procedures	01 45 33-1 - 11
01 50 00	Temporary Facilities and Controls	01 50 00-1 - 7
01 50 13	Safety Standards	01 50 13-1 - 8
01 50 23	Uniform Safety Standards for School Construction	01 50 23-1 - 4
01 51 00	Temporary Utilities	01 51 00-1
01 60 00	Product Requirements	01 60 00-1 - 4

01 70 00	Execution Requirements	01 70 00-1 - 12

DIVISION 02
NOT USED

DIVISION 03 - CONCRETE

03 31 00	Cast-In-Place Concrete	03 31 00-1 - 14
03 45 00	Precast Architectural Concrete	03 45 00-1 - 10

DIVISION 04 - MASONRY

04 20 00	Unit Masonry	04 20 00-1 - 21

DIVISION 05 - METALS

05 12 00	Structural Steel Framing	05 12 00-1 - 11
05 50 00	Metal Fabrications	05 50 00-1 - 6

DIVISION 06 – 09
NOT USED

DIVISION 10 - SPECIALTIES

10 14 19	Dimensional Letter Signage	10 14 19-1 - 5

DIVISION 11 - 22
NOT USED

DIVISION 23 – HEATING, VENTILATING, AND AIR-CONDITIONING

23 05 23.12	Ball Valves for HVAC Piping	23 05 23.12-1 - 8
23 05 29	Hangers and Supports for HVAC Piping and Equipment	23 05 29-1 - 11
23 07 13	Duct Insulation	23 07 13-1 - 11
23 07 19	HVAC Piping Insulation	23 07 19-1 - 8
23 21 13	Hydronic Piping	23 21 13-1 - 6
23 31 13	Metal Ducts	23 31 13-1 - 11
23 33 00	Air Duct Accessories	23 33 00-1 - 3
23 73 13.16	Indoor Semi-Custom Air-Handling Units	23 73 13.16-1 - 16

DIVISION 26 - ELECTRICAL

26 05 00	Basic Electrical Materials and Methods	26 05 00-1 - 14
26 05 19	Low-Voltage Electrical Power Conductors and Cables	26 05 19-1 - 7
26 05 23	Control Voltage Electrical Power Cables	26 05 23-1 - 17
26 05 26	Grounding and Bonding for Electrical Systems	26 05 26-1 - 8
26 05 29	Hanger and Supports for Electrical Systems	26 05 29-1 - 7
26 05 33	Raceways and Boxes for Electrical Systems	26 05 33-1 - 11
26 05 43	Underground Ducts and Raceways for Electrical Systems	26 05 43-1 - 8
26 05 44	Sleeves and Sleeve Seals for Electrical Raceways and Cabling	26 05 44-1 - 5
26 05 48.16	Seismic Controls for Electrical Systems	26 05 48.16-1 - 8
26 05 53	Identification for Electrical Systems	26 05 53-1 - 10
26 05 72	Overcurrent Protective Device Short Circuit Study	26 05 72-1 - 7
26 05 73	Overcurrent Protective Device Coordination Study	26 05 73-1 - 10
26 05 74	Overcurrent Protective Device Arc-Flash Study	26 05 74-1 - 8

26 56 19	LED Exterior Lighting	26 56 19-1 - 10

DIVISION 27
NOT USED

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

28 31 11	Digital Addressable Fire-Alarm System	28 31 11-1 - 35

DIVISION 31 - EARTHWORK

31 10 00	Site Preparation	31 10 00-1 - 8
31 20 00	Earthmoving	31 20 00-1 - 16
31 23 19	Dewatering	31 23 19-1 - 4
31 23 23	Trenching and Backfilling	31 23 23-1 - 5
31 25 13	Temporary Erosion and Sediment Control	31 25 13-1 - 12
31 50 00	Excavation Support and Protection	31 50 00-1 - 3

DIVISION 32 – EXTERIOR IMPROVEMENTS

32 05 19.13	Geotextiles for Exterior Improvements	32 05 19.13-1 - 2
32 10 00	Aggregate Bases and Pavements	32 10 00-1 - 7
32 92 19	Seeding	32 92 19-1 - 19

DIVISION 33 - 34
NOT USED

DRAWINGS

HH-G000	Cover Sheet
HH-G100	Ground and First Floor Overall Building Plans and Code Information
HH-G101	Second Floor Overall Building Plan and Code Information
HH-G102	Third and Fourth Floor Overall Building Plans and Code Information
HH-C100	Site Plans
HH-C510	Site Details
HH-C530	Erosion Control Details
HH-A100	Arch and Gym Entrance Elevations
HH-S100	Structural Elevation Details and Notes – Not in folder
HH-M100	Boiler Room Plan
HH-E000	Abbreviations, General Notes, and Legends
HH-E100	Electrical Site Plan and Details
HH-E101	Boiler Room Plan

DIVISION 00 - BIDDING AND CONTRACT REQUIREMENTS

DOCUMENT 00 11 13

INVITATION TO BID

A. PROJECT

1. The Union-Endicott Central School District, 1100 East Main Street, Endicott, NY 13760 invites sealed bids to be received for the 2023 Capital Improvements Project – Phase 3.

   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

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 Union Endicott CSD District Office at 1100 East Main St. Endicott, NY 13760 until 11:00 AM Local Time, on November 20, 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:

   a. Tom Bowman
      Upstate Estimating
      1100 East Main Street
      Endicott, NY 13760

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

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

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 project site will be available for bidders to inspect proposed work areas from 9:00 AM to 3:00 PM on weekdays by appointment with Mr. Toby Riddleberger, Director of Facilities, phone number (607) 201-4975.

Signed: Susan Reif
District Clerk

Dated: November 5, 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 31, 2026 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 ON-SITE INSPECTION

A. Special attention is called to prospective bidders that project site will be available for bidders to inspect proposed work areas from 9:00 AM to 3:00 PM on weekdays by appointment with Mr. Toby Riddleberger, Director of Facilities, phone number (607) 201-4975.

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 vestibule. 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

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 Construction Manager:

Tom Bowman
1100 East Main Street
Endicott, NY 13760
E-Mail: tbowman@upstateest.com

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 Public Work Contractor Registration, 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

DOCUMENT 00 31 00

INFORMATION AVAILABLE TO BIDDERS

1.1 SUMMARY

A. Document Includes:

1. Subsurface investigation report.

2. Topographic survey.

3. Lead survey report.

4. Asbestos test report.

5. 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 at the office of Arcadis, 59-61 Court Street, Suite 300, Binghamton NY 13901.

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 at the office of Arcadis, 59-61 Court Street, Suite 300, Binghamton NY 13901.

1.4 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: Union-Endicott Central School District

PROJECT: 2023 Capital Improvements Project – Phase 3

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 Public Work Contractor Registration, 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.

8. The total project cost shall be divided into the following categories, including all labor, material, overhead and profit costs. Sum of all categories to equal total amount of bid.

Dated: _____, 2025

Signed _____

For _____
(Name of Company)

Street _____

City _____

State _____

Zip _____

Telephone _____

NON-COLLUSIVE BIDDING CERTIFICATION

TO: Union-Endicott Central School District

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

2023 Capital Improvements Project – Phase 3

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: Union-Endicott Central School District

PROJECT: 2023 Capital Improvements Project – Phase 3

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 Public Work Contractor Registration, 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.

8. The total project cost shall be divided into the following categories, including all labor, material, overhead and profit costs. Sum of all categories to equal total amount of bid.

Dated: _____, 2025

Signed _____

For _____
(Name of Company)

Street _____

City _____

State _____

Zip _____

Telephone _____

NON-COLLUSIVE BIDDING CERTIFICATION

TO: Union-Endicott Central School District

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

2023 Capital Improvements Project – Phase 3

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: Union-Endicott Central School District

PROJECT: 2023 Capital Improvements Project – Phase 3

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 Public Work Contractor Registration, 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.

8. The total project cost shall be divided into the following categories, including all labor, material, overhead and profit costs. Sum of all categories to equal total amount of bid.

Dated: _____, 2025

Signed _____

For _____
(Name of Company)

Street _____

City _____

State _____

Zip _____

Telephone _____

NON-COLLUSIVE BIDDING CERTIFICATION

TO: Union-Endicott Central School District

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

2023 Capital Improvements Project – Phase 3

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.

NOTICE TO PROCEED

Date:

Project: 2023 Capital Improvement Projects – Phase 3

Contract:

State Education Number(s): 03-15-01-06-0-011-049

Architect's Project No.: 143846-3

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 all of the documents required which include (Certificate of Insurance, Performance Bond, Labor and Material Payment Bond, list of subcontractors and material suppliers and Schedule of Values.

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)

«Union-Endicott Central School District »« »
«1100 East Main Street »
«Endicott, NY 13760 »

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

« »« »
« »
« »
« »

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

«SED No. 03-15-01-06-0-011-049 – Senior High School »
« »
«Contract No.
2023 Capital Improvements – Phase 3
Union-Endicott Central School District
1100 East Main Street
Endicott, NY 13760 »

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

«Upstate Estimating Services, LLC »« »
«1235 Upper Front Street »
«Binghamton, NY 13905 »

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)

TABLE OF ARTICLES

1 THE CONTRACT DOCUMENTS

2 THE WORK OF THIS CONTRACT

3 DATE OF COMMENCEMENT AND DATES OF SUBSTANTIAL COMPLETION

4 CONTRACT SUM

5 PAYMENTS

6 DISPUTE RESOLUTION

7 TERMINATION OR SUSPENSION

8 MISCELLANEOUS PROVISIONS

9 ENUMERATION OF CONTRACT DOCUMENTS

EXHIBIT A INSURANCE AND BONDS
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.

§ 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.)

«On or before August 31, 2026 »

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

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)

(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.

§ 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;

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)

.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.

§ 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:
(Check the appropriate box.)

[« 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.

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)

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)

«Pamela Portland »
«Union-Endicott CSD »
«1100 East Main Street »
«Endicott, NY 13760 »

§ 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

.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:

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)

Number	Date	Pages
N/A		

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:

.8 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 _____, shall become part of the Contract Documents.
.2 Instructions to Bidders, dated November 5, 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)*

DRAFT

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)

DOCUMENT 00 60 00

BONDS AND CERTIFICATES

PART 1 PERFORMANCE BOND AND PAYMENT BOND

A. As described in Document 00 21 13 – Instructions 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 and subject to the provisions under Document 00 73 00 – Supplementary General Conditions of the Contract.

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 (9/09) 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 (as modified by the Supplementary General Conditions).

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

1. Prior to starting work, the contractor shall purchase and maintain insurance for the following types of coverage and limits of liability. The contractor, and its subcontractors, if any, shall, before commencing services, furnish evidence to Union-Endicott Central School District's contract administration team in the form of a certificate of insurance and a copy of the all additional insured endorsements.

2. Commercial General Liability (CGL) coverage with limits of insurance not less than $1,000,000 per occurrence, and $2,000,000 annual aggregate, in addition:
   a. If the CGL coverage contains a General Aggregate Limit, such General Aggregate shall apply separately to each project.
   b. CGL policy shall include blanket broad form contractual liability coverage.
   c. CGL coverage shall be written on ISO occurrence form CG 00 01 (1093) or a substitute form providing equivalent coverage and shall cover liability arising from premises, operations, independent contractors, products-completed operations, and personal and advertising injury.

d. Union-Endicott Central School District shall be included as an additional insured for both on-going and completed operations. Coverage for the additional insured shall apply on a Primary and Non-contributory basis before any other insurance or self-insurance, including any deductible, maintained by, or provided to the additional insured. There shall be no Labor Law exclusions.

e. The contractor shall maintain CGL coverage for itself and all additional insureds for the duration of the project and maintain completed operations coverage for itself and each additional insured for at least 3 years after completion of the work.

3. Automobile Liability:
   a. Business Auto Liability with limits of at least $1,000,000 each accident.
   b. Business Auto Coverage must include coverage for liability arising out of all owned, leased, hired and non-owned automobiles.
   c. Union-Endicott Central School District shall be included as additional insured. Coverage for the additional insured shall apply on a Primary and Non-contributory basis before any other insurance or self-insurance, including any deductible, maintained by, or provided to the additional insured.

4. Commercial Umbrella:
   a. Umbrella limits must be at least $5,000,000.
   b. Umbrella coverage must include as insured's all entities that are additional insureds on the underlying CGL and Automobile Liability.
   c. Umbrella coverage for such additional insured's shall apply as primary before any other insurance or self-insurance, including any deductible, maintained by, or provided to, the additional insured other than the CGL, auto liability and employers liability coverages maintained by the contractor.

5. Workers Compensation, Employers Liability and New York State Disability (DBL):
   a. Coverage A: Statutory limits apply.
   b. Coverage B: Statutory limits (NYS); $1,000,000 each accident and/or disease.

6. Contractor's Pollution Legal Liability:
   a. Per claim limit of at least $1,000,000.
   b. Aggregate limit of at least $2,000,000.

7. The Contractor shall provide and maintain, at its own expense, an All-Risk Builder's Risk insurance policy to insure all Work under the Contract against any loss or damage, with a deductible not to exceed $5,000.00. Contractor shall be responsible for any deductible amounts. The value of the insurance shall at all times be equal to or greater than the full value of the Work shall be in the names of both the Owner and the Contractor,

payable to the Owner and Contractor as their interests may appear and any proceeds thereof shall be retained by the Owner as security for the performance by the Contractor in making good any loss, damage or injury. Upon such satisfactory performance by the Contractor, the proceeds shall be paid by the Owner to the Contractor.

8. Owner and Contractors Protective (OCP) Liability Coverage:
   a. $1,000,000 Per Occurrence
   b. $2,000,000 Aggregate

9. Additionally, the following must be provided:
   a. Waiver of Subrogation applicable on General Liability, Automobile and Workers Compensation Policies.
   b. Thirty (30) day notice of cancellation applicable on all policies.

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, 1986 Edition.

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.

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.

AIA Document A312 – 2010 Performance Bond. Copyright © 2010. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are registered trademarks of The American Institute of Architects. This document was produced at 11:11:10 ET on 05/31/2023 under Order No.4104239632 which expires on 02/04/2024, 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 docinfo@aiacontracts.com.
User Notes: (810104627)

§ 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.

AIA Document A312 – 2010 Performance Bond. Copyright © 2010. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are registered trademarks of The American Institute of Architects. This document was produced at 11:11:10 ET on 05/31/2023 under Order No.4104239632 which expires on 02/04/2024, 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 docinfo@aiacontracts.com.
User Notes: (810104627)

§ 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.

AIA Document A312 – 2010 Performance Bond. Copyright © 2010. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are registered trademarks of The American Institute of Architects. This document was produced at 11:11:10 ET on 05/31/2023 under Order No.4104239632 which expires on 02/04/2024, 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 docinfo@aiacontracts.com.
User Notes: (810104627)

§ 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:	

AIA Document A312 – 2010 Performance Bond. Copyright © 2010. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are registered trademarks of The American Institute of Architects. This document was produced at 11:11:10 ET on 05/31/2023 under Order No.4104239632 which expires on 02/04/2024, 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 docinfo@aiacontracts.com.
User Notes: (810104627)

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.
/

AIA Document A312 – 2010 Payment Bond. Copyright © 2010. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are registered trademarks of The American Institute of Architects. This document was produced at 11:10:22 ET on 05/31/2023 under Order No.4104239632 which expires on 02/04/2024, 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 docinfo@aiacontracts.com.
User Notes: (1181710388)

§ 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.

AIA Document A312 – 2010 Payment Bond. Copyright © 2010. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are registered trademarks of The American Institute of Architects. This document was produced at 11:10:22 ET on 05/31/2023 under Order No.4104239632 which expires on 02/04/2024, 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 docinfo@aiacontracts.com.
User Notes: (1181710388)

§ 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.

AIA Document A312 – 2010 Payment Bond. Copyright © 2010. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are registered trademarks of The American Institute of Architects. This document was produced at 11:10:22 ET on 05/31/2023 under Order No.4104239632 which expires on 02/04/2024, 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 docinfo@aiacontracts.com.
User Notes: (1181710388)

§ 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:	

AIA Document A312 – 2010 Payment Bond. Copyright © 2010. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are registered trademarks of The American Institute of Architects. This document was produced at 11:10:22 ET on 05/31/2023 under Order No.4104239632 which expires on 02/04/2024, 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 docinfo@aiacontracts.com.
User Notes: (1181710388)

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

© 1988-2016 ACORD CORPORATION. All rights reserved.

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:
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.

AIA Document A305 – 2020. Copyright © 1964, 1969, 1979, 1986, and 2020. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are registered trademarks of The American Institute of Architects. This document was produced at 11:12:27 ET on 05/31/2023 under Order No.4104239632 which expires on 02/04/2024, 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 docinfo@aiacontracts.com.
User Notes: (894913873)

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.

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.

AIA Document A305 – 2020 Exhibit A. Copyright © 2020. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are registered trademarks of The American Institute of Architects. This document was produced at 11:10:31 ET on 05/31/2023 under Order No.4104239632 which expires on 02/04/2024, 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 docinfo@aiacontracts.com.
User Notes: (1848331108)

.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.

AIA Document A305 – 2020 Exhibit A. Copyright © 2020. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are registered trademarks of The American Institute of Architects. This document was produced at 11:10:31 ET on 05/31/2023 under Order No.4104239632 which expires on 02/04/2024, 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 docinfo@aiacontracts.com.
User Notes: (1848331108)

§ 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)

AIA Document A305 – 2020 Exhibit A. Copyright © 2020. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are registered trademarks of The American Institute of Architects. This document was produced at 11:10:31 ET on 05/31/2023 under Order No.4104239632 which expires on 02/04/2024, 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 docinfo@aiacontracts.com.
User Notes: (1848331108)

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.)

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.

§ 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?

AIA Document A305 – 2020 Exhibit B. Copyright © 2020. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are registered trademarks of The American Institute of Architects. This document was produced at 11:11:55 ET on 05/31/2023 under Order No.4104239632 which expires on 02/04/2024, 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 docinfo@aiacontracts.com.
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?

AIA Document A305 – 2020 Exhibit B. Copyright © 2020. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are registered trademarks of The American Institute of Architects. This document was produced at 11:11:55 ET on 05/31/2023 under Order No.4104239632 which expires on 02/04/2024, 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 docinfo@aiacontracts.com.
User Notes: (1934846794)

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.

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.

AIA Document A305 – 2020 Exhibit C. Copyright © 2020. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are registered trademarks of The American Institute of Architects. This document was produced at 11:09:54 ET on 05/31/2023 under Order No.4104239632 which expires on 02/04/2024, 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 docinfo@aiacontracts.com.
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?

AIA Document A305 – 2020 Exhibit C. Copyright © 2020. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are registered trademarks of The American Institute of Architects. This document was produced at 11:09:54 ET on 05/31/2023 under Order No.4104239632 which expires on 02/04/2024, 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 docinfo@aiacontracts.com.
User Notes: (1148806451)

§ 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:

AIA Document A305 – 2020 Exhibit C. Copyright © 2020. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are registered trademarks of The American Institute of Architects. This document was produced at 11:09:54 ET on 05/31/2023 under Order No.4104239632 which expires on 02/04/2024, 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 docinfo@aiacontracts.com.
User Notes: (1148806451)

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				

AIA Document A305 – 2020 Exhibit D. Copyright © 2020. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 11:09:58 ET on 05/31/2023 under Order No.4104239632 which expires on 02/04/2024, 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 docinfo@aiacontracts.com.
User Notes: (3B9ADA3F)

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 – Phase 3
Union-Endicott Central School District
1100 East Main Street
Endicott, NY 13760

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

Upstate Estimating Services, LLC
1235 Upper Front Street
Binghamton, NY 13905

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

Union-Endicott Central School District
1100 East Main Street
Endicott, NY 13760

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.

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 17:46:20 ET on 11/02/2025 under Order No.4104248922 which expires on 12/31/2025, 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 docinfo@aiacontracts.com.
User Notes: (1951813225)

TABLE OF ARTICLES

1 GENERAL PROVISIONS

2 OWNER

3 CONTRACTOR

4 ARCHITECT AND CONSTRUCTION MANAGER

5 SUBCONTRACTORS

6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

7 CHANGES IN THE WORK

8 TIME

9 PAYMENTS AND COMPLETION

10 PROTECTION OF PERSONS AND PROPERTY

11 INSURANCE AND BONDS

12 UNCOVERING AND CORRECTION OF WORK

13 MISCELLANEOUS PROVISIONS

14 TERMINATION OR SUSPENSION OF THE CONTRACT

15 CLAIMS AND DISPUTES

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 17:46:20 ET on 11/02/2025 under Order No.4104248922 which expires on 12/31/2025, 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 docinfo@aiacontracts.com.
User Notes: (1951813225)

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.

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 17:46:20 ET on 11/02/2025 under Order No.4104248922 which expires on 12/31/2025, 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 docinfo@aiacontracts.com.
User Notes: (1951813225)

§ 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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 17:46:20 ET on 11/02/2025 under Order No.4104248922 which expires on 12/31/2025, 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 docinfo@aiacontracts.com.
User Notes: (1951813225)

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,

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 17:46:20 ET on 11/02/2025 under Order No.4104248922 which expires on 12/31/2025, 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 docinfo@aiacontracts.com.
User Notes: (1951813225)

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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 17:46:20 ET on 11/02/2025 under Order No.4104248922 which expires on 12/31/2025, 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 docinfo@aiacontracts.com.
User Notes: (1951813225)

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.

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 17:46:20 ET on 11/02/2025 under Order No.4104248922 which expires on 12/31/2025, 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 docinfo@aiacontracts.com.
User Notes: (1951813225)

§ 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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 17:46:20 ET on 11/02/2025 under Order No.4104248922 which expires on 12/31/2025, 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 docinfo@aiacontracts.com.
User Notes: (1951813225)

(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.

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 17:46:20 ET on 11/02/2025 under Order No.4104248922 which expires on 12/31/2025, 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 docinfo@aiacontracts.com.
User Notes: (1951813225)

§ 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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 17:46:20 ET on 11/02/2025 under Order No.4104248922 which expires on 12/31/2025, 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 docinfo@aiacontracts.com.
User Notes: (1951813225)

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.

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 17:46:20 ET on 11/02/2025 under Order No.4104248922 which expires on 12/31/2025, 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 docinfo@aiacontracts.com.
User Notes: (1951813225)

§ 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.

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 17:46:20 ET on 11/02/2025 under Order No.4104248922 which expires on 12/31/2025, 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 docinfo@aiacontracts.com.
User Notes: (1951813225)

§ 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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 17:46:20 ET on 11/02/2025 under Order No.4104248922 which expires on 12/31/2025, 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 docinfo@aiacontracts.com.
User Notes: (1951813225)

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.

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 17:46:20 ET on 11/02/2025 under Order No.4104248922 which expires on 12/31/2025, 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 docinfo@aiacontracts.com.
User Notes: (1951813225)

§ 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.

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 17:46:20 ET on 11/02/2025 under Order No.4104248922 which expires on 12/31/2025, 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 docinfo@aiacontracts.com.
User Notes: (1951813225)

§ 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.

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 17:46:20 ET on 11/02/2025 under Order No.4104248922 which expires on 12/31/2025, 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 docinfo@aiacontracts.com.
User Notes: (1951813225)

§ 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.

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 17:46:20 ET on 11/02/2025 under Order No.4104248922 which expires on 12/31/2025, 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 docinfo@aiacontracts.com.
User Notes: (1951813225)

§ 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.

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 17:46:20 ET on 11/02/2025 under Order No.4104248922 which expires on 12/31/2025, 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 docinfo@aiacontracts.com.
User Notes: (1951813225)

§ 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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 17:46:20 ET on 11/02/2025 under Order No.4104248922 which expires on 12/31/2025, 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 docinfo@aiacontracts.com.
User Notes: (1951813225)

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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 17:46:20 ET on 11/02/2025 under Order No.4104248922 which expires on 12/31/2025, 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 docinfo@aiacontracts.com.
User Notes: (1951813225)

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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 17:46:20 ET on 11/02/2025 under Order No.4104248922 which expires on 12/31/2025, 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 docinfo@aiacontracts.com.
User Notes: (1951813225)

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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 17:46:20 ET on 11/02/2025 under Order No.4104248922 which expires on 12/31/2025, 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 docinfo@aiacontracts.com.
User Notes: (1951813225)

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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 17:46:20 ET on 11/02/2025 under Order No.4104248922 which expires on 12/31/2025, 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 docinfo@aiacontracts.com.
User Notes: (1951813225)

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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 17:46:20 ET on 11/02/2025 under Order No.4104248922 which expires on 12/31/2025, 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 docinfo@aiacontracts.com.
User Notes: (1951813225)

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.

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 17:46:20 ET on 11/02/2025 under Order No.4104248922 which expires on 12/31/2025, 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 docinfo@aiacontracts.com.
User Notes: (1951813225)

§ 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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 17:46:20 ET on 11/02/2025 under Order No.4104248922 which expires on 12/31/2025, 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 docinfo@aiacontracts.com.
User Notes: (1951813225)

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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 17:46:20 ET on 11/02/2025 under Order No.4104248922 which expires on 12/31/2025, 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 docinfo@aiacontracts.com.
User Notes: (1951813225)

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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 17:46:20 ET on 11/02/2025 under Order No.4104248922 which expires on 12/31/2025, 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 docinfo@aiacontracts.com.
User Notes: (1951813225)

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.

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 17:46:20 ET on 11/02/2025 under Order No.4104248922 which expires on 12/31/2025, 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 docinfo@aiacontracts.com.
User Notes: (1951813225)

§ 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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 17:46:20 ET on 11/02/2025 under Order No.4104248922 which expires on 12/31/2025, 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 docinfo@aiacontracts.com.
User Notes: (1951813225)

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.

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 17:46:20 ET on 11/02/2025 under Order No.4104248922 which expires on 12/31/2025, 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 docinfo@aiacontracts.com.
User Notes: (1951813225)

§ 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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 17:46:20 ET on 11/02/2025 under Order No.4104248922 which expires on 12/31/2025, 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 docinfo@aiacontracts.com.
User Notes: (1951813225)

.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.

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 17:46:20 ET on 11/02/2025 under Order No.4104248922 which expires on 12/31/2025, 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 docinfo@aiacontracts.com.
User Notes: (1951813225)

§ 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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 17:46:20 ET on 11/02/2025 under Order No.4104248922 which expires on 12/31/2025, 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 docinfo@aiacontracts.com.
User Notes: (1951813225)

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.

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 17:46:20 ET on 11/02/2025 under Order No.4104248922 which expires on 12/31/2025, 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 docinfo@aiacontracts.com.
User Notes: (1951813225)

§ 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.

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 17:46:20 ET on 11/02/2025 under Order No.4104248922 which expires on 12/31/2025, 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 docinfo@aiacontracts.com.
User Notes: (1951813225)

DOCUMENT 00 73 00

SUPPLEMENTARY GENERAL CONDITIONS OF THE CONTRACT

The following Supplement modifies, deletes from, adds, and replaces the "General Conditions of the Contract for Construction – Construction Manager-Adviser Edition", AIA Document A232-2009. 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 Construction Manager 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 Prime Contractor.

1.5 OWNERSHIP AND USE OF ARCHITECT'S DRAWINGS, SPECIFICATIONS, AND OTHER INSTRUMENTS OF SERVICE

1.5.2 Add the following sentence to the end of subparagraph 1.5.3:

Subcontractors, sub-subcontractors, material or equipment suppliers and others desiring copies of any drawings or specifications shall obtain them from the Prime 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:

Union-Endicott Central School District

or its duly authorized representative.

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, the Owner, the Construction Manager 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 Delete subparagraph 3.6 and substitute the following (if appropriate):

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 materialperson 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 materialperson 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

3.8.2.3 Add the following sentence at the end of subparagraph 3.8.2.3:

Except when installation is specified as part of the allowance in the General Requirements (Division 1 of the Specifications).

3.9 SUPERINTENDENT

3.9.2 Add the following provision as a new subparagraph 3.9.2:

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 sentence at the end of 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 Construction Manager.

3.15 CLEANING UP

3.15.1 Add the following sentences as new sentences to subparagraph 3.15.1:

.1 The Prime 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 Construction Manager.

3.18 INDEMNIFICATION

3.18.1 Delete subparagraph 3.18.1 and substitute the following:

Contractor shall defend, indemnify and hold harmless the District, its officers, employees and agents from and against any and all demands, claims, actions, proceedings, liabilities, damages, costs or expenses including without limitation reasonable attorney's fees and court costs and disbursements whenever made and however asserted arising at any time in connection with this Agreement from or relating in any way to: 1) any negligent or intentional act or omission of Contractor or any or its owners, managers, officers, employees, agents, invitees, contractors or subcontractors; and 2) any and all other costs, expenses, attorney's fees and liabilities incurred by the District in defense of any such claims, demands, actions or proceedings whether the same proceeds to judgment or not. Contractor agrees upon written request of the District to defend any action or suit brought against the District on any claim or demand associated in way with this Agreement. In the prosecution of any successful lawsuit by the District for the enforcement of this or any other provision of the Agreement, Contractor agrees to pay the District's reasonable attorney's fees and any costs of suit incurred therein.

ARTICLE 4 ADMINISTRATION OF THE CONTRACT

4.1 GENERAL

4.1.1 Add the following sentence at the end of subparagraph 4.1.1:

Where the term "Architect" 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

4.1.2 Add the following at the end of subparagraph 4.1.2:

Where the term 'Construction Manager or Project Manager' or a pronoun in place of it occurs in these specifications or drawings, it refers to:

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 CHANGES

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 Construction Manager 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 Construction Manager has issued an appropriate change order. If requested, the Contractor shall also submit quotes from subcontractors and material suppliers.

7.3 CONSTRUCTION CHANGE DIRECTIVES

7.3.7 In the first sentence, delete the words "an amount for overhead and profit" and substitute "an allowance for overhead and profit in accordance with Clauses 7.3.11.1 through 7.3.11.5 below".

7.3.11 Add the following provision as a new subparagraph 7.3.11:

In subparagraph 7.3.7, the allowance for overhead and profit shall be as scheduled below. Labor costs shall include items incidental to labor, such as worker's compensation insurance, unemployment insurance, Social Security, fringe and all mandatory costs paid in connection with labor. Overhead shall include Prime Contractor's supervisory employees, general office expense and small tools.

1. In no event shall the overhead and profit for any Change Order or Construction Change Directive exceed fifteen percent (15%) of the total cost of labor and materials, whether the Contractor, Subcontractor or Sub-subcontractor performs the work.

2. The allowance for overhead and profit as defined in Subparagraph 7.3.6, shall be ten percent (10%) for the entity that actually performs the work plus five percent (5%) for administrative costs, in the event the Prime Contractor is not that entity. Should the work be performed by a sub-subcontractor the applicable markups shall be 5% for the sub-subcontractor, 5% for the subcontractor and 5% for the Prime Contractor.

3. Overhead and profit shall not be added to work performed pursuant to Field Directive Work Allowance or Architect Directed Materials Allowances.

4. In order to facilitate checking of quotations for extras or credits, all proposals shall be accompanied by a complete 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.

5. Contractor's neglect causing expense or delay to Owner or Construction Manager 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 to the Contractor at actual cost.

ARTICLE 9 PAYMENTS AND COMPLETION

9.2 SCHEDULE OF VALUES

9.2 Delete subparagraph 9.2 and substitute the following:

The Contractor shall submit to the Architect/Engineer and Construction Manager, prior to any payment being made under the contract, copies of a progress schedule and schedule of values as set forth in the General Requirements (Division 01 of the Specifications).

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 Construction Manager, 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 Construction Manager, 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 Construction Manager prior to approval of Application for Payment.

9.3.4 Add the following sentence 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 Construction Manager a Requisition for Payment, using AIA Documents G732 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 Construction Manager will have reviewed the Contractor's Requisition for Payment, received from the Contractor four (4) copies of the Requisition for Payment in a form satisfactory to the Construction Manager. 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

9.4.8 Add the following provision as a new subparagraph 9.4.8:

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.

9.4.9 Add the following provision as a new subparagraph 9.4.9:

Final payment of withheld percentage will be made within thirty (30) days after final inspection and acceptance.

9.5 DECISIONS TO WITHHOLD CERTIFICATION

9.5.4 Add the following provision as a new subparagraph 9.5.4:

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 Construction Manager.

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 Construction Manager to determine when "substantial completion" has been accomplished.

9.10 FINAL COMPLETION AND FINAL PAYMENT

9.10.2 Add the following sentence at the end of subparagraph 9.10.2:

The affidavits and Consent of Surety shall be submitted in triplicate on AIA Documents G706, G706a, and G707. A copy of each may be obtained from the Architect.

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 Construction Manager. 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.

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

---

1. Purpose and Scope:

This Item describes the Public Work Enforcement Fund (the Fund, PWEF) and its relevance to State agencies and public benefit corporations engaged in construction or reconstruction contracts, maintenance and repair, and announces the recently-enacted increase to the percentage of the dollar value of such contracts that must be deposited into the Fund. This item also describes the roles of the following entities with respect to the Fund:

- New York State Department of Labor (DOL),
- The Office of the State of Comptroller (OSC), and
- State agencies and public benefit corporations.

2. Background and Statutory References:

DOL uses the Fund to enforce the State's Labor Law as it relates to contracts for construction or reconstruction, maintenance and repair, as defined in subdivision two of Section 220 of the Labor Law. State agencies and public benefit corporations participating in such contracts are required to make payments to the Fund.

Chapter 511 of the Laws of 1995 (as amended by Chapter 513 of the Laws of 1997, Chapter 655 of the Laws of 1999, Chapter 376 of the Laws of 2003 and Chapter 407 of the Laws of 2005) established the Fund.

3. Procedures and Agency Responsibilities:

The Fund is supported by transfers and deposits based on the value of contracts for construction and reconstruction, maintenance and repair, as defined in subdivision two of Section 220 of the Labor Law, into which all State agencies and public benefit corporations enter.

Chapter 407 of the Laws of 2005 increased the amount required to be provided to this fund to .10 of one-percent of the total cost of each such contract, to be calculated at the time agencies or public benefit corporations enter into a new contract or if a contract is amended. The provisions of this bill became effective August 2, 2005.

To all State Departments, Agency Heads and Public Benefit Corporations
IMPORTANT NOTICE REGARDING PUBLIC WORK ENFORCEMENT FUND

OSC will report to DOL on all construction-related ("D") contracts approved during the month, including contract amendments, and then DOL will bill agencies the appropriate assessment monthly. An agency may then make a determination if any of the billed contracts are exempt and so note on the bill submitted back to DOL. For any instance where an agency is unsure if a contract is or is not exempt, they can call the Bureau of Public Work at the number noted below for a determination. Payment by check or journal voucher is due to DOL within thirty days from the date of the billing. DOL will verify the amounts and forward them to OSC for processing.

For those contracts which are not approved or administered by the Comptroller, monthly reports and payments for deposit into the Public Work Enforcement Fund must be provided to the Administrative Finance Bureau at the DOL within 30 days of the end of each month or on a payment schedule mutually agreed upon with DOL.

Reports should contain the following information:

- Name and billing address of State agency or public benefit corporation;
- State agency or public benefit corporation contact and phone number;
- Name and address of contractor receiving the award;
- Contract number and effective dates;
- Contract amount and PWEF assessment charge (if contract amount has been amended, reflect increase or decrease to original contract and the adjustment in the PWEF charge); and
- Brief description of the work to be performed under each contract.

Checks and Journal Vouchers, payable to the "New York State Department of Labor" should be sent to:

Department of Labor
Administrative Finance Bureau-PWEF Unit
Building 12, Room 464
State Office Campus
Albany, NY 12226

Any questions regarding billing should be directed to NYSDOL's Administrative Finance Bureau-PWEF Unit at (518) 457-3624 and any questions regarding Public Work Contracts should be directed to the Bureau of Public Work at (518) 457-5589.

NEW YORK STATE OF OPPORTUNITY. Department of Labor

Required Notice under Article 25-B of the Labor Law

Attention All Employees, Contractors and Subcontractors: You are Covered by the Construction Industry Fair Play Act

The law says that you are an employee unless:

- You are free from direction and control in performing your job, **and**
- You perform work that is not part of the usual work done by the business that hired you, **and**
- You have an independently established business.

Your employer cannot consider you to be an independent contractor unless all three of these facts apply to your work.

It is against the law for an employer to misclassify employees as independent contractors or pay employees off the books.

Employee Rights: If you are an employee, you are entitled to state and federal worker protections. These include:

- Unemployment Insurance benefits, if you are unemployed through no fault of your own, able to work, and otherwise qualified,
- Workers' compensation benefits for on-the-job injuries,
- Payment for wages earned, minimum wage, and overtime (under certain conditions),
- Prevailing wages on public work projects,
- The provisions of the National Labor Relations Act, and
- A safe work environment.

It is a violation of this law for employers to retaliate against anyone who asserts their rights under the law. Retaliation subjects an employer to civil penalties, a private lawsuit or both.

Independent Contractors: If you are an independent contractor**, you must pay all taxes and Unemployment Insurance contributions required by New York State and Federal Law.**

Penalties for paying workers off the books or improperly treating employees as independent contractors:

• **Civil Penalty**	First offense: Up to $2,500 per employee Subsequent offense(s): Up to $5,000 per employee
• **Criminal Penalty**	First offense: Misdemeanor - up to 30 days in jail, up to a $25,000 fine and debarment from performing public work for up to one year. Subsequent offense(s): Misdemeanor - up to 60 days in jail or up to a $50,000 fine and debarment from performing public work for up to 5 years.

If you have questions about your employment status or believe that your employer may have violated your rights and you want to file a complaint, call the Department of Labor at (866) 435-1499 or send an email to dol.misclassified@labor.ny.gov. All complaints of fraud and violations are taken seriously. You can remain anonymous.

Employer Name:

IA 999 (09/16)

WE ARE YOUR DOL

NEW YORK STATE Department of Labor

New York State Department of Labor
Bureau of Public Work

Attention Employees

THIS IS A:

PUBLIC WORK PROJECT

If you are employed on this project as a **worker, laborer, or mechanic** you are entitled to receive the **prevailing wage and supplements rate** for the classification at which you are working.

Your pay stub and wage notice received upon hire must clearly state your wage rate and supplement rate.

Chapter 629 of the Labor Laws of 2007:

These wages are set by law and must be posted at the work site. They can also be found at: https://dol.ny.gov/bureau-public-work

If you feel that you have not received proper wages or benefits, please call our nearest office.*

Albany	(518) 457-2744	Patchogue	(631) 687-4882
Binghamton	(607) 721-8005	Rochester	(585) 258-4505
Buffalo	(716) 847-7159	Syracuse	(315) 428-4056
Garden City	(516) 228-3915	Utica	(315) 793-2314
New York City	(212) 932-2419	White Plains	(914) 997-9507
Newburgh	(845) 568-5287		

* For New York City government agency construction projects, please contact the Office of the NYC Comptroller at (212) 669-4443, or www.comptroller.nyc.gov – click on Bureau of Labor Law.

Contractor Name: _____

Project Location: _____

Requirements for OSHA 10 Compliance

Article 8 §220-h requires that when the advertised specifications, for every contract for public work, is $250,000.00 or more the contract must contain a provision requiring that every worker employed in the performance of a public work contract shall be certified as having completed an OSHA 10 safety training course. The clear intent of this provision is to require that all employees of public work contractors, required to be paid prevailing rates, receive such training "prior to the performing any work on the project."

The Bureau will enforce the statute as follows:

All contractors and sub contractors must attach a copy of proof of completion of the OSHA 10 course to the first certified payroll submitted to the contracting agency and on each succeeding payroll where any new or additional employee is first listed.

Proof of completion may include but is not limited to:

- Copies of bona fide course completion card (*Note: Completion cards do not have an expiration date.)*
- Training roster, attendance record of other documentation from the certified trainer pending the issuance of the card.
- Other valid proof

**A certification by the employer attesting that all employees have completed such a course is not sufficient proof that the course has been completed.

Any questions regarding this statute may be directed to the New York State Department of Labor, Bureau of Public Work at 518-457-5589.

WICKS

Public work projects are subject to the Wicks Law requiring separate specifications and bidding for the plumbing, heating and electrical work, when the total project's threshold is $3 million in Bronx, Kings, New York, Queens and, Richmond counties; $1.5 million in Nassau, Suffolk and Westchester counties; and $500,000 in all other counties.

For projects below the monetary threshold, bidders must submit a sealed list naming each subcontractor for the plumbing, HVAC and electrical and the amount to be paid to each. The list may not be changed unless the public owner finds a legitimate construction need, including a change in specifications or costs or the use of a Project Labor Agreement (PLA), and must be open to public inspection.

Allows the state and local agencies and authorities to waive the Wicks Law and use a PLA if it will provide the best work at the lowest possible price. If a PLA is used, all contractors shall participate in apprentice training programs in the trades of work it employs that have been approved by the Department of Labor (DOL) for not less than three years. They shall also have at least one graduate in the last three years and use affirmative efforts to retain minority apprentices. PLA's would be exempt from Wicks, but deemed to be public work subject to prevailing wage enforcement.

The Commissioner of Labor shall have the power to enforce separate specification requirement s on projects, and may issue stop-bid orders against public owners for non-compliance.

Other new monetary thresholds, and similar sealed bidding for non-Wicks projects, would apply to certain public authorities including municipal housing authorities, NYC Construction Fund, Yonkers Educational Construction Fund, NYC Municipal Water Finance Authority, Buffalo Municipal Water Finance Authority, Westchester County Health Care Association, Nassau County Health Care Corp., Clifton-Fine Health Care Corp., Erie County Medical Center Corp., NYC Solid Waste Management Facilities, and the Dormitory Authority.

Contractors must pay subcontractors within a 7 days period.

(07.19)

Introduction to the Prevailing Rate Schedule

Information About Prevailing Rate Schedule

This information is provided to assist you in the interpretation of particular requirements for each classification of worker contained in the attached Schedule of Prevailing Rates.

Classification

It is the duty of the Commissioner of Labor to make the proper classification of workers taking into account whether the work is heavy and highway, building, sewer and water, tunnel work, or residential, and to make a determination of wages and supplements to be paid or provided. It is the responsibility of the public work contractor to use the proper rate. If there is a question on the proper classification to be used, please call the district office located nearest the project. District office locations and phone numbers are listed below.
Prevailing Wage Schedules are issued separately for "General Construction Projects" and "Residential Construction Projects" on a county-by-county basis.

General Construction Rates apply to projects such as: Buildings, Heavy & Highway, and Tunnel and Water & Sewer rates.
Residential Construction Rates generally apply to construction, reconstruction, repair, alteration, or demolition of one family, two family, row housing, or rental type units intended for residential use.
Some rates listed in the Residential Construction Rate Schedule have a very limited applicability listed along with the rate. Rates for occupations or locations not shown on the residential schedule must be obtained from the General Construction Rate Schedule. Please contact the local Bureau of Public Work office before using Residential Rate Schedules, to ensure that the project meets the required criteria.

*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

Every contractor and subcontractor MUST keep original payrolls or transcripts subscribed and affirmed as true under penalty of perjury. Payrolls must be maintained for at least three (3) years from the projects date of completion. Additionally, as per Article 6 of the Labor Law, contractors and subcontractors are required to establish, maintain, and preserve for not less that six (6) years, contemporaneous, 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.

Payroll records and transcripts are required to be kept on site during all the time that work under that contract is being performed.

NOTE: *For more detailed information regarding Article 9 prevailing wage contracts, please refer to "General Provisions of Laws Covering Workers on Article 9 Public Work Building Service Contracts".*

If you have any questions concerning the attached schedule or would like additional information, please write to:

New York State Department of Labor
Bureau of Public Work
State Office Campus, Bldg. 12
Albany, NY 12240

OR

Contact the nearest BUREAU of PUBLIC WORK District Office

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

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 healthcare 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

Broome County General Construction

Boilermaker — 10/01/2025

JOB DESCRIPTION Boilermaker **DISTRICT** 1

ENTIRE COUNTIES
Albany, Broome, Chenango, Columbia, Delaware, Essex, Fulton, Greene, Hamilton, Herkimer, Montgomery, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Tioga, Warren, Washington

WAGES
Per hour

	07/01/2025	01/01/2026
		+ $2.50
Boilermaker	$ 43.34	

SUPPLEMENTAL BENEFITS
Per hour

Journeyworker	$26.51
	+ $1.49*

(*) This portion of the benefit is NOT subject to the SAME PREMIUM as shown for overtime.

OVERTIME PAY
See (B, E, Q, V) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 15, 25) on HOLIDAY PAGE
Note: When a holiday falls on Sunday, the day observed by the State or Nation shall be observed, and when Christmas Day and New Year's fall on Saturday, Friday will be observed as the holiday.

REGISTERED APPRENTICES
Wages per hour
(1/2) year terms at the following percentage of Journeyman's wage.

1st	2nd	3rd	4th	5th	6th	7th	8th
65%	65%	70%	75%	80%	85%	90%	95%

Supplemental Benefits per hour

1st	2nd	3rd	4th	5th	6th	7th	8th
$19.71	$19.71	$20.69	$21.64	$22.62	$23.60	$24.57	$25.53
+1.49**	+1.49**	+1.49**	+1.49**	+1.49**	+1.49**	+1.49**	+1.49**

(**) This portion of the benefit is NOT subject to the SAME PREMIUM as shown for overtime.

1-197

Broadband — 10/01/2025

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, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Wyoming, Yates

PARTIAL COUNTIES
Orange: Only in the Village of Greenwood Lake, Village of Highland Falls, Town of Tuxedo, and Town of Patterson

WAGES
NOTE: Applies to all public work and covered private projects, including those receiving ConnectAll funding subject to New York State Labor Law §224-E, solicited on or after July 1,2025. For all other projects solicited prior to July 1,2025 please see LINEMAN ELECTRICIAN-TELEDATA

Per Hour:	07/01/2025	08/04/2025
Field Tech Install/Repair	$ 51.31	$ 52.85

For outside work (excluding installation on building construction/alteration/renovation projects), stopping at first point of attachment (demarcation), installing/maintaining/repairing broadband internet service.

"Broadband", "Broadband Service", or "Broadband Internet" means mass-market retail service by wire or radio that provides the capability to transmit data to and receive data from all or substantially all internet endpoints, including any capabilities that are incidental to and enable the operation of the communications service, but excluding dial-up internet access service.

Note: EXLCUDES work within ten (10) feet of High Voltage (600 Volts and over) transmission lines for this work, please see LINEMAN

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 — 10/01/2025

JOB DESCRIPTION Carpenter - Building **DISTRICT** 2

ENTIRE COUNTIES
Broome, Tioga

WAGES

Per hour:	07/01/2025	01/01/2026	07/01/2026 Additional	07/01/2027 Additional
Carpenter	$ 31.69	$ 32.19	$ 3.50*	$ 4.00*
Floor Coverer	31.69	32.19	3.50*	4.00*
Carpet Layer	31.69	32.19	3.50*	4.00*
Dry-Wall	31.69	32.19	3.50*	4.00*
Diver-Wet Day	36.25	36.25	24.44*	4.00*
Diver -Dry Day	32.69	33.19	3.50*	4.00*
Diver Tender	32.69	33.19	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	$ 22.07	$ 22.07

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-Bro

Carpenter - Building / Heavy&Highway — 10/01/2025

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 worked:

Journeyworker	$ 27.34

OVERTIME PAY
See (B, E, Q) 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 worked:

$19.10	$19.69	$21.83	$22.42

2-42AtSS

Carpenter - Heavy&Highway 10/01/2025

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 10/01/2025

JOB DESCRIPTION Electrician **DISTRICT** 2

ENTIRE COUNTIES
Broome

PARTIAL COUNTIES
Chenango: Entire County except the Townships of Columbus, New Berlin and Sherburne.
Delaware: Only the Townships of Davenport, Delhi, Deposit, Franklin, Hamden, Masonville, Meredith, Sidney, Tompkins and Walton Townships,and that portion of Colchester and Hancock Townships north of the east branch of the Delaware River.
Otsego: Only the Townships of Butternuts, Hartwick, Laurens, Maryland, Milford, Morris, Oneonta, Otego, Unadilla and Westford.
Tioga: Only the Townships of Berkshire, Newark Valley, Owego, Richford and Tioga.

WAGES

Per hour:	07/01/2025
Electrician (base wage)	$ 42.68
Cable Splicer	50.43

ADDITIONAL AMOUNTS FOR SPECIFIC TYPES OF JOBSITE CONDITIONS (amount subject to any overtime premiums):
Additional $ 0.50 per hour when required to work underground, such as in tunnels for roads, railroads, or water.
Additional $ 0.50 per hour when required to work at a height of 40 feet above the ground or roof level.

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	$ 42.68
Between the hours of 4:30PM and 1:00AM	50.06
Between the hours of 12:30AM and 9:00AM	56.08

SUPPLEMENTAL BENEFITS

Per hour:	
Journeyworker	$ 31.78 plus 3% of wage

OVERTIME PAY
See (B, *E, Q) on OVERTIME PAGE
*Double time after 8 hours on Saturday.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, *8, 16) on HOLIDAY PAGE
When a dated holiday falls on a Saturday it shall be celebrated on Friday. When a dated holiday falls on a Sunday, it shall be celebrated on Monday.
*Good Friday may be celebrated the following Monday by mutual agreement of Employer and Employees.

REGISTERED APPRENTICES
WAGES: Terms at the following percentages of Journeyworker's wage.

1st	2nd	3rd	4th	5th
0-2000 Hrs	2000-3500 Hrs	3500-5000 Hrs	5000-6500 Hrs	6500-8000 Hrs
45%	50%	58%	68%	78%

ADDITIONAL AMOUNTS FOR SPECIFIC TYPES OF JOBSITE CONDITIONS (amount subject to any overtime premiums):
Additional $ 0.50 per hour when required to work underground, such as in tunnels for roads, railroads, or water.
Additional $ 0.50 per hour when required to work at a height of 40 feet above the ground or roof level.

SUPPLEMENTAL BENEFITS per hour:

07/01/2025	
1st term	$ 10.25 plus 3% of the hourly wage
2nd term	$ 27.12 plus 3% of the hourly wage

All other terms $ 27.83 plus 3% of the hourly wage

2-325

Elevator Constructor 10/01/2025

JOB DESCRIPTION Elevator Constructor **DISTRICT** 6

ENTIRE COUNTIES
Broome, Cayuga, Chenango, Cortland, Franklin, Jefferson, Lewis, Onondaga, Oswego, St. Lawrence, Tioga, Tompkins

PARTIAL COUNTIES
Delaware: Only the towns of: Tompkins, Walton, Masonville, Sidney, Franklin and Deposit.
Madison: Only the towns of: Cazenovia, DeRuyter, Eaton, Fenner, Georgetown, Lebanon, Lenox, Nelson and Sullivan.
Oneida: Only the towns of: Camden, Florence and Vienna.

WAGES

Per hour:	07/01/2025	01/01/2026	01/01/2027
Mechanic	$ 58.44	$ 61.003	$ 63.719
Helper	40.91	42.70	44.60

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker	$ 38.435*	$ 38.985*	39.535*

*NOTE - add 6% of regular hourly rate for all hours worked. Add 8% of regular hourly rate if more than 5 years of service.

OVERTIME PAY
See (D, O) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6, 15, 16) on HOLIDAY PAGE
Overtime: See (5, 6, 15, 16) on HOLIDAY PAGE
NOTE: When a holiday falls on a Saturday, it shall be observed on Friday. When a holiday falls on Sunday, it shall be observed on Monday.

REGISTERED APPRENTICES
WAGES per hour: 1 year terms at the following percentage of the Elevator Constructor wage.

0-6 months	6-12 months	2nd year	3rd year	4th year
50%	55%	65%	70%	80%

SUPPLEMENTAL BENEFITS per hour:

0-6 months: 6% of the hourly apprentice rate paid, no additional supplemental benefits.

All other terms: Same as Journeyworker

6-62.1

Glazier 10/01/2025

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 — 10/01/2025

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 — 10/01/2025

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

6-60

Laborer - Building 10/01/2025

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 **10/01/2025**

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 10/01/2025

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 — 10/01/2025

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 — 10/01/2025

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
NOTE: Applies to all public work and covered private projects, including those receiving ConnectAll funding subject to LL 224-E,solicited prior to July 1, 2025. For all projects, excluding dial-up internet access service, solicited on or after July 1, 2025, please see BROADBAND

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

For outside work, stopping at first point of attachment (demarcation).

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 — 10/01/2025

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 — 10/01/2025

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 — 10/01/2025

JOB DESCRIPTION Mason - Building **DISTRICT** 5

ENTIRE COUNTIES
Broome, Chenango, Delaware, Otsego, Tioga

WAGES
Per hour: 07/01/2025

Building:

Bricklayer, Cement	$ 34.34
Mason, Plasterer, Stone	
Mason, Tuck Pointer	

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman	$ 29.76

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 rates:

1st	2nd	3rd	4th
$ 21.89	$ 27.04	$ 28.22	$ 30.91

Supplemental benefits per hour:

1st	2nd	3rd	4th
$ 23.69	$ 24.70	$ 27.64	$ 29.07

5-3B - Bing - Z2

Mason - Heavy&Highway — 10/01/2025

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 — 10/01/2025

JOB DESCRIPTION Mason - Tile Finisher **DISTRICT** 5

ENTIRE COUNTIES
Broome, Chemung, Chenango, Cortland, Delaware, Otsego, Schuyler, Steuben, Tioga, Tompkins

PARTIAL COUNTIES
Allegany: 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 — 10/01/2025

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 — 10/01/2025

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 10/01/2025

JOB DESCRIPTION Millwright **DISTRICT** 6

ENTIRE COUNTIES
Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Herkimer, Madison, Seneca, Tioga, Yates

WAGES
Per hour: 07/01/2025

Building	$ 38.00
Heavy & Highway	41.50

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 he/she is 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) are 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	$ 26.54

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 a 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	22.16
Appr. 3rd year	23.62
Appr. 4th year	25.08

Operating Engineer - Building 10/01/2025

JOB DESCRIPTION Operating Engineer - Building **DISTRICT** 1

ENTIRE COUNTIES
Broome, Chenango, Tioga

PARTIAL COUNTIES
Dutchess: Defined as north of the northern boundary line of City of Poughkeepsie 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 Route 343 then along Route 343 east to the northern boundary of Town of Dover Plains and east along the northern boundary of Town of Dover Plains to Connecticut.

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 NYS crane license, tower cranes**(including self erecting), hydraulic cranes, locomotive crane, piledriver, cableway, derricks, whirlies, dragline, boom trucks, cherry pickers, overhead cranes (gantry or saddle type), truck cranes

CLASS A:
Shovel, Excavators 18,001 lbs. and above(including rubber tire full swing), Gradalls, power road grader, all CMI equipment, front-end rubber tire loader, tractor-mounted drill (quarry master), mucking machine, concrete central mix plant, concrete pump, belcrete system, automated asphalt concrete plant, and tractor road paver, boom trucks 5 tons and under, maintenance engineer, self-contained crawler drill-hydraulic rock drill, Profiler/Milling machine.

CLASS B:
Excavators 18,000 lbs. and under, Backhoes (rubber tired backhoe/loader combination), bulldozer, pushcat, tractor, traxcavator, scraper, LeTourneau grader, form fine grader, self-propelled soil compactor (fill roller), asphalt roller, blacktop spreader, power brooms, sweepers, trenching machine, Barber Green loader, side booms, hydro hammer, concrete spreader, concrete finishing machine, one drum hoist, power hoisting (single drum), hoist two drum or more, three drum engine, power hoisting (two drum and over), two drum and swinging engine, three drum swinging engine, hod hoist, A-L frame winches, core and well drillers (one drum), post hole digger, model CHB Vibro-Tamp or similar machine, batch bin and plant operator, dinky locomotive, skid steer loader, track excavator 5/8 cubic yard or smaller, front end rubber tired loader under four cubic yards, vacum machine (mounted or towed).

CLASS C:
Fork lift, high lift, all terrain fork lift: or similar, oiler, fireman and heavy-duty greaser, boilers and steam generators, pump, vibrator, motor mixer, air compressor, dust collector, welding machine, well point, mechanical heater, generators, temporary light plants, electric submersible pumps 4" and over, murphy type diesel generator, conveyor, elevators, concrete mixer, beltcrete power pack (belcrete system), seeding, and mulching machines, pumps, rotating telehandler (that does not require NYS crane license).

WAGES per hour

	07/01/2025
Class A1*	$ 51.71
Class A	$ 49.31
Class B	$ 48.85
Class C	$ 46.54

(*) TONNAGE RATING PREMIUMS:
Note: Additional value subject to same premiums as shown for OT
All cranes 1000 tons and over, A1 rate plus $7.00
All cranes 800-999 tons, A1 rate plus $6.00
All cranes 600-799 tons, A1 rate plus $5.00
All cranes 400-599 tons, A1 rate plus $4.00
All cranes 200-399 tons, A1 rate plus $3.00
All cranes 111-199 tons, A1 rate plus $2.25
All cranes 110 tons and under, A1 rate only

(**)Additional $0.50 per hr over A1 rate for Tower Cranes (no tonnage premium applies)
Additional $2.50 per hr over B rate for Nuclear Leader work.
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

	07/01/2025
Journeyworker	$ 32.95

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
NOTE: All hours worked on designated holidays shall be paid a double the hourly rate of pay plus 8 hours of straight time.
NOTE: If a holiday falls on Sunday, it will be celebrated on Monday. If the holiday falls on Saturday, it will be celebrated on Friday.

REGISTERED APPRENTICES
Wages per hour

1000 hours terms at the following percentage of Journeyworker's wage Class B:

1st	2nd	3rd	4th
60%	70%	80%	90%

Supplemental Benefits per hour worked

	07/01/2025
All terms	$ 28.35

1-158 BCT

Operating Engineer - Heavy&Highway — 10/01/2025

JOB DESCRIPTION Operating Engineer - Heavy&Highway **DISTRICT** 1

ENTIRE COUNTIES
Albany, Broome, Chenango, Clinton, Columbia, Essex, Franklin, Fulton, Greene, Hamilton, Herkimer, Montgomery, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Tioga, Warren, Washington

PARTIAL COUNTIES
Dutchess: Defined as north of the northern boundary line of City of Poughkeepsie 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 Route 343 then along Route 343 east to the northern boundary of Town of Dover Plains and east along the northern boundary of Town of Dover Plains to Connecticut.

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

CLASSIFICATION A1*: All Cranes that require a NYS Crane License; tower cranes(including self erecting)**, hydraulic cranes, locomotive crane, piledriver, cableway, derricks, whirlies, dragline, boom trucks, cherry pickers, overhead cranes (gantry or saddle type), truck cranes

CLASSIFICATION 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, Boom truck, GPS operated Bull Dozer, Cableway, Caisson Auger, Central Mix Concrete Plant (Automated), Concrete Curb Machine (Self Propelled, Slipform), Concrete Pump, Crane, Cherry Picker, Derricks (steel erection), Dragline, Overhead Crane (Gantry or Straddle type), Pile Driver, Truck Crane, Directional Drilling Machine, Dredge, Dual Drum Paver, Excavator (All Purpose Hydraulically Operated) (Gradall or Similar), Front End Loader (4 cu. yd. and Over), Head Tower (Sauerman or Equal), Hoist (Two or Three Drum), Holland Loader, Maintenance Engineer, Mine Hoist, Mucking Machine or Mole, PB-4 and similar type, Power Grader, Profiler/Milling Machine (over 105 H.P.), Quad 9, Quarry Master (or equivalent), Rotating Telehandler, Scraper (Including Challenger Type), Shovel, Side Boom, Slip Form Paver (If a second man is needed, he shall be an Oiler), Tractor Drawn BeltType Loader, Truck or Trailer Mounted Log Chipper (Self Feeder), Tug Operator (Manned Rented Equipment Excluded), Tunnel Shovel

CLASSIFICATION 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), Brokk, Boring Machine, Cage Hoist, Central Mix Plant [(Non-Automated) and All Concrete Batching Plants], Concrete Paver (Over 16S), Crawler Drill (Self-contained), Crusher, Diesel Power Unit, Drill Rigs, Tractor Mounted, Front End Loader (Under 4 cu. yd.), Greaseman/Lubrication Engineer, Hi Pressure Boiler (15 lbs. and over), Hoist (One Drum), Hydro-Axe, 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), L.C.M. Work Boat Operator, Locomotive, Material handling knuckle boom, Mini Excavator (under 18,000 lbs.), Mixer (for stabilized base self-propelled), Monorail Machine, Plant Engineer, Prentice Loader, Profiler/Milling Machine (105 H.P. and under), 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, Vacum machine (mounted or towed), Vermeer saw (ride on, any size or type), Welder, Winch, Winch Cat

CLASSIFICATION C:

A Frame Winch Hoist on Truck, Articulated Heavy Hauler, Aggregate Plant, Asphalt or Concrete Grooving Machine (ride on), Ballast Regulator(Ride-on), Boiler (used in conjunction with production), Bituminous Heater (self-propelled), Boat (powered), Cement and Bin Operator, Concrete Pavement Spreader and Finisher Concrete Paver or Mixer (16' and under), Concrete Saw (self-propelled), Conveyor, Deck Hand, Directional Drill Machine Locator, Drill (Core and Well), Farm Tractor with accessories, Fine Grade Machine, Fireman, Fork Lift, Form Tamper, Grout Pump, Gunite Machine, Hammers (Hydraulic self-propelled), Hydra-Spiker (ride-on), Hydraulic Pump (jacking system), Hydro-Blaster (Water), Mulching Machine, Oiler, Parapet Concrete or Pavement Grinder, Post Hole Digger and Post Driver, Power Broom (towed), Power Heaterman, Power Sweeper, Revinius Widener, Roller (Grade and Fill), Scarifier (ride-on), Shell Winder, Skid steer loader (Bobcat or similar; including all attachments), Span-Saw (ride-on), Steam Cleaner, Tamper (ride-on), Tie Extractor (ride-on), Tie Handler (ride-on), Tie Inserter (ride-on), Tie Spacer (ride-on), Tire Repair, Track Liner (ride-on), Tractor, Tractor (with towed accessories), Vibratory Compactor, Vibro Tamp, Well Point, and the following hands-off equipment: Compressors, Dust Collectors, Generators, Pumps, Welding Machines, Light Plants and Heaters

WAGES per hour

	07/01/2025
Class A1*	$ 60.30
Class A	57.30
Class B	56.39
Class C	53.82

(*) TONNAGE RATING PREMIUMS:
Cranes over 1000 tons, A1 rate plus $7.00
Cranes from 800-999 tons, A1 rate plus $6.00
Cranes from 600-799 tons, A1 rate plus $5.00
Cranes from 400-599 tons, A1 rate plus $4.00
Cranes from 200-399 tons, A1 rate plus $3.00
Cranes from 111-199 tons, A1 rate plus $2.00
Cranes from 65-110 tons, A1 rate plus $1.50
Cranes from 0-64 Tons, A1 rate only
NOTE: Additional value subject to same premiums as shown for OT

(**) 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
NOTE: Additional value subject to same premiums as shown for OT

Additional $2.50 per hr. for hazardous waste removal work on State and/or Federally designated waste site which require 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, of at least 5 consecutive days, starting from 5:00 PM to 1:00 AM that is mandated by the Contracting Agency.

SUPPLEMENTAL BENEFITS
Per hour

	07/01/2025
Journeyworker	$ 33.70

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 the holiday falls on Sunday, it will be observed on Monday. If the observed Monday Holiday is worked, pay shall be double time plus Holiday pay for time worked. If the Holiday falls on a Saturday and is worked pay shall be double time plus Holiday pay for time worked. If the Holiday falls on a Saturday employer can choose to observe the paid holiday Saturday or give Friday off with holiday pay.

REGISTERED APPRENTICES
Wages per hour

1000 hours terms at the following percentage of Journeyworker's wage Class B

1st	2nd	3rd	4th
60%	70%	80%	90%

Supplemental Benefits per hour worked

	07/01/2025
All Terms	$ 28.30

Operating Engineer - Survey Crew — 10/01/2025

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 — 10/01/2025

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 — 10/01/2025

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 — 10/01/2025

JOB DESCRIPTION Painter **DISTRICT** 2

ENTIRE COUNTIES
Broome, Chenango, Tioga

WAGES
Per hour:

	07/01/2025	05/01/2026 Additional
Painter	$ 28.20	$ 1.85*
Taper, Paperhangers, and Vinyl hangers	29.61	1.90*

*To be allocated at a later date.

ADDITIONAL AMOUNTS FOR SPECIFIC TYPES OF JOBSITE CONDITIONS (amount subject to any overtime premiums):
- Additional $ 1.10 per hour for Brush and Roll Epoxy (Solvent Base Only)
- Additional $ 0.60 per hour for Swing Scaffold, Boatswain chair, Spray helper, Steam cleaning acid and high pressure water, Power grinders with respirator
- Additional $ 0.60 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 $ 1.00 per hour for Spray Painting
- Additional $ 1.00 per hour for Steeple Jack (Over 100 feet)
- Additional $ 1.50 per hour for Spray Epoxy (Solvent Based)
- Additional $ 0.90 per hour for Sandblasting

NOTE - SEE BRIDGE PAINTER RATES FOR BRIDGES & TANKS

SUPPLEMENTAL BENEFITS
Per hour:
Journeyworker $ 24.98

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	$ 19.00	$ 20.00	$ 21.00	$ 22.00	$ 23.00	$ 24.00	$ 25.00

Taper: 750 hour terms at the following Journeyworker Taper Apprentice wage rate:

1st	2nd	3rd	4th	5th	6th
$ 20.00	$ 21.00	$ 22.00	$ 23.00	$ 24.00	$ 25.00

ADDITIONAL AMOUNTS FOR SPECIFIC TYPES OF JOBSITE CONDITIONS (amount subject to any overtime premiums):
- Additional $ 1.10 per hour for Brush and Roll Epoxy (Solvent Base Only)
- Additional $ 0.60 per hour for Swing Scaffold, Boatswain chair, Spray helper, Steam cleaning acid and high pressure water, Power grinders with respirator

- Additional $ 0.60 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 $ 1.00 per hour for Spray Painting
- Additional $ 1.00 per hour for Steeple Jack (Over 100 feet)
- Additional $ 1.50 per hour for Spray Epoxy (Solvent Based)
- Additional $ 0.90 per hour for Sandblasting

SUPPLEMENTAL BENEFITS per hour:
Painter/Decorator:

1st	2nd	3rd	4th	5th	6th	7th	8th
$ 6.00	$ 7.00	$ 8.00	$ 9.10	$ 11.00	$ 11.00	$ 13.00	$ 14.00

Taper/Drywall Finisher:

1st	2nd	3rd	4th	5th	6th
$ 6.00	$ 7.00	$ 8.00	$ 10.00	$ 13.00	$ 14.00

2-178 B

Painter — 10/01/2025

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 - Metal Polisher — 10/01/2025

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 — 10/01/2025

JOB DESCRIPTION Plumber **DISTRICT** 2

ENTIRE COUNTIES
Broome, Chenango

PARTIAL COUNTIES
Cortland: Only the Township of Marathon.
Delaware: Only the Townships of Andes, Bovina, Colchester, Davenport, Delhi, Deposit, Franklin, Hamden, Hancock, Harpersfield, Kortright, Masonville, Meredith, Sidney, Stamford, Tompkins and Walton.
Madison: Only the Township of Georgetown.
Otsego: Only the Townships of Burlington, Butternuts, Decatur, Edmeston, Hartwick, Laurens, Maryland, Milford, Morris, New Lisbon, Oneonta, Otego, Pittsfield, Unadilla, Westford and Worchester.
Tioga: Only the Townships of Newark Valley and Owego.

WAGES

Per hour:	07/01/2025	05/01/2026 Additional
Plumber	$ 44.91	$ 3.45*
Steamfitter	44.91	3.45*

*To be allocated at a later date

SHIFT WORK
Agency-mandated shift operations:

1. Shift work shall start no earlier than 6AM Monday and will conclude no later than 9AM Saturday (overtime premiums applicable after 8 hours in a shift).

2. Single irregular shiftwork, less than 3 consecutive days will be paid at the rate of time and one-half of the regular hourly rate.

3. 3 consecutive work days or more:
First Shift - No Premium (Starting 6AM-9AM)
Second Shift - Regular hourly rate plus 12%
Third Shift - Regular hourly rate plus 18%

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker	$ 15.15
	+18.21*

*This portion of the benefit is subject to the SAME PREMIUM as shown for overtime on projects over $100 million in total construction costs (including engineering & architecture).

OVERTIME PAY
See (B, E, Q, *V) on OVERTIME PAGE
*portion of supplemental benefits subject to V code when project cost is over $100 million (including engineering & architecture).

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
When a Holiday falls on Sunday, it will be celebrated the following day. If the holiday falls on a Saturday, it will be observed that day unless so determined by the Federal Government to be celebrated on a different day.

REGISTERED APPRENTICES
WAGES: One year terms at the following percentage of Journeyworker's wage.

1st.	2nd.	3rd.	4th.	5th.
50%	55%	60%	70%	85%

SUPPLEMENTAL BENEFITS per hour:

1st term	$ 15.15
	+8.92*
All other terms	$ 15.15
	+14.21*

*This portion of the benefit is subject to the SAME PREMIUM as shown for overtime on projects over $100 million in total construction costs (including engineering & architecture).

2-112s-SF

Roofer — 10/01/2025

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

Sheetmetal Worker — 10/01/2025

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	$ 25.83	$ 27.82	$ 31.79	$ 33.78
+0.60*	+0.65*	+0.70*	+0.79*	+0.84*

Indentured prior to 05/01/2025 (Half Year Terms):

1st	2nd	3rd	4th	5th	6th	7th	8th
$ 23.84	$ 23.84	$ 25.83	$ 27.82	$ 29.81	$ 31.79	$ 33.78	$ 35.77
+0.60*	+0.60*	+0.65*	+0.70*	+0.75*	+0.79*	+0.84*	+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 — 10/01/2025

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 10/01/2025

JOB DESCRIPTION Teamster - Building **DISTRICT** 6

ENTIRE COUNTIES
Broome, Cayuga, Cortland, Delaware, Onondaga, Seneca, Tompkins, Yates

PARTIAL COUNTIES
Allegany: Only the Townships of Alfred, Almond, Burns.
Chenango: Only the Townships of Afton, Bainbridge, Coventry, Greene, Guilford, Oxford and Smithville.
Madison: Only the Townships of Cazenovia, DeRuyter, Fenner, Georgetown, Lenox, Nelson and Sullivan.
Oswego: All Townships except Boylston, Redfield and Sandy Creek.
Otsego: Only the Townships of Butternuts, Laurens, Maryland, Millford, Morris, Oneonta, Otego, Unadilla, and Worchester.
Steuben: Only the Townships of Canisteo, Cohoctan, Dansville, Fremont, Greenwood, Hornell, Hartsville, Jasper, Prattsburg, Troupsburg, and West Union.
Tioga: Only the Townships of Berkshire, Candor, Newark Valley, Nichols, Owego, Richford, and Tioga. All territory east of Nichols/Smithboro to Broome County, within the State of New York.

WAGES
GROUP A: Straight Trucks.
GROUP B: Tractor Trailer, Farm Tractor, Fuel Truck.
GROUP C: Euclid.
GROUP D: On site Mechanic.

Per hour:	07/01/2025
Building: (under $ 5 million*)	
GROUP A, B, C, D	$ 34.43
Building: (over $ 5 million*)	
GROUP A, B	$ 35.48
GROUP C	35.83
GROUP D	35.63

* Total project cost including General Construction, Plumbing, HVAC and Electrical

SUPPLEMENTAL BENEFITS
Per hour:

(under $5 million*)	$ 30.87
(over $5 million*)	31.67

* Total project cost including General Construction, Plumbing, HVAC and Electrical

OVERTIME PAY
(D, O) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

6-317

Teamster - Heavy&Highway 10/01/2025

JOB DESCRIPTION Teamster - Heavy&Highway **DISTRICT** 2

ENTIRE COUNTIES
Broome, Delaware

PARTIAL COUNTIES
Chenango: Only the Townships of Smithville, Greene, Coventry, Oxford, Afton, Bainbridge and Guilford.
Otsego: Only the Townships of Butternuts, Laurens, Maryland, Milford, Morris, Oneonta, Otego, Unadilla and Worchester.
Tioga: Only the Townships of Nichols, Tioga, Candor, Richford, Berkshire, Newark Valley and Owego.

WAGES
Per hour:

GROUP #1: Warehousemen, Yardmen, Truck Helpers, Pickups, Panel Trucks, Flatboy Material Trucks (straight jobs), Single Axle Dump Trucks, Dumpsters, Material Checkers and Receivers, Greasers, Truck Tiremen, Mechanic Helpers and Parts Chasers, Tandems and Batch Trucks, Mechanics, Dispatcher. Semi-Trailers, Low-boy Trucks, Asphalt Distributor Trucks, Agitator, Mixer Trucks and Dumpcrete type vehicles, Truck Mechanic.

GROUP #2: Specialized Earth Moving Equipment-Euclid type or similar off-highway where not self-loading. Straddle (Ross) Carrier, and self-contained concrete mobile truck. Off-highway Tandem Back-Dump, Twin Engine Equipment and Double-Hitched Equipment where not self-loading.

GROUP #3: Fuel Truck that requires a HazMat license endorsement.

	07/01/2025	07/01/2026	07/01/2027
Group #1	$ 36.63	$ 39.98	$ 43.64
Group #2	36.72	40.07	43.73
Group #3	41.63	44.98	48.64

NOTES
- An additional $1.50 per hour shall be paid to an employee who performs hazardous waste removal work on a City, County, State and/or Federally designated waste site where employee is required to use or wear personal protective equipment.

SHIFT WORK
- A single irregular work shift can start any time between 5:00pm and 1:00am. All employees who work a single irregular shift on governmental mandated night work shall be paid an additional $5.00 per hour (applicable on projects bid on or after 07/01/2020).

SUPPLEMENTAL BENEFITS
Per hour paid:

$ 28.20	$ 28.85	$ 29.69

OVERTIME PAY
See (B, E, Q, X) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
If a holiday falls on Sunday, it will be celebrated Monday.
Any employee laid off within the week in which a holiday falls shall receive holiday pay.

2-317(Bing)

Welder — 10/01/2025

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 09/26/2025

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 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	DOL	*****8421	B & B DRYWALL, INC		206 WARREN AVE APT 1WHITE PLAINS NY 10603	12/14/2021	12/14/2026
DOL	NYC	*****2113	BHW CONTRACTING, INC.		401 HANOVER AVENUE STATEN ISLAND NY 10304	01/11/2021	01/11/2026
DOL	DA	*****2404	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	*****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		CHRISTOPHER PEROSI		5507 NESCONSET HIGHWAY MT. SINAI NY 11766	07/17/2025	07/17/2030
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
DOL	DOL	*****7619	DANCO CONSTRUCTION UNLIMITED INC.		485 RAFT AVENUE HOLBROOK NY 11741	10/19/2021	10/19/2026
DOL	DOL		DANIEL ROBERT MCNALLY		7 GREENFIELD DRIVE WARWICK NY 10990	03/25/2022	03/25/2027
DOL	DOL		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	*****2337	EGL DRAINAGE SOLUTION & REPAIRS LLC		5507 NESCONSET HIGHWAY MT. SINAI NY 11766	07/17/2025	07/17/2030
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	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	*****5010	J. LINDSLEY ENTERPRISE, LLC		1002 STATE ROUTE 176 FULTON NY 13069	07/30/2025	07/30/2030
DOL	DOL	*****0241	J. LINDSLEY ROOFING, LLC		211 NORTH 2ND STREET FULTON NY 13069	07/30/2025	07/30/2030
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
DOL	DOL	*****1147	J.R.N. CONSTRUCTION, LLC		531 THIRD ST ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL		JAMES J. BAKER		7901 GEE ROAD CANASTOTA NY 13032	08/17/2021	08/17/2026
DOL	DOL		JAMES LINDSLEY		211 NORTH 2ND STREET FULTON NY 13069	07/30/2025	07/30/2030
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

NYSDOL Bureau of Public Work Debarment List 09/26/2025

Article 8

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		JENNIFER LINDSLEY		211 NORTH 2ND STREET FULTON NY 13069	07/30/2025	07/30/2030
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
DOL	DOL		KARIN MANGIN		796 PHELPS ROAD FRANKLIN LAKES NJ 07417	12/01/2020	12/01/2025
DOL	DOL		KATE E. CONNOR		7088 INTERSTATE ISLAND RD SYRACUSE NY 13209	03/31/2021	03/31/2026

DOL	DOL		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	*****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		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
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		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	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	*****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 BELLEROSE NY 11426	12/22/2022	12/22/2027
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

NYSDOL Bureau of Public Work Debarment List 09/26/2025

Article 8

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	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 CONTRACTING, 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 one (1) facility:

Senior High School
1200 East Main Street
Endicott, NY 13760

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 22 00 – Measurement and Payment: Unit prices, and defect assessment.

C. Section 01 23 00 – Alternates: Alternates.

D. 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.

E. Section 01 33 00 – Submittals: Submittal procedures, construction progress schedules, proposed products list, product data, shop drawings, samples, certificates, and manufacturer's instructions.

F. 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.

G. Section 01 41 00 – Regulatory Requirements: Building codes, and labor laws.

H. 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. Demolition and removal of existing pavement, chain link fence, ticket booth and associated elements. Prepare for new site, structure and electrical connections.

2. Construction of new exterior entry arch and associated site modifications.

3. Installation of new building signage at gym entrance.

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 03 - Concrete: All sections.

D. Division 04 - Masonry: All sections.

E. Division 05 - Metals: All sections.

F. Division 10 - Specialties: All sections.

G. Division 31 - Earthwork: All sections.

H. Division 32 – Exterior Improvements: All sections.

1.8 CONTRACT NO. 2 - MECHANICAL

A. Contract includes but is not limited to:

1. Removal and replacement of heat recovery unit and associated mechanical connections.

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 23 – Heating, Ventilating, and Air Conditioning: All sections.

1.9 CONTRACT NO. 3 - ELECTRICAL

A. Contract includes but is not limited to:

1. Providing electrical connections for lighting at new exterior entry arch.

2. Providing electrical connections for heat recovery unit.

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 26 - Electrical: All sections.

D. Division 28 – Electronic Safety and Security; All sections.

1.10 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. If, in the sole opinion of the Construction Manager, work is not progressing in a satisfactory and timely manner, the Contractor shall provide additional manpower or work overtime hours to re-establish schedule compliance. This shall be at no additional cost to the Owner.

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.

3.

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 Construction Contractor shall include in their Base Bid the amount of ten thousand Dollars ($10,000) 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 Construction Contractor shall include in their Base Bid the amount of ten thousand Dollars ($10,000) 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.

H. All Project Start-Up documents shall be submitted within 30 days of Contract Award (unless otherwise noted) and prior to the Contractor’s first pay application. No payments shall be processed until all Start-Up documents have been received to the satisfaction of the Owner’s Representative.

I. Start-Up Documents shall be submitted as individual electronic PDF files, under a single electronic transmittal (E-mail). The submitted individual Start-Up Document files shall be clearly outlined on the transmittal.

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.

3. The project documents are not intended to define every single component of the work. The Contractor shall ensure that all components (either shown or not shown) necessary for a complete and functional system shall be installed at no additional cost to the Owner.

4. The Contractor under no circumstances shall submit any additional cost proposals for any missing components, or other components necessary for a proper installation and a complete and functional system. If Contractor submits such cost proposals, each proposal will be void and rejected, and shall not interfere or cause any delay with proper installation and completion of a proper working system to the satisfaction of the Owner, Architect, and Construction Manager.

2 PART 2 PRODUCTS

Not Used

3 PART 3 EXECUTION

Not Used

Hourly Labor Rate Breakdown:

Date:
Arcadis Project No.: 143846-3
Project: 2023 Capital Improvements Project – Phase 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. Field engineering.

C. Preconstruction conference.

D. Progress meetings.

E. Preinstallation conferences.

F. On-site manager.

G. Job superintendent.

H. Construction mobilization.

I. Equipment electrical characteristics and components.

J. Cutting and patching.

K. 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.

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 FIELD ENGINEERING

A. Control datum for survey is that established by Contract No. 1 – General Contractor.

B. Verify setbacks and easements; confirm drawing dimensions and elevations.

C. Provide field engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.

D. Maintain complete and accurate log of control and survey work as work progresses.

E. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

F. Promptly report to Construction Manager loss or destruction of reference point or relations required because of changes in grades or other reasons.

G. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Construction Manager.

1.4 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.

1.5 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.

E. Weekly Superintendent Meetings: Construction Manager will conduct short (less than 1 hour) superintendent (or onsite foreman) meetings on a weekly basis to enhance trade-to-trade horizontal communication. Each Contractor shall come prepared to discuss any planned work and/or work in progress and review any required coordination with other trades and/or the Owner.

F. Attendance: Is mandatory by all contractors for any and all Project meetings. Failure to attend may result in $300/occurrence liquidated damages as solely determined by the Owner, Architect, or Construction Manager. This shall not be considered a penalty; however, said amount will be deducted from Contract amount. No additional notification is required.

1.6 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.

1.7 ON-SITE MANAGER

A. On-site Manager: Construction Manager's On-site Manager.

1.8 SUPERINTENDENTS AND WORKMEN

A. The Contractor and Subcontractors shall at all times, while the work is in progress, have sufficient, competent superintendents and foremen in charge of the work. The number of workmen engaged in the performance of the work, shall, at all time, be sufficient to complete the work within the agreed time and, as not to delay or impede the work of other Contractors on the job site. If in the sole judgment of the Owner's Representative, the Contractor (including any/all Subcontractors) has insufficient manpower and/or Contractor is behind schedule, the Contractor shall increase the amount of competent personnel and/or apply overtime to a level acceptable to the Owner's Representative and restore to the original schedule at the Contractor's expense.

B. The Contractor shall work in conjunction with any other contractors and shall schedule work that enhances (not hinders) each Contractor's workflow. The Contractor shall coordinate his scope of work with other Contractors for optimum schedule compliance of the Project.

C. The Contractor and Subcontractors shall give their personal attention constantly to the faithful execution of the work; they shall be present daily without interruption, either in person or by a duly authorized representative, on site of the work.

D. Competent Superintendent, Foreman, and Lead personnel – The Contractor and Subcontractors shall maintain on the job site competent foreman and lead personnel at all times. Each prime Contractor shall have a competent superintendent who also supervises and is responsible for all Subcontractors. At no time shall Contractor or Subcontractor personnel be on site unsupervised by Prime Contractor. The Contractor's foreman or superintendent shall exhibit supervisory role model characteristics and shall conduct all communication, means, and methods that enhance, not hinder workflow and work team interaction. Under no circumstances shall Contractor's (or Subcontractor's) foreman or superintendent engage in any management misconduct with the Owner, Construction Manager, Architect, or other trades including but not limited to shouting, swearing, refusal to listen, insubordination, work sequence override, insufficient or poor communication, lack of proper management skills, insufficient trade preplanning, and any other action of misconduct as solely determined by the Owner and Construction Manager. In the event the Contractor's (or Subcontractor's) foreman or superintendent refuses for any reason to comply with these management requirements, the Owner or Construction Manager is authorized to stop all work and require immediate removal of Contractor's foreman or superintendent from the job site. The Contractor, at the sole discretion of the Owner or Construction Manager, will immediately replace said personnel. All work stoppage expenses and all other costs due to onsite Contractor misconduct will be at no cost to the Owner. There shall be no delays in work progress, nor shall the schedule be negatively impacted due to a Contractor/Subcontractor employee being removed from the job site.

1.9 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.**

C. Prime Contractor's Superintendent is required to be on site at all times. Subcontractors are working regardless if Prime Contractor's own force 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.

1.10 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.

1.12 COMMUNICATION AND RESPONSE TIME

A. Communication and Timely Responses are critical to the project and construction progress.

B. The Contractor's Project Manager shall provide an on-site and off-site contract person(s) that will be available to the Construction Manager throughout the duration of the project.

C. The Contractor's Project Manager shall provide the Construction Manager with a means of contact via office phone, cell phone, and E-Mail.

D. The Contractor shall provide phone number(s) and E-Mail for additional point(s) of contact in the events the Project Manager is not available.

E. E-Mail Correspondence from the Construction Manager shall be responded to upon receipt whenever possible, but within one business day regardless.

F. The Contractor shall provide the Construction Manager with a 24/7 Contact Person and phone number in the event of an on-site emergency related to the construction. The designated individual shall be available before, during, and after the designated work hours.

G. Failure to comply with the requirements herein may result in a hold of payment and/or permanent dismissal of the Contractor's designated personnel from the project.

1.13 E-MAIL CORRESPONDENCE

A. All E-Mail correspondence shall include the Project Designation (as instructed by the Construction Manager) in the subject box, as well as a description of the correspondence.

1.14 SIGN-IN

A. All Contractor, Subcontractor, and Vendor Personnel visiting and/or working on site shall be signed in daily at the Construction Manager's job trailer. Sign-in shall be the responsibility of the appropriate Contractor and the individual, not the Construction Manager.

B. Failure to sign in will result in a Single Warning documented in writing to the appropriate Contractor's office. The violating individual must immediately stop work and sign-in before continuing with any on-site work activity.

C. A second warning will require the violating individual to leave site for the remainder of the shift.

D. At the sole discretion of the Construction Manager, repeated offenses may result with the individual permanently removed from on-site project related activity.

E. The Contractor's construction progress or schedule compliance shall not be negatively impacted by members of the contractor's direct or indirect work force that have failed to sign in and are instructed to leave site.

1.15 BADGES/IDENTIFICATION (LOST, FEE, TEMPORARY, DISTRICT ISSUE

A. All Contractors, Subcontractors, Vendors, or other persons visiting and/or working on site shall display visible Photo Identification (ID) at all times.

B. Photo Identification shall be the responsibility of the appropriate Prime Contractor.

C. Where applicable, the Owner may provide and require Owner Furnished Badges which shall be displayed on the individual at all times while on site. Loss of the owner Furnished Badge must be reported immediately. Replacement fees may apply.

D. Failure to display Photo ID, Owner or Contractor furnished, will result in a Single Warning documented in writing to the Contractor's office. The violating individual must immediately report to the Construction Manager's job trailer to receive a Temporary Photo ID. A valid driver's license is required. Costs may apply.

E. A second warning will require the violating individual to leave site for the remainder of the shift.

F. Repeated offenses may result with the individual permanently removed from on-site project related activity.

G. The Contractor's construction progress or schedule compliance shall not be negatively impacted by members of the Contractor's direct or indirect work force that have failed to display phot identification and are instructed to leave site.

1.16 LABOR ALLOWANCE

A. The General Contractor, Mechanical Contractor - 1, and Mechanical Contractor - 2 shall include 100 Labor Man-hours within the base bid to be used at the discretion of the Owner's Representative. Time shall be documented with any unused time being credited back to the Owner at full price.

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 finishes.

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.

J. Erection drawings.

K. Coordination drawings.

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 ensure completion within the duration submitted and approved. Workdays per task shall be required to accurately produce a Critical Path Method Schedule.

L. 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.

M. 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.

N. All potential schedule conflict items shall immediately be reported, together with a proposed resolution, to the Construction Manager.

O. The Owner and the Construction Manager reserve the right to adjust and/or modify any portion of the Master Construction Schedule or Sequence Plans at no additional cost to the Owner.

Q. The Construction Schedule and Contractor’s Schedule of Values shall serve as the basis for payment. Failure to comply with the requirements herein will result in a hold of payment until adherence is corrected. Continuous failure to comply may be construed as breach of contract and/or serve as a basis of contract termination.

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.

1.11 COORDINATION DRAWINGS

A. The Mechanical Construction Contractor shall prepare and submit to the Architect for review coordination drawing in concert with the General, Plumbing and Electrical Prime Contractors for the purpose of identifying any and/or all conflicts amongst these contractors. The Mechanical contractor is responsible for obtaining all pertinent information from the other contractors to prepare the coordination drawings and is responsible to identify conflicts.

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: *Union-Endicott CSD*
2023 Capital Improvements – Phase 3

Project No. *143846-3*

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 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 45 33

SPECIAL INSPECTIONS AND TESTING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 GENERAL REQUIREMENTS

A. Special Inspections and Testing shall be in accordance with Chapter 17 of the Building Code of New York State, adopted 2002.

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 Inspection and Testing Agents, including testing laboratories, shall be approved by the Owner's Representative and the Design Professional in Responsible Charge.

B. The following specific requirements for Inspection and Testing Agents may be waived by the Design Professional in Responsible Charge.

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. Inspection and Testing Agents shall submit to the Owner's Representative and the Design Professional in Responsible Charge 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. 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 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 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 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 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 Inspection and Testing Agents may not release, revoke, alter, or enlarge on the requirements of the Contract Documents.

B. The Inspection and Testing Agents will not have control over the Contractor's means and methods of construction.

C. The Inspection and Testing Agents shall not be responsible for construction site safety.

D. 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 Design Professional in Responsible Charge.

B. The Statement of Special Inspections shall be submitted to the State Education Department 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 submit these reports to the Owner's Representative and Design Professional in Responsible Charge. 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 Inspection and Testing Agents shall report any discrepancies from the Contract Documents found during an inspection. If the discrepancies are not corrected during the inspection, the Inspection and Testing Agents shall notify the Owner's Representative and Design Professional in Responsible Charge. Reports shall document all discrepancies identified and the corrective action taken.

C. The Testing Laboratory shall promptly notify the Design Professional in Responsible Charge 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.

D. The Inspection and Testing Agents shall submit reports to the Owner's Representative and Design Professional in Responsible Charge within 7 days of the inspection or test. Handwritten reports may be submitted if final typed copies are not available.

E. At the completion of the work requiring Special Inspections, each Inspection and Testing Agent, including laboratories, shall provide a statement to the Owner's Representative and Design Professional in Responsible Charge 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 Design Professional in Responsible Charge and submitted to the New York State Education Department 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.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

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 ASD, Section A3.4; AISC LRFD, Section A3.3	1704.3		
2. Inspection of high-strength bolting.	X	X	AISC LRFD, Section M2.5	1704.3, 1704.3.3		
3. Material verification of structural steel.			ASTM A 6 or A 568	1704.3, 1708.4	√	
4. Material verification of weld filler materials.			AISC, ASD, Section A3.6; AISC LRFD, Section A3.5	1704.3	√	
5. Inspection of welding:						
a. Structural steel					√	
(1) Groove Welds	X		AWS D1.1	1704.3.1		
(2) MP Fillet Welds	X		AWS D1.1	1704.3.1		
(3) SP Fillet >5/16”	X		AWS D1.1	1704.3.1		
(4) SP Fillet <= 5/16”		X	AWS D1.1	1704.3.1		
(5) Flr & Deck Welds		X	AWS D1.3	-		
b. Reinforcing steel		X	AWS D1.4 ACI 318: 3.5.2	1903.5.2		
6. Inspection of steel frame joint details.		X		1704.3.2	√	
B. Concrete Construction						
1. Inspection of reinforcing steel, including prestressing tendons, and placement.		X	ACI 318: 3.5, 7.1-7.7	1704.4, 1903.5, 1907.1, 1907.7, 1914.4	√	Spec 033100
2. Inspection of reinforcing steel welding.			AWS D1.4; ACI 318: 3.5.2	1704.4, 1903.5.2	☐	
3. Inspection of bolts to be installed in concrete prior to and during placement.	X			1704.4, 1912.5	√	Spec 033100

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
4. Verify use of required design mix.		X	ACI 318: Ch. 4, 5.2-5.4		1704.4, 1904, 1905.2-1905.4, 1914.2, 1914.3	√	Spec 033100
5. Sampling fresh concrete: slump, air content, temperature, strength test specimens.	X		ASTM C 172, C 31; ACI 318: 5.6, 5.8		1704.4, 1905.6, 1914.10	√	Spec 033100
6. Inspection of placement for proper application techniques.	X		ACI, 318: 5.9, 5.10		1704.4, 1905.9, 1905.10, 1914.6, 1914.7, 1914.8	√	Spec 033100
7. Inspection for maintenance of specified curing temperature and techniques.		X	ACI, 318: 5.11, 5.13		1704.4, 1905.11, 1905.13, 1914.9	√	Spec 033100
8. Inspection of prestressed concrete.	X		ACI 318: 18.18, 18.164		1704.4	☐	
9. Erection of precast concrete members.		X	ACI 318: Ch. 16		1704.4	☐	
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	☐	
C. Masonry Construction L1 = Level 1 Inspection required for nonessential facilities. 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		X L1		2.6A	1704.5	√	

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
and grout.		L2					
b. Placement of masonry units and construction of mortar joints.		X L1 L2		3.3B	1704.5	√	
c. Location and placement of reinforcement, connectors, tendons, anchorages.		X L1 L2		3.4, 3.6A	1704.5	√	
d. Prestressing technique and installation.		X L1 L2		3.6A, 3.6B	1704.5	☐	
e. Grade and size of tendons and anchorages.		X L1 L2		2.4B, 2.4H	1704.5	☐	
f. Grout specs prior to grouting.	X L2			3.2D	1704.5	√	
g. Placement of grout.	X L2			3.5	1704.5	√	
h. Grouting of tendons.	X L2			3.6C	1704.5	☐	
2. Inspection shall verify:					1704.5	☐	
a. Size and location of structural elements.		X L1 L2		3.3G	1704.5	√	
b. Type, size, and location of anchors.	X L2	X L1	1.15.4, 2.1.1		1704.5	√	
c. Specified size, grade, and type of reinforcement.		X L1 L2	1012	2.4, 3.4	1704.5	√	
d. Welding of reinforcing bars.	X L1 L2		2.1.8.6, 2.1.8.6		1704.5, 2108.9.2.11	☐	
e. Cold/hot weather protection of masonry construction.		X L1 L2		108	1704.5, 2104.3, 2104.4	√	
f. Prestressing force measurement and application.	X L2	X L1		3.6B	1704.5	☐	
3. Inspection prior to grouting.		X L1 L2	1.12	3.2D, 3.4, 2.6B, 3.3B	1704.5	☐	
4. Grout placement.	X L1 L2			3.5, 3.6C	1704.5	☐	

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
5. Preparation of grout specimens, mortar specimens, and/or prisms.	X L1 L2			1.4	1704.5	☐	
6. Compliance with documents and submittals.		X L1 L2		1.5	1704.5	☐	
D. Wood Construction: Fabrication of wood structured elements and assemblies.		X			1704.6, 1704.2	☐	
E. Soils							
1. Site preparation.					1704.7.1	√	Spec 312000
2. During fill placement.		X			1704.7.2	√	Spec 312000
3. Evaluation of in-place density.		X			1704.7.3	√	Spec 312000
F. Pile Foundations: Installation and load tests.					1704.8	☐	
G. Pier Foundations: Seismic Design Category C, D, E. F.					1704.9, 1616.3	☐	
H. Wall Panels and Veneers: Seismic Design Category E, F.					1704.10, 1616.3, 1704.5	☐	

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
I. Sprayed Fire-Resistant Materials						
1. Structural member surface conditions.		X		1704.11.1	☐	
2. Application.		X		1704.11.2	☐	
3. Thickness.		X	ASTM E 605	1704.11.3	☐	
4. Density.		X	ASTM E 605	1704.11.4	☐	
5. Bond strength.		X	ASTM E 736	1704.11.5	☐	
J. Exterior Insulation and Finish Systems (EIFS)				1704.12	☐	
K. Special Cases				1704.13	☐	
L. Smoke Control				1704.14	☐	
M. Special Inspections for Seismic Resistance: Applicable to specific structures, systems, and components.						
1. Structural steel.	X		AISC Seismic	1707.2	☐	
2. Structural wood.	X			1707.3	☐	
3. Cold-formed steel framing.		X		1707.4	☐	
4. Storage racks and access floors.		X		1707.5	☐	
5. Architectural components.		X		1707.6	☐	
6. Mechanical and electrical components.		X		1707.7	☐	
7. Seismic isolation system.		X		1707.8	☐	
N. Structural Testing for Seismic Resistance: Applicable to specific structures, systems, and						

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
components.						
1. Testing and verification of masonry materials and assemblies.				1708.1	☐	
2. Testing for seismic resistance.				1708.2	☐	
3. Reinforcing and prestressing steel.			ACI 318	1708.3, 1903.5.2	☐	
4. Structural steel.			AISC Seismic	1708.5	☐	
5. Mechanical and electrical equipment.				1708.5	☐	
6. Seismically isolated structures.				1708.6, 1623.8	☐	
O. Structural Observations				1709.1	☐	
Applicable to specific structures.						
P. Test Safe Load				1712.1	☐	
Q. In-Situ Load Tests				1713.1	☐	
R. Preconstruction Load Tests				1714.1	☐	
S. Other (list)						

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 and ventilation.

1.3 TEMPORARY ELECTRICITY

A. Refer to Section 01 51 00 – Temporary Utilities.

1.4 TEMPORARY VENTILATION

A. Refer to Section 01 50 23 – Uniform Safety Standards for School Construction and Section 01 51 00 – Temporary Utilities.

1.5 TELEPHONE SERVICE

A. All Prime Contractors will provide cell phone access at all time of on-site construction.

1.6 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.

1.7 TEMPORARY SANITARY FACILITIES

A. Contract No. 1 - General Contractor shall provide one (1) temporary chemical toilets for use of all workers on the project. 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. 1 – General Contractor shall remove the temporary toilets and all traces thereof.

1.8 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.

1.9 INTERIOR ENCLOSURES

A. Contract No. 2 - Mechanical 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.

1.10 PROTECTION OF OWNER'S PROPERTY AND PROJECT MATERIALS

A. Contractor shall protect the Owner's buildings, grounds, equipment, materials, and products from damage or soiling by use of drop cloths, screens, scaffolds, or other devices as required. Owner's property and project materials shall be protected against damage from any cause including but not limited to Contractor neglect, insufficient anchoring of materials, insufficient protection of materials, insufficient waterproofing, insufficient protection of Owner's roof, insufficient protection of existing or new finished floors, also any damage by theft, freezing, moisture, wind, or motor vehicle traffic. Contractor shall repair or replace all items lost, stolen, or damaged, at no cost to the Owner.

B. The Contractor shall furnish to the job site, unload and install all materials specified in the applicable technical sections of these Contract Documents. Installation shall be in strict accordance with locations as indicated on the drawings, as detailed, as scheduled, and as specified herein. Installation shall include all accessories required to assure a complete and workable installation of the system.

C. The Owner or Construction Manager will not receive or unload any materials. All materials must be consolidated, arrive via the Contractor's truck, and be unloaded by Contractor's personnel.

D. The Construction Manager must approve all locations for storage of materials and equipment at the job site. Approval by the Construction Manager of such storage does not alter Contractor's sole responsibility for the protection and condition of stored material.

E. Contractor shall follow manufacturer's recommendation for protection of equipment and materials during storage.

F. The Contractor shall not load or permit any part of the structure and/or elevators to be loaded with a weight that will endanger its function or safety.

G. The Contractor shall confine his apparatus, storage of materials, and the operations of his workmen to limits indicated by law, ordinances, permits, or as directed by the Owner and Construction Manager and shall not unreasonably encumber the premises with his material. If at any time it becomes necessary to move stored materials owned by the Contractor, he shall move such material without cost to the Owner.

H. The last Contractor on site for each day of construction shall ensure the building envelope, along with site perimeter is secure (doors, entrances, windows, hatches, fences, gates, temporary barriers, etc.). Since the safety and security of the site is of utmost concern, the last Contractor on site that does not secure the building or site perimeter to the sole satisfaction of the Construction Manager, $500 in liquidated damages shall be charged to the Contractor. This shall not be considered a penalty; however, said amount will be deducted from Contract amount. No additional notification is required.

1.11 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.

1.12 MAINTENANCE OF TRAFFIC

A. Contract No. 1 - General 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 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 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 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 Contractor shall be responsible for establishing, maintaining, and eliminating the detour to the satisfaction of the Owner.

1.13 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.

1.14 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.

1.15 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.

1.16 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.

1.17 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.

1.21 DUST CONTROL

A. It shall be assumed that all construction work is taking place in an Owner-occupied building and/or adjacent to an Owner-occupied space. All occupied areas shall be suitable for Owner's intended use on a daily basis.

B. It shall be the responsibility of each Contractor to control dust generated by their work and/or the work of their Subcontractor(s). Dust Control measures shall be at no additional cost to the Owner.

C. Provide negative air exhaust fans for adequate ventilation to perform he work safely and to evacuate construction generated dust from the work zone to an outside/outdoor area. Provide temporary ducting if required.

D. Provide hard wall barriers and/or plastic curtains as required to seal construction work areas from Owner occupied spaces. Where construction is performed within an occupied space, cover Owner's existing furnishings, equipment, floors, carpets, finishes, etc. with plastic sheeting or drop cloths as required to protect from dust settlement.

E. All owner-occupied areas shall be dust free, with cleanliness restored to the original state, at the end of each shift and/or prior to Owner use of said areas. Cleaning shall be the responsibility of the appropriate Contractor and shall be to a level acceptable to the Construction Manager.

F. Failure of the Contractor to prevent dust intrusion, or to perform satisfactory subsequent cleaning of owner-occupied spaces, will result in a back-charge to said Contractor. Back-charge, as solely determined by the Construction Manager, may include, but may not be limited to: cost of professional cleaning, cleaning by the Owner, replacement of HVAC filters, damaged equipment or property, Owner's lost time due to the inability to use the space, Construction Manger's time to coordinate cleaning and assist the Owner as needed. Contractor's continued failure to comply with the requirements herein may be construed as intentional damage to the Owner's property and may result in additional financial and contractual action.

1.18 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 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. Each Prime 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. Each Prime 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. Each Prime 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.

H. If the premises and job site are not maintained properly as determined solely by the Construction Manager, the Owner may have any accumulations of waste materials or trash removed and subcontract any unfinished cleaning, including final cleaning, and charge such cost to the Contractor.

I. All areas of the buildings at the end of each work week shall be cleaned throughout. Each Contractor shall assign one (1) Laborer to form a composite crew for each weekly cleaning cycle. This cleaning shall include the removal of trash and rubbish from these areas, broom cleaning of floors, the removal of plaster, mortar, dirt, and other extraneous materials from all surfaces.

J. The General Contractor, in addition to the cleaning specified above and the more specific cleaning which is required, shall retain a professional and independent cleaning crew and prepare each work or sequence area for occupancy by a thorough cleaning throughout wherever work or alterations have been done. Contractor shall list “professional/independent cleaning” on the Schedule of Values. This cleaning shall include but is not limited to, all exposed structural steel, miscellaneous metal, woodwork, plaster, masonry, concrete, mechanical and electrical equipment, piping duct work, conduit, and any and all finished surfaces. Also, all surfaces visible after all permanent fixtures, casework, convector covers, covers for finned tube radiation, grills, registers, and other such fixtures or devices are in place. Provide and maintain adequate runner strips of non-staining reinforce Kraft building paper on finished floor as required for protection. All equipment and glass shall be left in undamaged, bright, clean, polished condition. Re-cleaning will be required if directed by the Construction Manager at no cost to the Owner. Upon completion of the work, the Contractor shall remove all temporary work and structures, scaffolding, surplus materials, and rubbish of every kind from the site of the work.

K. If, in the sole judgment of Owner and/or Construction Manager, the contractors/Subcontractors do not comply with these cleaning requirements, the Owner reserves the right to complete all necessary steps to maintain conformance with all costs (including cost of additional administration) to be paid by the Contractor.

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. Vinyl asbestos floor tile/mastic

2. Thermal System Insulation in concealed spaces

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 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 IBI Group, 59-61 Court Street, Suite 300, Binghamton, NY 13901.

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. Refer to Document 00 31 00 and Section 01 50 13 for additional information.

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.

3. Refer to Sections 01 50 13 and 02 82 00 for additional information.

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.

B. Refer to Document 00 31 00, and Sections 01 50 13 and 02 83 00 for additional information.

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.

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.

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 Certificate of Insurance for Products and Completed Operations.

G. Owner will occupy all portions of building as specified in Section 01 10 00.

1.3 FINAL CLEANING

A. All Prime Contractors 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. Replace filters of operating equipment.

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.

G. Onsite training, demonstration, and video recording is required by each trade for any and all equipment, systems, and other components. If, in the sole judgment of the Owner and/or Construction Manager, the Contractors/Subcontractors do not comply with these requirements herein, the Owner reserves the right to complete all necessary steps to maintain conformance with all costs (including cost for additional training, videotaping, and demonstration) to paid by the Contractor.

1.6 TESTING, ADJUSTING AND BALANCING

A. Contract No. 2 – Mechanical 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. 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.

H. At Contract closeout, submit documents with transmittal letter containing date, Project title, Contractor's name and address, list of documents, and signature of Contractor.

I. 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 (1) 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 01400.

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.

H. The Contractor warranties all of the Work against defects in materials or workmanship for the respective periods stated in the Contract Documents, but not less than a period of twelve (12) months following the date of Substantial Completion (AIA G704/C\Ma). Under this Warranty, the Contractor shall make good, at its own cost and expense and without delay, any defects or failure of any part of the work due to poor or faulty workmanship, materials, manufacturing, or installation, or due to the failure of any equipment or materials to satisfactorily perform as required by the Contract Documents and to perform to the sole satisfaction of the Owner and Construction Manager. The Contractor shall also, at its expense, make good any damage to any part of the Project or other property of the Owner caused by such failure. With respect to Latent Defects, the Contractor agrees that any Latent Defects in material or workmanship which is identified within twenty-four (24) months following the date of final acceptance shall be corrected at the Contractor's expense within thirty (3) days following notice. Any work replaced or rebuilt during the above-mentioned Warranty period or Latent Defects period shall be similarly warranted for an additional twelve (12) month period starting from the date of acceptance of the repair, reconstruction, or replacement.

I. "Latent Defect" shall be solely defined for the purposes of this Warranty as any flaw or inherent weakness in a component or system of components that were not discovered prior to date of Substantial Completion.

J. Multiple Defects, defined as any more than one (1) defect of a component or system shall immediately trigger the following corrective actions, as determined solely by the Owner, Architect, or Construction Manager, including:

1. Contractor shall bear all costs to bring in knowledgeable personnel and perform root cause analysis and provide written outcome of all findings to the Owner.

2. Root cause resolution shall include repair and if necessary full replacement of all components which may have similar root cause failures, even though the component has not yet failed. Component replacement will be through an updated design and/or updated component specifically tailored to eliminate said root cause.

3. Upon written notice to Contractor of a Multiple Latent Defect, Contractor shall warrant said component or system for an additional twelve (12) months from date of repair and/or replacement.

4. If Multiple Defects continue after root cause analysis, this root cause process will repeat itself, until component or system performs flawlessly for a continuous twelve (12A) month period, regardless of any previous repair or replacement attempts.

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.

1.18 PUNCH LIST AND CLOSE-OUT SCHEDULE AND RELATED LIQUIDATED DAMAGES

A. The Contractor acknowledges an agrees that if the Contractor fails to complete all punch lists and punch list work directed by the Architect, Construction Manager, or the Owner, and complete all project close-out documentation (collectively "Final Completion Work"), The Owner will sustain extensive damages and serious loss as a result of such failure. The exact amount of such damages will be extremely difficult to ascertain. They may include, but are not limited to, additional services by the Architect, Construction Manager, overtime to Owner's employees, additional overhead and utility costs, and expenses resulting from disruption of Owner's business and operations which may include services relied upon by the public. Therefore, the Owner and the Contractor agree as set forth below in this Sections.

1. Notwithstanding anything to the contrary in the Contract Documents, contractor shall complete all Final Completion Work within the time frames set forth in the Contract Documents, but in any case, not more than 60 days after the Substantial Completion date. Further notwithstanding anything to the contrary in the Contract Documents, the Owner shall be entitled to holdback retainage in the amount of 5% of the Contract Sum until all Final Completion Work is completed.

2. Upon the 61st day after the Substantial Completion date, if the Contractor has not completed the Final Completion Work, the Contractor forfeits and loses all rights to the balance of the retainage being held by the Owner. No additional notification is required other than stated herein.

3. Upon the 91st day after the Substantial Completion date, if the Contractor has not completed the Final Completion Work, the Contractor forfeits and loses all rights to the balance of the retainage being held by the Owner. No additional notification is required other than stated herein.

4. The amounts in this Section are agreed by the parties as a reasonable pre-estimate of damages and shall be considered liquidated damages and shall not be considered a penalty for any situation. Such damages shall NOT under any circumstances cover any damages sustained by the loss or delay of funding sources including NYSED building aid caused in whole or in part by the Contractor's failure. The Contractor shall be separately and directly liable for such losses to the Owner. In addition to the liquidated damages described herein.

5. The Owner may deduct liquidated damages described I this Section from any unpaid amounts then or thereafter due the Contractor under this Contract, including any retainage or those amounts held by the Owner. Any liquidated damages not so deducted from any unpaid amounts due the Contractor shall be payable by the Contractor to the Owner at the demand of the Owner, together with interest from the date of the demand at a rate equal to 1.5% per month, or the highest permitted by applicable law.

6. Notwithstanding anything to the contrary in the Contract, if the Owner is unable recover liquidated damages as set forth above in accordance with the terms and conditions of this Section because any portion of this Section is found to be unenforceable or invalid as a penalty or otherwise, then, the Owner shall be entitled to recover from the Contractor all of the Owner's actual damages in connection with any failure by the Contractor to complete Final Completion Work within the time frames described above, including, without limitation, those damages described in the opening paragraph of this Section, as well as consequential damages.

2 PART 2 PRODUCTS

Not Used

3 PART 3 EXECUTION

Not Used

END OF SECTION

DIVISION 02 – NOT USED

DIVISION 03 – CONCRETE

SECTION 03 31 00

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes Cast-in-place (CIP) structural concrete, including:

1. Concrete Formwork and Formwork Accessories
2. Concrete Mixtures and Admixtures
3. Steel Concrete Reinforcement and Accessories
4. Curing compounds
5. Grout
6. Crack repair and epoxy adhesives
7. Joint fillers and sealants
8. Handling, placing, and constructing

B. Products Installed But Not Furnished Under This Section:

1. Anchor rods, leveling plates, railing sleeves, brackets, and other embedded items of steel, vinyl, plastic, or other materials. Refer to Structural Steel-Section 051200, and Metal Fabrications –Section 055000 or other specification sections where the embedded item is described.
2. Sleeves for pipe, conduit and other items passing through or embedded in concrete. Refer to the specification section where the item is described.

C. Related Sections.

1. Code Required Special Inspections and Procedures – Section 014533
2. Structural Steel – Section 051200

1.02 DEFINITIONS

A. ACI 301, Section 1.2 - Definitions:

1. Add the following definitions:
   a. Cementitious Material: Cementitious materials include cement, ground blast furnace slag and fly ash.
   b. Corrosion Inhibitor Admixture: A liquid admixture, calcium nitrite that inhibits corrosion of concrete-embedded steel in the presence of chloride ions.
   c. Pumped Concrete: Concrete that is conveyed by pumping pressure through rigid pipe or flexible hose.
   d. Water-to-Cementitious Ratio (w/c): An equational value representing quantity in pounds of free moisture available for cement hydration divided by quantity of cementitious materials in pounds per cubic yard concrete.

1.03 REFERENCES

A. Work on this project shall conform to all requirements of ACI 301-05 published by the American Concrete Institute, Farmington Hills, Michigan, except as modified by these Contract Documents.

B. Reference publications

1. ACI 301-05: Specifications for Structural Concrete.

2. ACI 302.1R-04: Guide for Concrete Floor and Slab Construction.

3. ACI 304.2R-96: Placing Concrete by Pumping Methods.

4. ACI 305R-99: Hot Weather Concreting.

5. ACI 306R-88: Cold Weather Concreting (Re-approved 1997).

6. ACI 308.1-98: Standard Specification for Curing Concrete.

7. ACI 318-08 Building Code Requirements for Reinforced Concrete.

8. ASTM C 94/C 94M - 04: Standard Specification for Ready- Mixed Concrete.

9. ASTM C 494/C 494M - 04: Standard Specification for Chemical Admixtures for Concrete.

10. ASTM C 311-77 Standard Methods of Sampling and Testing Fly Ash or Natural Pozzolans For Use As A Mineral Admixture in Portland Cement Concrete.

11. Manual of Standard Practice, MSP-1-01 of the Concrete Reinforcing Steel Institute.

1.04 STANDARDS PRODUCING ORGANIZATIONS

A. Refer to ACI 301-14

1.05 SUBMITTALS

A. Submittals Package: Submit product data for design mix(es) and materials for concrete specified below at the same time as a package.

B. Product Data:

1. Mix Design: Submit proposed concrete design mix(es) together with name and location of batching plant at least 28 days prior to the start of concrete work.
   a. Include test results of proposed concrete proportions based on previous field experience or laboratory trial batches in accordance with ACI 301, Section 4.
   b. Pumped Concrete: Include test results of proposed design mix(es) tested under actual field conditions with the maximum horizontal run and vertical lift required for this project.

2. Portland Cement: Brand and manufacturer's name.

3. Fly Ash: Name and location of source, and DOT test numbers.

4. Air-entraining Admixture: Brand and manufacturer's name.

5. Water-reducing Admixture: Brand and manufacturer's name.

6. High Range Water-reducing Admixture (Superplasticizer): Brand and manufacturer's name.

7. Accelerating Admixture: Brand and manufacturer's name.

8. Aggregates: Name and location of source, and DOT test numbers.

C. Reinforcing Steel

1. Shop Drawings: Placing drawings for bar reinforcement.

2. Affidavit by the bar reinforcement manufacturer certifying that bar material meets the contract requirements.

1.06 QUALITY ASSURANCE

A. Refer to Section 014533-Special Inspections and Testing, for Concrete Construction inspection and testing to be performed by the Owner's Inspection and Testing Agency.

B. Qualifications of Crew Pumping Concrete: Workers pumping concrete shall have had at least one year of experience pumping concrete.

C. Concrete batching plants shall be currently approved as concrete suppliers by the New York State Department of Transportation.

D. Truck mixers for concrete shall be currently approved by the New York State Department of Transportation.

E. Pumping equipment for pumped concrete shall be subject to the approval of the Architect.

F. Fly ash supplier shall be on the New York State Department of Transportation's current "Approved List of Suppliers of Fly Ash".

G. Source Quality Control: The Owner reserves the right to inspect and approve the following items, at his own discretion, either with his own forces or with a designated inspection agency:

1. Batching and mixing facilities and equipment.

2. Sources of materials.

H. Pre-Construction Conference: Attend a Pre-Construction Conference at the job site conducted by the Architect's Representative prior to the start of concrete placement for the purpose of reviewing the requirements and procedures of the Contract Documents.

I. Field Quality Control

1. ACI 301, Section 1.6.4.2 - Testing Services:
   a. Add the following paragraph:
      1) 1.6.4.2.e Strength Tests for Pumped Concrete: Prepare strength test specimens and make strength tests from concrete samples obtained at the truck discharge chute and at the end of the pump delivery line in accordance with paragraph 16.3.4.4.

2. ACI 301, Section 1.6.3.3.
   a. Add the following paragraph:
      1) 1.6.3.3.c Make available to the Owner's Inspections and Testing Agency whatever test samples are required to make tests. Furnish shipping boxes for compression test cylinders.

3. Adjustment to Concrete Mixes: Mix design adjustments may be requested by the Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, at no additional cost to the Owner and as accepted by the Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by the Architect's Representative before using in the work.

4. Test results will be reported by the Owner's Testing Agency in writing to the Architect's Representative and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day tests and 28-day tests.

5. Nondestructive Testing: Impact hammer, Windsor probe, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.

6. Additional Tests: The Architect shall require additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by the Architect's Representative. The Owner's Testing Agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. Contractor shall pay for such tests when unacceptable concrete is verified, including all inspection and Engineering fees when non-conforming work is verified.

1.07 DELIVERY

A. ASTM C 94/C 94M - 04, Article 13.1 - Batch Ticket Information: In addition to the information required by Paragraph 16.1, also include the following:

1. Type and brand, and amount of cement.

2. Weights of fine and coarse aggregates.

3. Class and brand, and amount of fly ash (if any).

PART 2 PRODUCTS

2.01 MATERIALS

A. Cement: ASTM C 150, Type I or II Portland cement.

B. Water: Potable

C. Air-entraining Admixture: ASTM C 260, and on the New York State Department of Transportation's current "Approved List".

D. Water-reducing Admixture: ASTM C 494/C 494M - 04, Type A, and on the New York State Department of Transportation's current "Approved List".

E. High Range Water-reducing Admixture (Superplasticizer): ASTM C 494/C 494M - 04, Type F, and on the New York State Department of Transportation's current "Approved List".

F. Retarding Admixture: ASTM C 494, Type D, Water-reducing and retarding, for use in hot weather concreting, and on the New York State Department of Transportation's current "Approved List".

G. Accelerating Admixture: Non-corrosive admixture, containing no chloride, complying with ASTM C 494, Type C or E, and on the New York State Department of Transportation's current "Approved List".

H. Fly Ash: ASTM C 618, including Table 1 (except for footnote A), Class F except that loss on ignition shall not exceed 4.0 percent.

I. ACI 301, Section 4.2.1.2 - Aggregates:

1. Add the following paragraph:
   a. Fine aggregate for pumped concrete shall meet the requirements of ASTM C 33, except 15 to 30 percent shall pass the No. 50 sieve and 5 to 10 percent shall pass the No. 100 sieve. The fineness modulus of the fine aggregate for pumped concrete shall not vary more than 0.20 from the average value used in proportioning.

2. Add the following paragraph:

3. Aggregates shall be taken from storage silos or other approved locations that have been tested and approved by the New York State Department of Transportation, unless otherwise approved in writing by the Architect.

J. Moisture-Retaining Cover: Waterproof paper, polyethylene film, or polyethylene-coated burlap complying with ASTM C 171.

K. Joint Fillers and Sealants (Contraction Joints within the building and in the concrete slabs on grade):

1. Elastomeric Polyurethane Joint Sealant
   a. Sikaflex-1cSL by Sika Corporation, 201 Polito Avenue, Lyndhurst, NJ 07071
   b. Sonolastic® SL 2 by BASF Building Systems
   c. Eucolastic II, as manufactured by the Euclid Chemical Company, 19218 Redwood Road, Cleveland, OH 44110

L. Reinforcing Steel

1. Bar Reinforcement: ASTM A 615, Grade 60, deformed steel bars.

2. Fabric Reinforcement: ASTM A 185, welded wire fabric, fabricated into flat sheets unless otherwise indicated.

3. Bar Supports; Either of the Following Types:
   a. Galvanized steel or AISI Type 430 stainless steel, and without plastic tips.
   b. Insoluble plastic, with minimum 1,500 psi tensile strength and capable of retaining fabricated shape at temperatures between 5 degrees F and 170 degrees F.
   c. Solid concrete brick

4. Fabric Reinforcement Supports:
   a. Uni Zag by Universal Form Clamp, 840 South 25th Avenue, Bellwood, IL 60104, (800)728-1958.
   b. Continuous Support, “CS” by Dayton Superior, 721 Richard Street, Miamisburg, OH 45342, (800) 745-3700.
   c. Solid concrete brick

5. Tie Wire: Black annealed wire, 16-1/2 gage or heavier.

M. Chemical Curing and Anti-Spalling Compound: ASTM C-309, Type 1D, Class B, with a minimum 18 percent total solids content. No thinning of material allowed.

1. SureCure Emulsion, Kaufman Products, Inc. 3811 Curtis Avenue, Baltimore, MD 21226, (800) 637-6372.

2. Cure & Seal by Symons Corp., 200 East Touhy Ave., PO Box 5018, Des Plaines, IL 60017-5018, (847) 298-3200.

3. Kure-N-Seal by Sonneborn/ BASF Building Systems, 889 Valley Park Dr., Shakopee, MN 55379, (800) 433-9517.

4. Day-Chem Cure & Seal UV 26 percent (J-22 UV) by Dayton Superior Corp., 721 Richard St., Miamisburg, OH 45342, (800) 745-3700.

5. Acrylseal HS by Master Builders/ BASF Building Systems, 23700 Chagrin Blvd., Cleveland, OH 44122, (800) 628-9990.

2.02 PROPORTIONING OF MIXES

A. Normal weight concrete for concrete foundation piers and walls, concrete columns, and for all other concrete unless otherwise specified, shall have a minimum compressive strength of 4000 psi and a water cement ratio of 0.45. Slump: Maximum 4 inches; minimum 2 inches before the addition of any water-reducing admixtures or high-range water-reducing admixtures (superplasticizers) at the Site. The concrete shall be air-entrained

B. Optional Material: Fly ash may be substituted for (Portland) cement in normal weight and lightweight concrete up to a maximum of 40 percent by weight of the required minimum (Portland) cement. If fly ash is incorporated in a concrete design mix, make necessary adjustments to the design mix to compensate for the use of fly ash as a partial replacement for (Portland) cement.

1. Adjustments shall include the required increase in air-entraining admixture to provide the specified air content.

2. Lower early strength of the concrete shall be considered in deciding when to remove formwork.

C. Slump for Pumped Concrete: When a water-reducing admixture is not used, maximum slump shall be 4 inches. When a water-reducing admixture is used, maximum slump shall be 6 inches and when a high-range water-reducing admixture (superplasticizers) is used, maximum slump shall be 8 inches.

D. Design Air Content: Design air content for concrete required to be air entrained shall be 6 percent by volume, with an allowable tolerance of plus or minus 1.5 percent for total air content, except as otherwise specified. Use air-entraining admixture, not air-entrained cement. Concrete to be air-entrained shall be exterior foundation walls and piers, spectator seating area concrete beams and deck, all concrete columns, exterior slabs, ramps, and stairs.

E. ACI 301, Section 4.2.2.3: Change article to read as follows:

1. 4.2.2.3 – Size of Coarse Aggregates:
   a. 4.2.2.3.a Normal Weight Concrete: Coarse aggregates shall conform to graduation requirements for various sizes as tabulated in Table No. 2 of ASTM C33. The sizes of coarse aggregates for various classes of Work shall be as follows with all percentages being determined by weight.

b. 4.2.2.3.c For concrete Work having a minimum cross-sectional dimension of not more than 6 inches, the coarse aggregate shall be a well graded mixture of No. 67 (3/4" to No. 4) and No. 57 (1" to No. 4), provided that not more than 50 percent nor less than 30 percent shall be Size No. 67 and not more than 70 percent nor less than 50 percent shall be Size No. 57.
c. 4.2.2.3.d For concrete Work having a minimum cross-sectional dimension greater than 6 inches and not more than 12 inches, including concrete floors, the coarse aggregate shall consist of a mixture of No. 67, No. 57 and No. 467 (1 ½" to No. 4), providing that not more than 25 percent nor less than 10 percent shall be Size No. 67 and not more than 40 percent shall be Size No. 467.
d. 4.2.2.3.e For concrete Work having a minimum cross-sectional dimension of more than 12 inches, the coarse aggregate shall consist of a mixture of No. 67, No. 57 and No. 357 (2" to No. 4), providing not more than 25 percent nor less than 10 percent shall be Size No. 67 and not more than 40 percent shall be Size No. 357.

F. Admixtures: Do not use admixtures in concrete unless specified or approved in writing by the Architect.

G. ACI 301, Section 4.1.2.1 - Mixture Proportions:

1. Add the following to paragraph 4.1.2.1:
   a. Proposed design mix(es) for pumped concrete and the pumping equipment shall have been tested under actual field conditions with the maximum horizontal run and vertical lift required for this project.

2.03 JOINTS

A. ACI 301, Section 5.3.2.6 - Construction joints and other bonded joints:

1. Delete the following subparagraphs:
   a. Use an acceptable surface retarder in accordance with manufacturer's recommendations.
   b. Roughen the surface in an acceptable manner that exposes the aggregate uniformly and does not leave laitance, loosened particles of aggregate, or damaged concrete at the surface; or

B. ACI 301, Section 10.2.5 – Isolation-joint filler materials:

1. Add the following paragraphs:
   a. Except as otherwise shown on the Drawings, expansion joints shall be as follows:
   b. In joints required to receive a sealant, the joint filler shall be 1/2 inch thick and recessed as required to form a caulking slot.

c. In joints not required to receive a sealant, the joint filler shall be 1/2 inch thick and extend through the full cross-section of the concrete.
d. Tool edges of concrete with 1/8 inch radius edging tool.

2.04 PRODUCTION OF CONCRETE

A. Provide ready-mixed concrete, either central-mixed or truck-mixed, unless otherwise approved in writing by the Architect.

B. ACI 301, Section 5.3.2.1 Weather considerations

1. Delete paragraph under 5.3.2.1.c - Hot Weather, and add the following:
   a. 5.3.2.1.c Provide adequate controls to insure that the temperature of the concrete when placed does not exceed 90 degrees F., and make every effort to place it at a lower temperature. The temperature of the concrete as placed shall not be so high as to cause difficulty from loss of slump, flash set or cold joints. Ingredients may be cooled before mixing by shading the aggregates, fog spraying the coarse aggregate, chilling the mixing water or other approved means. Mixing water may be chilled with flake ice or well-crushed ice of a size that will melt completely during mixing, providing the water equivalent of the ice is calculated into the total amount of mixing water.

C. Protect concrete from physical damage or reduced strength due to weather extremes during mixing, placement and curing.

1. In cold weather, comply with ACI 306R.
   a. When air temperature is below 40 degrees F (4 degrees C) heat the mixing water and, if necessary, the aggregates to obtain a concrete mixture temperature of not less than 50 degrees F (10 degrees C) and not more than 80 degrees F (27 degrees C) at point of placement. If the mixing water is heated, do not exceed a temperature of 140 degrees F at the time it is added to the cement and aggregates.

2. In hot weather, comply with ACI 305R.
   a. When air temperature is between 85 degrees F (30 degrees C) and 90 degrees F (32 degrees C), reduce mixing and delivery time from 1 1/2 hours to 75 minutes, and when air temperature is above 90 degrees F (32 degrees C), reduce mixing and delivery time to 60 minutes.

PART 3 EXECUTION

3.01 EXAMINATION AND PREPARATION

A. Do not use items of aluminum for mixing, chuting, conveying, forming or finishing concrete, except magnesium alloy tools may be used for finishing.

B. Check items of aluminum required to be embedded in the concrete and insure that they are coated, painted or otherwise isolated in an approved manner.

C. Install waterstops in accordance with manufacturer's printed instructions.

D. Hardened concrete, reinforcement, forms, and earth which will be in contact with fresh concrete shall be free from frost at the time of concrete placement.

E. Do not deposit concrete in water. Keep excavations free of water by pumping or by other approved methods.

F. Prior to placement of concrete, remove all hardened concrete spillage and foreign materials from the space to be occupied by the concrete.

3.02 ADMIXTURE ADDITIONS AT THE SITE

A. Site additions shall be limited to high-range water-reducers, non-chloride accelerators, and corrosion inhibitors. Comply with manufacturers' printed instructions for discharge of admixtures shall be furnished.

B. High-Range Water-Reducers:

1. Concrete shall arrive at a slump of 2 to 4 inches (50 to 100 mm). Water additions at the Site shall be limited to comply with water-to-cementitious ratio requirements.

2. Following addition of high-range water-reduced concrete, a minimum of 70 revolutions or 5 minutes of mixing shall be completed to assure a consistent mixture.

C. All concrete with other admixture additions shall mix a minimum of 70 revolutions or 5 minutes to assure a consistent mixture.

3.03 PLACING

A. ACI 301, Section 5.3.2.3 Conveying equipment:

1. Add the following paragraphs:

a. 5.3.2.3.d When pumping concrete, the lubricating mortar for the delivery line shall not be discharged into an area of concrete placement.
b. 5.3.2.3.e The inside diameter of the delivery lines for pumped concrete shall be the greater of either a minimum of 5 inches or 3 times the maximum size of coarse aggregate.

B. ACI 301, Section 5.3.2.2 - Conveying:

1. Add the following paragraph:
a. Operation of truck mixers and agitators and discharge limitations shall conform to the requirements of ASTM C 94.

C. ACI 301, Section 5.3.2.4 - Depositing:

1. Add the following paragraph:
a. Do not allow concrete to free fall more than 4 feet.

3.04 REPAIRING SURFACE DEFECTS

A. ACI 301, Section 5.3,7 – Repair of surface defects:

1. Add the following paragraph:
a. 5.3.7.1.a Finish patched areas to match the texture of the surrounding surface.

B. ACI 301, Section 5.3.7.2 - Repair of tie holes:

1. Delete last paragraph in 5.3.7.2 and replace with the following:
a. The patch mixture shall consist of a mixture of dry-pack mortar, consisting of one part Portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for placing and handling. For surfaces exposed to view, blend white Portland cement and standard Portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.

3.05 FINISHING FORMED SURFACES

A. Finish Schedule: Except where indicated otherwise on the Drawings, provide the finishes below:

1. Rough Form Finish for concrete surfaces not exposed to view.

2. Smooth Form Finish for exterior concrete surfaces exposed to view. Remove forms as soon as removal operations will not damage concrete (reference ACI 301-05.2.3.2), and perform necessary patching.

3.06 SLABS

A. Slabs On Grade: Provide saw-cut type control joints unless otherwise shown, using the early entry dry saw-cut method. Saw-cut joints within 4 hours of finishing the slab.

B. ACI 301, Section 5.3.4 – Finishing unformed surfaces:

1. Add the following paragraph to section 5.3.4.1 Placement:
   a. Provide monolithic finishes on concrete floors and slabs without the addition of mortar or other filler material. Finish surfaces in true planes, true to line, with particular care taken during screeding to maintain an excess of concrete in front of the screed so as to prevent low spots. Screed and darby concrete to true planes while plastic and before free water rises to the surface. Do not perform finishing operations during the time free water (bleeding) is on the surface.

C. Finish Schedule: Except where indicated otherwise on the Drawings, provide the finishes below:

1. Floated Finish for:
   a. Treads and platforms of exterior steps and stairs.
   b. Slabs and fill over which waterproofing, roofing, vapor barrier, insulation, terrazzo, or resin bound flooring is required.

2. Troweled Finish for:
   a. Interior slabs that are to be exposed to view.
   b. Slabs and fill over which resilient wood flooring, resilient tile or sheet flooring, carpet, or thin-film coating system is required.
   c. Slabs and fill over which thin-set ceramic tile is required, except fine-broom finished surface.
   d. Treads and platforms of interior steps and stairs.

3. Broom or Belt Finish for:
   a. Exterior slab. Texture as approved by the Architect's Representative.

4. Scratched Finish for:
   a. Surfaces to be covered with ceramic tile set in a bonded thick mortar bed, except screed to a Class B tolerance.
   b. Surfaces to be covered with floor topping.

D. ACI 302 Chapter 8.2.8.2 - Tools for jointing; Saw-cutting.

1. Add the following paragraph:
   a. Early-entry dry-cut saws are required in place of conventional wet-cut saws.

E. Floor flatness and levelness tolerances: For flatness and levelness tolerances of floor slabs refer to ACI 302 Chapter 8.15. Floor surface tolerances shall be 1/8 inch over a horizontal distance of 10 feet in any direction, unless otherwise specified by floor profile quality classifications in ACI 302.

1. When flatness or levelness tolerances are not met then the floor shall be ground or scarified and repoured to meet specifications.

3.07 CURING AND PROTECTION

A. Cure all exposed concrete using supervised wet cure or an approved curing compound.

B. Hot Weather Concreting: Comply with ACI 305R whenever the atmospheric temperature or the form surface temperature is at or above 90 degrees F., or climatic conditions of wind and/or low humidity will cause premature drying of the concrete.

C. Curing Temperature: Maintain the temperature of the concrete at 50 degrees F. or above during the curing period. Keep the concrete temperature as uniform as possible and protect from rapid atmospheric temperature changes. Avoid temperature changes in concrete which exceeds 5 degrees F. in any one hour and 50 degrees F. in any 24-hour period.

D. Curing of Slabs to Receive Moisture-Sensitive Finish Flooring, including vinyl composition tile (VCT), rubber flooring, sheet vinyl, resilient tile, carpet, ceramic tile, wood flooring, and laminates:

1. Cure the slab by covering with a moisture retaining cover as defined above for a period of 7 days.

2. Do not add water (ponding or wet bulap)

3. Do not use curing compounds or cure-and-seal materials unless approved in writing by the Architect. Architect will require written approval from the adhesive and floor covering manufacturer that the curing compound or cure-and-seal material will not compromise the adhesion of the floor covering to the concrete slab, and will not require removal of the curing compound or cure-and-seal material prior to placement of the finish floor covering.

END OF SECTION

SECTION 03 45 00

PRECAST ARCHITECTURAL CONCRETE

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Architectural precast concrete trim units.

1.02 REFERENCE STANDARDS

A. ACI 211.1-1991 (Reapproved 2009): Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.

B. ACI 211.2-1998 (Reapproved 2004): Practice for Selecting Proportions for Structural Lightweight Concrete.

C. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2008.

D. ASTM A 185/A 185M-07: Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.

E. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement; 2015.

F. ASTM A767/A767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement; 2009.

G. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2015.

H. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2013.

I. ASTM C 144-04: Specification for Aggregate for Masonry Mortar.

J. ASTM C150/C150M - Standard Specification for Portland Cement; 2015.

K. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a.

L. ASTM C 494/C 494M-10a: Specification for Chemical Admixtures for Concrete.

M. ASTM C 595/C 595M-11: Specification for Blended Hydraulic Cements.

N. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2015.

O. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete; 2010.

P. ASTM C989/C989M - Standard Specification for Slag Cement for Use in Concrete and Mortars; 2014.

Q. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures; 2014.

R. PCI MNL-117 - Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products; 2007.

S. PCI MNL-120 - PCI Design Handbook - Precast and Prestressed Concrete; 2010, Seventh Edition.

T. PCI MNL-122 - Architectural Precast Concrete; 2007, Third Edition.

U. PCI MNL-135 - Tolerance Manual for Precast and Prestressed Concrete Construction; 2000.

1.03 SUBMITTALS

A. Product Data: For each type of product.

B. Design Mixtures: For each precast concrete mixture. Include compressive strength and water-absorption tests.

C. Shop Drawings:

1. Indicate locations, plans, elevations, dimensions, shapes, and cross sections of each unit.

2. Indicate joints, reveals, drips, chamfers, and extent and location of each surface finish.

3. Indicate details at building corners.

4. Indicate relationship of architectural precast concrete units to adjacent materials.

D. Samples: Design reference samples for initial verification of design intent, for each type of finish indicated on exposed surfaces of architectural precast concrete units, in sets of three, representative of finish, color, and texture variations expected; approximately 12 by 12 by 2 inches.

E. Qualification Data: For fabricator.

1.04 QUALITY ASSURANCE

A. Fabricator Qualifications: A firm that assumes responsibility for engineering architectural precast concrete units to comply with performance requirements. This responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

1. Designated as a PCI-certified plant for Group A, Category A1 - Architectural Cladding and Load Bearing Units or designated as an APA-certified plant for production of architectural precast concrete products.

B. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

C. Quality-Control Standard: For manufacturing procedures and testing requirements, quality-control recommendations, and dimensional tolerances for types of units required, comply with PCI MNL 117, "Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products."

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver architectural precast concrete units in such quantities and at such times to limit unloading units temporarily on the ground or other rehandling.

B. Support units during shipment on nonstaining shock-absorbing material.

C. Store units with adequate dunnage and bracing and protect units to prevent contact with soil, to prevent staining, and to prevent cracking, distortion, warping or other physical damage.

D. Place stored units so identification marks are clearly visible, and units can be inspected.

E. Handle and transport units in a manner that avoids excessive stresses that cause cracking or damage.

F. Lift and support units only at designated points indicated on Shop Drawings.

PART 2 - PRODUCTS

2.01 MOLD MATERIALS

A. Molds: Rigid, dimensionally stable, non-absorptive material, warp and buckle free, that provides continuous and true precast concrete surfaces within fabrication tolerances indicated; nonreactive with concrete and suitable for producing required finishes.

1. Mold-Release Agent: Commercially produced form-release agent that does not bond with, stain or adversely affect precast concrete surfaces and does not impair subsequent surface or joint treatments of precast concrete.

B. Surface Retarder: Chemical set retarder, capable of temporarily delaying final hardening of newly placed concrete mixture to depth of reveal specified.

2.02 REINFORCING MATERIALS

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

B. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, fabricated from as-drawn steel wire into flat sheets.

2.03 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150/C 150M, Type I or Type III, gray, unless otherwise indicated.

1. For surfaces exposed to view in finished structure, use gray or white cement, of same type, brand, and mill source.

B. Supplementary Cementitious Materials:

1. Fly Ash: ASTM C 618, Class C or F, with maximum loss on ignition of 3 percent.

2. Metakaolin: ASTM C 618, Class N.

3. Silica Fume: ASTM C 1240, with optional chemical and physical requirement.

4. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

5. Blended Hydraulic Cement: ASTM C 595, Type IS, portland blast-furnace slag Type IP, portland-pozzolan Type I (PM), pozzolan-modified portland Type I (SM), slag-modified portland cement.

C. Normal-Weight Aggregates: Except as modified by PCI MNL 117, ASTM C 33/C 33M, with coarse aggregates complying with Class 5S. Stockpile fine and coarse aggregates for each type of exposed finish from a single source (pit or quarry) for Project.

1. Face-Mixture-Fine Aggregates: Selected, natural or manufactured sand compatible with coarse aggregate; to match approved finish sample.

D. Coloring Admixture: ASTM C 979/C 979M, synthetic or natural mineral-oxide pigments or colored water-reducing admixtures, temperature stable, and nonfading.

E. Water: Potable; free from deleterious material that may affect color stability, setting, or strength of concrete and complying with chemical limits of PCI MNL 117.

F. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

G. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and to not contain calcium chloride, or more than 0.15 percent chloride ions or other salts by weight of admixture.

1. Water-Reducing Admixtures: ASTM C 494/C 494M, Type A.

2. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.

3. Water-Reducing and Accelerating Admixture: ASTM C 494/C 494M, Type E.

4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.

2.04 ACCESSORIES

A. Precast Accessories: Provide clips, hangers, high-density plastic or steel shims, and other accessories required to install architectural precast concrete units.

2.05 GROUT MATERIALS

A. Sand-Cement Grout: Portland cement, ASTM C 150/C 150M, Type I, and clean, natural sand, ASTM C 144 or ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 to 3 parts sand, by volume, with minimum water required for placement and hydration. Water-soluble chloride ion content less than 0.06 percent by weight of cement when tested according to ASTM C 1218/C 1218M.

2.06 CONCRETE MIXTURES

A. Limit use of fly ash and ground granulated blast-furnace slag to 20 percent of portland cement by weight; limit metakaolin and silica fume to 10 percent of portland cement by weight.

B. Design mixtures may be prepared by a qualified independent testing agency or by qualified precast plant personnel at architectural precast concrete fabricator's option.

C. Limit water-soluble chloride ions to maximum percentage by weight of cement permitted by ACI 318 or PCI MNL 117 when tested according to ASTM C 1218/C 1218M.

D. Normal-Weight Concrete Mixtures: Proportion face and backup mixtures face and backup mixtures or full-depth mixtures, at fabricator's option by either laboratory trial batch or field test data methods according to ACI 211.1, with materials to be used on Project, to provide normal-weight concrete with the following properties:

1. Compressive Strength (28 Days): 5000 psi minimum.

2. Maximum Water-Cementitious Materials Ratio: 0.45.

E. Water Absorption: 6 percent by weight or 14 percent by volume, tested according to ASTM C 642, except for boiling requirement.

F. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content complying with PCI MNL 117.

G. When included in design mixtures, add other admixtures to concrete mixtures according to manufacturer's written instructions.

2.07 MOLD FABRICATION

A. Molds: Accurately construct molds, mortar tight, of sufficient strength to withstand pressures due to concrete-placement operations and temperature changes and for prestressing and detensioning operations. Coat contact surfaces of molds with release agent before reinforcement is placed. Avoid contamination of reinforcement and prestressing tendons by release agent.

B. Maintain molds to provide completed architectural precast concrete units of shapes, lines, and dimensions indicated, within fabrication tolerances specified.

1. Form joints are not permitted on faces exposed to view in the finished work.

2. Edge and Corner Treatment: Uniformly chamfered.

2.08 FABRICATION

A. Furnish loose hardware items including steel plates, clip angles, seat angles, anchors, dowels, cramps, hangers, and other hardware shapes for securing architectural precast concrete units to supporting and adjacent construction.

B. Cast-in reglets, slots, holes, and other accessories in architectural precast concrete units as indicated on the Contract Drawings.

C. Reinforcement: Comply with recommendations in PCI MNL 117 for fabricating, placing, and supporting reinforcement.

1. Clean reinforcement of loose rust and mill scale, earth, and other materials that reduce or destroy the bond with concrete. When damage to epoxy-coated reinforcing exceeds limits specified in ASTM A 775/A 775M, repair with patching material compatible with coating material and epoxy coat bar ends after cutting.

2. Accurately position, support, and secure reinforcement against displacement during concrete-placement and consolidation operations. Completely conceal support devices to prevent exposure on finished surfaces.

3. Place reinforcing steel and prestressing strands to maintain at least 3/4-inch minimum concrete cover. Increase cover requirements for reinforcing steel to 1-1/2 inches when units are exposed to corrosive environment or severe exposure conditions. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position while placing concrete. Direct wire tie ends away from finished, exposed concrete surfaces.

4. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh spacing and wire tie laps, where required by design. Offset laps of adjoining widths to prevent continuous laps in either direction.

D. Reinforce architectural precast concrete units to resist handling, transportation, and erection stresses and specified in-place loads.

E. Comply with requirements in PCI MNL 117 and requirements in this Section for measuring, mixing, transporting, and placing concrete. After concrete batching, no additional water may be added.

F. Place face mixture to a minimum thickness after consolidation of the greater of 1 inch or 1.5 times the maximum aggregate size, but not less than the minimum reinforcing cover specified.

G. Place concrete in a continuous operation to prevent cold joints or planes of weakness from forming in precast concrete units.

1. Place backup concrete mixture to ensure bond with face-mixture concrete.

H. Thoroughly consolidate placed concrete by internal and external vibration without dislocating or damaging reinforcement and built-in items, and minimize pour lines, honeycombing, or entrapped air voids on surfaces. Use equipment and procedures complying with PCI MNL 117.

1. Place self-consolidating concrete without vibration according to PCI TR-6, "Interim Guidelines for the Use of Self-Consolidating Concrete in Precast/Prestressed Concrete Institute Member Plants." Ensure adequate bond between face and backup concrete, if used.

I. Comply with PCI MNL 117 for hot- and cold-weather concrete placement.

J. Identify pickup points of architectural precast concrete units and orientation in structure with permanent markings, complying with markings indicated on Shop Drawings. Imprint or permanently mark casting date on each architectural precast concrete unit on a surface that does not show in finished structure.

K. Cure concrete, according to requirements in PCI MNL 117, by moisture retention without heat or by accelerated heat curing using low-pressure live steam or radiant heat and moisture. Cure units until compressive strength is high enough to ensure that stripping does not have an effect on performance or appearance of final product.

L. Discard and replace architectural precast concrete units that do not comply with requirements, including structural, manufacturing tolerance, and appearance, unless repairs meet requirements in PCI MNL 117 and Architect's approval.

2.09 FABRICATION TOLERANCES

A. Fabricate architectural precast concrete units to shapes, lines, and dimensions indicated so each finished unit complies with PCI MNL 117 product tolerances as well as position tolerances for cast-in items.

2.10 FINISHES

A. Exposed faces shall be free of joint marks, grain, and other obvious defects. Corners, including false joints shall be uniform, straight, and sharp. Finish exposed-face surfaces of architectural precast concrete units as follows:

1. Honed Finish: Use continuous mechanical abrasion with fine grit, followed by filling and rubbing procedures.

B. Finish exposed top surfaces of architectural precast concrete units to match face-surface finish.

C. Finish unexposed surfaces of architectural precast concrete units with as cast finish.

2.11 SOURCE QUALITY CONTROL

A. Quality-Control Testing: Test and inspect precast concrete according to PCI MNL 117 requirements. If using self-consolidating concrete, also test and inspect according to PCI TR-6, ASTM C 1610/C 1610M, ASTM C 1611/C 1611M, ASTM C 1621/C 1621M, and ASTM C 1712.

B. Defective Units: Discard and replace recast architectural concrete units that do not comply with acceptability requirements in PCI MNL 117, including concrete strength, manufacturing tolerances, and color and texture range. Chipped, spalled, or cracked units may be repaired, subject to Architect's approval. Architect reserves the right to reject precast units that do not match approved samples, sample panels, and mockups. Replace unacceptable units with precast concrete units that comply with requirements.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine supporting structural frame or foundation and conditions for compliance with requirements for installation tolerances, bearing surface tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Install clips, hangers, bearing pads, and other accessories required for connecting architectural precast concrete units to supporting members and backup materials.

B. Erect architectural precast concrete level, plumb, and square within specified allowable tolerances. Provide temporary supports and bracing as required to maintain position, stability, and alignment of units until permanent connections are completed.

1. Install temporary steel or plastic spacing shims as precast concrete units are being erected. Tack weld steel shims to each other to prevent shims from separating.

2. Maintain horizontal and vertical joint alignment and uniform joint width as erection progresses.

3. Unless otherwise indicated, maintain uniform joint widths of 3/4 inch.

C. Grouting or Dry-Packing Connections and Joints: Grout connections where required or indicated. Retain flowable grout in place until hard enough to support itself. Alternatively, pack spaces with stiff dry-pack grout material, tamping until voids are completely filled. Place grout and finish smooth, level, and plumb with adjacent concrete surfaces. Promptly remove grout material from exposed surfaces before it affects finishes or hardens. Keep grouted joints damp for not less than 24 hours after initial set.

3.03 ERECTION TOLERANCES

A. Erect architectural precast concrete units level, plumb, square, and in alignment without exceeding the noncumulative erection tolerances of PCI MNL 117, Appendix I.

3.04 REPAIRS

A. Repair architectural precast concrete units if permitted by Architect. Architect reserves the right to reject repaired units that do not comply with requirements.

B. Mix patching materials and repair units so cured patches blend with color, texture, and uniformity of adjacent exposed surfaces and show no apparent line of demarcation between original and repaired work, when viewed in typical daylight illumination from a distance of 20 feet.

C. Prepare and repair damaged galvanized coatings with galvanizing repair paint according to ASTM A 780/A 780M.

D. Remove and replace damaged architectural precast concrete units when repairs do not comply with requirements.

3.05 CLEANING

A. Clean surfaces of precast concrete units exposed to view.

B. Clean mortar, plaster, fireproofing, weld slag, and other deleterious material from concrete surfaces and adjacent materials immediately.

C. Clean exposed surfaces of precast concrete units after erection and completion of joint treatment to remove weld marks, other markings, dirt, and stains.

1. Perform cleaning procedures, if necessary, according to precast concrete fabricator's recommendations. Protect other work from staining or damage due to cleaning operations.
2. Do not use cleaning materials or processes that could change the appearance of exposed concrete finishes or damage adjacent materials.

END OF SECTION

DIVISION 04 – MASONRY

SECTION 04 20 00

UNIT MASONRY

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Concrete masonry units.
2. Mortar and grout.
3. Masonry-joint reinforcement.
4. Ties and anchors.
5. Embedded flashing.
6. Miscellaneous masonry accessories.
7. Masonry-cell fill.

B. Products Installed but not Furnished under This Section:

1. Steel lintels in unit masonry.
2. Steel shelf angles for supporting unit masonry.

C. Related Requirements:

1. Section 05 12 23 "Structural Steel Framing" for installing anchor sections of adjustable masonry anchors for connecting to structural steel frame.

1.02 REFERENCE STANDARDS

A. ACI 315-1999: Details and Detailing of Concrete Reinforcement

B. ASTM A 36/A 36M-08: Specification for Carbon Structural Steel

C. ASTM A 82/A 82M-07: Specification for Steel Wire, Plain, for Concrete Reinforcement

D. ASTM A 153/A 153M-09: Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

E. ASTM A 615/A 615M-12: Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

F. ASTM A 951/A 951M-11: Specification for Steel Wire for Masonry Joint Reinforcement

G. ASTM C 90-11b: Specification for Loadbearing Concrete Masonry Units

H. ASTM C 91/C 91M-12: Specification for Masonry Cement

I. ASTM C 109/C 109M-11b: Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens)

J. ASTM C 114-11b: Test Methods for Chemical Analysis of Hydraulic Cement

K. ASTM C 140-12: Test Methods for Sampling and Testing Concrete Masonry Units and Related Units

L. ASTM C 150/C 150M-12: Specification for Portland Cement

M. ASTM C 207-06 (Reapproved 2011): Specification for Hydrated Lime for Masonry Purposes

N. ASTM C 270-12a: Specification for Mortar for Unit Masonry

O. ASTM C 404-11: Specification for Aggregates for Masonry Grout

P. ASTM C 476-10: Specification for Grout for Masonry

Q. ASTM C 494/C 494M-11: Specification for Chemical Admixtures for Concrete

R. ASTM C 578-11b: Specification for Rigid, Cellular Polystyrene Thermal Insulation

S. ASTM C 780-11: Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry

T. ASTM C 1019-11: Test Method for Sampling and Testing Grout

U. ASTM C 1093-11: Practice for Accreditation of Testing Agencies for Unit Masonry

V. ASTM C 1314-11a: Test Method for Compressive Strength of Masonry Prisms

W. ASTM C 1506-09: Test Method for Water Retention of Hydraulic Cement-Based Mortars and Plasters

X. ASTM D 226/D 226M-09: Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing

Y. ASTM D 1056-07: Specification for Flexible Cellular Materials - Sponge or Expanded Rubber

Z. ASTM D 2000-12: Classification System for Rubber Products in Automotive Applications

AA. TMS 602/ACI 530.1/ASCE 6-2011: Specification for Masonry Structures

BB. NCMA TEK 8-4A-2005: Cleaning Concrete Masonry

1.03 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).

B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.04 SUBMITTALS

A. Product Data: For each type of product.

B. Qualification Data: For testing agency.

C. Samples: Submit four samples of facing brick units to illustrate color, texture, and extremes of color range.

D. Manufacturer's Certificates: Certify that masonry units meet or exceed specified requirements.

E. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91/C 91M for air content.

2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

F. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to TMS 602/ACI 530.1/ASCE 6.

G. Shop Drawings: For reinforcing steel. Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315. Show elevations of reinforced walls.

1.05 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM C 1093 for testing indicated.

B. Fire Rated Assemblies: Conform to applicable code for UL Assemblies as indicated on the contract documents.

C. 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 mockups for each type of exposed unit masonry construction in sizes approximately 96 inches long by 72 inches high by full thickness, including face and backup Wythe's and accessories.

2. Where masonry is to match existing, erect mockups adjacent and parallel to existing surface.

3. Clean exposed faces of mockups with masonry cleaner as indicated.

4. Protect accepted mockups from the elements with weather-resistant membrane.

5. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.

   a. Approval of mockups is also for other material and construction qualities specifically approved by Architect in writing.
   b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

6. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.

E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.07 FIELD CONDITIONS

A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

   1. Extend cover a minimum of 24 inches down both sides of walls, and hold cover securely in place.

   2. Where one Wythe of multiwythe masonry walls is completed in advance of other Wythes, secure cover a minimum of 24 inches down face next to unconstructed Wythe, and hold cover in place.

B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.

C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.

2. Protect sills, ledges, and projections from mortar droppings.

3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.

4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.

E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

PART 2 - PRODUCTS

2.01 UNIT MASONRY, GENERAL

A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6, except as modified by requirements in the Contract Documents.

B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work.

C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.

1. Where fire-resistance-rated construction is indicated, units shall be listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction.

2.02 BRICK UNITS

A. Facing Brick: ASTM C216, Type FBS, Grade SW.

1. Color and texture to match existing High School brick.

2. Nominal Size: As indicated on drawings.

2.03 CONCRETE MASONRY UNITS

A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.

1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.

2. Provide square-edged units for outside corners unless otherwise indicated.

B. CMUs: ASTM C 90.

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3050 psi.

2. Density Classification: Normal weight unless otherwise indicated.

3. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.

2.04 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150/C 150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C 114.

B. Hydrated Lime: ASTM C 207, Type S.

C. Aggregate for Mortar: ASTM C 144.

1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.

2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16sieve.

3. White-Mortar Aggregates: Natural white sand or crushed white stone.

4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

D. Aggregate for Grout: ASTM C 404.

E. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the work include, but are not limited to, the following:

a. BASF Corporation-Construction Systems.
b. Euclid Chemical Company; and RPM company; Accelguard 80.
c. Grace Construction Products; W.R. Grace & Co.; Morset

F. Water: Potable.

2.05 REINFORCEMENT

A. Uncoated-Steel Reinforcing Bars: ASTM A 615/A 615M, Grade 60

B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.

C. Masonry-Joint Reinforcement, General: ASTM A 951/A 951M.

1. Interior Walls: Mill- galvanized carbon steel.

2. Exterior Walls: Hot-dip galvanized carbon steel.

3. Wire Size for Side Rods: 0.148-inch diameter.

4. Wire Size for Cross Rods: 0.148-inch diameter.

5. Wire Size for Veneer Ties: 0.187-inch diameter.

6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.

7. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

D. Masonry-Joint Reinforcement for Single-Wythe Masonry: Ladder or truss type with single pair of side rods.

2.06 TIES AND ANCHORS

A. General: Ties and anchors shall extend at least 1-1/2 inches into veneer but with at least a 5/8-inch cover on outside face.

B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:

1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M, with ASTM A 153/A 153M, Class B-2 coating.

2. Steel Plates, Shapes, and Bars: ASTM A 36.

C. Adjustable Masonry-Veneer Anchors:

1. General: Provide anchors that allow vertical adjustment but resist a 100-lbf load in both tension and compression perpendicular to plane of wall without deforming or developing play in excess of 1/16 inch.

2. Fabricate sheet metal anchor sections and other sheet metal parts from 0.075-inch-thick steel sheet, galvanized after fabrication.

3. Fabricate wire ties from 0.187-inch-diameter, hot-dip galvanized-steel wire unless otherwise indicated.

4. Contractor's Option: Unless otherwise indicated, provide any of the adjustable masonry-veneer anchors specified.

5. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a rib-stiffened, sheet metal anchor section with screw holes top and bottom, with a projecting vertical tab having a slotted hole for inserting wire tie.
   a. Hohmann & Barnard, Inc.; BL-407 Anchor: www.h-b.com
   b. Substitutions: See Section 01 60 00 - Product Requirements.

6. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a corrosion-resistant, self-drilling, eye-screw designed to receive wire tie. Eye-screw has spacer that seats directly against framing and is same thickness as sheathing and has gasketed washer head that covers hole in sheathing.
   a. Basis of Design: Hohmann & Barnard, Inc.; 2-Seal Thermal Wing Nut Anchor: www.h-b.com
   b. Substitutions: See Section 01 60 00 - Product Requirements.

D. Strap Anchors for Masonry Anchorage to Existing Structural Steel: Adjustable steel strap anchor and slotted channel welded to face of existing steel with a 3/16 inch weld.

1. Manufacturers:
   a. Hohmann & Barnard, Inc.; 360 Gripstay Channel and 365 Bent Gripstay Anchor: www.h-b.com
   b. Substitutions: See Section 01 60 00 – Product Requirements.

2. Material: Hot-Dip Galvanized, ASTM A 153/ A 153M Class B.

3. Thickness: 14 Gauge, Minimum.

2.07 EMBEDDED FLASHING MATERIALS

A. Flexible Flashing: Use the following unless otherwise indicated:

1. Asphalt-Coated Copper Flashing: 5-oz. /sq. ft. copper sheet coated with flexible asphalt. Use only where flashing is fully concealed in masonry.
   a. Manufacturers:
      1) Advanced Building Products, Inc.; Copper Fabric Flashing: www.advancedbuildingproducts.com
      2) Hohmann & Barnard, Inc.; C-Fab Flashing: www.h-b.com

B. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

C. Termination Bars for Flexible Flashing: Stainless steel bars 1/8 inch by 1 inch.

2.08 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene.

B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

C. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D 226/D 226M, Type I (No. 15 asphalt felt).

D. Weep/Cavity Vent Products: Use the following unless otherwise indicated:

1. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch less than depth of outer Wythe, in color selected from manufacturer's standard.
   a. Wire-Bond; Cellvent 3601: wirebond.com
   b. MortarNet Solutions; CellVent Standard: mortarnet.com.

E. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.

1. Manufacturers:
   a. Wire-Bond; CavityNet DT (3611D): wirebond.com
   b. MortarNet Solutions; MortarNet MN 10-1 mortarnet.com

2. Configuration: Provide one of the following:
   a. Strips, full depth of cavity and 10 inches high, with dovetail-shaped notches 7 inches deep that prevent clogging with mortar droppings.

b. Strips, not less than 3/4 inch thick and 10 inches high, with dimpled surface designed to catch mortar droppings and prevent weep holes from clogging with mortar.

F. Drip Edge: Stainless steel; compatible with membrane and adhesives.

G. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.09 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.

2. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

B. At Contractor's option, mortar and grout may be field-mixed from packaged dry materials, made from factory premixed dry materials with addition of water only, or ready mixed.

C. Mortar for Unit Masonry: Comply with ASTM C 270, Property Specification. Provide the following types of mortar for applications stated unless another type is indicated.

1. Exterior Masonry Veneer: Type N.

2. Exterior Cavity Walls: Type S mortar with Type N pointing mortar.

3. Exterior, Non-loadbearing Masonry: Type N.

4. Interior, Loadbearing Masonry: Type N.

5. Interior, Non-loadbearing Masonry: Type O.

D. Grout Mix Designs:

1. Bond Beams: 2,000 psi strength at 28 days; 8-10 inches slump; provide premixed type in accordance with ASTM C 476.
   a. Fine grout for spaces with smallest horizontal dimension of 2 inches or less.
   b. Coarse grout for spaces with smallest horizontal dimension greater than 2 inches.

2. Engineered Masonry: 2,000 psi strength at 28 days; 8-10 inches slump; provide premixed type in accordance with ASTM C 476.
   a. Fine grout for spaces with smallest horizontal dimension of 2 inches or less.

b. Coarse grout for spaces with smallest horizontal dimension greater than 2 inches.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

2. Verify that foundations are within tolerances specified.

3. Verify that reinforcing dowels are properly placed.

4. Verify that substrates are free of substances that impair mortar bond.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION, GENERAL

A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-Wythe walls to actual widths of masonry units, using units of widths indicated.

B. Build chases and recesses to accommodate items specified in this and other Sections.

C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.

D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.

F. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.

3.03 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch or minus 1/4 inch.

2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.

3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet, or 1/2-inch maximum.

2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.

3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.

4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.

5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.

6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet or 1/2-inch maximum.

7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.

2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.

3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.

4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.

5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

3.04 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.

C. Lay concealed masonry with all units in a Wythe in running bond or bonded by lapping not less than 4 inches. Bond and interlock each course of each Wythe at corners. Do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.

D. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.

H. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

I. Build nonload-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.

1. Install compressible filler in joint between top of partition and underside of structure above.

2. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide 1/2-inch clearance between end of anchor rod and end of tube. Space anchors 48 inches o.c. unless otherwise indicated.

3. Wedge nonload-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.

4. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Section 07 84 00 "Firestopping."

3.05 MORTAR BEDDING AND JOINTING

A. Lay CMUs as follows:

1. Bed face shells in mortar and make head joints of depth equal to bed joints.

2. Bed webs in mortar in all courses of piers, columns, and pilasters.

3. Bed webs in mortar in grouted masonry, including starting course on footings.

4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.

5. Fully bed units and fill cells with mortar at anchors and ties as needed to fully embed anchors and ties in mortar.

B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

C. Lay structural clay tile as follows:

1. Lay vertical-cell units with full head joints unless otherwise indicated. Provide bed joints with full mortar coverage on face shells and webs.

2. Lay horizontal-cell units with full bed joints unless otherwise indicated. Keep drainage channels, if any, free of mortar. Form head joints with sufficient mortar so excess will be squeezed out as units are placed in position. Butter both sides of units to be placed, or butter one side of unit already in place and one side of unit to be placed.

3. Maintain joint thicknesses indicated except for minor variations required to maintain bond alignment. If not indicated, lay walls with 1/4- to 3/8-inch-thick joints.

D. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

E. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

F. Cut joints flush where indicated to receive cavity wall insulation or air barriers unless otherwise indicated.

3.06 CAVITY WALLS

A. Bond Wythes of cavity walls together as follows:

1. Individual Metal Ties: Provide ties as shown installed in horizontal joints, but not less than one metal tie for 2.67 sq. ft. of wall area spaced not to exceed 24 inches o.c. horizontally and 16 inches o.c. vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches of openings and space not more than 36 inches apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24 inches o.c. vertically.
   a. Where bed joints of Wythes do not align, use adjustable-type (two-piece-type) ties.

2. Masonry-Veneer Anchors: Comply with requirements for anchoring masonry veneers.

B. Bond Wythes of cavity walls together using bonding system indicated on Drawings.

C. Keep cavities clean of mortar droppings and other materials during construction. Bevel beds away from cavity, to minimize mortar protrusions into cavity. Do not attempt to trowel or remove mortar fins protruding into cavity.

D. Installing Cavity Wall Insulation: Place small dabs of adhesive, spaced approximately 12 inches o.c. both ways, on inside face of insulation boards, or attach with plastic fasteners designed for this purpose. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside Wythe of masonry or other construction as shown.

1. Fill cracks and open gaps in insulation with crack sealer compatible with insulation and masonry.

3.07 ANCHORED MASONRY VENEERS

A. Anchor masonry veneers to wall framing or concrete and masonry backup with masonry-veneer anchors to comply with the following requirements:

1. Fasten screw-attached anchors through sheathing to wall framing and to concrete and masonry backup with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.

2. Embed tie sections in masonry joints.

3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.

4. Space anchors as indicated, but not more than 16 inches o.c. vertically and 25 inches o.c. horizontally, with not less than one anchor for each 2.67 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 36 inches, around perimeter.

B. Provide not less than 1 inch of airspace between back of masonry veneer and face of insulation.

1. Keep airspace clean of mortar droppings and other materials during construction. Bevel beds away from airspace, to minimize mortar protrusions into airspace. Do not attempt to trowel or remove mortar fins protruding into airspace.

3.08 MASONRY-CELL FILL

A. Molded-polystyrene insulation inserts shall be pre-installed by CMU manufacturer prior to delivery to jobsite.

B. Unless otherwise indicated on Construction Documents, inserts shall be left in place when grouting.

3.09 MASONRY-JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.

1. Space reinforcement not more than 16 inches o.c.

2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.

3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings.

B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

C. Provide continuity at wall intersections by using prefabricated T-shaped units.

D. Provide continuity at corners by using prefabricated L-shaped units.

E. Cut and bend reinforcing units as directed by manufacturer for continuity at corners, returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

F. Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete, to comply with the following:

1. Provide an open space not less than 1/2 inch wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.

2. Anchor masonry with anchors embedded in masonry joints and attached to structure.

3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.

3.10 CONTROL AND EXPANSION JOINTS

A. General: Install control- and expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.

B. Form control joints in concrete masonry using one of the following methods:

1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout, and rake out joints in exposed faces for application of sealant.

2. Install preformed control-joint gaskets designed to fit standard sash block.

3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar, or rake out joint for application of sealant.

4. Install temporary foam-plastic filler in head joints, and remove filler when unit masonry is complete for application of sealant.

C. Form expansion joints in brick as follows:

1. Build flanges of metal expansion strips into masonry. Lap each joint 4 inches in direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints if any.

2. Build flanges of factory-fabricated, expansion-joint units into masonry.

3. Build in compressible joint fillers where indicated.

4. Form open joint full depth of brick Wythe and of width indicated, but not less than 3/8 inch for installation of sealant and backer rod specified in Section 07 92 00 "Joint Sealants."

D. Provide horizontal, pressure-relieving joints by either leaving an airspace or inserting a compressible filler of width required for installing sealant and backer rod specified in Section 07 92 00 "Joint Sealants," but not less than 3/8 inch.

1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

3.11 LINTELS

A. Install steel lintels where indicated.

B. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.

3.12 FLASHING, WEEP HOLES, AND CAVITY VENTS

A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated. Install cavity vents at shelf angles, ledges, and other obstructions to upward flow of air in cavities, and where indicated.

B. Install flashing as follows unless otherwise indicated:

1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.

2. At multiwythe masonry walls, including cavity walls, extend flashing through outer Wythe, turned up a minimum of 8 inches, and through inner Wythe to within 1/2 inch of the interior face of wall in exposed masonry. Where interior face of wall is to receive furring or framing, carry flashing completely through inner Wythe and turn flashing up approximately 2 inches on interior face.

3. At masonry-veneer walls, extend flashing through veneer, across airspace behind veneer, and up face of sheathing at least 8 inches; with upper edge tucked under air barrier, lapping at least 4 inches. Fasten upper edge of flexible flashing to sheathing through termination bar.

4. At lintels and shelf angles, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.

5. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Section 07 92 00 "Joint Sealants" for application indicated.

6. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall, and adhere flexible flashing to top of metal drip edge.

C. Install regrets and nailers for flashing and other related construction where they are shown to be built into masonry.

D. Install weep holes in exterior Wythes and veneers in head joints of first course of masonry immediately above embedded flashing.

1. Use specified weep/cavity vent products to form weep holes.

2. Space weep holes 24 inches o.c. unless otherwise indicated.

E. Place cavity drainage material in airspace behind veneers to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.

F. Install cavity vents in head joints in exterior Wythes at spacing indicated. Use specified weep/cavity vent products to form cavity vents.

3.13 REINFORCED UNIT MASONRY INSTALLATION

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.

1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.

2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and that of other loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.

2. Limit height of vertical grout pours to not more than 60 inches.

3.14 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

B. Testing Prior to Construction: One set of tests.

C. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.

D. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.

E. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.

F. Mortar Test (Property Specification): For each mix provided, according to ASTM C 780. Test mortar for compressive strength.

G. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.

H. Prism Test: For each type of construction provided, according to ASTM C 1314 at 7 days and at 28 days.

3.15 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.

2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.

3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.

4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.

5. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

3.16 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

B. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.

1. Crush masonry waste to less than 4 inches in each dimension.

2. Mix masonry waste with at least two parts of specified fill material for each part of masonry waste. Fill material is specified in Section 31 20 00 "Earth Moving."

3. Do not dispose of masonry waste as fill within 18 inches of finished grade.

C. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.

D. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION

DIVISION 05 – METALS

SECTION 05 12 00

STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Structural shapes, plates, and bars.
2. Bolts, connectors, and anchors.
3. Grout.
4. Connection Design

B. Related Requirements:

1. Section 07 84 43 – Joint Firestopping

1.2 PERFORMANCE REQUIREMENTS

A. Structural Performance: Structural Steel Connections shall be selected, completed or designed by the fabricator to withstand the design loads indicated.

B. Delegated Engineering Responsibility. Structural Steel Connection Design is delegated by the Engineer of Record (EOR) to a qualified licensed professional engineer retained by the structural steel fabricator. The Connection Design Engineer retained by the fabricator shall prepare calculations, shop drawings, and other structural design details for submission to the Engineer of Record with the fabricator's structural steel shop drawings.

1.3 RELATED SECTIONS

A. Section 01 45 33 – Code Required Special Inspections

B. Section 05 31 00 – Fluted Steel Decks

C. Section 05 50 00 – Metal Fabrications

D. Section 05 51 13 – Metal Pan Stairs

1.4 REFERENCE STANDARDS

A. American Institute of Steel Construction:

1. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges.

2. AISC 341 - Seismic Provisions for Structural Steel Buildings.

3. AISC 360 - Specification for Structural Steel Buildings.

B. ASTM International:

1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.

2. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

3. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished.

4. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

5. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.

6. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

7. ASTM A354 - Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs, and Other Externally Threaded Fasteners.

8. ASTM A449 - Standard Specification for Quenched and Tempered Steel Bolts and Studs.

9. ASTM A490 - Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength.

10. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

11. ASTM A514/A514M - Standard Specification for High-Yield-Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding.

12. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.

13. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.

14. ASTM A588/A588M - Standard Specification for High-Strength Low-Alloy Structural Steel with 50 ksi (345 MPa) Minimum Yield Point to 4-in. (100-mm) Thick.

15. ASTM A618/A618M - Standard Specification for Hot-Formed Welded and Seamless High-Strength Low-Alloy Structural Tubing.

16. ASTM A852/A852M - Standard Specification for Quenched and Tempered Low-Alloy Structural Steel Plate with 70 ksi (485 MPa) Minimum Yield Strength to 4 in. (100 mm) Thick.

17. ASTM A992/A992M - Standard Specification for Structural Steel Shapes.

18. ASTM E94 - Standard Guide for Radiographic Examination.

19. ASTM E164 - Standard Practice for Ultrasonic Contact Examination of Weldments.

20. ASTM E165 - Standard Test Method for Liquid Penetrant Examination.

21. ASTM E709 - Standard Guide for Magnetic Particle Examination.

22. ASTM F436 - Standard Specification for Hardened Steel Washers.

23. ASTM F959 - Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners.

24. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.

25. ASTM F1852 - Standard Specification for Twist-Off Type Tension Control Structural Bolt/Nut/Washer Assemblies, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

26. ASTM F2329 - Standard Specification for Zinc Coating, Hot-Dip, Requirements for Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts, and Special Threaded Fasteners.

C. American Welding Society:

1. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.

2. AWS D1.1 - Structural Welding Code - Steel.

D. Research Council on Structural Connections:

1. RCSC - Specification for Structural Joints Using ASTM F3125 Grades A325 or A490 Bolts.

E. SSPC: The Society for Protective Coatings:

1. SSPC - Steel Structures Painting Manual.

2. SSPC Paint 15 - Steel Joist Shop Paint.

3. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic).

4. SSPC SP 3 - Power Tool Cleaning.

5. SSPC SP 6 - Commercial Blast Cleaning.

6. SSPC SP 10 - Near-White Blast Cleaning.

1.5 SUBMITTALS

A. Section 01 25 00 - Submittal Procedures: Requirements for submittals.

B. Shop Drawings shall include the following:

1. Indicate profiles, sizes, spacing, and locations of structural members, openings, attachments, and bolts.

2. Connection details.

3. Cambers and loads.

4. Indicate welded connections with AWS A2.4 welding symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.

5. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify high strength bolted slip-critical, direct-tension, or tensioned shear/bearing connections.

6. Submit details of all moment connections and other non-standard connections not covered by standard details, signed and sealed by a Professional Engineer for approval prior to fabrication.

7. Submit a signed and sealed letter stating that all shop fabrication drawings have been prepared and reviewed under the connection Design Engineer’s supervision.

C. Manufacturer's Mill Certificates: Certify products meet or exceed specified requirements.

D. Mill Test Reports: Submit indicating structural strength, destructive and non-destructive test analysis.

E. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification.

F. Qualification data for firms and persons specified in the Qualifications section documenting compliance with the specified requirements.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with the following:

1. Structural Steel: AISC 303, ASIC 341 and AISC 360.

2. High Strength Bolted Connections: AISC Specification for Structural Joints Using ASTM A325 or A490 Bolts.

3. Perform Work in accordance with IBC 2015.

1.7 QUALIFICATIONS

A. Fabricator: Company specializing in performing Work of this section with minimum 5 years documented experience with any of the following current AISC Certification:

1. Standard Steel Building Structures (STD).

2. Conventional Steel Building Structures (SBD).

3. Complex Steel Building Structures (CBD).

B. Erector: Company specializing in performing Work of this section with minimum 5 years documented experience with any of the following current AISC Certification:

1. Certified Steel Erector (CSE).

2. Advanced Certified Steel Erector (ACSE).

C. Shop Painter: Company specializing in performing Work of this section with minimum 5 years documented experience with any the following current AISC Certification:

1. Sophisticated Paint Endorsement - Enclosed (P1).

2. Sophisticated Paint Endorsement - Covered (P2).

3. Sophisticated Paint Endorsement - Outside (P3).

4. Welders and Welding Procedures: AWS D1.1 qualified.

D. Professional Engineer Qualifications: Current active registration in New York State with experience with structural steel framing connection design similar to that indicated and shown in the contract drawings.

1.8 CONNECTIONS

A. All connections shall conform to AISC Steel Construction Manual.

B. Retain a Professional Engineer to be responsible for the design of connections not specifically designed and detailed by the Engineer of Record (EOR).

C. For all framed beam shear connections, use end plate (shop welded), single angle or double angle header connections (shop bolted or welded) or shear tabs where practical.

D. Framed beam shear connections shall not be less than one half of the depth of the connected member.

E. All connections shall be designed and detailed to resist connection forces provided on the Structural Drawings. Where these forces are not provided or unless shown otherwise on the Structural drawings, connect all simply supported non-composite flexural members (beams, channels, etc.) at each end for one half of the total uniformly distributed factored load of the laterally supported beam. For composite beams, increase connection load at each end to 75 % of the total uniformly distributed factored load on the steel section only.

F. Connect for the factored moment where shown on the structural design drawings. Design connections for eccentricities where shown on the structural design drawings.

G. For spandrel beams, provide full depth web connection or top and bottom flange clips where detailed and shown on structural design drawings.

H. Provide reinforcement of unconnected sides of HSS members, where detailed and shown on the structural design drawings.

I. Bolted connections shall be bearing-type unless otherwise shown on the structural design drawings. Use of oversize holes shall be subject to approval and such connections shall be detailed as slip-critical.

J. Vertical and Horizontal Bracings. Connect all tension and compression members for the axial force shown on the drawings plus the shear force due to direct member loading, if applicable.

K. Prior to erection diagram review, the fabricator is to be provided the necessary information to locate punched or drilled holes from (9/16”) to (15/16”) diameter for other trades to attach blocking or other material where shown on structural design drawings.

L. Provide holes for pipes and ducts as indicated on structural design drawings and reinforce only those as detailed and shown on the structural design drawings. Cutting holes in any structural steel member in the field is not permitted without the written approval of the Engineer of Record.

M. Structural steel members shall not be spliced unless approved by the EOR in writing. Except for splices shown on structural design drawings, do not splice vertical and horizontal members unless necessary to accommodate shipping lengths or material availability. Ensure that splice connections develop the factored load at the splice location of the member unless otherwise indicated on the drawings.

PART 2 - PRODUCTS

2.1 STRUCTURAL STEEL

A. Structural W-Shapes and WT-Shapes: ASTM A992/A992M. ASTM A572/A572M; Grade 50. ASTM A913/A913M; Grade 50.

B. Structural WT-Shapes: Cut from structural W-shapes.

C. Channels and Angles: ASTM A36/A36M.

D. Round Hollow Structural Sections: ASTM A500/A500M, Grade B.

E. Rectangular Hollow Structural Sections: ASTM A500/A500M, Grade B.

F. Structural Pipe: ASTM A53/A53M, Grade B.

G. Structural Plates and Bars: ASTM A36/A36M.

H. Floor Plates: ASTM A786/A786M raised pattern.

I. Sliding Bearing Plates: Teflon coated.

2.2 BOLTS, CONNECTORS, AND ANCHORS

A. Bolts: Heavy hex, structural type

1. ASTM A325; Type 1, plain, or hot dipped.

B. Nuts: ASTM A563; heavy hex type.

1. Finish: Plain or Hot dipped galvanized.

C. Heavy hex, structural type.

1. ASTM A325; Type 1, plain, or hot dipped.

D. Washers: ASTM F436; Type 1, beveled. Furnish clipped washers where space limitations require.

1. Finish: Plain or Hot dipped galvanized.

E. Compressible-Washer-Type Direct Tension Indicators: ASTM F959; Type 325.

1. Finish: Mechanically galvanized.

F. Tension Control Assemblies: ASTM F1852; Type 1, heavy hex head, twist off type; complete with washers and heavy hex nuts.

1. Finish: Unfinished.

G. Anchor Rods: ASTM F1554; Grade 36.

1. Shape: Hooked or Straight.

2. Plate Washers: ASTM A36/A36M.

H. Threaded Rods: ASTM A36/A36M.

1. Finish: Hot dipped galvanized.

I. Forged Structural Steel Hardware:

1. Clevises and Turnbuckles: ASTM A108; Grade 1085.

2. Eye Nuts and Eye Bolts: ASTM A108; Grade 1030.

3. Sleeve Nuts: ASTM A108; Grade 1018.

4. Rod Ends, Yoke Ends and Pins, Cotter Pins, and Coupling Nuts: Carbon steel.

2.3 WELDING MATERIALS

A. Welding Materials: AWS D1.1; type required for materials

2.4 FABRICATION

A. Continuously seal joined members by intermittent welds and plastic filler. Continuous welds. Grind exposed welds smooth.

B. Fabricate connections for bolt, nut, and washer connectors.

C. Develop required camber for members.

2.5 FINISHES

A. Items noted to by “Architecturally Exposed Structural Steel” to be prepared and finished in accordance with the High-Performance Coatings Specification.

B. Unless noted otherwise, prepare structural component surfaces in accordance with SSPC SP-3.

C. Shop prime structural steel members to a dry film thickness not less than 1.5 mils. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete, or at slip critical faying surfaces
.

1. Primer: Fabricator’s standard lead, chromate, and asphalt free, rust inhibiting primer compatible with architectural finishes.

D. Galvanizing: ASTM A123/A123M; hot dip galvanize after fabrication.

1. Galvanizing for Bolts, Connectors, and Anchors:
   a. Hot-Dipped Galvanizing:
   b. Bolts, Nuts, and Washers: ASTM F2329.

2. Connectors and Anchors: ASTM A153/A153M.
   a. Mechanical Galvanizing: ASTM B695; Class 50 minimum.

2.6 ACCESSORIES

A. Grout: Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing minimum compressive strength of 7,000 psi at 28 days.

1. Shop Primer: SSPC Paint 15, Type 1, red oxide.

2. Touch-Up Primer: Match shop primer.

2.7 SOURCE QUALITY CONTROL

A. Section 01 40 00 – Quality Requirements: Testing, inspection and analysis requirements.

1. Shop test bolted and welded connections as specified for field quality control tests.

2. When fabricator is approved by authority having jurisdiction, submit certificate of compliance indicating Work performed at fabricator’s facility conforms to Contract Documents.

3. Specified shop tests are not required for Work performed by approved fabricator.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 73 00 – Execution: Requirements for installation examination.

B. Verify bearing surfaces are at correct elevation.

C. Verify anchors rods are set in correct locations and arrangements with correct exposure for steel attachment.

3.2 PREPARATION

A. Section 01 73 00 – Execution: Requirements for installation preparation.

1. Furnish templates for installation of anchor rods and embedment in concrete and masonry work.

3.3 ERECTION

A. Allow for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in alignment until completion of erection and installation of permanent bracing.

1. Field weld components indicated on shop drawings.

2. Field connect members with threaded fasteners; tighten to snug tight for bearing type connections.

3. Do not field cut or alter structural members without approval of Architect/Engineer.

4. After erection, touch up welds and abrasions to match shop finishes.

3.4 GROUT INSTALLATION

A. Remove defective concrete, laitance, dirt, oil, grease and other foreign material from concrete surfaces by brushing, hammering, chipping or other similar means until sound, clean concrete surface is achieved.

1. Rough concrete lightly, but not enough to interfere with placement of grout.

2. Remove foreign materials from metal surfaces in contact with grout.

3. Align, level and maintain final positioning of components to be grouted.

4. Saturate concrete surfaces with clean water; remove excess water, leave none standing.

5. Shim bearing plates and equipment supports to proper elevation as shown on drawings, snug tighten anchor bolts.

6. Fill void under bearing surface with grout. Install and pack grout to remove air pockets.

7. Moist cure grout.

8. Remove forms after grout is set. Trim grout edges to from smooth surface, splayed 45 degrees.

9. Tighten anchor bolts after grout has cured for a minimum of 3 days.

3.5 TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

1. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

2. Maximum Offset From Alignment: 1/4 inch.

3.6 FIELD QUALITY CONTROL

A. Section 01 45 33 – Code Required Special Inspections and Testing.

1. Section 01 73 00 - Execution: Requirements for testing, adjusting, and balancing.

2. Bolted Connections: Inspect in accordance with AISC 303.
   a. Visually inspect all bolted connections.
   b. For Direct Tension Indicators, comply with requirements of ASTM F959. Verify that gaps are less than gaps specified in Table 2.

3. Welding: Inspect welds in accordance with AWS D1.1.
   a. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
   b. Visually inspect all welds.
   c. Ultrasonic Inspection: ASTM E164; perform on all full penetration welds.
   d. Liquid Penetrant Inspection: ASTM E165.
   e. Magnetic Particle Inspection: ASTM E709.
   f. Radiographic Inspection: ASTM E94.
   g. Correct defective bolted connections and welds.

END OF SECTION

SECTION 05 50 00

METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid metal plates.

2. Loose bearing and leveling plates for applications where they are not specified in other Sections.

B. Products furnished, but not installed, under this Section include the following:

1. Loose steel lintels.

2. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.

C. Related Requirements:

1. Section 04 20 00 "Unit Masonry" for installing loose lintels, anchor bolts, and other items built into unit masonry.

1.2 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.3 ACTION SUBMITTALS

A. Product Data: For the following:

1. Fasteners.

2. Shop primers.

B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for the following:

1. Metal plates.

2. Loose steel lintels.

1.4 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel in accordance with the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."

1.5 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls, floor slabs, decks, and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 METALS

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

B. Steel Plates, Shapes, and Bars: ASTM A36/A36M.

C. Aluminum Plate and Sheet: ASTM B209 (ASTM B209M), Alloy 6061-T6.

D. Aluminum Extrusions: ASTM B221 (ASTM B221M), Alloy 6063-T6.

2.2 FASTENERS

A. General: Unless otherwise indicated, provide Type 304 stainless steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.

1. Provide stainless steel fasteners for fastening aluminum

B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A (ASTM F568M, Property Class 4.6); with hex nuts, ASTM A563 (ASTM A563M); and, where indicated, flat washers.

2.3 MISCELLANEOUS MATERIALS

A. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.

B. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

C. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.

D. Shrinkage-Resistant Grout: Factory-packaged, nonmetallic, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.4 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Form exposed work with accurate angles and surfaces and straight edges.

E. Weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

2. Obtain fusion without undercut or overlap.

3. Remove welding flux immediately.

4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.

G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches (3.2 by 38 mm), with a minimum 6-inch (150-mm) embedment and 2-inch (50-mm) hook, not less than 8 inches (200 mm) from ends and corners of units and 24 inches (600 mm) o.c., unless otherwise indicated.

2.5 LOOSE BEARING AND LEVELING PLATES

A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.

B. Galvanize bearing and leveling plates.

C. Prime plates with zinc-rich primer.

2.6 LOOSE STEEL LINTELS

A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.

B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span, but not less than 8 inches (200 mm) unless otherwise indicated.

C. Galvanize and prime loose steel lintels located in exterior walls.

2.7 GENERAL FINISH REQUIREMENTS

A. Finish metal fabrications after assembly.

B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.8 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products.

1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean galvanized surfaces of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.

2.9 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, Class I, AA-M12C22A41.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

2. Obtain fusion without undercut or overlap.

3. Remove welding flux immediately.

4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

F. Corrosion Protection: Coat concealed surfaces of aluminum that come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:

1. Cast Aluminum: Heavy coat of bituminous paint.

2. Extruded Aluminum: Two coats of clear lacquer.

3.2 REPAIRS

A. Touchup Painting:

1. Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
   a. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

END OF SECTION

DIVISION 06-09 – NOT USED

DIVISIONS 10 - SPECIALTIES

SECTION 10 14 19

DIMENSIONAL LETTER SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Dimensional characters.
   a. Cast dimensional characters.

1.2 ACTION 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 at least half size

C. 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. Dimensional Characters: Half-size Sample of each type of dimensional character.

D. Product Schedule: For dimensional letter signs. Use same designations as existing, as indicated on Drawings or specified.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.4 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.

1.5 DIMENSIONAL CHARACTERS

A. Cast Characters: Characters with uniform faces, sharp corners, and precisely formed lines and profiles, and as follows:

1. Character Material: Cast aluminum

2. Character Height: refer to drawings

3. Thickness: refer to drawings

4. Finishes: per Section 1.10

5. Mounting: Concealed studs

6. Typeface: ClarendonURW-BolCon, with customized ‘R’ to match existing campus signage.

1.6 DIMENSIONAL CHARACTER MATERIALS

A. Aluminum Castings: ASTM B26/B26M, alloy and temper recommended by sign manufacturer for casting process used and for type of use and finish indicated.

B. Aluminum Extrusions: ASTM B221 alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.

1.7 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 stainless steel or hot-dip galvanized devices unless otherwise indicated.

3. Exposed Metal-Fastener Components, General:
   a. Fabricated from same basic metal and finish of fastened metal unless otherwise indicated.

B. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.

1.8 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. Internally brace dimensional characters for stability, to meet structural performance loading without oil-canning or other surface deformation, and for securing fasteners.

6. 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.

7. 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.

1.9 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. Organic, Anodic, and Chemically Produced Finishes: Apply to formed metal after fabrication but before applying contrasting polished finishes on raised features unless otherwise indicated.

1.10 ALUMINUM FINISHES

A. Color Anodic Finish: AAMA 611, Class II, 0.010 mm or thicker.

B. To be an Orange color from manufacturer's full range -provide samples similar in shade to Sherwin Williams - Spicy Hue SW6342. Final selection to be made by Architect.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

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. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF DIMENSIONAL CHARACTERS

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.

3.3 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

DIVISION 11-22 – NOT USED

DIVISION 23 – HEATING, VENTILATING, AND AIR CONDITIONING

SECTION 23 05 23.12

BALL VALVES FOR HVAC PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Brass ball valves.
2. Bronze ball valves.
3. Steel ball valves,
4. Iron ball valves.

1.2 DEFINITIONS

A. CWP: Cold working pressure.

B. RPTFE: Reinforced polytetrafluoroethylene.

C. SWP: Steam working pressure.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of valve.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Prepare valves for shipping as follows:

1. Protect internal parts against rust and corrosion.
2. Protect threads, flange faces, and weld ends.
3. Set ball valves open to minimize exposure of functional surfaces.

B. Use the following precautions during storage:

1. Maintain valve end protection.

2. Store valves indoors and maintain at higher-than-ambient-dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.

C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use operating handles or stems as lifting or rigging points.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain each type of valve from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. ASME Compliance:

1. ASME B1.20.1 for threads for threaded-end valves.

2. ASME B16.1 for flanges on iron valves.

3. ASME B16.5 for flanges on steel valves.

4. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.

5. ASME B16.18 for cast copper solder-joint connections.

6. ASME B16.22 for wrought copper and copper alloy solder-joint connections.

7. ASME B16.34 for flanged and threaded end connections.

B. Provide bronze valves made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.

C. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.

D. Valve Sizes: Same as upstream piping unless otherwise indicated.

E. Valve Actuator Types:

1. Hand Lever: For quarter-turn valves smaller than NPS 4 (DN 100).

F. Valves in Insulated Piping:

1. Provide 2-inch (50-mm) extended neck stems.

2. Extended operating handles with nonthermal-conductive covering material, and protective sleeves that allow operation of valves without breaking vapor seals or disturbing insulation.

3. Memory stops that are fully adjustable after insulation is applied.

G. Valve Bypass and Drain Connections: MSS SP-45.

2.3 BRASS BALL VALVES

A. Brass Ball Valves, One Piece:

1. Standard: MSS SP-110.

2. CWP Rating: 400 psig (2760 kPa).

3. Body Design: One piece.

4. Body Material: Forged brass.

5. Ends: Threaded.

6. Seats: PTFE.

7. Stem: Brass.

8. Ball: Chrome-plated brass.

9. Port: Reduced.

B. Brass Ball Valves, Two Piece with Full Port and Stainless Steel Trim, Threaded Ends or Soldered Ends:

1. Standard: MSS SP-110.

2. SWP Rating: 150 psig (1035 kPa).

3. CWP Rating: 600 psig (4140 kPa).

4. Body Design: Two piece.

5. Body Material: Forged brass.

6. Ends: Threaded or soldered.

7. Seats: PTFE.

8. Stem: Stainless steel.

9. Ball: Stainless steel, vented.

10. Port: Full.

2.4 BRONZE BALL VALVES

A. Bronze Ball Valves, One Piece with Bronze Trim, Threaded Ends:

1. Standard: MSS SP-110.
2. CWP Rating: 400 psig (2760 kPa).
3. Body Design: One piece.
4. Body Material: Bronze.
5. Ends: Threaded.
6. Seats: PTFE.
7. Stem: Bronze.
8. Ball: Chrome-plated brass.
9. Port: Reduced.

B. Bronze Ball Valves, One Piece with Stainless Steel Trim, Threaded Ends:

1. Standard: MSS SP-110.
2. CWP Rating: 600 psig (4140 kPa).
3. Body Design: One piece.
4. Body Material: Bronze.
5. Ends: Threaded.
6. Seats: PTFE.
7. Stem: Stainless steel.
8. Ball: Stainless steel, vented.
9. Port: Reduced.

C. Bronze Ball Valves, Two Piece with Full Port and Stainless Steel Trim, Threaded or Soldered Ends:

1. Standard: MSS SP-110.
2. SWP Rating: 150 psig (1035 kPa).

3. CWP Rating: 600 psig (4140 kPa).
4. Body Design: Two piece.
5. Body Material: Bronze.
6. Ends: Threaded or soldered.
7. Seats: PTFE.
8. Stem: Stainless steel.
9. Ball: Stainless steel, vented.
10. Port: Full.

2.5 STEEL BALL VALVES

A. Steel Ball Valves with Full Port and Stainless Steel Trim, Class 150:

1. Standard: MSS SP-72.
2. CWP Rating: 285 psig (1964 kPa).
3. Body Design: Split body.
4. Body Material: Carbon steel, ASTM A216/A216M, Type WCB.
5. Ends: Flanged.
6. Seats: PTFE.
7. Stem: Stainless steel.
8. Ball: Stainless steel, vented.
9. Port: Full.

2.6 IRON BALL VALVES

A. Iron Ball Valves, Class 125:

1. Standard: MSS SP-72.
2. CWP Rating: 200 psig (1380 kPa).
3. Body Design: Split body.
4. Body Material: ASTM A126, gray iron.

5. Ends: Flanged.

6. Seats: PTFE.

7. Stem: Stainless steel.

8. Ball: Stainless steel.

9. Port: Full.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.

B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.

C. Examine threads on valve and mating pipe for form and cleanliness.

D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.

E. Do not attempt to repair defective valves; replace with new valves. Remove defective valves from site.

3.2 INSTALLATION OF VALVES

A. Install valves with unions or flanges at each piece of equipment arranged to allow space for service, maintenance, and equipment removal without system shutdown.

B. Provide support of piping adjacent to valves such that no force is imposed upon valves.

C. Locate valves for easy access.

D. Install valves in horizontal piping with stem at or above center of pipe.

E. Install valves in position to allow full valve actuation movement.

F. Valve Tags: Comply with requirements in Section 230553 "Identification for HVAC Piping and Equipment" for valve tags and schedules.

G. Adhere to manufacturer's written installation instructions. When soldering or brazing valves, do not heat valves above maximum permitted temperature. Do not use solder with melting point temperature above valve manufacturer's recommended maximum.

3.3 ADJUSTING

A. Adjust or replace valve packing after piping systems have been tested and put into service, but before final adjusting and balancing. Replace valves exhibiting leakage.

3.4 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

A. If valves with specified SWP classes or CWP ratings are unavailable, provide the same types of valves with higher SWP classes or CWP ratings.

B. Select valves with the following end connections:

1. For Copper Tubing, NPS 2 (DN 50) and Smaller: Threaded ends except where solder-joint valve-end option or press-end option is indicated in valve schedules below.

2. For Copper Tubing, NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Flanged ends except where threaded valve-end option is indicated in valve schedules below.

3. For Copper Tubing, NPS 5 (DN 125) and Larger: Flanged ends.

4. For Steel Piping, NPS 2 (DN 50) and Smaller: Threaded ends.

5. For Steel Piping, NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Flanged ends except where threaded valve-end option is indicated in valve schedules below.

6. For Steel Piping, NPS 5 (DN 125) and Larger: Flanged ends.

7. For Stainless Steel Piping, NPS 2 (DN 50) and Smaller: Threaded ends.

8. For Stainless Steel Piping,NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Flanged ends.

3.5 CONDENSER-WATER VALVE SCHEDULE

A. Pipe NPS 2 (DN 50) and Smaller: Brass or bronze ball valves, two with stainless steel trim, full port, and threaded or solder-joint ends.

1. Valves may be provided with solder-joint ends instead of threaded ends.

B. Pipe NPS 2-1/2 (DN 65) and Larger:

1. Iron ball valves, Class 125.
   a. Iron Valves, NPS 2-1/2 to NPS 4 (DN 65 to DN 100): May be provided with threaded ends instead of flanged ends.

2. Steel ball valves, Class 150.

END OF SECTION

SECTION 23 05 29

HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

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. Metal pipe hangers and supports.
2. Trapeze pipe hangers.
3. Metal framing systems.
4. Thermal-hanger shield inserts.
5. Fastener systems.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show fabrication and installation details and include calculations for the following; include Product Data for components:

1. Trapeze pipe hangers.
2. Metal framing systems.
3. Pipe stands.

1.4 INFORMATIONAL SUBMITTALS

A. Welding certificates.

1.5 QUALITY ASSURANCE

A. Structural-Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: Hangers and supports for HVAC piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.

1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.

2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

2.2 METAL PIPE HANGERS AND SUPPORTS

A. Carbon-Steel Pipe Hangers and Supports:

1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.

2. Galvanized Metallic Coatings: Pregalvanized, hot-dip galvanized, or electro-galvanized.

3. Nonmetallic Coatings: Plastic coated, or epoxy powder-coated.

4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.

5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel or stainless steel.

B. Copper Pipe and Tube Hangers:

1. Description: MSS SP-58, Types 1 through 58, copper-plated steel, factory-fabricated components.

2. Hanger Rods: Continuous-thread rod, nuts, and washer made of copper-plated steel or stainless steel.

2.3 TRAPEZE PIPE HANGERS

A. Description: MSS SP-58, Type 59, shop- or field-fabricated pipe-support assembly made from structural carbon-steel shapes with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

2.4 METAL FRAMING SYSTEMS

A. Non-MFMA Manufacturer Metal Framing Systems:

1. Description: Shop- or field-fabricated, pipe-support assembly made of steel channels, accessories, fittings, and other components for supporting multiple parallel pipes.

2. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.

3. Channels: Continuous slotted carbon-steel channel with inturned lips.

4. Channel Width: Select for applicable load criteria.

5. Channel Nuts: Formed or stamped nuts or other devices designed to fit into channel slot and, when tightened, prevent slipping along channel.

6. Hanger Rods: Continuous-thread rod, nuts, and washer made of galvanized steel or stainless steel.

7. Metallic Coating: Plain.

8. Paint Coating: Acrylic or urethane.

2.5 THERMAL-HANGER SHIELD INSERTS

A. Insulation-Insert Material for Cold Piping: ASTM C552, Type II cellular glass with 100-psi (688-kPa) or ASTM C591, Type VI, Grade 1 polyisocyanurate with 125-psi (862-kPa) minimum compressive strength and vapor barrier.

B. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.

C. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.

D. Insert Length: Extend 2 inches (50 mm) beyond sheet metal shield for piping operating below ambient air temperature.

2.6 FASTENER SYSTEMS

A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

B. Mechanical-Expansion Anchors: Insert-wedge-type anchors for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

1. Indoor Applications: Zinc-coated or stainless steel.

2. Outdoor Applications: Stainless steel.

2.7 EQUIPMENT SUPPORTS

A. Description: Welded, shop- or field-fabricated equipment support made from structural carbon-steel shapes.

2.8 MATERIALS

A. Aluminum: ASTM B221 (ASTM B221M).

B. Carbon Steel: ASTM A1011/A1011M.

C. Structural Steel: ASTM A36/A36M, carbon-steel plates, shapes, and bars; galvanized.

D. Stainless Steel: ASTM A240/A240M.

E. Threaded Rods: Continuously threaded. Zinc-plated or galvanized steel for indoor applications and stainless steel for outdoor applications. Mating nuts and washers of similar materials as rods.

F. Grout: ASTM C1107/C1107M, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.

1. Properties: Nonstaining, noncorrosive, and nongaseous.

2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.

B. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).

3.2 HANGER AND SUPPORT INSTALLATION

A. Metal Pipe-Hanger Installation: Comply with MSS SP-58. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.

B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-58. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.

1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.

2. Field fabricate from ASTM A36/A36M, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.

C. Fiberglass Pipe-Hanger Installation: Comply with applicable portions of MSS SP-58. Install hangers and attachments as required to properly support piping from building structure.

D. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.

E. Fastener System Installation:

1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches (100 mm) thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.

2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

F. Equipment Support Installation: Fabricate from welded-structural-steel shapes.

G. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

H. Install lateral bracing with pipe hangers and supports to prevent swaying.

I. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 (DN 65) and larger and at changes in direction of piping.

J. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

K. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.

L. Insulated Piping:

1. Attach clamps and spacers to piping.
    a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
    b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
    c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.

2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
    a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN 100) and larger if pipe is installed on rollers.

3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
    a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN 100) and larger if pipe is installed on rollers.

4. Shield Dimensions for Pipe: Not less than the following:
    a. NPS 1/4 to NPS 3-1/2 (DN 8 to DN 90): 12 inches (305 mm) long and 0.048 inch (1.22 mm) thick.
    b. NPS 4 (DN 100): 12 inches (305 mm) long and 0.06 inch (1.52 mm) thick.

5. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.3 EQUIPMENT SUPPORTS

A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.

B. Grouting: Place grout under supports for equipment and make bearing surface smooth.

C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.4 METAL FABRICATIONS

A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.

B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.

C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

2. Obtain fusion without undercut or overlap.

3. Remove welding flux immediately.

4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

3.5 ADJUSTING

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches (40 mm).

3.6 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils (0.05 mm).

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A780/A780M.

3.7 HANGER AND SUPPORT SCHEDULE

A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.

B. Comply with MSS SP-58 for pipe-hanger selections and applications that are not specified in piping system Sections.

C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.

D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

E. Use carbon-steel pipe hangers and supports and attachments for general service applications.

F. Use copper-plated pipe hangers and copper or stainless steel attachments for copper piping and tubing.

G. Use thermal-hanger shield inserts for insulated piping and tubing.

H. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30 (DN 15 to DN 750).

2. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36 (DN 20 to DN 900), requiring clamp flexibility and up to 4 inches (100 mm) of insulation.

3. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes NPS 1/2 to NPS 24 (DN 15 to DN 600) if little or no insulation is required.

4. Pipe Hangers (MSS Type 5): For suspension of pipes NPS 1/2 to NPS 4 (DN 15 to DN 100), to allow off-center closure for hanger installation before pipe erection.

5. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.

6. Single-Pipe Rolls (MSS Type 41): For suspension of pipes NPS 1 to NPS 30 (DN 25 to DN 750), from two rods if longitudinal movement caused by expansion and contraction might occur.

7. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes NPS 2-1/2 to NPS 24 (DN 65 to DN 600), from single rod if horizontal movement caused by expansion and contraction might occur.

8. Complete Pipe Rolls (MSS Type 44): For support of pipes NPS 2 to NPS 42 (DN 50 to DN 1050) if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is unnecessary.

9. Pipe Roll and Plate Units (MSS Type 45): For support of pipes NPS 2 to NPS 24 (DN 50 to DN 600) if small horizontal movement caused by expansion and contraction might occur and vertical adjustment is unnecessary.

10. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes NPS 2 to NPS 30 (DN 50 to DN 750) if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.

I. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.

2. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.

J. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.

2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction, to attach to top flange of structural shape.

3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.

4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.

5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.

6. C-Clamps (MSS Type 23): For structural shapes.

7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.

8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.

9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.

10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.

11. Malleable-Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.

12. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:
    a. Light (MSS Type 31): 750 lb (340 kg).
    b. Medium (MSS Type 32): 1500 lb (680 kg).
    c. Heavy (MSS Type 33): 3000 lb (1360 kg).

13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.

14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.

15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.

K. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.

2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.

3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.

L. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.

2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches (32 mm).

3. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41, roll hanger with springs.

4. Spring Sway Braces (MSS Type 50): To retard sway, shock, vibration, or thermal expansion in piping systems.

5. Variable-Spring Hangers (MSS Type 51): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from hanger.

6. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from base support.

7. Variable-Spring Trapeze Hangers (MSS Type 53): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from trapeze support.

8. Constant Supports: For critical piping stress and if necessary to avoid transfer of stress from one support to another support, critical terminal, or connected equipment. Include auxiliary stops for erection, hydrostatic test, and load-adjustment capability. These supports include the following types:
   a. Horizontal (MSS Type 54): Mounted horizontally.
   b. Vertical (MSS Type 55): Mounted vertically.
   c. Trapeze (MSS Type 56): Two vertical-type supports and one trapeze member.

M. Comply with MSS SP-58 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.

N. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.

O. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

END OF SECTION

SECTION 23 07 13

DUCT INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes insulating the following duct services:

1. Indoor, exposed supply and outdoor air.

2. Indoor, exposed return located in unconditioned space.

3. Indoor, exposed exhaust between isolation damper and penetration of building exterior.

B. Related Requirements:

1. Section 23 07 19 "HVAC Piping Insulation."

2. Section 23 31 13 "Metal Ducts" for duct liners.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied if any).

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or craft training program.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation material containers are to be marked with the manufacturer's name, appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.5 COORDINATION

A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 23 05 29 "Hangers and Supports for HVAC Piping and Equipment."

B. Coordinate clearance requirements with duct Installer for duct insulation application. Before preparing ductwork Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

C. Coordinate installation and testing of heat tracing.

1.6 SCHEDULING

A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products in accordance with ASTM E84, by a testing agency acceptable to authorities having jurisdiction. Factory label insulation, jacket materials, adhesive, mastic, tapes, and cement material containers with appropriate markings of applicable testing agency.

1. All Insulation Installed Indoors and Outdoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

2.2 INSULATION MATERIALS

A. Comply with requirements in "Duct Insulation Schedule, General," "Indoor Duct and Plenum Insulation Schedule," and "Aboveground, Outdoor Duct and Plenum Insulation Schedule" articles for where insulating materials are to be applied.

B. Products do not contain asbestos, lead, mercury, or mercury compounds.

C. Products that come in contact with stainless steel have a leachable chloride content of less than 50 ppm when tested in accordance with ASTM C871.

D. Insulation materials for use on austenitic stainless steel are qualified as acceptable in accordance with ASTM C795.

E. Foam insulation materials do not use CFC or HCFC blowing agents in the manufacturing process.

F. Glass-Fiber Blanket: Glass fibers bonded with a thermosetting resin; suitable for maximum use temperature up to 450 deg F in accordance with ASTM C411. Comply with ASTM C553, Type II, and ASTM C1290, Type II with factory-applied vinyl jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

2.3 ADHESIVES

A. Materials are compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.

B. Glass-Fiber and Mineral Wool Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

C. ASJ Adhesive, and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.

2.4 MASTICS AND COATINGS

A. Materials are compatible with insulation materials, jackets, and substrates.

B. Vapor-Retarder Mastic, Water Based, Interior Use: Suitable for indoor use on below ambient services.

1. Water-Vapor Permeance: Comply with ASTM C755, Section 7.2.2, Table 2, for insulation type and service conditions.

2. Service Temperature Range: Minus 20 to plus 180 deg F

3. Color: White.

C. Breather Mastic: Water based; suitable for indoor and outdoor use on above ambient services.

1. Water-Vapor Permeance: ASTM E96/E96M, greater than 1.0 perm at manufacturer's recommended dry film thickness.

2. Service Temperature Range: Minus 20 to plus 180 deg F

3. Color: White.

2.5 LAGGING ADHESIVES

A. Description: Comply with MIL-A-3316C, Class I, Grade A and are compatible with insulation materials, jackets, and substrates.

1. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over duct insulation.

2. Service Temperature Range: 0 to plus 180 deg F

3. Color: White.

2.6 SEALANTS

A. FSK and Metal Jacket Flashing Sealants:

1. Materials are compatible with insulation materials, jackets, and substrates.

2. Fire- and water-resistant, flexible, elastomeric sealant.

3. Service Temperature Range: Minus 40 to plus 250 deg F

4. Color: Aluminum.

2.7 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C1136, Type II.

2. ASJ+: All-service jacket composed of aluminum foil reinforced with glass scrim bonded to a kraft paper interleaving with an outer film leaving no paper exposed; complying with ASTM C1136, Types I, II, III, IV, and VII.

2.8 FIELD-APPLIED JACKETS

A. Field-applied jackets comply with ASTM C921, Type I, unless otherwise indicated.

B. FSK Jacket: Aluminum-foil-face, fiberglass-reinforced scrim with kraft-paper backing.

1. Color: White.

2.9 TAPES

A. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C1136.

1. Width: 3 inches.

2. Thickness: 6.5 mils

3. Adhesion: 90 ounces force/inch in width.

4. Elongation: 2 percent.

5. Tensile Strength: 40 lbf/inch in width.

6. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

B. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.

1. Width: 2 inches.

2. Thickness: 3.7 mils.

3. Adhesion: 100 ounces force/inch in width.

4. Elongation: 5percent.

5. Tensile Strength: 34 lbf/inch in width.

2.10 SECUREMENTS

A. Bands:

1. Stainless Steel: ASTM A240/A240M, Type 304 or Type 316; 0.015 inch thick, 1/2 inch wide with wing seal or closed seal.

2. Aluminum: ASTM B209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 1/2 inch wide with wing seal or closed seal.

3. Springs: Twin spring set constructed of stainless steel with ends flat and slotted to accept metal bands. Spring size determined by manufacturer for application.

B. Insulation Pins and Hangers:

1. Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.106-inch diameter shank, length to suit depth of insulation indicated.

2. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.106-inch-diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch galvanized carbon-steel washer.

3. Metal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
   a. Baseplate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
   b. Spindle: Copper- or zinc-coated, low-carbon steel, fully annealed, 0.106-inch- diameter shank, length to suit depth of insulation indicated.
   c. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.

4. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- thick, galvanized-steel sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
   a. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.

C. Staples: Outward-clinching insulation staples, nominal 3/4-inch- wide, stainless steel or Monel.

D. Wire: 0.062-inch soft-annealed, stainless steel

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.

1. Verify that systems to be insulated have been tested and are free of defects.

2. Verify that surfaces to be insulated are clean and dry.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of ducts and fittings.

B. Install insulation materials, vapor barriers or retarders, jackets, and thicknesses required for each item of duct system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, compress, or otherwise damage insulation or jacket.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Keep insulation materials dry during application and finishing. Replace insulation materials that get wet during storage or in the installation process before being properly covered and sealed in accordance with Contract Documents.

G. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

H. Install insulation with least number of joints practical.

I. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

    1. Install insulation continuously through hangers and around anchor attachments.

    2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.

    3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.

J. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

K. Install insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth, but not to the extent of creating wrinkles or areas of compression in the insulation.

2. Cover circumferential joints with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.

3. Overlap jacket longitudinal seams at least 1-1/2 inches. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches o.c.
   a. For below ambient services, apply vapor-barrier mastic over staples.

4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.

5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct flanges and fittings.

L. Cut insulation in a manner to avoid compressing insulation.

M. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

N. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

3.4 INSTALLATION OF GLASS-FIBER AND MINERAL-WOOL INSULATION

A. Blanket Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.

B. Comply with manufacturer's written installation instructions.

1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 50 percent coverage of duct and plenum surfaces.

2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.

3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
   a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.

b. On duct sides with dimensions larger than 18 inches, place pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
d. Do not overcompress insulation during installation.
e. Impale insulation over pins and attach speed washers.
f. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.

4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.
   a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
   b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches

5. Overlap unfaced blankets a minimum of 2 inches on longitudinal seams and end joints. At end joints, secure with steel bands spaced a maximum of 18 inches o.c.

6. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.

7. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

3.5 FIELD-APPLIED JACKET INSTALLATION

A. Where FSK jackets are indicated, install as follows:

1. Draw jacket material smooth and tight.

2. Install lap or joint strips with same material as jacket.

3. Secure jacket to insulation with manufacturer's recommended adhesive.

4. Install jacket with 1-1/2-inch laps at longitudinal seams and 3-inch- wide joint strips at end joints.

5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.

3.6 FINISHES

A. Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.
   a. Finish Coat Material: Interior, flat, latex-emulsion size.

B. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.

C. Do not field paint aluminum or stainless steel jackets.

3.7 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. Inspect ductwork, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection is limited to one location(s) for each duct system defined in the "Duct Insulation Schedule, General" Article.

C. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.8 DUCT INSULATION SCHEDULE, GENERAL

A. Plenums and Ducts Requiring Insulation:

1. Indoor, exposed supply and outdoor air.

2. Indoor, exposed return located in unconditioned space.

3. Indoor, exposed exhaust between isolation damper and penetration of building exterior.

3.9 INDOOR DUCT AND PLENUM INSULATION SCHEDULE

A. Exposed, rectangular, supply-air duct insulation is the following:

1. Glass-Fiber Blanket: 1-1/2 inches thick and 0.75 lb/cu. ft. nominal density.

B. Exposed, rectangular, return-air duct insulation is the following:

1. Glass-Fiber Blanket: 1-1/2 inches thick and 0.75 lb/cu. ft. nominal density.

C. Exposed, rectangular, outdoor-air duct insulation is the following:

1. Glass-Fiber Blanket: 1-1/2 inches thick and 0.75 lb/cu. ft. nominal density.

D. Exposed, rectangular, exhaust-air duct insulation is one of the following:

1. Glass-Fiber Blanket: 1-1/2 inches thick and 0.75 lb/cu. ft. nominal density.

E. Exposed, supply-air plenum insulation is one of the following:

1. Glass-Fiber Blanket: 1-1/2 inches thick and 0.75 lb/cu. ft. nominal density.
2. Glass-Fiber Board: 1-1/2 inches thick and 2 lb/cu. ft. nominal density.

F. Exposed, return-air plenum insulation is one of the following:

1. Glass-Fiber Blanket: 1-1/2 inches thick and 0.75 lb/cu. ft. nominal density.
2. Glass-Fiber Board: 1-1/2 inches thick and 2 lb/cu. ft. nominal density.

G. Exposed, outdoor-air plenum insulation is one of the following:

1. Glass-Fiber Blanket: 1-1/2 inches thick and 0.75 lb/cu. ft. nominal density.
2. Glass-Fiber Board: 1-1/2 inches thick and 2 lb/cu. ft. nominal density.

H. Exposed, exhaust-air plenum insulation is one of the following:

1. Glass-Fiber Blanket: 1-1/2 inches thick and 0.75 lb/cu. ft. nominal density.
2. Glass-Fiber Board: 1-1/2 inches thick and 2 lb/cu. ft. nominal density.

END OF SECTION

SECTION 23 07 19

HVAC PIPING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes insulation for HVAC piping systems.

B. Related Requirements:

1. Section 23 07 13 "Duct Insulation" for duct insulation.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory and field applied, if any).

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or craft training program.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation system materials are to be delivered to the Project site in unopened containers. The packaging is to include name of manufacturer, fabricator, type, description, and size.

1.5 COORDINATION

A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."

B. Coordinate clearance requirements with piping Installer for piping insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

1.6 SCHEDULING

A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products in accordance with ASTM E84 by a testing agency acceptable to authority having jurisdiction. Factory label insulation, jacket materials, adhesive, mastic, tapes, and cement material containers with appropriate markings of applicable testing agency.

1. All Insulation Installed Indoors and Outdoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

2.2 INSULATION MATERIALS

A. Comply with requirements in "Piping Insulation Schedule, General," "Indoor Piping Insulation Schedule," "Outdoor, Aboveground Piping Insulation Schedule," and "Outdoor, Underground Piping Insulation Schedule" articles for where insulating materials are applied.

B. Products do not contain asbestos, lead, mercury, or mercury compounds.

C. Glass Fiber, Preformed Pipe: Glass fibers bonded with a thermosetting resin, suitable for use up to a maximum temperature of 850 degrees F in accordance with ASTM C411.

1. Preformed Pipe Insulation with Jacket: Type II, Class 2, with factory applied ASJ jacket.

2.3 ADHESIVES

A. Materials are compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.

2.4 LAGGING ADHESIVES

A. Adhesives comply with MIL-A-3316C, Class I, Grade A, and are compatible with insulation materials, jackets, and substrates.

1. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over pipe insulation.

2. Service Temperature Range: 0 to plus 180 deg .

3. Color: White.

2.5 SEALANTS

A. Materials are as recommended by the insulation manufacturer and are compatible with insulation materials, jackets, and substrates.

B. Joint Sealants:

1. Permanently flexible, elastomeric sealant.
   a. Service Temperature Range: Minus 150 to plus 250 deg F
   b. Color: White or gray.

2.6 SECUREMENTS

A. Bands:

1. Stainless Steel: ASTM A240/A240M, Type 304 or Type 316; 0.015 inch thick, 1/2 inch wide with wing seal or closed seal.

2. Aluminum: ASTM B209 Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 1/2 inch wide with wing seal or closed seal.

3. Springs: Twin spring set constructed of stainless steel, with ends flat and slotted to accept metal bands. Spring size is determined by manufacturer for application.

B. Staples: Outward-clinching insulation staples, nominal 3/4 inch (19 mm) wide, stainless steel or Monel.

C. Wire: 0.062-inch soft-annealed, stainless steel

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.

1. Verify that systems to be insulated have been tested and are free of defects.

2. Verify that surfaces to be insulated are clean and dry.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

B. Coordinate insulation installation with the tradesman installing heat tracing. Comply with requirements for heat tracing that apply to insulation.

C. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless steel surfaces, use demineralized water.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping, including fittings, valves, and specialties.

B. Install insulation materials, forms, vapor barriers or retarders, jackets, and of thicknesses required for each item of pipe system, as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, compress, or otherwise damage insulation or jacket.

D. Install insulation with longitudinal seams at top and bottom (12 o'clock and 6 o'clock positions) of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

G. Keep insulation materials dry during storage, application, and finishing. Replace insulation materials that get wet during storage or in the installation process before being properly covered and sealed in accordance with the Contract Documents

H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

I. Install insulation with least number of joints practical.

J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.

2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends attached to structure with vapor-barrier mastic.

3. Install insert materials and insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.

4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

L. Install insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth, but not to the extent of creating wrinkles or areas of compression in the insulation.

2. Cover circumferential joints with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward-clinching staples along both edges of strip, spaced 4 inches o.c.

3. Overlap jacket longitudinal seams at least 1-1/2 inches Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward-clinching staples along edge at 2 inches o.c.

4. For below-ambient services, apply vapor-barrier mastic over staples.

5. Cover joints and seams with tape, in accordance with insulation material manufacturer's written instructions, to maintain vapor seal.

6. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.

M. Cut insulation in a manner to avoid compressing insulation.

N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches in similar fashion to butt joints.

P. For above-ambient services, do not install insulation to the following:

1. Vibration-control devices.

2. Testing agency labels and stamps.

3. Nameplates and data plates.

3.4 GENERAL PIPE INSULATION INSTALLATION

A. Requirements in this article generally apply to all insulation materials, except where more specific requirements are specified in various pipe insulation material installation articles below.

B. Insulation Installation on Fittings, Valves, Strainers, Flanges, Mechanical Couplings, and Unions:

1. Install insulation over fittings, valves, strainers, flanges, mechanical couplings, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.

2. Insulate pipe elbows using prefabricated fitting insulation or mitered or routed fittings made from same material and density as that of adjacent pipe insulation. Each piece is butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.

3. Insulate tee fittings with prefabricated fitting insulation or sectional pipe insulation of same material and thickness as that used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.

4. Insulate valves using prefabricated fitting insulation or sectional pipe insulation of same material, density, and thickness as that used for adjacent pipe. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.

5. Insulate strainers using prefabricated fitting insulation or sectional pipe insulation of same material, density, and thickness as that used for adjacent pipe. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers, so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.

6. Insulate flanges, mechanical couplings, and unions using a section of oversized preformed pipe insulation to fit. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Stencil or label the outside insulation jacket of each union with the word "union" matching size and color of pipe labels.

7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for above-ambient services. Reinforce the mastic with reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.

8. For services not specified to receive a field-applied jacket, except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing, using PVC tape.

C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.

D. Install removable insulation covers. Installation conforms to the following:

1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as that of adjoining pipe insulation.

2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union at least 2 times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless steel or aluminum bands. Select band material compatible with insulation and jacket.

3. Construct removable valve insulation covers in same manner as for flanges, except divide the two-part section on the vertical center line of valve body.

4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.

5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.5 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. All insulation applications will be considered defective if they do not pass tests and inspections.

C. Prepare test and inspection reports.

3.6 PIPING INSULATION SCHEDULE, GENERAL

A. Insulation conductivity and thickness per pipe size comply with schedules in this Section or with requirements of authorities having jurisdiction, whichever is more stringent.

B. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.

END OF SECTION

SECTION 23 21 13

HYDRONIC PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Copper tube and fittings.
2. Steel pipe and fittings.
3. Piping joining materials.
4. Transition fittings.
5. Dielectric fittings.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of the following:

1. Pipe and tube.
2. Fittings.
3. Joining materials.
4. Transition fittings.

1.3 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Piping layout, or BIM model, drawn to scale, indicating the items described in this Section, and coordinated with all building trades.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Hydronic piping components and installation are to be capable of withstanding the following minimum working pressures and temperatures unless otherwise indicated:

1. Condenser-Water Piping: 150 psig (1034 kPa at 73 deg F (66 deg C).

2.2 COPPER TUBE AND FITTINGS

A. Drawn-Temper Copper Tube: ASTM B88, Type K (ASTM B88M, Type A) and ASTM B88, Type L (ASTM B88M, Type B).

B. Annealed-Temper Copper Tube: ASTM B88, Type K (ASTM B88M, Type A) and ASTM B88, Type L (ASTM B88M, Type B).

C. Cast-Copper, Solder-Joint Fittings: ASME B16.18 pressure fittings. Do not use solder joints on pipe sizes greater than NPS 4 (DN 100).

D. Wrought-Copper, Solder-Joint Fittings: ASME B16.22 pressure fittings. Do not use solder joints on pipe sizes greater than NPS 4 (DN 100).

E. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends. Do not use solder joints on pipe sizes greater than NPS 4 (DN 100).

F. Cast-Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces and solder-joint or threaded ends. Do not use solder joints on pipe sizes greater than NPS 4 (DN 100).

G. Wrought-Copper Unions: ASME B16.22. Do not use solder joints on pipe sizes greater than NPS 4 (DN 100).

2.3 DIELECTRIC FITTINGS

A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.

B. Dielectric Unions:

1. Source Limitations: Obtain dielectric unions from single manufacturer.

2. Description:
   a. Standard: ASSE 1079.
   b. Pressure Rating: 125 psig (860 kPa) minimum at 180 deg F (82 deg C).

c. End Connections: Solder-joint copper alloy and threaded ferrous. Solder joints are not to be used on pipe sizes greater than NPS 4 (DN 100).

C. Dielectric Flanges:

1. Source Limitations: Obtain dielectric flanges from single manufacturer.

2. Description:
   a. Standard: ASSE 1079.
   b. Factory-fabricated, bolted, companion-flange assembly.
   c. Pressure Rating: 125 psig (860 kPa) minimum at 180 deg F (82 deg C).
   d. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

D. Dielectric-Flange Insulating Kits:

1. Source Limitations: Obtain dielectric-flange insulating kits from single manufacturer.

2. Description:
   a. Nonconducting materials for field assembly of companion flanges.
   b. Pressure Rating:[150 psig (1035 kPa).
   c. Gasket: Neoprene or phenolic.
   d. Bolt Sleeves: Phenolic or polyethylene.
   e. Washers: Phenolic with steel backing washers.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

A. Condenser-Water Piping, Aboveground, NPS 2 (DN 50) and Smaller, to Be Any of the Following:

1. Type K (Type A) 0r Type L (Type B) drawn-temper copper tubing, wrought-copper fittings, and soldered joints.

B. Condenser-Water Piping, Aboveground, NPS 2-1/2 (DN 65) and Larger, to Be Any of the Following:

1. Type K (Type A) or Type L (Type B), drawn-temper copper tubing, wrought-copper fittings, and soldered joints.

3.2 INSTALLATION OF PIPING

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.

B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

E. Install piping to permit valve servicing.

F. Install piping at indicated slopes.

G. Install piping free of sags and bends.

H. Install fittings for changes in direction and branch connections.

I. Install piping to allow application of insulation.

J. Select system components with pressure rating equal to or greater than system operating pressure.

K. Install groups of pipes parallel to each other, spaced to permit applying insulation and servicing of valves.

L. Install drains, consisting of a tee fitting, NPS 3/4 (DN 20) ball valve, and short NPS 3/4 (DN 20) threaded nipple with cap, at low points in piping system mains and elsewhere as required for system drainage.

M. Install piping at a uniform grade of 0.2 percent upward in direction of flow.

N. Reduce pipe sizes using eccentric reducer fitting installed with level side up.

O. Install branch connections to mains using tee fittings in main pipe, with the branch connected to the bottom of the main pipe. For up-feed risers, connect the branch to the top of the main pipe.

P. Install valves according to the following:

1. Section 230523.12 "Ball Valves for HVAC Piping."

3.3 JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Soldered Joints: Apply ASTM B813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints in accordance with ASTM B828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B32.

D. Threaded Joints: Thread pipe with tapered pipe threads in accordance with ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

   1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.

   2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

3.4 INSTALLATION OF HANGERS AND SUPPORTS

A. Comply with requirements in Section 230529 "Hangers and Supports for HVAC Piping and Equipment" for hangers, supports, and anchor devices.

B. Install hangers for copper tubing, with maximum horizontal spacing and minimum rod diameters, to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

C. Support horizontal piping within 12 inches (300 mm) of each fitting and coupling.

D. Support vertical runs of copper tubing to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

3.5 TERMINAL EQUIPMENT CONNECTIONS

A. Sizes for supply and return piping connections are to be the same as or larger than equipment connections.

B. Install ports for pressure gauges and thermometers at coil inlet and outlet connections.

3.6 FIELD QUALITY CONTROL

A. Prepare hydronic piping in accordance with ASME B31.9 and as follows:

1. Leave joints uninsulated and exposed for examination during test.

2. Flush hydronic piping systems with clean water; then remove and clean or replace strainer screens.

3. Isolate equipment from piping. If a valve is used to isolate equipment, its closure is to be capable of sealing against test pressure without damage to valve. Install blinds in flanged joints to isolate equipment.

4. Install pressure-relief valve, set at a pressure no more than one-third higher than test pressure, to protect against damage by expanding liquid or other source of overpressure during test.

B. Perform the following tests on hydronic piping:

1. Use ambient-temperature water as a testing medium unless there is risk of damage due to freezing. Another liquid that is safe for workers and compatible with piping may be used.

2. While filling system, use vents installed at high points of system to release air. Use drains installed at low points for complete draining of test liquid.

3. Isolate expansion tanks and determine that hydronic system is full of water.

4. Subject piping system to hydrostatic test pressure that is not less than 1.5 times the system's working pressure. Test pressure is not to exceed maximum pressure for any vessel, pump, valve, or other component in system under test.

5. After hydrostatic test pressure has been applied for at least 10 minutes, examine piping, joints, and connections for leakage. Eliminate leaks by tightening, repairing, or replacing components, and repeat hydrostatic test until there are no leaks.

6. Prepare written report of testing.

END OF SECTION

SECTION 23 31 13

METAL DUCTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Single-wall rectangular ducts and fittings.
2. Sheet metal materials.
3. Sealants and gaskets.
4. Hangers and supports.

B. Related Requirements:

1. Section 23 33 00 "Air Duct Accessories" for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of the following products:

1. Sealants and gaskets.

B. Design Submittals:

1. Sheet metal thicknesses.
2. Joint and seam construction and sealing.
3. Reinforcement details and spacing.
4. Materials, fabrication, assembly, and spacing of hangers and supports.

PART 2 - PRODUCTS

2.1 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.

1. Construct ducts of galvanized sheet steel unless otherwise indicated.

B. Transverse Joints: Fabricate joints in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

1. For ducts with longest side less than 36 inches, select joint types in accordance with Figure 2-1.

2. For ducts with longest side 36 inches or greater, use flange joint connector Type T-22, T-24, T-24A, T-25a, or T-25b. Factory-fabricated flanged duct connection system may be used if submitted and approved by engineer of record.

C. Longitudinal Seams: Select seam types and fabricate in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Ch. 4, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.2 SHEET METAL MATERIALS

A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials are to be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Comply with ASTM A653/A653M.

1. Galvanized Coating Designation: G90

2. Finishes for Surfaces Exposed to View: Mill phosphatized.

C. Reinforcement Shapes and Plates: ASTM A36/A36M, steel plates, shapes, and bars; black and galvanized.

1. Where black- and galvanized-steel shapes and plates are used to reinforce aluminum ducts, isolate the different metals with butyl rubber, neoprene, or EPDM gasket materials.

D. Tie Rods: Galvanized steel, 1/4-inch- minimum diameter for lengths 36 inches or less; 3/8-inch- minimum diameter for lengths longer than 36 inches .

2.3 SEALANT AND GASKETS

A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets are to be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested in accordance with UL 723; certified by an NRTL.

B. Two-Part Tape Sealing System:

1. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.

2. Tape Width: 4 inches .

3. Sealant: Modified styrene acrylic.

4. Water resistant.

5. Mold and mildew resistant.

6. Maximum Static-Pressure Class: 10 inch wg, positive and negative.

7. Service: Indoor and outdoor.

8. Service Temperature: Minus 40 to plus 200 deg F .

9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum.

C. Water-Based Joint and Seam Sealant:

1. Application Method: Brush on.

2. Solids Content: Minimum 65 percent.

3. Shore A Hardness: Minimum 20.

4. Water resistant.

5. Mold and mildew resistant.

6. VOC: Maximum 75 g/L (less water).

7. Maximum Static-Pressure Class: 10 inch wg positive and negative.

8. Service: Indoor or outdoor.

9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

D. Flanged Joint Sealant: Comply with ASTM C920.

1. General: Single-component, acid-curing, silicone, elastomeric.

2. Type: S.

3. Grade: NS.

4. Class: 25.

5. Use: O.

E. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

2.4 HANGERS AND SUPPORTS

A. Hanger Rods for Noncorrosive Environments: Galvanized-steel rods and nuts.

B. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.

C. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."

D. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A603.

E. Steel Cables for Stainless Steel Ducts: Stainless steel complying with ASTM A492.

F. Steel Cable End Connections: Galvanized-steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.

G. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

H. Trapeze and Riser Supports:

1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.

PART 3 - EXECUTION

3.1 DUCT INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and coordination drawings.

B. Install ducts in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.

C. Install ducts in maximum practical lengths with fewest possible joints.

D. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.

E. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.

F. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

G. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.

H. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.

I. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.

J. Install fire, combination fire/smoke, and smoke dampers where indicated on Drawings and as required by code, and by local authorities having jurisdiction. Comply with requirements in Section 233300 "Air Duct Accessories" for fire and smoke dampers and specific installation requirements of the damper UL listing.

K. Install heating coils, cooling coils, air filters, dampers, and all other duct-mounted accessories in air ducts where indicated on Drawings.

L. Protect duct interiors from moisture, construction debris and dust, and other foreign materials both before and after installation

M. Elbows: Use long-radius elbows wherever they fit.

1. Fabricate 90-degree rectangular mitered elbows to include turning vanes.

2. Fabricate 90-degree round elbows with a minimum of three segments for 12 inches and smaller and a minimum of five segments for 14 inches and larger.

N. Branch Connections: Use lateral or conical branch connections.

3.2 DUCT SEALING

A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

3.3 HANGER AND SUPPORT INSTALLATION

A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."

B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.

1. Install powder-actuated concrete fasteners after concrete is placed and completely cured.

2. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.

3. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.

C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.

D. Hangers Exposed to View: Threaded rod and angle or channel supports.

E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet.

F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.4 DUCTWORK CONNECTIONS

A. Make connections to equipment with flexible connectors complying with Section 233300 "Air Duct Accessories."

B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.5 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Leakage Tests:

1. Comply with SMACNA's "HVAC Air Duct Leakage Test Manual." Submit a test report for each test.

2. Test the following systems:
   a. Ducts with a Pressure Class Higher Than 3-Inch wg: Test representative duct sections totaling no less than 25 percent of total installed duct area for each designated pressure class.
   b. Supply Ducts with a Pressure Class of 2-Inch wg or Higher: Test representative duct sections totaling no less than 50 percent of total installed duct area for each designated pressure class.
   c. Return Ducts with a Pressure Class of 2Inch wg or Higher: Test representative duct sections totaling no less than 50 percent of total installed duct area for each designated pressure class.
   d. Exhaust Ducts with a Pressure Class of 2 Inch wg or Higher: Test representative duct sections totaling no less than 50 percent of total installed duct area for each designated pressure class.
   e. Outdoor-Air Ducts with a Pressure Class of 2- Inch wg or Higher: Test representative duct sections totaling no less than 50 percent of total installed duct area for each designated pressure class.

3. Disassemble, reassemble, and seal segments of systems to accommodate leakage testing and for compliance with test requirements.

4. Testing of each duct section is to be performed with access doors, coils, filters, dampers, and other duct-mounted devices in place as designed. No devices are to be removed or blanked off so as to reduce or prevent additional leakage.

5. Test for leaks before applying external insulation.

6. Conduct tests at static pressures equal to maximum design pressure of system or section being tested. If static-pressure classes are not indicated, test system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure.

7. Give seven days' advance notice for testing.

C. Duct System Cleanliness Tests:

1. Visually inspect duct system to ensure that no visible contaminants are present.

2. Test sections of metal duct system, chosen randomly by Owner, for cleanliness in accordance with "Description of Method 3 - NADCA Vacuum Test" in NADCA ACR, "Assessment, Cleaning and Restoration of HVAC Systems."
   a. Acceptable Cleanliness Level: Net weight of debris collected on the filter media is to not exceed 0.75 mg/100 sq. cm.

D. Duct system will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

3.6 DUCT CLEANING

A. Clean new duct system(s) before testing, adjusting, and balancing.

B. For cleaning of existing ductwork, see Section 230130.52 "Existing HVAC Air Distribution System Cleaning."

C. Use duct cleaning methodology as indicated in NADCA ACR.

D. Use service openings for entry and inspection.

1. Provide openings with access panels appropriate for duct static-pressure and leakage class at dampers, coils, and any other locations where required for inspection and cleaning access. Provide insulated panels for insulated or lined duct. Patch insulation and liner as recommended by duct liner manufacturer. Comply with Section 233300 "Air Duct Accessories" for access panels and doors.

2. Disconnect and reconnect flexible ducts as needed for cleaning and inspection.

3. Remove and reinstall ceiling to gain access during the cleaning process.

E. Particulate Collection and Odor Control:

1. When venting vacuuming system inside the building, use HEPA filtration with 99.97 percent collection efficiency for 0.3-micron-size (or larger) particles.

2. When venting vacuuming system to outdoors, use filter to collect debris removed from HVAC system, and locate exhaust downwind and away from air intakes and other points of entry into building.

F. Clean the following components by removing surface contaminants and deposits:

1. Air outlets and inlets (registers, grilles, and diffusers).

2. Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.

3. Air-handling unit internal surfaces and components including mixing box, coil section, air wash systems, spray eliminators, condensate drain pans, humidifiers and dehumidifiers, filters and filter sections, and condensate collectors and drains.

4. Coils and related components.

5. Return-air ducts, dampers, actuators, and turning vanes except in ceiling plenums and mechanical equipment rooms.

6. Supply-air ducts, dampers, actuators, and turning vanes.

7. Dedicated exhaust and ventilation components and makeup air systems.

G. Mechanical Cleaning Methodology:

1. Clean metal duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.

2. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.

3. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts, duct liner, or duct accessories.

4. Clean fibrous-glass duct liner with HEPA vacuuming equipment; do not permit duct liner to get wet. Replace fibrous-glass duct liner that is damaged, deteriorated, or delaminated or that has friable material, mold, or fungus growth.

5. Clean coils and coil drain pans in accordance with NADCA ACR. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.

6. Provide drainage and cleanup for wash-down procedures.

7. Antimicrobial Agents and Coatings: Apply EPA-registered antimicrobial agents if fungus is present. Apply antimicrobial agents in accordance with manufacturer's written instructions after removal of surface deposits and debris.

3.7 DUCT SCHEDULE

A. Fabricate ducts with galvanized sheet steel except as otherwise indicated and as follows:

1. Fabricate all ducts to achieve SMACNA pressure class, seal class, and leakage class as indicated below.

2. Underground Ducts: Concrete-encased, galvanized sheet steel.

B. Supply Ducts:

1. Ducts Connected to Constant-Volume Air-Handling Units (HRU-1):
   a. Pressure Class: Positive 2- inch wg
   b. Minimum SMACNA Seal Class: A.
   c. SMACNA Leakage Class for Rectangular: 2.
   d. SMACNA Leakage Class for Round and Flat Oval: 2

C. Return Ducts:

1. Ducts Connected to Air-Handling Units :
   a. Pressure Class: Positive or negative 2- inch wg
   b. Minimum SMACNA Seal Class: A.
   c. SMACNA Leakage Class for Rectangular: 2.
   d. SMACNA Leakage Class for Round and Flat Oval: 2

D. Exhaust Ducts:

1. Ducts Connected to Air-Handling Units:
   a. Pressure Class: Positive or negative 2- inch wg
   b. Minimum SMACNA Seal Class: A.
   c. SMACNA Leakage Class for Rectangular: 2.
   d. SMACNA Leakage Class for Round and Flat Oval: 2

E. Outdoor-Air (Not Filtered, Heated, or Cooled) Ducts:

1. Ducts Connected to Air-Handling Units :
   a. Pressure Class: Positive or negative 2- inch wg
   b. Minimum SMACNA Seal Class: A.
   c. SMACNA Leakage Class for Rectangular: 2.
   d. SMACNA Leakage Class for Round and Flat Oval: 2

F. Intermediate Reinforcement:

1. Galvanized-Steel Ducts: Galvanized steel.

G. Elbow Configuration:

1. Rectangular Duct - Requirements for Different Velocities: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."
   a. Velocity 1000 fpm or Lower:
      1) Radius Type RE 1 with minimum 0.5 radius-to-diameter ratio.
      2) Mitered Type RE 4 without vanes.
   b. Velocity 1000 to 1500 fpm :
      1) Radius Type RE 1 with minimum 1.0 radius-to-diameter ratio.
      2) Radius Type RE 3 with minimum 0.5 radius-to-diameter ratio and two vanes.
      3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."
   c. Velocity 1500 fpm or Higher:
      1) Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
      2) Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
      3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."

2. Rectangular Duct - Requirements for All Velocities: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."
   a. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
   b. Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
   c. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."

END OF SECTION

SECTION 23 33 00

AIR DUCT ACCESSORIES

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. Flange connectors.

2. Flexible connectors.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For air duct accessories to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Comply with NFPA 90A and NFPA 90B.

B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

2.2 FLANGE CONNECTORS

A. Description: Add-on or roll-formed, factory fabricated, slide-on transverse flange connectors, gaskets, and components.

B. Material: Galvanized steel.

C. Gauge and Shape: Match connecting ductwork.

2.3 FLEXIBLE CONNECTORS

A. Fire-Performance Characteristics: Adhesives, sealants, fabric materials, and accessory materials shall have flame-spread index not exceeding 25 and smoke-developed index not exceeding 50 when tested in accordance with ASTM E84.

B. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

C. Materials: Flame-retardant or noncombustible fabrics.

D. Coatings and Adhesives: Comply with UL 181, Class 1.

E. Metal-Edged Connectors: Factory fabricated with a fabric strip 3-1/2 inches wide attached to two strips of 2-3/4-inch- wide, 0.028-inch- thick, galvanized sheet steel or 0.032-inch- thick aluminum sheets. Provide metal compatible with connected ducts.

F. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.

1. Minimum Weight: 26 oz./sq. yd. .

2. Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.

3. Service Temperature: Minus 40 to plus 200 deg F .

2.4 MATERIALS

A. Galvanized Sheet Steel: Comply with ASTM A653/A653M.

1. Galvanized Coating Designation: G90 .

2. Exposed-Surface Finish: Mill phosphatized.

B. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts.

C. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install duct accessories in accordance with applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116 for fibrous-glass ducts.

B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless steel accessories in stainless steel ducts, and aluminum accessories in aluminum ducts.

C. Install flexible connectors to connect ducts to equipment.

END OF SECTION

SECTION 23 73 13.16

INDOOR SEMI-CUSTOM AIR-HANDLING UNITS

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 insulated, double-wall-casing, indoor, semi-custom air-handling units that are factory assembled using multiple section components, including the following:

1. Casings.
2. Fans, drives, and motors.
3. Air Filtration
4. Air-to-air energy recovery.
5. Coils.
6. Dampers.

1.3 ACTION SUBMITTALS

A. Product Data: For each air-handling unit.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
3. Include unit dimensions and weight.
4. Include cabinet material, metal thickness, finishes, insulation, and accessories.

5. Fans:
    a. Include certified fan-performance curves with system operating conditions indicated.
    b. Include certified fan-sound power ratings.
    c. Include fan construction and accessories.
    d. Include motor ratings, electrical characteristics, and motor accessories.

6. Include certified coil-performance ratings with system operating conditions indicated.

7. Include filters with performance characteristics.

8. Include dampers, including housings, linkages, and operators.

B. Shop Drawings: For each type and configuration of indoor, semi-custom air handling unit.

1. Include plans, elevations, sections, and mounting details.

2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

3. Detail fabrication and assembly of indoor, semi-custom air-handling units, as well as procedures and diagrams.

4. Include diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

A. Source quality-control reports.

B. Startup service reports.

C. Field quality-control reports.

D. Sample Warranty: For manufacturer's warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For air-handling units to include in emergency, operation, and maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Filters: **One** set(s) for each air-handling unit.

2. Gaskets: **One** set(s) for each access door.

1.7 WARRANTY

A. Warranty: Manufacturer agrees to repair or replace components of indoor, semi-custom air-handling units that fail in materials or workmanship within specified warranty period.

1. Warranty Period: One year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 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.

B. NFPA Compliance: Comply with NFPA 90A for design, fabrication, and installation of air-handling units and components.

C. ASHRAE 62.1 Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."

D. ASHRAE/IES 90.1 Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6 - "Heating, Ventilating, and Air-Conditioning."

E. Structural Performance: Casing panels shall be self-supporting and capable of withstanding positive/negative 8-inch wg (2000 Pa) of internal static pressure, without exceeding a midpoint deflection of 0.0042 inch/inch (0.0042 mm/mm) of panel span.

F. Casing Leakage Performance: ASHRAE 111, Class 6 leakage or better at plus or minus 8 inch wg (2000 Pa).

2.2 MANUFACTURERS

A. XeteX Model AHR-2200-DX-HG-HP, or approved equal.

2.3 UNIT CASINGS

A. Casing:

1. Units shall have a leakage rate not to exceed 1% of supply airflow at 10 in.w.c or a SMACNA leakage class rating of 5.0 (CL=5) [Class 3 negative pressure].

2. Unit panel deflection shall be in accordance with AHRI Class 2 deflection of L/240.

3. Unit is designed for indoor installation.

4. Unit shall be mounted on a curb that is supplied by others.

5. Unit shall have a thermal break construction with 2" double wall casing and injected foam (R-value 6.9/in) insulation

6. Unit shall have a continuous flat roof.

7. External casing shall be 18ga galvanized steel and not painted.

8. Internal casing shall be 18ga galvanized steel design.

9. Unit manufactured in one section with no splits.

10. Plumbing or electrical chase shall not be provided.

B. Flooring and Base Frame:

1. Unit Base Frame shall be constructed for minimal deflection using non insulated welded C-Channel structural steel (C Beam) with welded lifting lugs.

2. Base frame shall be covered with a welded 22ga galvanized sheet metal skin to ensure no water leakage through floor.

3. Unit floor shall be thermally broken 16ga galvanized steel with 2" injected foam (R-value 6.9/in) insulation.

4. Drain pans shall comply with ASHRAE 62.1 built with sloped, double pitched, and constructed of 304 stainless steel without MPT drain connections.

5. Unit base frame shall be painted XeteX Gray (acrylic)..

C. Access Doors and Windows:

1. Access doors shall be provided with lockable door handles, stainless steel piano hinges, and no viewports. Door tiebacks shall not be included.

2. Doors shall be accessible from one side.

3. Doors shall be a thermal break construction with 2" double wall casing and injected foam (R-value 6.9/in) insulation.

4. Doors shall be mounted in thermally broken extruded aluminum frames with a full perimeter gasket.

D. Unit Inlets and Outlets:

1. Outside air shall have a duct connection with damper.

2. Exhaust air shall have a duct connection with damper.

3. Supply air shall have a duct connection.

4. Return air shall have a duct connection.

2.4 FANS

A. Supply Air Fans:

1. Fan(s) shall consist of a two fan array with plenum type frame and a backward curved airfoil with a steel centrifugal impeller.

2. The fan(s) shall utilize a direct drive, premium efficient, and ODP motor(s).

3. Each blower base shall be constructed of galvanized steel and shall incorporate 1" spring isolators.

4. Fans shall utilize a VFD without bypass. The VFD will be Provided and Mounted by manufacturer and the signal will be provided by manufacturer.

B. Exhaust Air Fans:

1. Fan(s) shall consist of a two fan array with plenum type frame and a backward curved airfoil with a steel centrifugal impeller.

2. The fan(s) shall utilize a direct drive, premium efficient, and ODP motor(s).

3. Each blower base shall be constructed of galvanized steel and shall incorporate 1" spring isolators.

4. Fans shall utilize a VFD without bypass. The VFD will be provided and mounted by manufacturer and the signal will be provided by manufacturer.

C. Additional Fan And Motor Options:

1. Additional Option(s) that shall be included are a piezo flow ring(s) for supply and exhaust fan(s).

2.5 AIR FILTRATION:

A. Filters:

1. Type: Panel.

2. Face Dimensions, each: 24 x 20 inches by inches (mm by mm).

3. Depth: 2 inches (mm).

4. Number of Filters: 8 OA and 8 RA.

5. Access Location: Side.

6. Maximum or Rated Face Velocity: 510 fpm (m/s).

7. Recommended Final Resistance: 0.49 inches wg (Pa).

8. Minimum Efficiency Reporting Value:
   a. MERV Rating: MERV 8, according to ASHRAE 52.2.
   b. Filters shall be mounted on a galvanized filter rack.

9. Filters shall be mounted in a galvanized filter rack.

2.6 ENERGY RECOVERY DEVICE:

A. Energy recovery provided is an AHRI Certified - 3Å molecular sieve desiccant wheel (8” deep) with low cross-contaminating seal system with a purge sector.

B. Enthalpy Wheel Energy Recovery Device shall be installed with a wheel frequency modulated wheel drive (signal by others)

2.7 HEATING COMPONENTS:

A. Hot gas reheat coil provided in the supply airstream with galvanized casing, copper tube with aluminum fins. Modulating valve provided and controlled by manufacturer.

2.8 COOLING COMPONENTS:

A. Refrigerant evaporator coil provided in the supply airstream with copper tube and aluminum fin construction. Modulating valve provided and controlled by manufacturer. Option(s) include stainless steel drain pan.

2.9 UNIT REFRIGERATION:

A. An integral water source heat pump refrigeration system provided with multiple staged scroll compressors with a VFD lead.

B. Refrigerant evaporator coil provided in the supply airstream with copper tube and aluminum fin construction. Modulating valve provided and controlled by manufacturer. Option(s) include stainless steel drain pan.

C. System shall be designed with two refrigerant circuits. vibration isolators, filter driers, and sight glass. The system additionally features modulating Hot Gas Reheat on a single refrigerant circuit.

D. Refrigeration system shall be factory tested to verify function and designed performance.

E. Circuit(s) shall be charged with R-454B refrigerant and compressor oil. Critical charge of the system shall be handled by the installing contractor.

F. Refrigeration shall be controlled by an integrated Carel controller capable of cooling on demand.

G. Each circuit shall contain an electrical expansion valve controlled on, deticated control board.

2.10 DAMPERS:

A. All Dampers shall be AMCA Certified.

B. Outside air damper shall be a standard galvanized damper provided by manufacturer. A 2 position actuator shall be provided and installed by manufacturer.

C. Exhaust air damper shall be a standard galvanized damper provided by manufacturer. A 2 position actuator shall be provided and installed by manufacturer.

2.11 CAPACITIES AND CHARACTERISTICS

A. Supply Fan:

1. Type: SWSI, airfoil unhoused centrifugal plenum fan.

2. Drive: Direct.

3. Number of Fan Wheels: 2.

4. Fan Diameter: 18 inches.

5. Airflow: 12,400 cfm (L/s).

6. Total Static Pressure: 3.75 inches wg.

7. External Static Pressure: 1.5 inches wg.

8. Speed: 2194 RPM.

9. Motor:
   a. Size: 7.5 HP.
   b. Speed: 1800 RPM.
   c. Volts: 460 V.
   d. Phase: Three.
   e. Hertz: 60 Hz.

B. Exhaust Fan:

1. Type: SWSI, airfoil unhoused centrifugal plenum fan.

2. Drive: Direct.

3. Number of Fan Wheels: 2.

4. Fan Diameter: 20 inches.

5. Airflow: 12,400 cfm.

6. Total Static Pressure: 2.5 inches wg.

7. External Static Pressure: 0.75 inches wg.

8. Speed: 1712 RPM.

9. Motor:
   a. Size: 5 HP.
   b. Speed: 1800 RPM.
   c. Volts: 460 V.
   d. Phase: Three.
   e. Hertz: 60 Hz.

C. Cooling Coil: DX

1. Sensible Heat-Transfer Rate: 269,200 Btu/h (kW).

2. Total Heat-Transfer Rate: 370,600 Btu/h (kW).

3. Entering-Air, Dry-Bulb Temperature: 75.1 deg F (deg C).

4. Entering-Air, Wet-Bulb Temperature: 63.3 deg F (deg C).

5. Leaving-Air, Dry-Bulb Temperature: 55.0 deg F (deg C).

6. Leaving-Air, Wet-Bulb Temperature: 53.1 deg F (deg C).
7. Face Area: 25.36 sq. ft. (sq. m).
8. Maximum Face Velocity: 489 fpm (m/s).
9. Maximum Air-Side Static-Pressure Drop: 0.43 inches wg (Pa).
10. Number of Rows: 4.
11. Fin Spacing: Maximum 10 fins per inch (per mm).
12. Refrigerant: R-454B

D. Heating Coil: DX

1. Total Heat-Transfer Rate: 224,700 Btu/h (kW).
2. Entering-Air, Dry-Bulb Temperature: 49.0 deg F (deg C).
3. Leaving-Air, Dry-Bulb Temperature: 65.7 deg F (deg C).
4. Face Area: 25.36 sq. ft. (sq. m).
5. Maximum Face Velocity: 489 fpm (m/s).
6. Maximum Air-Side Static-Pressure Drop: 0.43 inches wg (Pa).
7. Number of Rows: 4.
8. Fin Spacing: Maximum 10 fins per inch (per mm).
9. Refrigerant: R-454B

E. Heating Coil: Hot Gas Reheat

1. Total Heat-Transfer Rate: 222,000 Btu/h (kW).
2. Entering-Air, Dry-Bulb Temperature: 55.0 deg F (deg C).
3. Leaving-Air, Dry-Bulb Temperature: 71.5 deg F (deg C).
4. Face Area: 23.62 sq. ft. (sq. m).
5. Maximum Face Velocity: 525 fpm (m/s).
6. Number of Rows: 2.
7. Fin Spacing: Maximum 11 fins per inch (per mm).

F. Dampers: Shut off.

1. Outdoor Air: Low leakage with 2 position actuator.

2. Exhaust Air: Low leakage with 2 position actuator.

G. Air-to-Air Energy Recovery:

1. Type: Heat-wheel air-to-air energy recovery.

2. Wheel:
   a. Model: SXA-2200-MS, or equal.
   b. Purge Angle: 5
   c. Press. Diff,: 1.5 inches wg
   d. Frost Control Setpoint: 15 deg T.
   e. OACF: 1200 cfm.
   f. OACF: 1.03
   g. EATR: 0.1%.

3. Exhaust Air:
   a. Airflow: 12,400 cfm (L/s).
   b. Face Velocity: 766 fpm (m/s).
   c. Summer:
      1) Entering-Air Temperature, Dry Bulb: 72.0 deg F (deg C).
      2) Entering-Air Temperature, Wet Bulb: 60.0 deg F (deg C).
      3) Leaving-Air Temperature, Dry Bulb: 78.9 deg F (deg C).
      4) Leaving-Air Temperature, Wet Bulb: 66.2 deg F (deg C).
      5) Air Pressure Drop: 1.04 inches wg (Pa).
   d. Winter:
      1) Entering-Air Temperature, Dry Bulb: 72.0 deg F (deg C).
      2) Entering-Air Temperature, Wet Bulb: 56 deg F (deg C).
      3) Leaving-Air Temperature, Dry Bulb: 21.0 deg F (deg C).
      4) Leaving-Air Temperature, Wet Bulb: 20.9 deg F (deg C).
      5) Air Pressure Drop: 1.04 inches wg (Pa).

4. Supply Air:
   a. Airflow: 12,400 cfm (L/s).
   b. Face Velocity: 766 fpm (m/s).
   c. Summer:
      1) Entering-Air Temperature, Dry Bulb: 82.0 deg F (deg C).
      2) Entering-Air Temperature, Wet Bulb: 69.0 deg F (deg C).
      3) Leaving-Air Temperature, Dry Bulb: 75.1 deg F (deg C).
      4) Leaving-Air Temperature, Wet Bulb: 63.3 deg F (deg C).
      5) Air Pressure Drop: 1.06 inches wg (Pa).
   d. Winter:
      1) Entering-Air Temperature, Dry Bulb: -2.0 deg F (deg C).
      2) Entering-Air Temperature, Wet Bulb: -3.0 deg F (deg C).
      3) Leaving-Air Temperature, Dry Bulb: 49.0 deg F (deg C).
      4) Leaving-Air Temperature, Wet Bulb: 42.0 deg F (deg C).
      5) Air Pressure Drop: 0.89 inches wg (Pa).

2.12 ELECTRICAL:

A. Unit shall be listed and certified to UL 60335 or UL 1995, and all components shall be listed or recognized by a NRTL (ETL, UL, CSA, etc.) as a complete packaged unit.

B. Control panel shall be mounted outside of unit footprint (mounted on outside of case or remote) in a NEMA 4 enclosure.

C. Unit power shall be single point power connection of 480 V/ 3 PH /60 Hz with a non-fused disconnect provided by manufacturer.

D. Additional electrical option(s) that shall be included are IP 65 rated unit LED lights and GFI (120/1 line required).

E. Unit shall be supplied with a short circuit current rating of 10 kAIC. High-voltage wiring shall be enclosed in a steel flexible conduit. Low□voltage wiring shall be unenclosed without a conduit

2.13 CONTROLS:

A. Factory mounted Carel DDC Controller programmed for full unit control with standard sequence of operation.

B. LCD control screen shall be provided.

C. BACnet MSTP communications provided.

D. Airflow Gauges and Sensors:

1. Exhaust airflow monitor shall include a pressure only (PIEZO) transducer which is provided, mounted and controlled by manufacturer.

2. Supply airflow monitor shall include a pressure only (PIEZO) transducer which is provided, mounted and controlled by manufacturer.

E. Control Sensors:

1. Supply air shall have Temp. sensor(s). The sensor will be provided and mounted by manufacturer and the signal will be provided by manufacturer.

2. Outside air location shall have Temp. sensor(s). The sensor will be provided and mounted by manufacturer and the signal will be provided by manufacturer.

3. Return air location shall have temperature and humidity sensor(s). The sensor will be provided and mounted by manufacturer and the signal will be provided by manufacturer.

4. Exhaust air location shall have Temp. sensor(s). The sensor will be provided and mounted by manufacturer and the signal will be provided by manufacturer.

5. Cold coil location shall have Temp. sensor(s). The sensor will be provided and mounted by manufacturer and the signal will be provided by manufacturer.

2.14 ADDITIONAL REQUIREMENTS:

A. Unit(s) shall be shrink wrapped for transportation.

B. Unit testing provided shall be a standard factory run testing.

2.15 WARRANTIES:

A. 1 Year Parts Warranty included by manufacturer.

2.16 FREIGHT:

A. Freight is provided by manufacturer.

2.17 SOURCE QUALITY CONTROL

A. AHRI 430 Certification: Test, rate, and label air-handling units and their components in accordance with AHRI 430.

B. AHRI 1060 Certification: Test, rate, and label air-handling units that include air-to-air energy recovery devices in accordance with AHRI 1060.

C. Fan Aerodynamic Performance Rating: Factory test and rate fan performance for airflow, pressure, power, air density, rotation speed, and efficiency in accordance with AMCA 210.

D. Fan Energy Index (FEI): Test in accordance with AMCA 210 and rate in accordance with AMCA 99, AMCA 207, and AMCA 208.

E. Fan Operating Limits: Classify fans in accordance with AMCA 99, Section 14.

F. Refrigerant Coils: Factory tested to minimum 450-psig (3105-kPa) internal pressure and to minimum 300-psig (2070-kPa) internal pressure while underwater, according to AHRI 410 and ASHRAE 33.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine casing insulation materials and filter media before air-handling unit installation. Reject insulation materials and filter media that are wet, moisture damaged, or mold damaged.

C. Examine roughing-in for steam, hydronic, and condensate drainage piping systems and electrical services to verify actual locations of connections before installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Equipment Mounting:

1. Install air-handling units on cast-in-place concrete equipment bases. Coordinate sizes and locations of concrete bases with actual equipment provided. Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-in-Place Concrete."

B. Arrange installation of units to provide access space around air-handling units for service and maintenance.

C. Do not operate fan system until filters (temporary or permanent) are in place. Replace temporary filters used during construction and testing, with new, clean filters.

D. Install filter-gauge, static-pressure taps upstream and downstream of filters. Mount filter gauges on outside of filter housing or filter plenum in accessible position. Provide filter gauges on filter banks, installed with separate static-pressure taps upstream and downstream of filters.

E. Connect duct to air-handling units with flexible connections. Comply with requirements in Section 233300 "Air Duct Accessories."

3.3 PIPING CONNECTIONS

A. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Where installing piping adjacent to air-handling unit, allow for service and maintenance.

C. Connect piping to air-handling units mounted on vibration isolators with flexible connectors.

D. Connect condensate drain pans using NPS 1-1/4 (DN 32), ASTM B88, Type M (ASTM B88M, Type C) copper tubing. Extend to nearest equipment or floor drain. Construct deep trap at connection to drain pan and install cleanouts at changes in direction.

3.4 ELECTRICAL CONNECTIONS

A. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

B. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

C. Install electrical devices furnished by manufacturer, but not factory mounted, according to NFPA 70 and NECA 1.

D. Install nameplate for each electrical connection, indicating electrical equipment designation and circuit number feeding connection.

1. Nameplate shall be laminated acrylic or melamine plastic signs with a black background and engraved white letters at least 1/2 inch (13 mm) high.

3.5 CONTROL CONNECTIONS

A. Install control and electrical power wiring to field-mounted control devices.

B. Connect control wiring according to Section 260523 "Control-Voltage Electrical Power Cables."

3.6 STARTUP SERVICE

A. Perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions.

2. Verify that shipping, blocking, and bracing are removed.

3. Verify that unit is secure on mountings and supporting devices and that connections to piping, ducts, and electrical systems are complete. Verify that proper thermal-overload protection is installed in motors, controllers, and switches.

4. Verify proper motor rotation direction, free fan wheel rotation, and smooth bearing operations. Reconnect fan drive system, align belts, and install belt guards.

5. Verify that bearings, pulleys, belts, and other moving parts are lubricated with factory-recommended lubricants.

6. Verify that zone dampers fully open and close for each zone.

7. Verify that face-and-bypass dampers provide full face flow.

8. Verify that outdoor- and return-air mixing dampers open and close, and maintain minimum outdoor-air setting.

9. Comb coil fins for parallel orientation.

10. Verify that proper thermal-overload protection is installed for electric coils.

11. Install new, clean filters.

12. Verify that manual and automatic volume control and fire and smoke dampers in connected duct systems are in fully open position.

B. Starting procedures for air-handling units include the following:

1. Energize motor; verify proper operation of motor, drive system, and fan wheel. Adjust fan to indicated rpm

2. Measure and record motor electrical values for voltage and amperage.

3. Manually operate dampers from fully closed to fully open position and record fan performance.

3.7 ADJUSTING

A. Adjust damper linkages for proper damper operation.

B. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

3.8 CLEANING

A. After completing system installation and testing, adjusting, and balancing air-handling unit and air-distribution systems and after completing startup service, clean air-handling units internally to remove foreign material and construction dirt and dust. Clean fan wheels, cabinets, dampers, coils, and filter housings, and install new, clean filters.

3.9 FIELD QUALITY CONTROL

A. Testing Agency: Contractor will engage a qualified testing agency to perform tests and inspections.

B. Perform the following tests and inspections:

1. Leak Test: After installation, fill water and steam coils with water, and test coils and connections for leaks.

2. Charge refrigerant coils with refrigerant and test for leaks.

3. Fan Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.

4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

C. Air-handling unit or components will be considered defective if unit or components do not pass tests and inspections.

D. Prepare test and inspection reports.

3.10 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain air-handling units.

END OF SECTION

DIVISION 26 - ELECTRICAL

SECTION 26 05 00

BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 Scope

A. Division 1, General Requirements, is hereby made a part of this section as fully as if repeated herein.

B. The work to be done under this Section of the Specifications shall include the furnishing of labor; material, equipment and tools required for the complete installation of systems for power, lighting, signals and all other work indicated on the drawings or as specified herein. A 100% operational building and electrical distribution system shall be provided.

C. A complete system of conduit and wiring for power and lighting from the building utility systems, shall be furnished and installed as indicated on the drawings and/or as described herein.

1.2 Referenced Standards

A. All workmanship and material shall conform in all respects to the latest edition of the applicable codes and rules and regulations of the Owner's insurance company.

B. The equipment, material and installation covered by these specifications shall be designed, tested, assembled and installed in compliance with the following applicable rules, regulations and standards:

Abbreviation	Applicable Codes and Standards
ANSI	American National Standards Institute Inc.
IEEE	Institute of Electrical and Electronic Engineers
IES	Illuminating Engineering Society
NEC	National Electric Code, State and Local Codes State Building Code
NEMA	National Equipment Manufacturer's Association
OSHA	Federal Occupational Safety and Health Act
UL	Underwriters' Laboratories
USASI	United States of America Standards Institute
FM	Factory Mutual Loss Prevention Data

C. All materials shall be new and only such materials as are herein specified shall be used.

D. All wiring, conduit, and materials shown and specified shall be in accordance with National, State and Local code requirements. Wiring, conduit, and materials shall be provided in sizes and numbers sufficient to function as specified and in accordance with Manufacturer's recommendations.

E. The installation of all electrical components shall meet the seismic provisions for the area where the installation is located.

1.3 Permits and Fees

A. Before commencing work, the Electrical Contractor shall obtain all certificates and permits required for the performance of the work. After completion of the work, the Owner shall be furnished certificates of final inspection and approval from the inspection authority having jurisdiction.

1.4 General Conditions

A. Throughout the specifications, types of material may be specified by manufacturer's name and catalogue number in order to establish standards quality and performance and not for the purpose of limiting competition. Unless specifically stated otherwise, the Electrical Contractor (EC) may assume that any material or equipment specified may be substituted, subject to approval by the Engineer. The EC must request, in writing, approval to substitute such item for the specified item, with supporting data and samples, if required to permit a fair evaluation of the proposed substitute with respect to quality, serviceability, warranty and cost.

1.5 Electrical Drawings

A. Drawings are generally diagrammatic and show the arrangement and location of fixtures, equipment and conduit. The EC shall carefully investigate the structural and finish conditions affecting his work and arrange his work accordingly. Should conditions on the job make it necessary to rearrange conduit or equipment, the EC shall so advise the Construction Manager or the Engineer and secure approval before proceeding with such work.

B. Obtain in the field all information relevant to the placing of electrical work and in case of any interference with other work, proceed as directed by the Construction Manager and furnish all labor and materials necessary to complete the work in an approved manner. Work shall be installed in such manner as to avoid all interferences.

C. The Owner, the Engineer and the Construction Manager reserve the right to make reasonable changes in locations of equipment indicated on drawings prior to rough-in without increase in contract cost.

D. Drawings and Specifications do not undertake to indicate every item of material, equipment, or labor required to produce a complete and properly operating installation. Materials, equipment, or labor not indicated, but which can be reasonably inferred to be necessary for a complete installation which complies with the applicable codes shall be provided.

E. Where exact locations are required by equipment for stubbing-up and terminating conduit concealed in floor slabs, the EC shall request shop drawings, equipment location drawings, foundation drawings, and any other data required by him to locate the concealed conduit before the floor slab is poured.

F. Where such data is not available in time to avoid delay in scheduled floor slab pours, EC shall obtain approval of the Engineer to install such conduit exposed. No additional compensation for such change will be allowed without prior approval by the Engineer. EC may elect to box-out a section of the slab if necessary.

G. The EC shall not reduce the size or number of conduit runs indicated on the drawings without the written approval of the Engineer.

H. Locate pull boxes, panelboards, control pushbuttons, terminal cabinets, safety switches and such other apparatus as may require periodic maintenance, operation, or inspection, so that they are easily accessible. If such items are shown on the plans in locations which are found to be inaccessible, the Engineer must be advised of the situation before work is advanced to the point where extra costs will be involved.

I. Single-phase circuit numbers on the power plans and the panelboard schedules are shown for circuiting information only. The EC shall circuit all panelboards to achieve evenly balanced loads on each phase, and update the documentation as required.

J. Any work installed contrary to Contract Drawings without prior written Engineer's approval shall be subject to change. No extra compensation will be allowed for making these changes.

K. Circuit layouts are not intended to show the number of fittings, or other installation details. Furnish all labor and materials necessary to install and place in satisfactory operation all power, lighting and other electrical systems shown.

L. Schematic diagrams shown on the drawings indicate the required functions only. If approved by the Engineer, the standard circuits of the manufacturer may be used to accomplish the functions indicated without exact adherence to the schematic drawings shown. Additional wiring or conduit required for such deviations shall be furnished at EC's expense.

M. Generally, the raceway and cable tray routing is shown diagrammatically. EC is responsible for final determination as to the routing as governed by structural conditions, and interference with other trades, by terminal locations on apparatus. Any coordination issues should be brought to the attention of the Construction Manager.

N. Verify the ceiling type, ceiling suspension systems, and clearance above hung ceilings prior to ordering lighting fixtures. Notify the Engineer of any discrepancies.

O. Portions of these drawings and specifications are abbreviated and may include incomplete sentences. Omissions of words or phrases such as "the Contractor shall", "shall be", "as indicated on the Drawings", "In accordance with", "a", "the" and "all are intended" shall be supplied by inference.

1.6 Conflicting Information

A. The Drawings, Specifications, and Schedules are complimentary to each other and what is called for by one shall be as binding as if called for by all. If a discrepancy exists between information contained in different parts of the project documentation, or with the applicable Codes, local regulations or utility company regulations, the higher cost shall be included in the bid. The Electrical Contractor shall notify the Project and/or Construction Manager about the discrepancy before proceeding with the work.

1.7 Workmanship

A. All labor shall be performed by experienced workers. The finished work shall represent the best possible appearance. Exposed work shall be straight and true with the building lines and other work. Conduits shall be parallel when lines are run in close proximity.

B. All equipment shall be handled and installed in accordance with the Manufacturer's recommended method.

C. Provide and maintain all necessary guards, barriers, lights, etc. to protect against injury to persons and damage to property.

1.8 Work Included

A. Electrical Systems installed, and work performed under this Division of the Specifications shall include but not necessarily be limited to the following:

B. Lighting and power distribution equipment.

C. Raceways, cables, wiring, junction and pull boxes, terminal cabinets, wireways, lugs, terminators, hardware and all other components and fittings required for complete operation of power, lighting, control and instrumentation systems provided under the scope of this project.

D. Complete lighting system (indoor and outdoor, normal, emergency and exit) including all fixtures, lamps, plaster and/or tile frames, stands, supports, switches, outlets, wiring, raceways and other components and fittings required for complete lighting systems.

E. Power, lighting, systems and control and instrumentation wiring and connections to the process equipment, as noted on the drawings.

F. Power wiring for all Heating, Ventilating, Air Conditioning and Plumbing systems.

G. Termination of all power, control and instrumentation wiring.

H. Furnishing, installing, and wiring all MANUAL motor starters for 120 volt fractional horsepower motors.

I. Wiring of all control devices and motors furnished by others for all motorized doors or equipment.

J. Grounding Systems, neutral, equipment, lightning protection, and structure[,static discharge].

K. Temporary service lighting and power system.

L. Fire Alarm system[,extension of existing system].

M. Lightning Protection system.

N. Security System.

O. Electrical Heat Tracing system.

P. Installation and wiring of disconnect switches as indicated on drawings.

Q. All other systems hereinafter specified and/or indicated on the drawings complete, tested and in perfect operating condition.

R. Special mounting provisions and structural supports as required by the governing codes and local authorities to satisfy seismic requirements.

S. Telephone/Data raceway (empty conduits and junction boxes, as defined on drawings – no wiring or devices, unless indicated otherwise on the drawings).

1.9 Work Not Included

A. The following items of labor and material incidental and/or related to the installation of the Electrical Work will be provided and/or installed under other Sections at no cost to the EC unless otherwise specified on the drawings:

B. Painting of all equipment and material not provided by the EC.

C. Furnishing and setting of Heating, Ventilating, Air Conditioning, Plumbing and process equipment and systems.

D. Temperature control systems for Heating, Ventilating and Air Conditioning Systems. Electrical work associated with these systems will be provided under a separate sub-contract.

1.10 Equipment General Requirements

A. All electrical devices, materials, and assemblies, where applicable, shall be listed or labeled for the appropriate application by a Nationally Recognized Testing Laboratory (NRTL) listed by OSHA. Any tests and inspections that may be required to obtain such Listing or Labeling shall be performed at no additional cost to the owner.

B. All electrical equipment and materials shall conform to the Standards as specified herein, in applicable specification sections and on the Drawings.

1.11 Handling of Materials

A. Equipment and Materials Purchased and Furnished by the Owner

1. The EC shall inspect all equipment and materials promptly upon delivery. The equipment shall be checked against the Bill of Lading and the Bill of Materials. Carefully examine the equipment for damage. Notify the Construction Manager about any missing or damaged equipment or parts.

2. Provide to the Construction Manager a signed receipt with an itemized listing of all equipment and materials received.

3. After the original inspection is completed the electrical equipment and materials furnished by the Owner will become the responsibility of the Electrical Contractor. Store the equipment in a warehouse located on or off site, as instructed by the Construction Manager. Electrical Contractor shall arrange and pay for all loading and transportation charges to and from the storage location. When subject to temperature fluctuations, the equipment must be protected from moisture condensation.

4. All instruction books, drawings, etc., as furnished with the equipment are property of the Owner and shall be returned to the Owner upon completion of this Contract.

B. Equipment and Materials Purchased by the Electrical Contractor

1. All electrical equipment and materials not Owner purchased, as indicated elsewhere, shall be purchased by the Electrical Contractor.

2. All electrical equipment and materials shall be new, except where existing equipment is designated for reuse.

C. Existing Equipment and Materials

1. The Electrical Contractor shall assume full responsibility for any damage to existing equipment and materials that may occur during, or as a result of performance of the work under this contract.

2. Any existing equipment that is found damaged and/or defective must be reported to the Construction Manager prior to moving and/or handling of such equipment.

3. Make the necessary alterations and additions to the electrical and communication systems required by changes as shown on the Drawings in the existing building and/or equipment

4. Where the removal of walls, floor or ceilings as shown on the Drawings, exposes or interferes with the existing electrical wiring or equipment, the Electrical Contractor, at his expense, shall make the necessary changes and leave the system in a satisfactory operating condition. All changes to the existing installation shall be accurately recorded and included in the "FINAL DOCUMENTS".

5. The Electrical Contractor, at his expense, shall remove all conduits and equipment indicated to be demolished including removal of conductors back to the source such as panels, motor control centers, etc.

6. Where existing conduit and outlet boxes are shown on the Drawings to be reused and additional conductors installed in the conduit, all existing conductors shall be removed and new conductors installed, unless noted otherwise.

7. When the existing lighting fixtures are indicated on the Drawings to be reused and/or relocated, the non-LED lighting fixtures shall be relamped, LED's to be wiped clean, and all lighting fixtures shall be cleaned, washed thoroughly with detergent and rinsed.

8. Any and all interruptions of electrical service for the installation or modification of equipment shall be done at a time approved by the Owner. Electrical Contractor will be held responsible for loss or damage incurred because of interruption of power to production, heating or other critical systems because of his work.

9. All vibration, careless handling or tracking of dirt, etc. which is detrimental to the existing and new equipment shall be avoided.

10. All existing electrical equipment which has been removed such as motor starters, lighting fixtures, etc. shall be delivered to the Owner at a designated location, unless directed by the Construction Manager for disposal.

D. Protection of Equipment and Materials

1. The Electrical Contractor shall provide adequate protection and follow the manufacturer's recommendations, at all times, for all material, apparatus and equipment furnished by him and by the Owner on the site and after erection of same.

2. All electrical equipment, wiring, switches, receptacles, conduit, panelboards, etc. shall be stored in strict compliance with the manufacturer's recommendations. All equipment must be protected from moisture, dust and debris at all times.

3. Any material or equipment stalled while under control of the EC shall be replaced at no extra cost to the Owner.

4. EC shall replace or repair to the satisfaction of the Construction Manager or the Engineer any equipment he damages in the course of handling, installation or testing.

5. All damaged or rejected material must be removed from the premises without delay.

1.12 Examination of Site

A. Each bidder shall visit the site of the project to acquaint himself with the difficulties which may be involved in the execution of work as shown on the drawings and as specified herein. The submission of the Bid proposal shall be construed as evidence that such a visit and investigation has been made. Claims for labor, equipment or materials required for difficulties encountered shall be borne by the EC.

1.13 Shop Drawings

A. Submit for approval, details of all materials, equipment, and systems except for long-lead items to be furnished under this section within thirty (30) days after the award of this contract.

B. One manufacturer shall be selected for any specific classification of material, equipment, or systems. For example, all panelboards shall be by one manufacturer, etc. If more than one manufacturer is submitted, the Engineer shall select one and disapprove the others.

C. The approval of systems, equipment and shop drawings is a general approval, subject to the contract drawings, specifications, and verification of all measurements at the job. Approval does not relieve the EC from the responsibility of shop drawing errors. The EC shall carefully check and correct all shop drawings prior to submission for approval.

1.14 Substitutions

A. Where equipment is identified by manufacturer and catalog number, it shall be as the base of requirements for quality and performance. Where the manufacturer for equipment is identified by name, the EC may submit for approval, similar equipment of other manufacturers as substitution. The Engineer's decision as to whether the submitted equipment is acceptable shall be final and binding.

B. All changes necessary to accommodate the substituted equipment shall be made at the EC's expense and shall be as approved by the Engineer. Detailed drawings indicating the required changes shall be submitted for approval at the time the substitution is requested.

C. When proposing a substitution for a lighting fixture, provide ratings dimension, design, profile, and photometric test reports for the proposed fixture. The EC may be required to provide point-by-point lighting calculations for the proposed fixture.

1.15 Record Drawings

A. The EC shall provide and maintain at the site a set of prints on which shall be accurately shown the actual installation of all work under this section, indicating any variation from contract drawings, including changes in sizes, locations, and dimensions. Changes in circuitry shall be clearly and completely indicated as the work progresses. The documentation shall include any changes which may be required to the existing circuitry and wiring.

B. These progress prints shall be available for inspection by the Engineer, the Owner or any of his representatives and may be used to determine the progress of electrical work.

C. At the completion of the work, the EC shall turn over to the construction manager the final set of markups which document all “as-built” information including the DIMENSIONED location of all underground conduits.

1.16 Temporary Light and Power

A. Sufficient wiring, outlets and lamps shall be installed to insure proper lighting in accordance with OSHA, state, and municipal codes.

B. All necessary transformers, wiring, panelboards, ground fault devices, switches and accessories required by the temporary light and power installation shall be provided by the EC.

C. The EC shall install and maintain a feeder, or feeders, of sufficient capacity for the requirements of all areas. He also shall provide a sufficient number of outlets, located at convenient points through the construction area.

D. The individual Subcontractors shall furnish their own extension cords, special lighting including sockets and lamps if required for a specific task, motors, and accessories. They shall also pay for all temporary wiring of construction offices and buildings used by them, except as provided in the preceding paragraph.

E. All temporary service equipment, wiring and accessories shall be removed by this EC after they served their purpose.

1.17 Instructions

A. The EC shall see that the Owner's operating personnel are made entirely familiar with the nature, operation, and maintenance of the system and equipment provided under this Division.

PART 2 - EQUIPMENT (NOT USED)

PART 3 - EXECUTION

3.1 Coordination of Work

A. The EC shall check the drawings of the various trades before submitting his bid and shall be responsible, under this Section of the Specifications, for the proper coordination of the Electrical work with the installations under other Sections for clearances. Any changes required to avoid interference shall be submitted to the Engineer for approval and shall be made without additional cost to the Owner.

B. Examine the architectural drawings for the location of suitable openings and aisles for the passage of equipment to be installed under this Section. The EC shall be responsible for having suitable openings and aisles left open until his equipment has been properly installed.

C. Investigate each space in the structure through which equipment must pass to reach its final location. When the EC is responsible for providing equipment, which is being installed in an area with restricted access, the manufacturer shall be required to ship his material in sections sized to permit passing through such restricted areas in the structure.

D. The equipment shall be kept upright at all times. When equipment must be tilted for ease of passage through restricted areas during transportation, the manufacturer must be consulted to ensure that the tilting does not impair the functional integrity of the equipment. If required, the EC shall provide the necessary bracing.

E. Special attention shall be given to the Process, Piping, Plumbing and HVAC Sections. Both Process and Plumbing piping, and HVAC ductwork will generally have right-of-way over electrical raceway routing.

F. Require trades providing equipment bases and pads, curbs, chases, pockets, and openings (except core drilling) to coordinate dimensions with actual dimensions of equipment furnished under this section. Furnish to other trades required dimensions, templates, bolts, and anchors for support or attachment of electrical work.

G. Prior to installation, coordinate the exact mounting arrangement and location of equipment indicated on the drawings to allow proper space requirements as indicated in the Electrical Code. If mounting heights or other location criteria are not indicated, arrange, and install components and equipment to provide maximum possible headroom consistent with these requirements.

H. Do not allow equipment or piping foreign to the electrical installation to be installed or pass through electric rooms, electric closets, telephone or data closets, except as approved by the Engineer.

I. Arrange for chases, slots, and openings in other building components during progress of construction, to allow for electrical installations.

3.2 Cutting and Patching

A. Refer to Division 1 section "Cutting and Patching," for a delineation of the responsibilities of the Electrical Contractor and the General Contractor with respect to coring, cutting, and patching. Unless instructed by the Construction Manager otherwise, cutting and patching necessary for the installation of the work under this Contract shall be done at the expense of the Electrical Contractor and shall be executed by workers skilled in the respective division of the work affected. Roofing penetrations and sealing shall be performed by a licensed roofing contractor, utilizing methods and materials approved by the roofing manufacturer. Patching shall be done using like materials and shall not show in the finished work. All openings around pipes and recessed equipment shall be closed, as described below and as shown on the drawings.

B. The cutting of walls, floors and structural members will be permitted only when absolutely necessary and then only when approved by the Construction Manager.

C. Contractor shall obtain Construction Manager's approval for the location of all cored penetrations before beginning work.

3.3 Closing of Openings

A. Unless shown otherwise on the drawings, the EC shall close the openings as follows:

B. Wherever slots, sleeves or other openings are provided in floors or walls for the passage of conduits or other forms of raceway, such openings, if unused, or if there is space left in such openings after installation of the conduit and raceways, shall be filled. If the opening is exposed inside of a process room, use an FDA approved caulk such as 732 by Dow Corning or Silicone Construction 1200 Sealant by General Electric. Contractor shall confirm with Owner that caulk is compatible with chemicals in use.

C. Provide an escutcheon plate around the pipe penetration wherever it is exposed to view in an occupied area. Escutcheon plate shall be tight to the pipe and overlap the penetration by at least 1". Seal the plate to the pipe and the wall with silicone caulk. Where the penetration is exposed inside of a process room use a 304 stainless steel escutcheon plate and seal with an FDA approved caulk as noted above. For floor penetrations provide a flashing cap around the top of the pipe sleeve.

D. Filling materials for openings in floors or walls shall be fire-resistive, similar to the material of the floor or wall itself and finished so as to prevent passage of water, smoke and fumes.

E. Slots and openings for future use shall be filled with fire rated silicone foam. Where raceways passing through the openings are exposed in finished rooms, the finishes of the filling materials shall match and be flush with the adjoining floor, ceiling, or wall finishes.

F. Where unused sleeves or slots are provided for future installation of conduit or other raceways, they shall be so identified when closed.

G. Sleeves for future use shall be extended two (2) inches above and below the floor slab, or wall on both sides, and shall be threaded and capped at both ends and filled with fire rated RTV silicone foam as made by Dow Corning.

3.4 Electrical Tests

A. Furnish all labor, materials, instruments, supplies, and services and bear all costs for the accomplishment of the tests herein specified or requested at job site. Correct all defects appearing under test, and repeat the tests until no defects are disclosed, leave the equipment clean and ready for use.

B. Testing Scheduling:

1. Unless specified otherwise under specific equipment specification section, three (3) weeks prior to performing the specified test, furnish to the Construction Manager and to the Engineer the following information:

2. Date, time, duration, and location of tests.

3. Test outlines description and sequence.

4. Test report forms to be used.

5. Qualifications of testing personnel.

6. Make and model number of test equipment and date of last calibration adjustment. Provide copies of current Certificates of Calibration for all instruments and testing equipment.

7. When applicable, name and position of manufacturer's representative(s) who will be conducting the testing.

C. The Contractor, at his own expense, shall furnish the necessary calibrated instruments. Materials not up to the Code requirements shall be replaced.

D. Grounds, shorts, etc., must be eliminated from the wiring. Test out all lighting fixtures, together with switches and controls; test the operation of all motors, controllers, and other electrical equipment devices. Each piece of equipment, including lighting fixtures, motors, and controls, shall be operated continuously for a period of not less than one (1) hour in the presence of the Construction Manager or the Engineer before acceptance.

E. The power distribution equipment and power equipment feeders (motors, package controllers, etc.) shall be megger tested, as specified in the Field Quality Control section of the applicable cable specification.

F. Perform all field testing and start-up tasks specified in the applicable sections of equipment specifications.

G. Perform Ground Resistance testing specified in Section 260526.

H. Rotating Machinery: Unless specified otherwise under specific equipment specification section, provide the following testing:

1. Visual and Mechanical Inspection:
    a. Inspect for physical damage. Report conditions which must be corrected.
    b. Compare equipment and motor nameplate information with construction documents, report discrepancies.
    c. Inspect for proper anchorage, mounting, grounding and connection.
    d. Perform special tests recommended by the manufacturer, such as gap spacing, pedestal alignment etc., where applicable.
    e. Check motors for proper lubrication by removing the grease drain plug and inserting a clean length of clear plastic tubing.
    f. Check slip rings, brushes and brush rigging for damage, contamination, loose connections and seating. Report conditions that must be corrected, cleaned, and adjusted.

2. Electrical Tests
    a. For motors rated over 600 volts perform all testing recommended by the manufacturer.
    b. For 480 volt motors, test the insulation with a 500 volt megger and record readings. All readings below one (1) megohm shall be reported immediately to the Construction Manager and to the Engineer.
    c. Measure full load running current and compare to nameplate. Motor full load current shall not exceed nameplate values. Report discrepancies.
    d. Observe proper operation and sequence of any reduced voltage starters.
    e. Check all protective devices in accordance with other sections of these specifications.
    f. Check motors for proper rotation after insulation tests and lubrication check and before coupling motor to the load.
    g. Check winding temperature detectors, bearing temperature relays in accordance with manufacturer’s recommendations. Report any deficiencies.
    h. All motors (uncoupled) shall be tested for correct rotation and re-connected when required.

3. Mechanical Tests
    a. Motors shall be checked for proper alignment of couplings and end play adjusted if necessary. On sleeve bearing motors proper magnetic center of shaft end play shall be noted with the motor running uncoupled. This position of magnetic center shall not change when the motor is running under load.

b. For motors 300 HP and larger, perform vibration base line test. Amplitude to be plotted versus frequency. Verify with manufacturer's recommendations.

I. Transformers shall be checked for proper nameplate voltage. Contractor must adjust transformer taps to obtain the transformer nameplate voltage when first energized and later at Construction Manager's direction prior to completion of the project.

J. Before inserting control fuses, use an ohm meter to check AC and DC control circuits for short circuit and extraneous grounds.

K. Panelboard load readings shall be provided, and load balanced within ten percent (10%).

L. The EC shall perform any tests other than herein specified which may be required by the Engineer or legal authorities to whose requirements this work is to conform.

M. The Engineer shall be notified immediately of any unfavorable test results or indication of faulty equipment. No piece of equipment shall be energized until the test data is evaluated and the equipment is proven acceptable.

N. If the test and inspection data submitted should indicate deficiencies in the performance or operation of the electrical apparatus, the EC shall promptly implement the necessary adjustments, corrections, modifications and/or replacements necessary to meet the specified requirements.

O. Upon completion of the remedial work, the EC shall retest the equipment or components previously found deficient on the first test or any additional test if required. It shall be the responsibility and obligation of the EC to have all remedial work accomplished as may be required by second and/or additional tests.

P. Upon completion of the work herein described, the EC shall submit 6 sets of typed and signed test and inspection reports to the Engineer. The reports shall indicate equipment used and the date of last calibration, name of the technician, time and date of test, soil condition at time of test (when applicable). The test results shall be tabulated and shall indicate minimum or maximum design value (as applicable) and the actual test result value for each test.

3.5 Warranty

A. Under the provisions of Purchasing Terms and Conditions

END OF SECTION

Section 26 05 19

Low-Voltage Electrical Power Conductors and Cables

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Copper building wire rated 600 V or less.

2. Connectors, splices, and terminations rated 600 V and less.

B. Related Requirements:

1. Section 260523 "Control-Voltage Electrical Power Cables" for control systems communications cables and Classes 1, 2, and 3 control cables.

1.3 DEFINITIONS

A. RoHS: Restriction of Hazardous Substances.

B. VFD: Variable-frequency drive.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Member company of NETA.

1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. **Subject to compliance with requirements, provide products by one of the following:**

1. Belden Inc.
2. General Cable Technologies Corporation.
3. Okonite Company (The).
4. Service Wire Co.
5. Southwire Company.
6. Substitutions: Under provisions of Division 1

2.2 BUILDING WIRE

A. Description: Flexible, insulated, and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.

B. Standards:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
2. RoHS compliant.
3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

C. Conductors: Copper, complying with ASTM B 3 for bare annealed copper and with ASTM B 8 for stranded conductors.

D. Conductor Insulation:

1. Type THHN and Type THWN-2: Comply with UL 83.
2. Type XHHW and XHHW-2: Comply with UL 44.

2.3 METAL-CLAD CABLE, TYPE MC

A. Description: A factory assembly of one or more current-carrying insulated conductors in an overall metallic sheath.

B. Standards:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.

2. Comply with UL 1569.

3. RoHS compliant.

4. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

C. Circuits:

1. Single circuit and multicircuit with color-coded conductors.

2. Power-Limited Fire-Alarm Circuits: Comply with UL 1424.

D. Conductors: Copper, complying with ASTM B 3 for bare annealed copper and with ASTM B 8 for stranded conductors.

E. Ground Conductor: Insulated.

F. Conductor Insulation:

1. Type TFN/THHN/THWN-2: Comply with UL 83.

2. Type XHHW-2: Comply with UL 44.

G. Armor: Aluminum, interlocked.

H. Jacket: PVC applied over armor.

2.4 VARIABLE FREQUENCY DRIVE (VFD) CABLE FOR CABLE TRAY OR WIREWAY INSTALLATION

A. Description: Type TC, Variable Frequency Drive shielded multi-conductor power cable,

B. Conductor Material: Stranded Copper

C. Insulation Material: 0.030” minimum of Cross-linked Polyethylene (XLPE), Type XHHW,

D. Insulation Voltage Rating: 600 volts

E. Temperature rating: continuous rating from -40°C to 75°C wet and 90°C dry.

F. Shielding and Ground: dual spirally wrapped copper tape shields and three bare symmetrically applied ground wires.

G. Outer Jacket: Thermoplastic CPE (Chlorinated Polyethylene) or PVC; heat, flame, sunlight, chemical and moisture resistant.

H. Flame Resistance: to meet Vertical Tray Flame Test requirements of UL 1277 and UL 1581.

2.5 CONNECTORS AND SPLICES

A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. 3M Electrical Products.

2. Burndy Corp.

3. Hubbell Power Systems, Inc.

4. O-Z/Gedney

5. Substitutions: Under provisions of Division 1

C. Jacketed Cable Connectors: For steel and aluminum jacketed cables, zinc die-cast with set screws, designed to connect conductors specified in this Section.

D. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.

1. Material: Copper

2. Type: Two hole with long barrels.

3. Termination: Crimp.

2.6 SOURCE QUALITY CONTROL

A. Conduct and follow standard industry and manufacturer’s tests and quality control procedures.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: Copper; stranded

B. Branch Circuits: Copper. Solid for No. 12 AWG and smaller; stranded for No. 10 AWG and larger.

C. Power-Limited Fire Alarm and Control: Solid for No. 12 AWG and smaller.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Dry Interior Locations:

1. Type THHN/THWN for #14 AWG through # 8 AWG, XHHW for #6 AWG and up.

2. In conduit and/or cable tray, when exposed.

3. Metal-Clad Cable, Type MC, when concealed and in cable tray, where available.

B. Wet or Damp Locations: Type THHN/THWN insulation; in conduit, unless indicated otherwise on drawings or Cable and Raceway Schedule.

C. For power wiring between VFD and motor, when installed in cable tray or when more than three motor feeders are installed in common conduit or wireway use shielded multi-conductor Variable Frequency Drive cable.

D. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.

B. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.

C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members and follow surface contours where possible.

F. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."

G. Complete cable tray systems installation according to Section 260536 "Cable Trays for Electrical Systems" prior to installing conductors and cables.

H. Install conductors continuous from termination point to termination point. Unless when specifically called for on the drawings, splices are allowed only for such loads as lighting or receptacles when multiple devices are powered from a common circuit.

3.4 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.

B. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

3.5 IDENTIFICATION

A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."

B. Identify each spare conductor at each end with identity number and location of other end of conductor and identify as spare conductor.

3.6 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.7 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Section 078413 "Penetration Firestopping."

3.8 FIELD QUALITY CONTROL

B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

C. Perform tests and inspections.

1. After installing conductors and cables and before electrical circuitry has been energized, test feeder conductors feeding the switchgear, MCC, panelboards, ATS, UPS, and all 480 volt power equipment feeders (motors, process and package controllers, etc.) for compliance with requirements below.

2. Perform each of the following visual and electrical tests:
   a. Inspect exposed sections of conductor and cable for physical damage and correct connection according to the single-line diagram.
   b. Test bolted connections for high resistance using one of the following:
      1) A low-resistance ohmmeter.
      2) Calibrated torque wrench.
      3) Thermographic survey.
   c. Inspect compression-applied connectors for correct cable match and indentation.
   d. Inspect for correct identification.
   e. Inspect cable jacket and condition.
   f. Insulation-resistance test on each conductor for ground and adjacent conductors. Apply a potential of 500-V dc for 300-V rated cable and 1000-V dc for 600-V rated cable for a one-minute duration.
   g. Continuity test on each conductor and cable.
   h. Uniform resistance of parallel conductors.

D. Cables will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports to record the following:

1. Procedures used.

2. Results that comply with requirements.

3. Results that do not comply with requirements, and corrective action taken to achieve compliance with requirements.

END OF SECTION

Section 26 05 23

Control-Voltage Electrical Power Cables

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. UTP cabling.
2. RS-485 cabling.
3. Low-voltage control cabling.
4. Control-circuit conductors.
5. Identification products.

1.3 DEFINITIONS

A. EMI: Electromagnetic interference.

B. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control and signaling power-limited circuits.

C. Plenum: A space forming part of the air distribution system to which one or more air ducts are connected. An air duct is a passageway, other than a plenum, for transporting air to or from heating, ventilating, or air-conditioning equipment.

D. RCDD: Registered Communications Distribution Designer.

E. UTP: Unshielded twisted pair.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified layout technician, installation supervisor, and field inspector.

B. Source quality-control reports.

C. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: Member company of NETA or an NRTL.

B. Testing Agency's Field Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

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.

2.2 PERFORMANCE REQUIREMENTS

A. Flame Travel and Smoke Density in Plenums: As determined by testing identical products according to NFPA 262 by a qualified testing agency. Identify products for installation in plenums with appropriate markings of applicable testing agency.

1. Flame Travel Distance: 60 inches (1520 mm) or less.

2. Peak Optical Smoke Density: 0.5 or less.

3. Average Optical Smoke Density: 0.15 or less.

B. Flame Travel and Smoke Density for Riser Cables in Non-Plenum Building Spaces: As determined by testing identical products according to UL 1666.

C. Flame Travel and Smoke Density for Cables in Non-Riser Applications and Non-Plenum Building Spaces: As determined by testing identical products according to UL 1685.

2.3 MANUFACTURERS

A. American Insulated Wire Corp.

B. AFC Cable Systems.

C. Collier Insulated Wire Company.

D. Okonite Company.

E. Cablec Insulated Cable Company.

F. Rockbestos.

G. Belden.

H. Southwire.

I. Substitutions: Under provisions of Division 1

2.4 CONTROL-CIRCUIT CONDUCTORS

A. Class 1 Control Circuits: Stranded copper, Type THHN-2-THWN-2, in raceway, complying with UL 44.

B. Class 2 Control Circuits: Stranded copper, Type THHN-2-THWN-2, in raceway power-limited cable, concealed in building finishes or power-limited tray cable, in cable tray, complying with UL 44.

C. Class 3 Remote-Control and Signal Circuits: Stranded copper, Type THHN-2-THWN-2, in raceway power-limited cable, concealed in building finishes or power-limited tray cable, in cable tray, complying with UL 44.

D. Class 2 Control Circuits and Class 3 Remote-Control and Signal Circuits That Supply Critical Circuits: Circuit Integrity (CI) cable.

1. Smoke control signaling and control circuits.

2.5 LOW-VOLTAGE CONTROL CABLE, FOR CONDUIT OR WIREWAY INSTALLATION

A. Description:

1. Single or multi-conductor wire and cable, as indicated in Construction Documents.

B. Conductor Material:

1. Stranded Copper

C. Insulation Voltage Rating:

1. 600 volts; except for Power- Limited Circuit wiring, per NEC, for Class 2 use 150 volt insulation and for Class 3 use 300 volt insulation

D. Temperature rating:

1. Continuous rating from -40°C to 75°C wet and 90°C dry.

2.6 LOW-VOLTAGE CONTROL CABLE For CABLE TRAY INSTALLATION

A. Description:

1. Type TC single or multi-conductor cable as noted in Construction Documents.

B. Conductor Material:

1. Stranded Copper

C. Insulation Voltage Rating:

1. 600 volts, except for Power- Limited Circuit wiring, per NEC, for Class 2 and 3 use 300 volt, type PLTC insulation.

D. Temperature rating:

1. Continuous rating from -40°C to 75°C wet and 90°C dry.

E. Outer Jacket:

1. Thermoplastic CPE (Chlorinated Polyethylene) or PVC; heat, flame, sunlight, chemical and moisture resistant

F. Ground:

1. All cables shall contain a copper ground conductor, unless specifically noted otherwise in Construction Documents.

G. Flame Resistance:

1. To meet Vertical Tray Flame Test requirements of UL 1277 and UL 1581

2.7 TWISTED CONDUCTOR (SHIELD OR UNSHIELDED) CABLE FOR CONDUIT OR WIREWAY INSTALLATION

A. Description:

1. Single Twisted Shielded or Unshielded Pairs and Triads, Multiple Twisted Shielded or Unshielded Pairs and Triad Cables.

B. Construction:

1. Twist pairs with varying lay (if more than one pair).

C. Conductor:

1. 19 Strand, Concentric Lay, Class B Tinned Copper.

D. Insulation Voltage Rating:

1. 600 volts; except for Power- Limited Circuit wiring, per NEC, for Class 2 use 150 volt insulation and for Class 3 use 300 volt insulation

E. Temperature Rating:

1. Continuous rating from -40°C to 75°C wet and 90°C dry.

F. Outer Jacket:

1. Thermoplastic CPE (Chlorinated Polyethylene) or PVC.

G. Shielding:

1. Where specified on Construction Documents, provide aluminum/polyester shielding tape which provides 100% coverage.

H. Drain Wire:

1. Seven Strand, Concentric Lay, Class B Tinned Copper.

I. Color Coding:

1. Identify conductors individually with color coded or sequentially tagged insulation.

2.8 TWISTED CONDUCTOR (SHIELD OR UNSHIELDED) CABLE FOR CABLE TRAY INSTALLATION

A. Description:

1. Single Twisted Shielded or Unshielded Pairs and Triads, Multiple Twisted Shielded or Unshielded Pairs and Triad Cables.

B. Construction:

1. Twist pairs with varying lay (if more than one pair) and cover with cable tape and copper or aluminum coated Mylar shielding tape.

C. Conductor:

1. 19 Strand, Concentric Lay, Class B Tinned Copper.

D. Insulation Voltage Rating:

1. 600 volts; Except for Power- Limited Circuit wiring per NEC, Class 2 and 3 use 300 volt, type PLTC

E. Temperature Rating:

1. Continuous rating from -40°C to 90°C.

F. Outer Jacket:

1. Thermoplastic CPE (Chlorinated Polyethylene) or PVC; heat, flame, sunlight, chemical and moisture resistant.

G. Shielding:

1. Where specified on Construction Documents, provide aluminum/polyester shielding which provides 100% coverage.

H. Drain Wire:

1. Seven Strand, Concentric Lay, Class B Tinned Copper.

I. Flame Test Rating:

1. UL 1277 and UL 1581.

J. Color Coding:

1. Identify conductors individually with color coded or sequentially tagged insulation.

2.9 BACKBOARDS

A. Description: Plywood, fire-retardant treated, 3/4 by 48 by 96 inches (19 by 1220 by 2440 mm). Comply with requirements for plywood backing panels in Section 061000 "Rough Carpentry."

B. Painting: Paint plywood on all sides and edges with flat light gray paint. Comply with requirements in Section 099123 "Interior Painting."

2.10 UTP CABLE

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ADC Krone.

B. Description: 100-ohm, four-pair UTP.

1. Comply with ICEA S-102-700 for mechanical properties of Category 6 cables.

2. Comply with TIA-568-C.1 for performance specifications.

3. Comply with TIA-568-C.2, Category 6.

4. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with NEMA WC 66, UL 444 and NFPA 70 for the following types:
   a. Communications, Plenum Rated: Type CMP complying with UL 1685 or Type CMP in listed plenum communications raceway.
   b. Communications, Plenum Rated: Type CM, Type CMG, Type CMP, Type CMR, or Type CMX in metallic conduit installed per NFPA 70, Article 300.22, "Wiring in Ducts, Plenums, and Other Air-Handling Spaces."
   c. Communications, Riser Rated: Type CMR complying with UL 1666 and ICEA S-103-701.
   d. Communications, Riser Rated: Type CMP, or Type CMR in listed plenum or riser communications raceway.
   e. Communications, Riser Rated: Type CMP or Type CMR in metallic conduit installed per NFPA 70, Article 300.22, "Wiring in Ducts, Plenums, and Other Air-Handling Spaces."
   f. Communications, General Purpose: Type CM or Type CMG; or Type CM, Type CMG, Type CMP, or Type CMR in listed communications raceways.
   g. Communications, General Purpose: Type CM, Type CMG, Type CMP, Type CMR, or Type CMX in metallic conduit installed per NFPA 70, Article 300.22, "Wiring in Ducts, Plenums, and Other Air-Handling Spaces."

h. Communications, Limited Purpose: Type CMX; or Type CM, Type CMG, Type CMP, or Type CMR.

2.11 UTP CABLE HARDWARE

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ADC Krone.

B. General Requirements for Cable Connecting Hardware: Comply with TIA/EIA-568-C.2, IDC type, with modules designed for punch-down caps or tools. Cables shall be terminated with connecting hardware of same category or higher.

C. Connecting Blocks: 110-style IDC for Category 6. Provide blocks for the number of cables terminated on the block, plus 50 percent spare. Integral with connector bodies, including plugs and jacks where indicated.

D. Cross-Connect: Modular array of connecting blocks arranged to terminate building cables and permit interconnection between cables.

1. Number of Terminals per Field: One for each conductor in assigned cables.

E. Patch Panel: Modular panels housing multiple-numbered jack units with IDC-type connectors at each jack for permanent termination of pair groups of installed cables.

1. Number of Jacks per Field: One for each four-pair UTP cable indicated, plus spares and blank positions adequate to suit specified expansion criteria.

F. Jacks and Jack Assemblies: 100-ohm, balanced, twisted-pair connector; four-pair, eight-position modular. Comply with TIA/EIA-568-C.1.

G. Patch Cords: Factory-made, four-pair cables in 48-inch (1200-mm) lengths; terminated with eight-position modular plug at each end.

1. Patch cords shall have bend-relief-compliant boots and color-coded icons to ensure Category 6 performance. Patch cords shall have latch guards to protect against snagging.

2. Patch cords shall have color-coded boots for circuit identification.

H. Workstation Outlets: Four port-connector assemblies mounted in multigang faceplate.

I. Faceplates:

1. Plastic Faceplate: High-impact plastic. Coordinate color with Section 262726 "Wiring Devices."

2. Metal Faceplate: Stainless steel, complying with requirements in Section 262726 "Wiring Devices."

3. For use with snap-in jacks accommodating any combination of UTP, optical-fiber, and coaxial work area cords.
   a. Flush-mounted jacks, positioning the cord at a 45-degree angle.

J. Legend:

1. Factory labeled by silk-screening.

2.12 TWIN-AXIAL DATA HIGHWAY CABLE

A. Standard Cable: NFPA 70, Type CM.

1. Paired, two pairs, No. 20 AWG, stranded (7x28) tinned-copper conductors.

2. Polypropylene insulation.

3. Individual aluminum foil-polyester tape shielded pairs with 100 percent shield coverage.

4. PVC jacket.

5. Pairs are cabled on common axis with No. 24 AWG, stranded (7x32) tinned-copper drain wire.

6. Flame Resistance: Comply with UL 1685.

B. Plenum-Rated Cable: NFPA 70, Type CMP.

1. Paired, two pairs, No. 20 AWG, stranded (7x28) tinned-copper conductors.

2. Plastic insulation.

3. Individual aluminum foil-polyester tape shielded pairs with 100 percent shield coverage.

4. Plastic jacket.

5. Pairs are cabled on common axis with No. 24 AWG, stranded (7x32) tinned-copper drain wire.

6. Flame Resistance: Comply with NFPA 262.

2.13 RS-485 CABLE

A. Standard Cable: NFPA 70, Type CMG.

1. Paired, two pairs, twisted, No. 22 AWG, stranded (7x30) tinned-copper conductors.

2. PVC insulation.

3. Unshielded.

4. PVC jacket.

5. Flame Resistance: Comply with UL 1685.

B. Plenum-Rated Cable: NFPA 70, Type CMP.

1. Paired, two pairs, No. 22 AWG, stranded (7x30) tinned-copper conductors.

2. Fluorinated ethylene propylene insulation.

3. Unshielded.

4. Fluorinated ethylene propylene jacket.

5. Flame Resistance: NFPA 262.

2.14 SOURCE QUALITY CONTROL

A. Conduct and follow standard industry and manufacturer's tests and quality control procedures.

B. Testing Agency: Engage a qualified testing agency to evaluate cables.

C. Factory test UTP cables according to TIA-568-C.2.

D. Factory test optical-fiber cables according to TIA-568-C.3.

E. Cable will be considered defective if it does not pass tests and inspections.

F. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 PROJECT CONDITIONS

A. Wire and cable routing shown on Drawings is diagrammatic unless dimensioned. Route wire and cable as required to meet Project Conditions.

B. Where wire and cable routing is not shown, and destination only is indicated, EC shall determine exact length based on actual routing of the run which he must coordinate based on the field conditions.

3.2 COORDINATION

A. Coordinate all Work with other trades.

B. Maintain wiring separation as required by the NEC and as indicated on plans and installation details.

C. Determine cable routing to avoid interference with other work.

3.3 STORAGE

A. Store all material in accordance with manufacturer's recommendations.

B. Store material where protected from physical damage and the weather, unless specifically permitted by the manufacturer.

C. Always seal spool ends to protect cable from exposure to moisture.

3.4 EXAMINATION

A. Verify that interior of building has been protected from weather.

B. Verify that mechanical work likely to damage wire has been completed.

C. Always examine cable for visible damage prior to installation.

3.5 PREPARATION

A. Completely and thoroughly swab raceway before installing wire.

3.6 INSTALLATION OF CONDUCTORS AND CABLES

A. Comply with NECA 1 and NFPA 70.

B. Install products in accordance with all applicable codes, standards and manufacturer's instructions.

C. Do not combine wiring for different systems (analog, discrete, power, tel/data, intrinsically safe, etc.) in common raceways, wiring harness or bundles. Maintain separation of wiring with different insulation ratings. Combining shielded and unshielded wiring is only permitted when specifically indicated in construction documents.

D. Control and instrumentation wiring for 120 volt circuit: use conductor not smaller than 14 AWG minimum, unless otherwise noted on drawings or schedules.

E. Twisted conductor shielded or unshielded cable for instrumentation wiring for 48 volt circuit and below: use No. 16 AWG minimum, unless otherwise noted on drawings or schedules.

F. Class 1, 2 and 3 wiring where permitted in NEC use No. 18 AWG, unless otherwise noted on drawings or schedules.

G. Pull all conductors into raceway at same time.

H. Protect exposed cable from damage.

I. Use suitable cable fittings and connectors.

J. Neatly train and lace wiring inside boxes and equipment.

K. Clean conductor surfaces before installing lugs and connectors.

L. Terminate all wires connected to items such as terminal boards or terminal blocks, or to other similar terminals by means of ring and tongue, nylon self-insulated, tin-plated copper pressure terminals.

M. Install conductors continuous from termination point to termination point.

N. General Requirements for Cabling:

1. Comply with TIA-568-C Series of standards.

2. Comply with BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems" and Ch. 6, "Optical Fiber Structured Cabling Systems."

3. Terminate all conductors and optical fibers; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, and cross-connect and patch panels.

4. Cables may not be spliced.

5. Secure and support cables at intervals not exceeding 30 inches (760 mm) and not more than 6 inches (150 mm) from cabinets, boxes, fittings, outlets, racks, frames, and terminals.

6. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems" and Ch. 6, "Optical Fiber Structured Cabling Systems." Install lacing bars and distribution spools.

7. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.

8. Cold-Weather Installation: Bring cable to room temperature before dereeling. Do not use heat lamps for heating.

9. Pulling Cable: Comply with BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems" and Ch. 6, "Optical Fiber Structured Cabling Systems." Monitor cable pull tensions.

10. Support: Do not allow cables to lay on removable ceiling tiles.

11. Secure: Fasten securely in place with hardware specifically designed and installed so as to not damage cables.

O. UTP Cable Installation:

1. Comply with TIA-568-C.2.

2. Install termination hardware as specified in Section 271500 "Communications Horizontal Cabling" unless otherwise indicated.

3. Do not untwist UTP cables more than 1/2 inch (12 mm) at the point of termination to maintain cable geometry.

P. Installation of Control-Circuit Conductors:

1. Install wiring in raceways. Comply with requirements specified in Section 260533 "Raceways and Boxes for Electrical Systems."

Q. Optical-Fiber Cable Installation:

1. Comply with TIA-568-C.3.

2. Terminate cable on connecting hardware that is rack or cabinet mounted.

R. Open-Cable Installation:

1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.

2. Suspend copper cable not in a wireway or pathway a minimum of 8 inches (200 mm) above ceilings by cable supports not more than 30 inches (760 mm) apart.

3. Cable shall not be run through or on structural members or in contact with pipes, ducts, or other potentially damaging items. Do not run cables between structural members and corrugated panels.

S. Installation of Cable Routed Exposed under Raised Floors:

1. Install plenum-rated cable only.

2. Install cabling after the flooring system has been installed in raised floor areas.

3. Below each feed point, neatly coil a minimum of 72 inches (1830 mm) in diameter.

T. Separation from EMI Sources:

1. Comply with BICSI TDMM and TIA-569-B recommendations for separating unshielded copper voice and data communications cable from potential EMI sources including electrical power lines and equipment.

2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:
   a. Electrical Equipment or Circuit Rating Less Than 2 kVA: A minimum of 5 inches (127 mm).
   b. Electrical Equipment or Circuit Rating between 2 and 5 kVA: A minimum of 12 inches (305 mm).
   c. Electrical Equipment or Circuit Rating More Than 5 kVA: A minimum of 24 inches (600 mm).

3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:
   a. Electrical Equipment or Circuit Rating Less Than 2 kVA: A minimum of 2-1/2 inches (64 mm).
   b. Electrical Equipment or Circuit Rating between 2 and 5 kVA: A minimum of 6 inches (150 mm).
   c. Electrical Equipment or Circuit Rating More Than 5 kVA: A minimum of 12 inches (305 mm).

4. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
   a. Electrical Equipment or Circuit Rating Less Than 2 kVA: No requirement.
   b. Electrical Equipment or Circuit Rating between 2 and 5 kVA: A minimum of 3 inches (75 mm).
   c. Electrical Equipment or Circuit Rating More Than 5 kVA: A minimum of 6 inches (150 mm).

5. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or 5 HP and Larger: A minimum of 48 inches (1200 mm).

6. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inches (127 mm).

3.7 EXAMINATION

A. Test cables on receipt at Project site.

   1. Test each pair of UTP cable for open and short circuits.

3.8 INSTALLATION OF RACEWAYS AND BOXES

A. Comply with requirements in Section 260533 "Raceways and Boxes for Electrical Systems" for raceway selection and installation requirements for boxes, conduits, and wireways as supplemented or modified in this Section.

   1. Outlet boxes shall be no smaller than 2 inches (50 mm) wide, 3 inches (75 mm) high, and 2-1/2 inches (64 mm) deep.

   2. Outlet boxes for optical-fiber cables shall be no smaller than 4 inches (102 mm) square by 2-1/8 inches (53 mm) deep with extension ring sized to bring edge of ring to within 1/8 inch (3.1 mm) of the finished wall surface.

   3. Flexible metal conduit shall not be used.

B. Comply with TIA-569-B for pull-box sizing and length of conduit and number of bends between pull points.

C. Install manufactured conduit sweeps and long-radius elbows if possible.

D. Raceway Installation in Equipment Rooms:

   1. Position conduit ends adjacent to a corner on backboard if a single piece of plywood is installed, or in the corner of the room if multiple sheets of plywood are installed around perimeter walls of the room.

2. Install cable trays to route cables if conduits cannot be located in these positions.

3. Secure conduits to backboard if entering the room from overhead.

4. Extend conduits 3 inches (75 mm) above finished floor.

5. Install metal conduits with grounding bushings and connect with grounding conductor to grounding system.

E. Backboards: Install backboards with 96-inch (2440-mm) dimension vertical. Butt adjacent sheets tightly and form smooth gap-free corners and joints.

3.9 REMOVAL OF CONDUCTORS AND CABLES

A. Remove abandoned conductors and cables. Abandoned conductors and cables are those installed that are not terminated at equipment and are not identified for future use with a tag.

3.10 FIRESTOPPING

A. Comply with requirements in Section 078413 "Penetration Firestopping."

B. Comply with TIA-569-B, Annex A, "Firestopping."

3.11 GROUNDING

A. For low-voltage control wiring and cabling, comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems."

3.12 IDENTIFICATION

A. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

B. Identify data and communications system components, wiring, and cabling according to TIA-606-A; label printers shall use label stocks, laminating adhesives, and inks complying with UL 969.

3.13 FIELD QUALITY CONTROL

A. Inspect wire and cable for physical damage and proper connection.

B. Measure tightness of bolted connections and compare torque measurements with manufacturer's recommended values.

C. Perform the following tests and inspections:

1. Visually inspect UTP and optical-fiber cable jacket materials for UL or third-party certification markings. Inspect cabling terminations to confirm color-coding for pin assignments and inspect cabling connections to confirm compliance with TIA-568-C.1.

2. Visually inspect cable placement, cable termination, grounding and bonding, equipment, and patch cords, and labeling of all components.

3. Test UTP cabling for direct-current loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not after cross-connection.
   a. Test instruments shall meet or exceed applicable requirements in TIA-568-C.2. Perform tests with a tester that complies with performance requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
   b. Document data for each measurement. Print data for submittals in a summary report that is formatted using Table 10.1 in BICSI TDMM as a guide or transfer the data from the instrument to the computer, save as text files, print, and submit.
   c. End-to-end cabling will be considered defective if it does not pass tests and inspections.
   d. Prepare test and inspection reports.

END OF SECTION

Section 26 05 26

Grounding and Bonding for Electrical Systems

PART 1 - GENERAL

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 Summary

A. Section includes grounding and bonding systems and equipment.

B. Section includes grounding and bonding systems and equipment, plus the following special applications:

1. Underground distribution grounding.

2. Foundation steel electrodes.

1.3 Action Submittals

A. Product Data: For each type of product indicated.

1.4 Informational Submittals

A. As-Built Data: Plans showing dimensioned as-built locations of grounding features specified in "Field Quality Control" Article, including the following:

1. Test wells.

2. Ground rods.

3. Ground rings.

4. Grounding arrangements and connections for separately derived systems.

B. Qualification Data: For testing agency and testing agency's field supervisor.

C. Field quality-control reports.

1.5 Closeout Submittals

A. Operation and Maintenance Data: For grounding to include in emergency, operation, and maintenance manuals.

1. In addition to items specified in Section 017800 "Closeout Submittals," include the following:
   a. Instructions for periodic testing and inspection of grounding features at test wells, and grounding connections for separately derived systems based on NFPA 70B.
      1) Tests shall determine if ground-resistance or impedance values remain within specified maximums, and instructions shall recommend corrective action if values do not.
      2) Include recommended testing intervals.

1.6 Quality Assurance

A. Testing Agency Qualifications: Member company of NETA or an NRTL.

1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

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. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 Manufacturers

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ERICO International Corporation
2. Harger Lightning & Grounding
3. Burndy; Part of Hubbell Electrical Systems

2.2 System Description

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with UL 467 for grounding and bonding materials and equipment.

2.3 Conductors

A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors:

1. Solid Conductors: ASTM B 3.
2. Stranded Conductors: ASTM B 8.
3. Tinned Conductors: ASTM B 33.

C. Grounding Bus: Predrilled rectangular bars of annealed copper, 1/4 by 4 inches (6.3 by 100 mm) in cross section, with 9/32-inch (7.14-mm) holes spaced 1-1/8 inches (28 mm) apart. Stand-off insulators for mounting shall comply with UL 891 for use in switchboards, 600 V and shall be Lexan or PVC, impulse tested at 5000 V.

2.4 Connectors

A. Listed and labeled by a Nationally Recognized Testing Laboratory (NRTL) acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.

B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy.

C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

D. Bus-Bar Connectors: Mechanical type, cast silicon bronze, solderless exothermic-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

2.5 Grounding Electrodes

A. Ground Rods: Copper-clad steel; 3/4 inch by 10 feet (19 mm by 3 m).

PART 3 - EXECUTION

3.1 Applications

A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.

B. Underground Grounding Conductors: Install bare copper conductor, No. 4/0 AWG minimum.

1. Bury at least 24 inches (600 mm) below grade.
2. Duct-Bank Grounding Conductor: Bury 12 inches (300 mm) above duct bank when indicated as part of duct-bank installation.

C. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.

D. Grounding Bus: Install in electrical equipment rooms, in rooms housing service equipment, and elsewhere as indicated.

E. Install bus horizontally, on insulated spacers 2 inches (50 mm) minimum from wall. Install above door frame and continue around room or as indicated on plan drawing.

F. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
3. Connections to Ground Rods at Test Wells: Bolted connectors.
4. Connections to Structural Steel: Welded connectors.

3.2 Grounding at the Service

A. Equipment grounding conductors and grounding electrode conductors shall be connected to the ground bus. Install a main bonding jumper between the neutral and ground buses.

3.3 Grounding Separately Derived Systems

A. Generator: Install grounding electrode(s) at the generator location. The electrode shall be connected to the equipment grounded conductor and to the frame of the generator.

3.4 Equipment Grounding

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:

1. Feeders and branch circuits.
2. Lighting circuits.
3. Receptacle circuits.
4. Single-phase motor and appliance branch circuits.
5. Three-phase motor and appliance branch circuits.
6. Flexible raceway runs.
7. Armored and metal-clad cable runs.

C. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.

D. Water Heater and Heat-Tracing Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.

3.5 Installation

A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Ground Bonding Common with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor and install in conduit.

C. Ground Rods: Drive rods until tops are 2 inches (50 mm) below finished floor or final grade unless otherwise indicated.

1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.
2. Where indicated on drawings, install three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.

D. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.

E. Grounding and Bonding for Piping:

1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type connector to a pipe flange by using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.

2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.

3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

F. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install bonding jumper to bond across flexible duct connections to achieve continuity.

G. Grounding cable crossing other metallic structures such as conduits, pipeline, lead-sheathed cables, etc. shall be a minimum of 12" distant from such structures.

H. Exposed Grounding Conductors

1. Exposed grounding conductors shall be run to conform to the surface over which they pass. Diagonal runs shall be avoided; the runs shall be horizontal, vertical, and parallel to building walls or columns. Conductors shall be neatly and securely fastened to the mounting surface without slack, using galvanized malleable iron straps or clamps.

I. Ground all armor metal sheath termination and cable shielding in accordance with the manufacturer's recommendations, or as directed by Engineer.

J. Instrument Grounding

1. Shields of twisted shielded pairs, triplets or quads shall not be grounded at the station ground grid but shall be connected to the insulated instrument ground bus at instrument panels. Shield braids shall be taped or insulated with sleeves to prevent accidental grounding of shields. All twisted pairs, triplets or quads cables will have an overall jacket to prevent field grounding.

3.6 Field Quality Control

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

C. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
3. Prepare dimensioned Drawings locating each test well, ground rod and ground-rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

D. Ground Grid Testing:

1. The ground grid installation subcontractor shall be responsible for all ground grid testing.
2. Perform a visual and mechanical inspection of the grounding grid system to ensure that all connections (both compression and exothermal) have been properly made.
3. Notify Construction Manager when any exothermal connections are available for inspection before they become inaccessible.
4. The ground grid resistance testing must be conducted by a certified testing company.
5. Use the fall-of-potential method according to IEEE 81. When the results of this method are beyond the required accuracy, use the ratio method to achieve satisfactory results.
6. All testing shall be conducted, and the results evaluated before any underground portion of the grid is paved over.
7. If resistance is found to be more than one (1) ohm, immediately report test results to the Construction Manager and the Engineer

E. Perform point-to-point resistance testing between all direct (main) connections to the ground bus at substation and generator and the closest ground well.

F. Perform point-to-point resistance testing between all ground busses located throughout the plant and the closest main ground point connection specified above.

G. Perform point-to-point resistance testing between each cable tray grounding conductor and the closest main ground point connection specified above.

H. Investigate and correct any grounding connections with resistance values which exceed 0.5 ohm.

I. Provide continuity testing between each equipment ground and the closest ground bus or cable tray grounding conductor.

J. For every separately derived system, verify single point connection between the grounded conductor and the grounding electrode.

K. Perform additional system tests for equipment grounding connections as directed by the Engineer or the Owner.

L. Grounding system will be considered defective if it does not pass tests and inspections.

M. Prepare test and inspection reports.

END OF SECTION

Section 26 05 29

Hangers and Supports for Electrical Systems

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Hangers and supports for electrical equipment and systems.

2. Construction requirements for concrete bases.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. IMC: Intermediate metal conduit.

C. RMC: Rigid metal conduit.

1.4 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.

C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1.5 ACTION SUBMITTALS

A. Product Data: For the following:

1. Steel slotted support systems.

2. Nonmetallic slotted support systems.

B. Shop Drawings: Show fabrication and installation details and include calculations for the following:

1. Trapeze hangers. Include Product Data for components.

2. Steel slotted channel systems. Include Product Data for components.

3. Nonmetallic slotted channel systems. Include Product Data for components.

4. Equipment supports.

1.6 INFORMATIONAL SUBMITTALS

A. Welding certificates.

1.7 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Comply with NFPA 70.

1.8 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified together with concrete Specifications.

B. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Section 07 72 00 "Roof Accessories."

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.

1. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.

2. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.

3. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.

4. Channel Dimensions: Selected for applicable load criteria.

B. Nonmetallic Slotted Support Systems: Structural-grade, factory-formed, glass-fiber-resin channels and angles with 9/16-inch- (14-mm-) diameter holes at a maximum of 8 inches (200 mm) o.c. in at least 1 surface.

1. Fittings and Accessories: Products of channel and angle manufacturer and designed for use with those items.

2. Fitting and Accessory Materials: Same as channels and angles, except metal items may be stainless steel.

3. Rated Strength: Selected to suit applicable load criteria.

C. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

D. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

E. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

F. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

G. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.

3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.

4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.

5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.

6. Toggle Bolts: All-steel springhead type.

7. Hanger Rods: Threaded steel.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

B. Materials: Comply with requirements in Section 05 50 00 "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.

C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted or other support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

1. Secure raceways and cables to these supports with two-bolt conduit clamps.

D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch (38-mm) and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Raceway Support Methods: In addition to methods described in NECA 1, EMT and RMC may be supported by openings through structure members, as permitted in NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb. (90 kg).

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.

2. To New Concrete: Bolt to concrete inserts.

3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.

4. To Existing Concrete: Expansion anchor fasteners.

5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches (100 mm) thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches (100 mm) thick.

6. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts.

7. To Light Steel: Sheet metal screws.

8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Comply with installation requirements in Section 055000 "Metal Fabrications" for site-fabricated metal supports.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

C. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 CONCRETE BASES

A. Construct concrete bases of dimensions indicated but not less than 4 inches (100 mm) larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.

B. Use 3000-psi (20.7-MPa), 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Section 03 30 00 "Cast-in-Place Concrete."

C. Anchor equipment to concrete base.

1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

2. Install anchor bolts to elevations required for proper attachment to supported equipment.

3. Install anchor bolts according to anchor-bolt manufacturer’s written instructions.

3.5 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

   1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).

B. Touchup: Comply with requirements in Section 099100 "Painting", Section 099123 "Interior Painting" and Section 099123 "Interior Painting Schedule" for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION

Section 26 05 33

Raceways and Boxes for Electrical Systems

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Metal conduits, tubing, and fittings.
2. Nonmetal conduits, tubing, and fittings.
3. Surface raceways.
4. Boxes, enclosures, and cabinets.

B. Related Requirements:

1. Section 260543 "Underground Ducts and Raceways for Electrical Systems" for exterior ductbanks, manholes, and underground utility construction.
2. Section 270528 "Pathways for Communications Systems" for conduits, wireways, surface pathways, innerduct, boxes, faceplate adapters, enclosures and cabinets serving communications systems.

1.3 DEFINITIONS

A. GRC: Galvanized Rigid Steel Conduit.

B. EMT: Electrical Metallic Tubing.

C. LFMC: Liquidtight Flexible Metal (steel) conduit.

D. NEC: National Electrical Code

1.4 ACTION SUBMITTALS.

A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

B. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, and attachment details.

PART 2 - PRODUCTS

2.1 METAL CONDUITS, TUBING, AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Southwire Company
2. AFC Cable Systems
3. Allied Tube & Conduit
4. Appleton
5. Crouse Hinds
6. Substitutions: Under provisions of Division 1

B. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. GRC: Comply with ANSI C80.1 and UL 6.

D. EMT: Comply with ANSI C80.3 and UL 797.

E. LFMC: Liquidtight Flexible steel conduit with PVC jacket and complying with UL 360.

F. Explosion proof flexible coupling complying with UL 886 (1203).

G. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.

1. Fittings for EMT:
   a. Material: die cast.
   b. Type: compression.

2. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.

3. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch (1 mm), with overlapping sleeves protecting threaded joints.

H. Joint Compound for IMC, GRC, or ARC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 NONMETALLIC CONDUITS, TUBING, AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. RACO; Hubbell

2. Thomas & Betts Corporation; A Member of the ABB Group

B. Listing and Labeling: Nonmetallic conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. ENT: Comply with NEMA TC 13 and UL 1653.

D. RNC: Type EPC-40-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.

E. LFNC: Comply with UL 1660.

F. Fittings for ENT and RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.

G. Fittings for LFNC: Comply with UL 514B.

2.3 METAL WIREWAYS AND AUXILIARY GUTTERS

A. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 12 unless otherwise indicated, and sized according to NFPA 70.

1. Metal wireways installed outdoors shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

C. Wireway Covers: Hinged type unless otherwise indicated.

D. Finish: Manufacturer's standard enamel finish.

2.4 SURFACE RACEWAYS

A. Listing and Labeling: Surface raceways and tele-power poles shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Surface Metal Raceways: Galvanized steel with snap-on covers complying with UL 5. Manufacturer's standard enamel finish in color selected by Architect.

C. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Wiremold / Legrand

2. Hubbell Incorporated; Wiring Device-Kellems

3. MonoSystems.

4. Substitutions: Under provisions of Division 1

2.5 BOXES, ENCLOSURES, AND CABINETS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Hoffman

2. Crouse-Hinds

3. Hubbell

4. Substitutions: Under provisions of Division 1

B. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.

C. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.

D. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, aluminum, Type FD, with gasketed cover.

E. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.

F. Metal Floor Boxes:

1. Material: Cast metal.

2. Type: Semi-adjustable.

3. Shape: Rectangular.

4. Listing and Labeling: Metal floor boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

G. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb. (23 kg). Outlet boxes designed for attachment of luminaires weighing more than 50 lb. (23 kg) shall be listed and marked for the maximum allowable weight.

H. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

I. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, cast aluminum with gasketed cover.

J. Box extensions used to accommodate new building finishes shall be of same material as recessed box.

K. Device Box Dimensions: 4 inches square by 2-1/8 inches deep (100 mm square by 60 mm deep).

L. Gangable boxes are prohibited.

M. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 1 with continuous-hinge cover with flush latch unless otherwise indicated.

1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.

2. Nonmetallic Enclosures: Plastic.

3. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.

N. Cabinets:

1. Unless indicated otherwise on drawings, NEMA 250, Type 1 galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.

2. Hinged door in front cover with flush latch and concealed hinge.

3. Key latch to match panelboards.

4. Metal barriers to separate wiring of different systems and voltage.

5. Accessory feet where required for freestanding equipment.

6. Nonmetallic cabinets shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Outdoors: Apply raceway products as specified below unless otherwise indicated:

1. Exposed Conduit up to 20ft: GRC.

2. Aboveground: GRC.

3. Underground Conduit: PVC Schedule 40 in duct bank.

4. Direct buried underground conduit: PVC Schedule 80 with 2" all around clean backfill.

5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.

6. Boxes and Enclosures, Aboveground:
   a. In unrated or Class I, Division 2 areas: NEMA 250, Type 3R.
   b. In Class I, Division 1 areas: NEMA 7.

B. Indoors: Apply raceway products as specified below unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: EMT.

2. Exposed and Subject to Severe Physical Damage: GRC. Raceway locations include the following:
   a. Loading dock.
   b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
   c. Mechanical rooms.

3. Concealed in Ceilings and Interior Walls and Partitions: type MC cable.

4. Exposed, GMP or Clean areas: PVC coated GRC

5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.

6. Damp or Wet Locations: GRC

7. Boxes and Enclosures in unrated or Class I, Division 2 areas: NEMA 250, Type 1, except use NEMA 250, Type 4 stainless steel in institutional and commercial kitchens and damp or wet locations.

8. In Class I, Division 1 areas: NEMA 7.

C. Minimum Raceway Size: 3/4-inch (21-mm) trade size.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.

2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.

3. EMT: Use compression, steel fittings. Comply with NEMA FB 2.10.

4. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.

E. Install nonferrous conduit or tubing for circuits operating above 60 Hz. Where aluminum raceways are installed for such circuits and pass-through concrete, install in nonmetallic sleeve.

F. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.

G. Install surface raceways only where indicated on Drawings.

H. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F (49 deg C).

3.2 INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.

B. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

C. Complete raceway installation before starting conductor installation.

D. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.

E. Arrange stub-ups so curved portions of bends are not visible above finished slab.

F. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches (300 mm) of changes in direction.

G. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.

H. Support conduit within 12 inches (300 mm) of enclosures to which attached.

I. Raceways Embedded in Slabs:

1. Run conduit larger than 1-inch (27-mm) trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure raceways to reinforcement at maximum 10-foot (3-m) intervals.

2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.

3. Arrange raceways to keep a minimum of 2 inches (50 mm) of concrete cover in all directions.

4. Do not embed threadless fittings in concrete unless specifically approved by Construction Manager for each specific location.

5. Change from ENT to GRC before rising above floor.

J. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

K. Coat field-cut threads on PVC-coated raceway with a corrosion-preventing conductive compound prior to assembly.

L. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.

M. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch (35mm) trade size and insulated throat metal bushings on 1-1/2-inch (41-mm) trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.

N. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.

O. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.

P. Cut conduit perpendicular to the length. For conduits 2-inch (53-mm) trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.

Q. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.

R. Surface Raceways:

1. Install surface raceway with a minimum 2-inch (50-mm) radius control at bend points.

2. Secure surface raceway with screws or other anchor-type devices at intervals not exceeding 48 inches (1200 mm) and with no less than two supports per straight raceway section. Support surface raceway according to manufacturer's written instructions. Tape and glue are not acceptable support methods.

S. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings according to NFPA 70.

T. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.

2. Where an underground service raceway enters a building or structure.

3. Where otherwise required by NFPA 70.

U. Comply with manufacturer's written instructions for solvent welding RNC and fittings.

V. Expansion-Joint Fittings:

1. Install in each run of aboveground RNC that is located where environmental temperature change may exceed 30 deg F (17 deg C) and that has straight-run length that exceeds 25 feet (7.6 m). Install in each run of aboveground RMC conduit that is located where environmental temperature change may exceed 100 deg F (55 deg C) and that has straight-run length that exceeds 100 feet (30 m).

2. Install type and quantity of fittings that accommodate temperature change listed for each of the following locations:
   a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F (70 deg C) temperature change.
   b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F (86 deg C) temperature change.
   c. Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F (70 deg C) temperature change.

3. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F (0.06 mm per meter of length of straight run per deg C) of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F (0.0115 mm per meter of length of straight run per deg C) of temperature change for metal conduits.

4. Install expansion fittings at all locations where conduits cross building or structure expansion joints.

5. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.

W. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches (1830 mm) of flexible conduit for recessed and semi-recessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

1. Use LFMC in damp or wet locations subject to severe physical damage and in Class I, Division 2 locations.

2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.

3. Use Explosion proof flexible coupling complying in Class I, Division 1 locations.

X. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.

Y. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.

Z. Locate boxes so that cover or plate will not span different building finishes.

AA. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.

BB. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.

CC. Set metal floor boxes level and flush with finished floor surface.

DD. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.3 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.4 CONDUIT SEALS

A. Install seals where required in Article 501 of NEC and as indicated on drawings.

3.5 FIRESTOPPING

A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 078400 "Firestopping."

3.6 PROTECTION

A. Protect coatings, finishes, and cabinets from damage and deterioration.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.

2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION

Section 26 05 43

Underground Ducts and Raceways for Electrical Systems

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

B. Section Includes:

1. Concrete-encased conduit, ducts, and duct accessories.

1.3 DEFINITIONS

A. Trafficways: Locations where vehicular or pedestrian traffic is a normal course of events.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include duct-bank materials, including separators and miscellaneous components.

2. Include ducts and conduits and their accessories, including elbows, end bells, bends, fittings, and solvent cement.

3. Include accessories as required.

4. Include warning tape.

1.5 INFORMATIONAL SUBMITTALS

A. Duct-Bank Coordination Drawings: Show duct profiles and coordination with other utilities and underground structures.

1. Include plans and sections, drawn to scale, and show bends and locations of expansion fittings.

2. Drawings shall be signed and sealed by a qualified professional engineer.

B. Product Certificates: For concrete and steel used in precast concrete manholes and handholes, as required by ASTM C 858.

C. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

1.7 FIELD CONDITIONS

A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions, and then only after arranging to provide temporary electrical service according to requirements indicated:

1. Notify Construction Manager no fewer than two days in advance of proposed interruption of electrical service.

2. Do not proceed with interruption of electrical service without Construction Manager's written permission.

B. Ground Water: Assume ground-water level is at grade level unless a lower water table is noted on Drawings.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR DUCTS AND RACEWAYS

A. Comply with ANSI C2.

B. Listed and labeled as defined in NFPA 70, by a nationally recognized testing laboratory, and marked for intended location and application.

2.2 METAL CONDUIT

A. GRC: Galvanized steel. Comply with ANSI C80.1 and UL 6.

2.3 RIGID NONMETALLIC DUCT

A. Underground Plastic Utilities Duct: Type EPC-40-PVC (Type EPC-80-PVC where specified on plans or details) RNC, complying with NEMA TC 2 and UL 651, with matching fittings complying with NEMA TC 3 by same manufacturer as duct.

B. Duct Accessories:

1. Duct Separators: Factory-fabricated rigid PVC interlocking spacers, sized for type and size of ducts with which used, and selected to provide minimum duct spacing indicated while supporting ducts during concreting or backfilling.

2. Warning Tape: Detectable underground-line warning tape specified in Section 260553 "Identification for Electrical Systems."

3. Solvents and Adhesives: As recommended by conduit manufacturer.

2.4 UTILITY STRUCTURE ACCESSORIES

A. Duct-Sealing Compound: Nonhardening, safe for contact with human skin, not deleterious to cable insulation, and workable at temperatures as low as 35˚F (2˚C). Capable of withstanding temperature of 300˚F (150˚C) without slump and adhering to clean surfaces of plastic ducts, metallic conduits, conduit coatings, concrete, masonry, lead, cable sheaths, cable jackets, insulation materials, and common metals.

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordinate layout and installation of ducts with final arrangement of other utilities, underground obstructions, site grading, and surface features as determined in the field. Notify Construction Manager if there is a conflict between areas of excavation and existing structures or archaeological sites to remain.

B. Coordinate elevations of ducts and duct-bank entrances into manholes and equipment. Revise locations and elevations as required to suit field conditions and to ensure that duct runs drain to manholes and handholes, and as approved by Construction manager.

C. Clear vegetation to be removed and protect vegetation to remain according to Section 310000 "Clearing, Excavation, Filling and Grading Earthwork." Remove and stockpile topsoil for reapplication according to Section 310000 "Clearing, Excavation, Filling and Grading Earthwork."

3.2 UNDERGROUND DUCT APPLICATION

A. Ducts for Electrical Cables: RNC Type EPC-40-PVC (Type EPC-80-PVC where specified on plans or details) in concrete-encased duct bank unless otherwise indicated.

B. Underground Ducts Crossing Paved Paths, Walks and Roadways: RNC Type EPC-40-PVC (Type EPC-80-PVC where specified on plans or details), encased in reinforced concrete unless otherwise indicated.

C. Direct buried Underground Ducts: RNC Type EPC-80-PVC with 2" all around clean backfill.

3.3 EARTHWORK

A. Excavation and Backfill: Comply with Section 310000 "Clearing, Excavation, Filling and Grading Earthwork," but do not use heavy-duty, hydraulic-operated, compaction equipment.

B. Restore surface features at areas disturbed by excavation and re-establish original grades unless otherwise indicated. Replace removed sod immediately after backfilling is completed.

C. Restore areas disturbed by trenching, storing of dirt, cable laying, and other work. Restore vegetation and include necessary topsoiling, fertilizing, liming, seeding, sodding, sprigging, and mulching. Comply with Section 310000 "Clearing, Excavation, Filling and Grading Earthwork" and Section 310000 "Clearing, Excavation, Filling and Grading Earthwork."

D. Cut and patch existing pavement in the path of underground ducts and utility structures according to the "Cutting and Patching" Article in Section 017300 "Execution."

3.4 DUCT INSTALLATION

A. Install ducts according to NEMA TCB 2.

B. Slope: Pitch ducts a minimum slope of 1:300 down toward manholes and handholes and away from buildings and equipment. Slope ducts from a high point in runs between two manholes, to drain in both directions.

C. Curves and Bends: Use 5-degree angle couplings for small changes in direction. Use manufactured long sweep bends with a minimum radius of 48 inches (1200 mm), both horizontally and vertically, at other locations unless otherwise indicated.

D. Joints: Use solvent-cemented joints in ducts and fittings and make watertight according to manufacturer's written instructions. Stagger couplings so those of adjacent ducts do not lie in same plane.

E. Installation Adjacent to High-Temperature Steam Lines: Where duct banks are installed parallel to underground steam lines, perform calculations showing the duct bank will not be subject to environmental temperatures above 40˚C. Where environmental temperatures are calculated to rise above 40˚C, and anywhere the duct bank crosses above an underground steam line, install insulation blankets listed for direct burial to isolate the duct bank from the steam line.

F. Building and Manhole Wall Penetrations: Make a transition from underground duct to rigid steel conduit at least 10 feet (3 m) outside the wall, without reducing duct line slope away from the building, and without forming a trap in the line. Use fittings manufactured for duct-to-conduit transition. Install conduit penetrations of building walls as specified in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

G. Sealing: Provide temporary closure at terminations of ducts that have cables pulled. Seal spare ducts at terminations. Use sealing compound and plugs to withstand at least 15-psig (1.03-MPa) hydrostatic pressure.

H. Pulling Cord: Install 100-lbf- (445-N-) test nylon cord in empty ducts.

I. Concrete-Encased Ducts: Support ducts on duct separators.

1. Excavate trench bottom to provide firm and uniform support for duct bank. Prepare trench bottoms as specified in Section 310000 "Clearing, Excavation, Filling and Grading Earthwork" for pipes less than 6 inches (150 mm) in nominal diameter.

2. Width: Excavate trench 12 inches (300 mm) wider than duct bank on each side.

3. Depth: Install top of duct bank at least 24 inches (600 mm) below finished grade in areas not subject to deliberate traffic, and at least 30 inches (750 mm) below finished grade in deliberate traffic paths for vehicles unless otherwise indicated.

4. Support ducts on duct separators coordinated with duct size, duct spacing, and outdoor temperature.

5. Separator Installation: Space separators close enough to prevent sagging and deforming of ducts, with not less than four spacers per 20 feet (6 m) of duct. Secure separators to earth and to ducts to prevent floating during concreting. Stagger separators approximately 6 inches (150 mm) between tiers. Tie entire assembly together using fabric straps; do not use tie wires or reinforcing steel that may form conductive or magnetic loops around ducts or duct groups.

6. Minimum Space between Ducts: 3 inches (75 mm) between ducts and exterior envelope wall, 2 inches (50 mm) between ducts for like services, and 4 inches (100 mm) between power and signal ducts.

7. Elbows: Use manufactured duct elbows for stub-ups at poles and equipment, at building entrances through floor, and at changes of direction in duct run unless otherwise indicated. Extend concrete encasement throughout length of elbow.

8. Elbows: Use manufactured rigid steel conduit elbows for stub-ups at poles and equipment, at building entrances through floor, and at changes of direction in duct run.
   a. Couple steel conduits to ducts with adapters designed for this purpose and encase coupling with 3 inches (75 mm) of concrete.
   b. Stub-Ups to Equipment: For equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches (1500 mm) from edge of base. Install insulated grounding bushings on terminations at equipment.

9. Reinforcement: Reinforce concrete-encased duct banks where they cross disturbed earth and where indicated. Arrange reinforcing rods and ties without forming conductive or magnetic loops around ducts or duct groups.

10. Forms: Use walls of trench to form side walls of duct bank where soil is self-supporting and concrete envelope can be poured without soil inclusions; otherwise, use forms.

11. Concrete Cover: Install a minimum of 3 inches (75 mm) of concrete cover at top and bottom, and a minimum of 2 inches (50 mm) on each side of duct bank.

12. Concreting Sequence: Pour each run of envelope between manholes or other terminations in one continuous operation.
   a. Start at one end and finish at the other, allowing for expansion and contraction of ducts as their temperature changes during and after the pour. Use expansion fittings installed according to manufacturer's written recommendations, or use other specific measures to prevent expansion-contraction damage.
   b. If more than one pour is necessary, terminate each pour in a vertical plane and install 3/4-inch (15-mm) reinforcing-rod dowels extending a minimum of 18 inches (450 mm) into concrete on both sides of joint near corners of envelope.

13. Pouring Concrete: Comply with requirements in "Concrete Placement" Article in Section 033000 "Cast-in-Place Concrete." Place concrete carefully during pours to prevent voids under and between conduits and at exterior surface of envelope. Do not allow a heavy mass of concrete to fall directly onto ducts. Allow concrete to flow to center of bank and rise up in middle, uniformly filling all open spaces. Do not use power-driven agitating equipment unless specifically designed for duct-bank application.

J. Warning Tape: Bury detectable warning tape approximately 12 inches (300 mm) above all concrete-encased ducts and duct banks. Align tape parallel to and within 3 inches (75 mm) of centerline of duct bank. Provide an additional detectable warning tape for each 12-inch (300-mm) increment of duct bank width over a nominal 18 inches (450 mm). Space additional tapes 12 inches (300 mm) apart, horizontally.

K. Test Wells: Install as indicated. Set top of test well flush with finished grade or floor.

3.5 GROUNDING

A. Ground underground ducts and utility structures according to Section 260526 "Grounding and Bonding for Electrical Systems."

B. At manhole:

1. Install insulated grounding bushing at the end of rigid steel conduit.

2. Bond grounding bushing with #8 bare copper conductor to the bare copper conductor run with the ductbank or to the manhole ground.

3.6 FIELD QUALITY CONTROL

A. Perform the following tests and inspections and prepare test reports:

1. Demonstrate capability and compliance with requirements on completion of installation of underground ducts and utility structures.

2. Pull solid aluminum or wood test mandrel through duct to prove joint integrity and adequate bend radii, and test for out-of-round duct. Provide a minimum 6-inch- (150-mm-) long mandrel equal to 80 percent fill of duct. If obstructions are indicated, remove obstructions and retest.

3. Test manhole grounding to ensure electrical continuity of grounding and bonding connections. Measure and report ground resistance as specified in Section 260526 "Grounding and Bonding for Electrical Systems."

B. Correct deficiencies and retest as specified above to demonstrate compliance.

3.7 CLEANING

A. Pull leather-washer-type duct cleaner, with graduated washer sizes, through full length of ducts. Follow with rubber duct swab for final cleaning and to assist in spreading lubricant throughout ducts.

B. Clean internal surfaces of manholes, including sump. Remove foreign material.

END OF SECTION

Section 26 05 44

Sleeves and Sleeve Seals for Electrical Raceways and Cabling

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. Round sleeves.
2. Rectangular sleeves.
3. Sleeve seal systems.
4. Grout.
5. Pourable sealants.
6. Foam sealants.

B. Related Requirements:

1. Section 078413 "Penetration Firestopping" for penetration firestopping installed in fire-resistance-rated walls, horizontal assemblies, and smoke barriers, with and without penetrating items.

1.3 Action Submittals

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 Round Sleeves

A. Wall Sleeves, Steel:

1. Description: ASTM A53/A53M, Type E, Grade B, Schedule 40, zinc coated, plain ends and integral waterstop.

B. Wall Sleeves, Cast Iron:

1. Description: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop.

C. Pipe Sleeves, PVC:

1. Description: ASTM D1785, Schedule 40.

D. Molded Sleeves, PVC:

1. Description: With nailing flange for attaching to wooden forms.

E. Molded Sleeves, PE or PP:

1. Description: Removable, tapered cup shaped, and smooth outer surface with nailing flange for attaching to wooden forms.

F. Sheet Metal Sleeves, Galvanized Steel, Round:

1. Description: Galvanized-steel sheet; thickness not less than 0.0239-inch (0.6-mm); round tube closed with welded longitudinal joint, with tabs for screw-fastening the sleeve to the board.

2.2 Rectangular Sleeves

A. Sheet Metal Sleeves, Galvanized Steel, Rectangular:

1. Description:
    a. Material: Galvanized sheet steel.
    b. Minimum Metal Thickness:
        1) For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and with no side larger than 16 inches (400 mm), thickness must be 0.052 inch (1.3 mm).
        2) For sleeve cross-section rectangle perimeter not less than 50 inches (1270 mm) or with one or more sides larger than 16 inches (400 mm), thickness must be 0.138 inch (3.5 mm).

2.3 Sleeve Seal Systems

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable or between raceway and cable.

1. Sealing Elements: EPDM rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.

2. Pressure Plates: Stainless steel.

3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

2.4 Grout

A. Description: Nonshrink; recommended for interior and exterior sealing openings in non-fire-rated walls or floors.

1. Standard: ASTM C1107/C1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

3. Packaging: Premixed and factory packaged.

2.5 Pourable Sealants

A. Description: Single-component, neutral-curing elastomeric sealants of grade indicated below.

1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces that are not fire rated.

2.6 Foam Sealants

Description: Multicomponent, liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam. Foam expansion must not damage cables or crack penetrated structure.

PART 3 - EXECUTION

3.1 Installation Of Sleeves For Non-Fire-Rated Electrical Penetrations

A. Comply with NECA 1.

B. Sleeves for Conduits Penetrating Above-Grade, Non-Fire-Rated, Concrete and Masonry-Unit Floors and Walls:

1. Interior Penetrations of Non-Fire-Rated Walls and Floors:
   a. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall or floor, so no voids remain. Tool exposed surfaces smooth; protect material while curing.
   b. Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Section 079200 "Joint Sealants."

2. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

3. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and raceway or cable, unless sleeve seal system is to be installed or seismic criteria require different clearance.

4. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of walls. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.

5. Install sleeves for floor penetrations. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level. Install sleeves during erection of floors.

C. Sleeves for Conduits Penetrating Non-Fire-Rated Wall Assemblies:

1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.

2. Seal space outside of sleeves with approved joint compound for wall assemblies.

D. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.

E. Aboveground, Exterior-Wall Penetrations: Seal penetrations using [steel] [cast-iron] pipe sleeves and mechanical sleeve seal systems. Size sleeves to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.

F. Underground, Exterior-Wall and Floor Penetrations:

1. Install [steel] [cast-iron] pipe sleeves with integral waterstops. Size sleeves to allow for 1-inch (25-mm) annular clear space between raceway or cable and sleeve for installing sleeve seal system. Install sleeve during construction of floor or wall.

2. Install steel pipe sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between raceway or cable and sleeve for installing sleeve seal system. Grout sleeve into wall or floor opening.

3.2 Installation Of Rectangular Sleeves and Sleeve Seals

A. Install sleeves in existing walls without compromising structural integrity of walls. Do not cut structural elements without reinforcing the wall to maintain the designed weight bearing and wall stiffness.

B. Install conduits and cable with no crossings within the sleeve.

C. Fill opening around conduits and cables with expanding foam without leaving voids.

D. Provide metal sheet covering at both wall surfaces and finish to match surrounding surfaces. Metal sheet must be same material as sleeve.

3.3 Installation Of Sleeve Seal Systems

A. Install sleeve seal systems in sleeves in exterior concrete walls and slabs-on-grade at raceway entries into building.

B. Install type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

END OF SECTION

Section 26 05 48.16

Seismic Controls for Electrical Systems

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Restraint channel bracings.
2. Restraint cables.
3. Seismic-restraint accessories.
4. Mechanical anchor bolts.
5. Adhesive anchor bolts.

B. Related Requirements:

1. Section 26 05 29 "Hangers and Supports for Electrical Systems" for commonly used electrical supports and installation requirements.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of seismic-restraint component used.
   a. Tabulate types and sizes of seismic restraints, complete with report numbers and rated strength in tension and shear as evaluated by an agency acceptable to authorities having jurisdiction.
   b. Annotate to indicate application of each product submitted and compliance with requirements.

B. Delegated-Design Submittal: For each seismic-restraint device.

1. Include design calculations and details for selecting seismic restraints complying with performance requirements, design criteria, and analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

2. Design Calculations: Calculate static and dynamic loading caused by equipment weight, operation, and seismic and wind forces required to select seismic and wind restraints and for designing vibration isolation bases.
    a. Coordinate design calculations with wind load calculations required for equipment mounted outdoors. Comply with requirements in other Sections for equipment mounted outdoors.

3. Seismic- and Wind-Restraint Details:
    a. Design Analysis: To support selection and arrangement of seismic and wind restraints. Include calculations of combined tensile and shear loads.
    b. Details: Indicate fabrication and arrangement. Detail attachments of restraints to the restrained items and to the structure. Show attachment locations, methods, and spacings. Identify components, list their strengths, and indicate directions and values of forces transmitted to the structure during seismic events. Indicate association with vibration isolation devices.
    c. Coordinate seismic-restraint and vibration isolation details with wind-restraint details required for equipment mounted outdoors. Comply with requirements in other Sections for equipment mounted outdoors.
    d. Preapproval and Evaluation Documentation: By an agency acceptable to authorities having jurisdiction, showing maximum ratings of restraint items and the basis for approval (tests or calculations).

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Show coordination of seismic bracing for electrical components with other systems and equipment in the vicinity, including other supports and seismic restraints.

B. Qualification Data: For professional engineer and testing agency.

C. Welding certificates.

D. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a nationally recognized testing laboratory as defined by OSHA in 29 CFR 1910.7 and that is acceptable to authorities having jurisdiction.

B. Comply with seismic-restraint requirements in the IBC unless requirements in this Section are more stringent.

C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

D. Seismic-restraint devices shall have horizontal and vertical load testing and analysis. They shall bear anchorage preapproval from OSHPD in addition to preapproval, showing maximum seismic-restraint ratings, by ICC-ES or another agency acceptable to authorities having jurisdiction. Ratings based on independent testing are preferred to ratings based on calculations. If preapproved ratings are not available, submittals based on independent testing are preferred. Calculations (including combining shear and tensile loads) that support seismic-restraint designs must be signed and sealed by a qualified professional engineer.

E. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Wind-Restraint Loading:

1. Basic Wind Speed: 105 mph.

2. Building Classification Category: II.

3. Minimum 10 lb/sq. ft. (48.8 kg/sq. m) multiplied by maximum area of HVAC component projected on vertical plane normal to wind direction and 45 degrees either side of normal.

B. Seismic-Restraint Loading:

1. Site Class as Defined in the IBC: B.

2. Assigned Seismic Use Group or Building Category as Defined in the IBC: II.
   a. Component Importance Factor: As indicated in Table in Part 3 of this Section.
   b. Component Response Modification Factor: Per ASCE 7, Table 13.6-1.
   c. Component Amplification Factor: Per ASCE 7, Table 13.6-1.

3. Design Spectral Response Acceleration at Short Periods (0.2 Second): 0.294

4. Design Spectral Response Acceleration at 1.0-Second Period: 0.110

2.2 RESTRAINT CHANNEL BRACINGS

A. Description: MFMA-4, shop- or field-fabricated bracing assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end, with other matching components, and with corrosion-resistant coating; rated in tension, compression, and torsion forces.

2.3 RESTRAINT CABLES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Kinetic Noise Control, Inc.

2. Loos & Co., Inc.

3. Substitutions: Under provisions of Division 1

B. Restraint Cables: ASTM A 603 galvanized-steel cables. End connections made of steel assemblies with thimbles, brackets, swivel, and bolts designed for restraining cable service; with a minimum of two clamping bolts for cable engagement.

2.4 SEISMIC-RESTRAINT ACCESSORIES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. B-line, Eaton business.

2. Kinetic Noise Control, Inc.

3. Mason Industries, Inc.

4. Substitutions: Under provisions of Division 1

B. Hanger-Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections to hanger rod.

C. Hinged and Swivel Brace Attachments: Multifunctional steel connectors for attaching hangers to rigid channel bracings and restraint cables.

D. Bushings for Floor-Mounted Equipment Anchor Bolts: Neoprene bushings designed for rigid equipment mountings and matched to type and size of anchor bolts and studs.

E. Bushing Assemblies for Wall-Mounted Equipment Anchorage: Assemblies of neoprene elements and steel sleeves designed for rigid equipment mountings and matched to type and size of attachment devices used.

F. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face.

2.5 MECHANICAL ANCHOR BOLTS

A. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

2.6 ADHESIVE ANCHOR BOLTS

A. Adhesive Anchor Bolts: Drilled-in and capsule anchor system containing PVC or urethane methacrylate-based resin and accelerator, or injected polymer or hybrid mortar adhesive. Provide anchor bolts and hardware with zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and equipment to receive vibration isolation and seismic-control devices for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for reinforcement and cast-in-place anchors to verify actual locations before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLICATIONS

A. Multiple Raceways or Cables: Secure raceways and cables to trapeze member with clamps approved for application by an agency acceptable to authorities having jurisdiction.

B. Hanger-Rod Stiffeners: Install hanger-rod stiffeners where indicated or scheduled on Drawings to receive them and where required to prevent buckling of hanger rods caused by seismic forces.

C. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static and seismic loads within specified loading limits.

3.3 SEISMIC-RESTRAINT DEVICE INSTALLATION

A. Coordinate the location of embedded connection hardware with supported equipment attachment and mounting points and with requirements for concrete reinforcement and formwork specified in Section 033000 "Cast-in-Place Concrete."

B. Equipment and Hanger Restraints:

1. Install resilient, bolt-isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch (3.2 mm).

2. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction providing required submittals for component.

C. Install cables so they do not bend across edges of adjacent equipment or building structure.

D. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.

E. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.

F. Drilled-in Anchors:

1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.

2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.

3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.

4. Adhesive Anchors: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.

5. Set anchors to manufacturer's recommended torque using a torque wrench.

6. Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior applications.

3.4 ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION

A. Install flexible connections in runs of raceways, cables, wireways, cable trays, and busways where they cross seismic joints, where adjacent sections or branches are supported by different structural elements, and where connection is terminated to equipment that is anchored to a different structural element from the one supporting them as they approach equipment.

3.5 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Provide evidence of recent calibration of test equipment by a testing agency acceptable to authorities having jurisdiction.

2. Schedule test with Construction Manager before connecting anchorage device to restrained component (unless postconnection testing has been approved), and with at least seven days' advance notice.

3. Obtain Construction Manager's approval before transmitting test loads to structure. Provide temporary load-spreading members.

4. Test at least four of each type and size of installed anchors and fasteners selected by Construction Manager.

5. Test to 90 percent of rated proof load of device.

B. Seismic controls will be considered defective if they do not pass tests and inspections.

C. Prepare test and inspection reports.

3.6 ADJUSTING

A. Adjust restraints to permit free movement of equipment within normal mode of operation.

3.7 COMPONENT SEISMIC IMPORTANCE FACTORS

Division	System/Component (1)	Size (2)	Ip (3)
Electrical	Emergency Lighting and Branch circuits to load (4)	A	1.5
Electrical	Normal Lighting (Source to load)	A	1.0
Electrical	Normal Power Distribution (Equipment and feeders)	A	1.0
Electrical	Normal Power Distribution (Branch circuits)	A	1.0
Electrical	Conduit and cable tray for systems that are not related to: fire alarm; emergency power; emergency lighting	A	1.0

Electronic Safety and Security	Fire Alarm (Entire system - including but not limited to equipment, cable tray and conduit)	A	1.5

1. Systems/Components listed shall include equipment, conveyances, appurtenances and accessories.

2. Exceptions to All as permitted by ASCE 7.

3. Ip = Component Importance Factor – Seismic component restraint required for all systems with an Ip=1.5.

4. Applies only to new emergency lighting fixtures, exit signs and branch circuit wiring installed under the scope of this project and powered from the existing emergency lighting panel LSP1.

END OF SECTION

Section 26 05 53

Identification for Electrical Systems

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Identification for raceways.
2. Identification of power and control cables.
3. Identification for conductors.
4. Underground-line warning tape.
5. Warning labels and signs.
6. Instruction signs.
7. Equipment identification labels.
8. Miscellaneous identification products.

1.3 ACTION SUBMITTALS

A. Product Data: For each electrical identification product indicated.

B. Samples: For each type of label and sign to illustrate size, colors, lettering style, mounting provisions, and graphic features of identification products.

C. Identification Schedule: An index of nomenclature of electrical equipment and system components used in identification signs and labels.

1.4 QUALITY ASSURANCE

A. Comply with ANSI A13.1 and IEEE C2.

B. Comply with NFPA 70.

C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.

D. Comply with ANSI Z535.4 for safety signs and labels.

E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

1.5 COORDINATION

A. Coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual; and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.

B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

C. Coordinate installation of identifying devices with location of access panels and doors.

D. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 POWER AND CONTROL RACEWAY IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway size.

B. Colors for Raceways Carrying Circuits at 600 V or Less:

1. Black letters on an orange field

2. Legend: Indicate voltage and system or service type.

C. Colors for Raceways Carrying Circuits at More Than 600 V:

1. Black letters on an orange field.

2. Legend: "DANGER CONCEALED HIGH VOLTAGE WIRING."

D. Vinyl Labels for Raceways Carrying Circuits at 600 V or Less: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing ends of legend label.

E. Snap-Around Labels for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

F. Snap-Around, Color-Coding Bands for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches (50 mm) long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

G. Tape and Stencil for Raceways Carrying Circuits More Than 600 V: 4-inch- (100-mm-) wide black stripes on 10-inch (250-mm) centers diagonally over orange background that extends full length of raceway or duct and is 12 inches (300 mm) wide. Stop stripes at legends.

H. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch (50 by 50 by 1.3 mm), with stamped legend, punched for use with self-locking cable tie fastener.

I. Write-On Tags: Polyester tag, 0.010 inch (0.25 mm) thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.

1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.

2.2 POWER AND CONTROL CABLE IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each cable size.

B. Self-Adhesive, Self-Laminating Polyester Labels: Preprinted, 3-mil- (0.08-mm-) thick flexible label with acrylic pressure-sensitive adhesive that provides a clear, weather- and chemical-resistant, self-laminating, protective shield over the legend. Labels sized to fit the cable diameter such that the clear shield overlaps the entire printed legend.

2.3 CONDUCTOR IDENTIFICATION MATERIALS

A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils (0.08 mm) thick by 1 to 2 inches (25 to 50 mm) wide.

B. Self-Adhesive, Self-Laminating Polyester Labels: Preprinted, 3-mil- (0.08-mm-) thick flexible label with acrylic pressure-sensitive adhesive that provides a clear, weather- and chemical-resistant, self-laminating, protective shield over the legend. Labels sized to fit the conductor diameter such that the clear shield overlaps the entire printed legend.

2.4 FLOOR MARKING TAPE

A. 2-inch- (50-mm-) wide, 5-mil (0.125-mm) pressure-sensitive vinyl tape, with yellow and black stripes and clear vinyl overlay.

2.5 DETECTABLE UNDERGROUND LINE WARNING TAPE

A. Tape:

1. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical and communications utility lines.

2. Printing on tape shall be permanent and shall not be damaged by burial operations.

3. Tape material and ink shall be chemically inert, and not subject to degrading when exposed to acids, alkalis, and other destructive substances commonly found in soils.

B. Color and Printing:

1. Comply with ANSI Z535.1 through ANSI Z535.5.

2. Inscriptions for Red-Colored Tapes: ELECTRIC LINE, HIGH VOLTAGE.

3. Inscriptions for Orange-Colored Tapes: TELEPHONE CABLE, CATV CABLE, COMMUNICATIONS CABLE, OPTICAL FIBER CABLE.

2.6 WARNING LABELS AND SIGNS

A. Comply with NFPA 70 and 29 CFR 1910.145.

B. Self-Adhesive Warning Labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.

C. Warning label and sign shall include, but are not limited to, the following legends:

1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."

2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES (915 MM)."

2.7 INSTRUCTION SIGNS

A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch (1.6 mm) thick for signs up to 20 sq. inches (129 sq. cm) and 1/8 inch (3.2 mm) thick for larger sizes.

1. Engraved legend with black letters on white face.

2. Punched or drilled for mechanical fasteners.

3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

B. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch (10 mm). Overlay shall provide a weatherproof and UV-resistant seal for label.

2.8 EQUIPMENT IDENTIFICATION LABELS

A. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch (10 mm). Overlay shall provide a weatherproof and UV-resistant seal for label.

B. Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Adhesive backed, with black letters on white background. Minimum letter height shall be 3/8 inch (10 mm).

C. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. Black letters on white background. Minimum letter height shall be 3/8 inch (10 mm).

2.9 CABLE TIES

A. General-Purpose Cable Ties: Fungus inert, self-extinguishing, one piece, self-locking, Type 6/6 nylon.

1. Minimum Width: 3/16 inch (5 mm).

2. Tensile Strength at 73˚F (23˚C), According to ASTM D 638: 12,000 psi (82.7 MPa).

3. Temperature Range: Minus 40 to plus 185˚F (Minus 40 to plus 85˚C).

4. Color: Black except where used for color-coding.

B. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self-extinguishing, one piece, self-locking, Type 6/6 nylon.

1. Minimum Width: 3/16 inch (5 mm).

2. Tensile Strength at 73˚F (23˚C), According to ASTM D 638: 12,000 psi (82.7 MPa).

3. Temperature Range: Minus 40 to plus 185˚F (Minus 40 to plus 85˚C).

4. Color: Black.

C. Plenum-Rated Cable Ties: Self-extinguishing, UV stabilized, one piece, self-locking.

1. Minimum Width: 3/16 inch (5 mm).

2. Tensile Strength at 73˚F (23˚C), According to ASTM D 638: 7000 psi (48.2 MPa).

3. UL 94 Flame Rating: 94V-0.

4. Temperature Range: Minus 50 to plus 284˚F (Minus 46 to plus 140˚C).

5. Color: Black.

2.10 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).

B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Verify identity of each item before installing identification products.

B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

C. Apply identification devices to surfaces that require finish after completing finish work.

D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.

E. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.

F. Attach cable labels that are not self-adhesive type with clear vinyl tape with adhesive appropriate to the location and substrate.

G. System Identification Color-Coding Bands for Cables: Each color-coding band shall completely encircle cable. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.

H. Aluminum Wraparound Marker Labels and Metal Tags: Secure tight to surface of conductor or cable at a location with high visibility and accessibility.

I. Cable Ties: For attaching tags. Use general-purpose type, except as listed below:

1. Outdoors: UV-stabilized nylon.

2. In Spaces Handling Environmental Air: Plenum rated.

J. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches (150 to 200 mm) below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches (400 mm) overall.

K. Painted Identification: Comply with requirements in painting Sections for surface preparation and paint application.

3.2 IDENTIFICATION SCHEDULE

A. Accessible Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive vinyl labels with the wiring system legend and system voltage. System legends shall be as follows:

1. Emergency Power.

2. Standby Power

3. Normal Power.

4. UPS Power.

B. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.

1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded service, feeder, and branch-circuit conductors.
   a. Color shall be factory applied.
   b. Colors for 208/120-V Circuits:
      1) Phase A: Black.
      2) Phase B: Red.
      3) Phase C: Blue.
   c. Colors for 480/277-V Circuits:
      1) Phase A: Brown.
      2) Phase B: Orange.
      3) Phase C: Yellow.
   d. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches (150 mm) from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

C. Power-Circuit Conductor Identification, more than 600 V: For conductors in vaults, pull and junction boxes, manholes, and handholes, use write-on tags.

D. Install instructional sign including the color-code for grounded and ungrounded conductors using adhesive-film-type labels.

E. Control-Circuit Conductor Identification: For conductors and cables in pull and junction boxes, manholes, and handholes, use self-adhesive, self-laminating polyester labels with the conductor or cable designation, origin, and destination.

F. Control-Circuit Conductor Termination Identification: For identification at terminations provide heat-shrink preprinted tubes with the conductor designation.

G. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.

1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.

2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.

3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.

H. Locations of Underground Lines: Identify with detectable underground line warning tape for power, lighting, communication, and control wiring and optical fiber cable.

1. Limit use of underground-line warning tape to direct-buried cables.

2. Install underground-line warning tape for both direct-buried cables and cables in raceway.

I. Workspace Indication: Install floor marking tape to show working clearances in the direction of access to live parts. Workspace shall be as required by NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.

J. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive warning labels.

1. Comply with 29 CFR 1910.145.

2. Identify system voltage with black letters on an orange background.

3. Apply to exterior of door, cover, or other access.

4. For equipment with multiple power or control sources, apply to door or cover of equipment including, but not limited to, the following:
   a. Power transfer switches.
   Controls with external control power connections.

K. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.

L. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 3/8-inch- (10-mm-) high letters for emergency instructions at equipment used for power transfer.

M. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.

1. Labeling Instructions:
   a. Indoor Equipment: Engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high label; where two lines of text are required, use labels 2 inches (50 mm) high.
   b. Outdoor Equipment: Engraved, laminated acrylic or melamine label.

c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
d. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.

2. Equipment to Be Labeled:
   a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be engraved, laminated acrylic or melamine label.
   b. Enclosures and electrical cabinets.
   c. Access doors and panels for concealed electrical items.
   d. Switchboards.
   e. Transformers: Label that includes tag designation shown on Drawings for the transformer, feeder, and panelboards or equipment supplied by the secondary.
   f. Substations.
   g. Emergency system boxes and enclosures.
   h. Enclosed switches.
   i. Enclosed circuit breakers.
   j. Enclosed controllers.
   k. Variable-speed controllers.
   l. Push-button stations.
   m. Power transfer equipment.
   n. Contactors.
   o. Remote-controlled switches, dimmer modules, and control devices.
   p. Power-generating units.
   q. Monitoring and control equipment.
   r. UPS equipment.

END OF SECTION

Section 26 05 72

Overcurrent Protective Device Short Circuit Study

PART 1 - GENERAL

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 Summary

A. Section includes a computer-based, fault-current study to determine the minimum interrupting capacity of circuit protective devices.

1.3 Definitions

A. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

B. One-Line Diagram: A diagram which shows, by means of single lines and graphic symbols, the course of an electric circuit or system of circuits and the component devices or parts used therein.

C. Protective Device: A device that senses when an abnormal current flow exists and then removes the affected portion from the system.

D. SCCR: Short-circuit current rating.

E. Service: The conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served.

1.4 Action Submittals

A. Product Data: For computer software program to be used for studies.

B. Other Action Submittals: Submit the following after the approval of system protective devices submittals. Submittals shall be in digital form.

1. Short-circuit study input data, including completed computer program input data sheets.

2. Short-circuit study and equipment evaluation report; signed, dated, and sealed by a qualified professional engineer.
    a. Submit study report for action prior to receiving final approval of the distribution equipment submittals. If formal completion of studies will cause delay in equipment manufacturing, obtain approval from Project Manager for preliminary submittal of sufficient study data to ensure that the selection of devices and associated characteristics is satisfactory.
    b. Revised single-line diagram, reflecting field investigation results and results of short-circuit study.

1.5 Informational Submittals

A. Product Certificates: For short-circuit study software, certifying compliance with IEEE 399.

1.6 Closeout Submittals

A. Study Report:

1. PDF version of the report for review.

2. PDF version of the final report.

B. Power System Data

1. Electronic version (software form) of power system model as required for future study modification or expansion utilizing SKM software.

1.7 Quality Assurance

A. Study shall use computer program that is distributed nationally and is in wide use. Software algorithms shall comply with requirements of standards and guides specified in this Section. Manual calculations are unacceptable.

B. Short-Circuit Study Software Developer Qualifications: An entity that owns and markets computer software used for studies, having performed successful studies of similar magnitude on electrical distribution systems using similar devices.

1. The computer program shall be developed under the charge of a licensed professional engineer who holds IEEE Computer Society's Certified Software Development Professional certification.

C. Short-Circuit Study Specialist Qualifications: Professional Engineer in charge of performing the study and documenting recommendations, licensed in the state where Project is located. All elements of the study shall be performed under the direct supervision and control of this Professional Engineer.

PART 2 - PRODUCTS

2.1 Computer Software

A. Subject to compliance with requirements, utilize the following software:

1. SKM, by SKM Systems Analysis, Inc.

B. Comply with IEEE 399 and IEEE 551.

C. Analytical features of fault-current-study computer software program shall have the capability to calculate "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.

D. Computer software program shall be capable of plotting and diagramming time-current-characteristic curves as part of its output.

2.2 Short-Circuit Study Report Contents

A. Executive summary.

B. Study descriptions, purpose, basis, and scope. Include case descriptions, definition of terms, and guide for interpretation of the computer printout.

C. Summary of deficiencies listing protective and power distribution equipment that does not meet the required short circuit interrupting, close-and-latch and thermal withstand requirements.

D. One-line diagram, showing the following:

1. Protective device designations and ratings.

2. Cable size and lengths.

3. Transformer designations and ratings.

4. Motor and generator designations and ratings.

5. Designations and ratings of:
   a. Switchgear.
   b. Switchboards.
   c. Motor-control center.
   d. Distribution panels.
   e. Panelboards.
   f. Control panels that may require accessing the interior of the panel for adjustments, monitoring or testing while energized.

E. Comments and recommendations for system improvements, where needed.

F. Protective Device Evaluation:

1. Evaluate equipment and protective devices and compare to short-circuit ratings.

2. Tabulations of circuit breaker, fuse, and other protective device ratings versus calculated short-circuit duties.

3. For 600-V overcurrent protective devices, ensure that interrupting ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current for fault-point X/R ratio less or equal to 6.6. Derate protective devices when fault-point X/R ratio is over 6.6.

4. For devices and equipment rated for asymmetrical fault current, apply multiplication factors listed in the standards to 1/2-cycle symmetrical fault current.

5. Verify adequacy of phase conductors at maximum three-phase bolted fault currents; verify adequacy of equipment grounding conductors and grounding electrode conductors at maximum ground-fault currents. Ensure that short-circuit withstand ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.

G. Short-Circuit Study Input Data:

1. As described in Article 3.2 "Power System Data".

H. Short-Circuit Study Output:

1. Low-Voltage Fault Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:
   a. Voltage.
   b. Calculated fault-current magnitude and angle.
   c. Fault-point X/R ratio.
   d. Equivalent impedance.

2. Momentary Duty Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:
   a. Voltage.
   b. Calculated symmetrical fault-current magnitude and angle.
   c. Fault-point X/R ratio.
   d. Calculated asymmetrical fault currents:
      1) Based on fault-point X/R ratio.
      2) Based on calculated symmetrical value multiplied by 1.6.
      3) Based on calculated symmetrical value multiplied by 2.7.

3. Interrupting Duty Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:
   a. Voltage.
   b. Calculated symmetrical fault-current magnitude and angle.
   c. Fault-point X/R ratio.

d. No AC Decrement (NACD) ratio.
e. Equivalent impedance.
f. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a symmetrical basis.
g. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a total basis.

PART 3 - EXECUTION

3.1 Examination

A. Examine relevant Project submittals. Proceed with study only after relevant equipment submittals have been assembled. Devices that have not been submitted and approved may not be used in study.

3.2 Power System Data

A. Obtain all data necessary for the conducting the study.

1. Verify completeness of data supplied on the one-line diagram. Call any discrepancies to the attention of Project Manager.

2. For equipment provided under the scope of this Project, use construction documents and the equipment information data from the submittals for this Project. Supplement submittal data with catalogue and published manufacturer information as required.

3. For new equipment provided under the scope of this Project and powered from the existing power distribution, obtain required electrical distribution system data by field investigation and surveys, conducted by qualified technicians and engineers. The qualifications of technicians and engineers shall be qualified as defined by NFPA 70E.

B. Gather and tabulate the following input data to support the short-circuit study. Comply with recommendations in IEEE 551 as to the amount of detail that is required to be acquired in the field. Field data gathering shall be under the direct supervision and control of the engineer in charge of performing the study and shall be by the engineer or engineer’s representative who holds NETA ETT Level III certification or NICET Electrical Power Testing Level III certification.

1. Product Data for Project's overcurrent protective devices involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.

2. Obtain electrical power utility impedance at the service.

3. Power sources and ties.

4. For transformers, include kVA, primary and secondary voltages, connection type, impedance, X/R ratio, taps measured in percent, and phase shift.

5. For reactors, provide manufacturer and model designation, voltage rating, and impedance.

6. For circuit breakers and fuses, provide manufacturer and model designation. List type of breaker, type of trip, SCCR, current rating, and breaker settings.

7. Generator short-circuit current contribution data, including short-circuit reactance, rated kVA, rated voltage, and X/R ratio.

8. Busway manufacturer and model designation, current rating, impedance, lengths, and conductor material.

9. Motor horsepower and NEMA MG 1 code letter designation.

10. Cable sizes, lengths, number, conductor material and conduit material (magnetic or nonmagnetic).

3.3 Short-Circuit Study

A. Perform study following the general study procedures contained in IEEE 399.

B. Calculate short-circuit currents according to IEEE 551.

C. Base study on the device characteristics supplied by device manufacturer.

D. The extent of the electrical power system to be studied is indicated on Drawings.

E. Study electrical distribution system from normal and alternate power sources throughout electrical distribution system for Project. Study all cases of system-switching configurations and alternate operations that could result in maximum and minimum fault conditions.

F. The calculations shall include the ac fault-current decay from induction motors and shall apply to low- and medium-voltage, three-phase ac systems. The calculations shall also account for the fault-current dc decrement, to address the asymmetrical requirements of the interrupting equipment.

G. Calculate short-circuit momentary and interrupting duties for three-phase and line-to-ground bolted fault at each of the following:

1. Electric utility's supply termination point.

2. Medium Voltage switchgear.

3. Low-voltage switchboard.

4. Motor-control centers.

5. Control panels.

6. Standby generators and automatic transfer switches.

7. Branch circuit panelboards.

8. Disconnect switches.

9. Control panel that may require accessing the interior of the panel for adjustments, monitoring or testing while energized.

3.4 Demonstration

A. Train Owner's operating and maintenance personnel in the use of study results.

END OF SECTION

Section 26 05 73

Overcurrent Protective Device Coordination Study

PART 1 - GENERAL

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 Summary

A. Section includes computer-based, overcurrent protective device coordination studies to determine overcurrent protective devices and to determine overcurrent protective device settings for selective tripping.

1.3 Definitions

A. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed, and salvaged, or removed and reinstalled.

B. One-Line Diagram: A diagram which shows, by means of single lines and graphic symbols, the course of an electric circuit or system of circuits and the component devices or parts used therein.

C. Protective Device: A device that senses when an abnormal current flow exists and then removes the affected portion from the system.

D. SCCR: Short-circuit current rating.

E. Service: The conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served.

1.4 Action Submittals

A. Product Data: For computer software program to be used for studies.

B. Other Action Submittals: Submit the following after the approval of system protective devices submittals. Submittals shall be in digital form.

1. Coordination-study input data, including completed computer program input data sheets.

2. Overcurrent protective device coordination study report; signed, dated, and sealed by a qualified professional engineer.
    a. Submit study report for action prior to receiving final approval of the distribution equipment submittals. If formal completion of studies will cause delay in equipment manufacturing, obtain approval from Project Manager for preliminary submittal of sufficient study data to ensure that the selection of devices and associated characteristics is satisfactory.

1.5 Informational Submittals

A. Product Certificates: For overcurrent protective device coordination study software, certifying compliance with IEEE 399.

1.6 Closeout Submittals

A. Study Report:

1. PDF version of the report for review.

2. PDF version of the final report.

B. Power System Data

1. Electronic version (software form) of power system model as required for future study modification or expansion utilizing SKM software.

1.7 Quality Assurance

A. Study shall use computer program that is distributed nationally and is in wide use. Software algorithms shall comply with requirements of standards and guides specified in this Section. Manual calculations are unacceptable.

B. Coordination Study Software Developer Qualifications: An entity that owns and markets computer software used for studies, having performed successful studies of similar magnitude on electrical distribution systems using similar devices.

1. The computer program shall be developed under the charge of a licensed professional engineer who holds IEEE Computer Society's Certified Software Development Professional certification.

C. Coordination Study Specialist Qualifications: Professional Engineer in charge of performing the study and documenting recommendations, licensed in the state where Project is located. All elements of the study shall be performed under the direct supervision and control of this Professional Engineer.

D. Adjusting Agency Qualifications: An independent agency, with the experience and capability to adjust overcurrent devices and to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 Computer Software

A. Software Developers: Subject to compliance with requirements, utilize the following software:

1. SKM, by SKM Systems Analysis, Inc.

B. Comply with IEEE 242 and IEEE 399.

C. Analytical features of device coordination study computer software program shall have the capability to calculate "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.

D. Computer software program shall be capable of plotting and diagramming time-current-characteristic curves as part of its output. Computer software program shall report device settings and ratings of all overcurrent protective devices and shall demonstrate selective coordination by computer-generated, time-current coordination plots.

1. Optional Features:
   a. Arcing faults.
   b. Simultaneous faults.
   c. Explicit negative sequence.
   d. Mutual coupling in zero sequence.

2.2 Protective Device Coordination Study Report Contents

A. Executive summary.

B. Study descriptions, purpose, basis and scope. Include case descriptions, definition of terms and guide for interpretation of the computer printout.

C. One-line diagram, showing the following:

1. Protective device designations and ampere ratings.

2. Cable size and lengths.

3. Transformer kilovolt ampere (kVA) and voltage ratings.

4. Motor and generator designations and kVA ratings.

5. Switchgear, switchboard, motor-control center, and panelboard designations and voltage ratings.

D. Study Input Data: As described in Article 3.2 "Power System Data".

E. Short-Circuit Study Output: As specified in "Short-Circuit Study Output" Paragraph in "Short-Circuit Study Report Contents" Article in Section 260572 "Overcurrent Protective Device Short-Circuit Study."

F. Coordination Recommendations:

1. Evaluation of coordination results for each Coordination Plot.

2. Recommendations for existing equipment setting changes.

G. Protective Device Coordination Study:

1. Report recommended settings of protective devices, ready to be applied in the field.
   a. Protective Relays:
      1) Table of recommended relay protection settings to include:
         a) Relay Designation and Type.
         b) Relay Make and Model.
         c) Settings.
      2) Recommended relay configuration and programing settings. Use manufacturer's data sheets for recording the recommended setting when available. Table to include:
         a) Device tag.
         b) Setting designation.
         c) Range.
         d) Default value.
         e) Setting.
         f) Setting description.
   b. Circuit Breakers:
      1) Table of recommended adjustable settings to include:
         a) Pickups and time delays (long time, short time, ground).
         b) I2T.
         c) Instantaneous pickup.
   c. Fuses: Show current rating, voltage, and class.

H. Time-Current Coordination Curves: Determine settings of overcurrent protective devices to achieve selective coordination. Graphically illustrate that adequate time separation exists between devices installed in series, including power utility company's upstream devices. Prepare separate sets of curves for the switching schemes and for emergency periods where the power source is local generation. Show the following information:

1. Device tag and title, one-line diagram with legend identifying the portion of the system covered.

2. Terminate device characteristic curves at a point reflecting maximum symmetrical or asymmetrical fault current to which the device is exposed.

3. Identify the device associated with each curve by manufacturer type, function, and, if applicable, tap, time delay, and instantaneous settings recommended.

4. Plot the following listed characteristic curves, as applicable:
   a. Power utility's overcurrent protective device.
   b. Medium-voltage equipment overcurrent relays.
   c. Medium- and low-voltage fuses including manufacturer's minimum melt, total clearing, tolerance, and damage bands.
   d. Low-voltage equipment circuit-breaker trip devices, including manufacturer's tolerance bands.
   e. Transformer full-load current, magnetizing inrush current, and ANSI through-fault protection curves.
   f. Cables and conductors damage curves.
   g. Ground-fault protective devices.
   h. Motor-starting characteristics.
   i. Generator short-circuit decrement curve and generator damage point.
   j. The largest feeder circuit breaker in each motor-control center and panelboard.

5. For Series Rated equipment which allows the application of two series interrupting devices for a condition where the available fault current is greater than the interrupting rating of the downstream equipment, maintain selectivity for tripping currents caused by overloads and lower-level fault. Both devices share in the interruption of the fault and selectivity is sacrificed at high fault levels.

6. Provide adequate time margins between device characteristics such that selective operation is achieved.

7. Comments and recommendations for system improvements.

PART 3 - EXECUTION

3.1 Examination

A. Examine relevant Project submittals. Proceed with study only after relevant equipment submittals have been assembled. Devices that have not been submitted and approved may not be used in study.

3.2 Power System Data

A. Obtain all data necessary to conduct the overcurrent protective device study.

1. Verify completeness of data supplied in the one-line diagram on Drawings. Call discrepancies to the attention of Project Manager.

2. For new equipment, use characteristics submitted under the provisions of action submittals and information submittals for this Project.

3. For new equipment provided under the scope of this Project and powered from the existing power distribution, obtain required electrical distribution system data by field investigation and surveys, conducted by qualified technicians and engineers. The qualifications of technicians and engineers shall be qualified as defined by NFPA 70E.

B. Gather and tabulate the following input data to support coordination study. The list below is a guide. Comply with recommendations in IEEE 551 for the amount of detail required to be acquired in the field. Field data gathering shall be under the direct supervision and control of the engineer in charge of performing the study and shall be by the engineer or its representative who holds NETA ETT Level III certification or NICET Electrical Power Testing Level III certification.

1. Product Data for overcurrent protective devices specified in other Sections and involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.

2. Electrical power utility impedance at the service.

3. Power sources and ties.

4. Short-circuit current at each system bus, three phase and line-to-ground.

5. Full-load current of all loads.

6. Voltage level at each bus.

7. For transformers, include kVA, primary and secondary voltages, connection type, impedance, X/R ratio, taps measured in percent, and phase shift.

8. For reactors, provide manufacturer and model designation, voltage rating, and impedance.

9. For circuit breakers and fuses, provide manufacturer and model designation. List type of breaker, type of trip and available range of settings, SCCR, current rating, and breaker settings.

10. Generator short-circuit current contribution data, including short-circuit reactance, rated kVA, rated voltage, and X/R ratio.

11. For relays, provide manufacturer and model designation, current transformer ratios, potential transformer ratios, and relay settings.

12. Busway manufacturer and model designation, current rating, impedance, lengths, and conductor material.

13. Motor horsepower and NEMA MG 1 code letter designation.

14. Low-voltage cable sizes, lengths, number, conductor material, and conduit material (magnetic or nonmagnetic).

15. Medium-voltage cable sizes, lengths, conductor material, and cable construction.

16. Data sheets to supplement electrical distribution system diagram, cross-referenced with tag numbers on diagram, showing the following:
    a. Special load considerations, including starting inrush currents and frequent starting and stopping.
    b. Transformer characteristics, including primary protective device, magnetic inrush current, and overload capability.
    c. Motor full-load current, locked rotor current, service factor, starting time, type of start, and thermal-damage curve.
    d. Generator thermal-damage curve.
    e. Ratings, types, and settings of utility company's overcurrent protective devices.
    f. Special overcurrent protective device settings or types stipulated by utility company.
    g. Time-current-characteristic curves of devices to be coordinated.
    h. Manufacturer, frame size, interrupting rating in amperes rms symmetrical, ampere or current sensor rating, long-time adjustment range, short-time adjustment range, and instantaneous adjustment range for circuit breakers.
    i. Manufacturer and type, ampere-tap adjustment range, time-delay adjustment range, instantaneous attachment adjustment range, and current transformer ratio for overcurrent relays.
    j. Panelboards, switchboards, motor-control center ampacity, and SCCR in amperes rms symmetrical.
    k. Identify series-rated interrupting devices for a condition where the available fault current is greater than the interrupting rating of the downstream equipment. Obtain device data details to allow verification that series application of these devices complies with NFPA 70 and UL 489 requirements.

3.3 Protective Device Coordination Study

A. Comply with IEEE 242 for calculating short-circuit currents and determining coordination time intervals.

B. Comply with IEEE 399 for general study procedures.

C. The study shall be based on the device characteristics supplied by device manufacturer.

D. The extent of the electrical power system to be studied is indicated on Drawings.

E. Study electrical distribution system from normal and alternate power sources throughout electrical distribution system for Project. Study all cases of system-switching configurations and alternate operations that could result in maximum fault conditions.

F. Include overcurrent protection devices that provide power to control panels that may require accessing the interior of the panel for adjustments, monitoring or testing while energized.

G. Transformer Primary Overcurrent Protective Devices:

1. Device shall not operate in response to the following:
   a. Inrush current when first energized.
   b. Self-cooled, full-load current or forced-air-cooled, full-load current, whichever is specified for that transformer.
   c. Permissible transformer overloads according to IEEE C57.96 if required by unusual loading or emergency conditions.

2. Device settings shall protect transformers according to IEEE C57.12.00 and NFPA 70.

H. Motor Protection:

1. Select protection for low-voltage motors according to IEEE 242 and NFPA 70.

2. Select protection for motors served at voltages more than 600 V according to IEEE 620.

I. Conductor Protection: Protect cables against damage from fault currents according to ICEA P-32-382, ICEA P-45-482, and protection recommendations in IEEE 242. Demonstrate that equipment withstands the maximum short-circuit current for a time equivalent to the tripping time of the primary relay protection or total clearing time of the fuse. To determine temperatures that damage insulation, use curves from cable manufacturers or from listed standards indicating conductor size and short-circuit current.

J. Generator Protection: Select protection according to manufacturer's written recommendations and to IEEE 242.

K. The calculations shall include the ac fault-current decay from induction motors, synchronous motors, and asynchronous generators and shall apply to low- and medium-voltage, three-phase ac systems. The calculations shall also account for the fault-current dc decrement, to address the asymmetrical requirements of the interrupting equipment.

1. For grounded systems, provide a bolted line-to-ground fault-current study for areas as defined for the three-phase bolted fault short-circuit study.

3.4 Load-Flow And Voltage-Drop Study

A. Perform a load-flow and voltage-drop study to determine the steady-state loading profile of the system. Analyze power system performance two times as follows:

1. Determine load-flow and voltage drop based on full-load currents obtained in "Power System Data" Article.

2. Determine load-flow and voltage drop based on 80 percent of the design capacity of the load buses.

3. Prepare the load-flow and voltage-drop analysis and report to show power system components that are overloaded or might become overloaded; show bus voltages that are less than as prescribed by NFPA 70.

3.5 Field Adjusting

A. Setting and testing of the following equipment will be provided by the associated equipment manufacturers or the Utility Company; therefore, they are excluded from this scope:

1. Unit Substation USSD.

2. Switchgear SSG4001.

3. Motor Control Center SMCC4601.

4. Switchgear MV1 - Incoming Line fuses only.

B. For the rest of the equipment:

1. Adjust relay and protective device settings according to the recommended settings provided by the coordination study. Field adjustments shall be completed by the engineering service division of the equipment manufacturer under the Startup and Acceptance Testing contract portion.

2. Provide secondary injection testing for equipment with secondary injection capabilities. Verify each protective device operates within the limits published by the equipment manufacturer.

C. Testing and adjusting shall be by a full-time employee of the Field Adjusting Agency, who holds NETA ETT Level III certification or NICET Electrical Power Testing Level III certification.

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters. Perform NETA tests and inspections for all adjustable overcurrent protective devices.

3.6 Demonstration

A. Engage the Coordination Study Specialist to train Owner's maintenance personnel in the following:

1. Acquaint personnel in the fundamentals of operating the power system in normal and emergency modes.

2. Hand-out and explain the objectives of the coordination study, study descriptions, purpose, basis, and scope. Include case descriptions, definition of terms, and guide for interpreting the time-current coordination curves.

3. Explain how to adjust, operate, and maintain overcurrent protective device settings.

END OF SECTION

Section 26 05 74

Overcurrent Protective Device Arc-Flash Study

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

A. Section includes a computer-based, arc-flash study to determine the arc-flash hazard distance and the incident energy to which personnel could be exposed during work on or near electrical equipment.

1.3 DEFINITIONS

A. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed, and salvaged, or removed and reinstalled.

B. One-Line Diagram: A diagram which shows, by means of single lines and graphic symbols, the course of an electric circuit or system of circuits and the component devices or parts used therein.

C. Protective Device: A device that senses when an abnormal current flow exists and then removes the affected portion from the system.

D. SCCR: Short-circuit current rating.

E. Service: The conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served.

1.4 ACTION SUBMITTALS

A. Product Data: For computer software program to be used for studies.

B. Other Action Submittals: Submit the following submittals after the approval of system protective devices submittals. Submittals shall be in digital form.

1. Arc-flash study input data, including completed computer program input data sheets.

2. Arc-flash study report; signed, dated, and sealed by a qualified professional engineer.
    a. Submit study report for action prior to receiving final approval of the distribution equipment submittals. If formal completion of studies will cause delay in equipment manufacturing, obtain approval from Project Manager for preliminary submittal of sufficient study data to ensure that the selection of devices and associated characteristics is satisfactory.

1.5 INFORMATIONAL SUBMITTALS

A. Product Certificates: For arc-flash hazard analysis software, certifying compliance with IEEE 1584 and NFPA 70E.

1.6 CLOSEOUT SUBMITTALS

A. Study Report:

1. PDF version of the report for review.

2. PDF version of the final report.

B. Power System Data

C. Electronic version (software form) of power system model as required for future study modification or expansion utilizing SKM software.

1. Maintenance procedures according to requirements in NFPA 70E shall be provided in the equipment manuals.

D. Operation and Maintenance Procedures: In addition to items specified in Section 017800 "Closeout Submittals," provide maintenance procedures for use by Owner's personnel that comply with requirements in NFPA 70E.

1.7 QUALITY ASSURANCE

A. Studies shall use computer programs that are distributed nationally and are in wide use. Software algorithms shall comply with requirements of standards and guides specified in this Section. Manual calculations are unacceptable.

B. Arc-Flash Study Software Developer Qualifications: An entity that owns and markets computer software used for studies, having performed successful studies of similar magnitude on electrical distribution systems using similar devices.

1. The computer program shall be developed under the charge of a licensed professional engineer who holds IEEE Computer Society's Certified Software Development Professional certification.

C. Arc-Flash Study Specialist Qualifications: Professional Engineer in charge of performing the study, analyzing the arc flash, and documenting recommendations, licensed in the state where Project is located. All elements of the study shall be performed under the direct supervision and control of this Professional Engineer.

PART 2 - PRODUCTS

2.1 COMPUTER SOFTWARE DEVELOPERS

A. Software Developers: Subject to compliance with requirements, provide software by one of the following:

1. SKM, by SKM Systems Analysis, Inc.

B. Comply with IEEE 1584 and NFPA 70E.

C. Analytical features of device coordination study computer software program shall have the capability to calculate "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.

2.2 ARC-FLASH STUDY REPORT CONTENT

A. Executive summary.

B. Study descriptions, purpose, basis, and scope.

C. One-line diagram, showing the following:

1. Protective device designations and ampere ratings.

2. Cable size and lengths.

3. Transformer kilovolt ampere (kVA) and voltage ratings.

4. Motor and generator designations and kVA ratings.

5. Switchgear, switchboard, motor-control center and panelboard designations.

D. Study Input Data: As described in Article 3.2 "Power System Data".

E. Short-Circuit Study Output: As specified in "Short Circuit Study Output" Paragraph in "Short-Circuit Study Report Contents" Article in Section 260572 "Overcurrent Protective Device Short-Circuit Study."

F. Protective Device Coordination Study Report Contents: As specified in "Protective Device Coordination Study Report Contents" Article in Section 260573 "Overcurrent Protective Device Coordination Study."

G. Arc-Flash Study Output:

1. Interrupting Duty Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:
   a. Voltage.
   b. Calculated symmetrical fault-current magnitude and angle.
   c. Fault-point X/R ratio.
   d. No AC Decrement (NACD) ratio.
   e. Equivalent impedance.
   f. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a symmetrical basis.
   g. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a total basis.

H. Incident Energy and Flash Protection Boundary Calculations:

1. Arcing fault magnitude.

2. Protective device clearing time.

3. Duration of arc.

4. Arc-flash boundary.

5. Working distance.

6. Incident energy.

7. Hazard risk category.

8. Recommendations for arc-flash energy reduction.

I. Fault study input data, case descriptions, and fault-current calculations including a definition of terms and guide for interpretation of the computer printout.

2.3 ARC-FLASH WARNING LABELS

A. Comply with requirements in Section 260553 "Identification for Electrical Systems." Produce a 3.5-by-5-inch (76-by-127-mm) thermal transfer label of high-adhesion polyester for each work location included in the analysis.

B. The label shall have an orange header with the wording, "WARNING, ARC-FLASH HAZARD," and shall include the following information taken directly from the arc-flash hazard analysis:

1. Location designation (Equipment Tag and Fed From Equipment Tag).

2. Nominal voltage.

3. Flash protection boundary.

4. Incident energy and corresponding working distance.

5. Short Circuit Current, 3 phase

6. Engineering report number, revision number, and issue date.

C. Labels shall be machine printed, with no field-applied markings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine relevant Project submittals. Proceed with study only after relevant equipment submittals have been assembled. Overcurrent protective devices that have not been submitted and approved may not be used in study.

3.2 POWER SYSTEM DATA

A. Obtain all data necessary for the conduct of the arc-flash hazard analysis.

1. Verify completeness of data supplied on the one-line diagram on Drawings. Call discrepancies to the attention of Project Manager.

2. For new equipment, use characteristics submitted under the provisions of action submittals and information submittals for this Project.

3. For new equipment provided under the scope of this Project and powered from the existing power distribution, obtain required electrical distribution system data by field investigation and surveys, conducted by qualified technicians and engineers.

B. Electrical Survey Data: Gather and tabulate the following input data to support study. Comply with recommendations in IEEE 1584 and NFPA 70E as to the amount of detail that is required to be acquired in the field. Field data gathering shall be under the direct supervision and control of the engineer in charge of performing the study and shall be by the engineer or its representative who holds NETA ETT Level III certification or NICET Electrical Power Testing Level III certification.

1. Product Data for overcurrent protective devices specified in other Sections and involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.

2. Obtain electrical power utility impedance at the service.

3. Power sources and ties.

4. Short-circuit current at each system bus, three phase and line-to-ground.

5. Full-load current of all loads.

6. Voltage level at each bus.

7. For transformers, include kVA, primary and secondary voltages, connection type, impedance, X/R ratio, taps measured in per cent, and phase shift.

8. For reactors, provide manufacturer and model designation, voltage rating and impedance.

9. For circuit breakers and fuses, provide manufacturer and model designation. List type of breaker, type of trip and available range of settings, SCCR, current rating, and breaker settings.

10. Generator short-circuit current contribution data, including short-circuit reactance, rated kVA, rated voltage, and X/R ratio.

11. For relays, provide manufacturer and model designation, current transformer ratios, potential transformer ratios, and relay settings.

12. Busway manufacturer and model designation, current rating, impedance, lengths, and conductor material.

13. Motor horsepower and NEMA MG 1 code letter designation.

14. Low-voltage cable sizes, lengths, number, conductor material and conduit material (magnetic or nonmagnetic).

15. Medium-voltage cable sizes, lengths, conductor material, and cable construction and metallic shield performance parameters.

3.3 ARC-FLASH HAZARD ANALYSIS

A. Comply with NFPA 70E and its Annex D for hazard analysis study.

B. Preparatory Studies:

1. Short-Circuit Study Output: As specified in "Short-Circuit Study Output" Paragraph in "Short-Circuit Study Report Contents" Article in Section 260572 "Overcurrent Protective Device Short-Circuit Study."

2. Protective Device Coordination Study Report Contents: As specified in "Protective Device Coordination Study Report Contents" Article in Section 260573 "Overcurrent Protective Device Coordination Study."

C. Calculate maximum and minimum contributions of fault-current size.

1. The minimum calculation shall assume that the utility contribution is at a minimum and shall assume no motor load.

2. The maximum calculation shall assume a maximum contribution from the utility and shall assume motors to be operating under full-load conditions.

D. Calculate the arc-flash protection boundary and incident energy at locations in the electrical distribution system where personnel could perform work on energized parts.

E. Include medium- and low-voltage equipment locations.

F. Safe working distances shall be specified for calculated fault locations based on the calculated arc-flash boundary, considering incident energy of 1.2 cal/sq.cm.

G. Incident energy calculations shall consider the accumulation of energy over time when performing arc-flash calculations on buses with multiple sources. Iterative calculations shall consider the changing current contributions, as the sources are interrupted or decremented with time. Fault contribution from motors and generators shall be decremented as follows:

1. Fault contribution from induction motors should not be considered beyond three to five cycles.

2. Fault contribution from synchronous motors and generators should be decayed to match the actual decrement of each as closely as possible (e.g., contributions from permanent magnet generators will typically decay from 10 per unit to three per unit after 10 cycles).

H. Arc-flash computation shall include both line and load side of a Main circuit breaker of switchgear, switchboard or MCC when the Main is in a separate enclosure or isolated compartment.

I. Base arc-flash calculations on actual overcurrent protective device clearing time. Cap maximum clearing time at two seconds based on IEEE 1584, Section B.1.2.

3.4 LABELING

A. Apply arc-flash label to each:

1. Medium-voltage switchgear
2. Medium-voltage switch.
3. Low-voltage Switchgear.
4. Low-voltage switchboard.
5. Motor-control center.
6. Distribution panel.
7. Panelboard.
8. Control panel that may require accessing the interior of the panel for adjustments, monitoring, or testing while energized.

3.5 APPLICATION OF WARNING LABELS

A. Install the arc-fault warning labels under the direct supervision and control of the Arc-Flash Study Specialist.

3.6 DEMONSTRATION

A. Engage the Arc-Flash Study Specialist to train Owner's maintenance personnel in the potential arc-flash hazards associated with working on energized equipment and the significance of the arc-flash warning labels.

END OF SECTION

Section 26 56 19

LED Exterior Lighting

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. Luminaire types
2. Luminaire-mounted photoelectric relays.
3. Photoelectric relays.
4. Materials.
5. Finishes.
6. Luminaire support components.

1.3 DEFINITIONS

A. CCT: Correlated color temperature.

B. CRI: Color rendering index.

C. Fixture: See "Luminaire."

D. IP: International Protection or Ingress Protection Rating.

E. Lumen: Measured output of lamp and luminaire, or both.

F. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

G. NRTL: OSHA approved Nationally Recognized Testing Laboratory.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of luminaire.

1. Arrange in order of luminaire designation.

2. Include data on features, accessories, and finishes.

3. Include physical description and dimensions of luminaire.

4. Lamps, include life, output (lumens, CCT, and CRI), and energy-efficiency data.

5. Photometric data and adjustment factors based on laboratory tests, complying with IES Lighting Measurements Testing and Calculation Guides, of each luminaire type.
   a. Manufacturer's Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the NVLAP for Energy Efficient Lighting Products.
   b. Testing Agency Certified Data: For indicated luminaires, photometric data certified by a qualified independent testing agency. Photometric data for remaining luminaires shall be certified by manufacturer.

6. Wiring diagrams for power, control, and signal wiring.

7. Photoelectric relays.

8. Means of attaching luminaires to supports and indication that the attachment is suitable for components involved.

B. Samples: For each luminaire and for each color and texture indicated with factory-applied finish.

C. Product Schedule: For luminaires and lamps. Use same designations indicated on Drawings.

D. Delegated-Design Submittal: For luminaire supports.

1. Include design calculations for luminaire supports.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing laboratory providing photometric data for luminaires.

B. Product Certificates: For each type of the following:

1. Luminaire.

2. Photoelectric relay.

C. Evidence of Listing/Labeling by an NRTL as defined by OSHA in 29 CFR 1910.7.

D. Sample warranty.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For luminaires and photoelectric relays to include in operation and maintenance manuals.

1. Provide a list of all lamp types used on Project. Use ANSI and manufacturers' codes.

2. Provide a list of all photoelectric relay types used on Project; use manufacturers' codes.

1.7 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: Ten for every 100 of each type and rating installed. Furnish at least one of each type.

2. Glass, Acrylic, and Plastic Lenses, Covers, and Other Optical Parts: One for every 100 of each type and rating installed. Furnish at least one of each type.

3. Diffusers and Lenses: One for every 100 of each type and rating installed. Furnish at least one of each type.

4. Globes and Guards: One for every 20 of each type and rating installed. Furnish at least one of each type.

1.8 QUALITY ASSURANCE

A. Luminaire Photometric Data Testing Laboratory Qualifications:

1. Luminaire manufacturers' laboratory that is accredited under the NVLAP for Energy Efficient Lighting Products.

2. Provided by an independent agency, with the experience and capability to conduct the testing indicated, accredited under the NVLAP for Energy Efficient Lighting Products and complying with applicable IES testing standards.

B. Provide luminaires from a single manufacturer for each luminaire type.

C. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.

D. Mockups: For exterior luminaires, complete with power and control connections.

1. Obtain Construction Manager's approval of luminaires in mockups before starting installations.

2. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed work.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering prior to shipping.

1.10 FIELD CONDITIONS

A. Verify existing and proposed utility structures prior to the start of work associated with luminaire installation.

B. Mark locations of exterior luminaires for approval by Construction Manager prior to the start of luminaire installation.

1.11 WARRANTY

A. Manufacturer's Warranty: Per Purchasing Terms and Conditions.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Seismic Performance:

1. Luminaires shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

2. Luminaires and lamps shall be labeled vibration and shock resistant.

3. The term "withstand" means "the luminaire will remain in place without separation of any parts when subjected to the seismic forces specified and the luminaire will be fully operational during and after the seismic event."

2.2 LUMINAIRE 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.

B. NRTL Compliance: Luminaires shall be listed and labeled for indicated class and division of hazard by an NRTL.

C. FM Global Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by FM Global.

D. UL Compliance: Comply with UL 1598.

E. Lamp base complying with ANSI C81.61 or IEC 60061-1.

F. Bulb shape complying with ANSI C79.1.

G. CRI of 85. CCT of 4100 K, unless listed otherwise on drawings.

H. L70 lamp life of 50,000 hours.

I. Lamps dimmable from 100 percent to 0 percent of maximum light output.

J. Internal driver.

K. Nominal Operating Voltage: 277 VAC, unless listed otherwise on drawings. .

L. Source Limitations:

1. Obtain luminaires of the same type from a single manufacturer.

2.3 LUMINAIRE-MOUNTED PHOTOELECTRIC RELAYS

A. Comply with UL 773 or UL 773A.

B. Contact Relays: Factory mounted, single throw, designed to fail in the on position, and factory set to turn light unit on and off with 15-second minimum time delay. Relay shall have directional lens in front of photocell to prevent artificial light sources from causing false turnoff.

1. Adjustable window slide for adjusting on-off set points.

2.4 LUMINAIRE TYPES

A. See Lighting Fixture Schedule on drawings for fixture types and requirements.

2.5 MATERIALS

A. Metal Parts: Free of burrs and sharp corners and edges.

B. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position. Doors shall be removable for cleaning or replacing lenses.

C. Diffusers and Globes:

1. Acrylic Diffusers: 100 percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

2. Glass: Annealed crystal glass unless otherwise indicated.

3. Lens Thickness: At least 0.125 inch minimum unless otherwise indicated.

D. Lens and Refractor Gaskets: Use heat- and aging-resistant resilient gaskets to seal and cushion lenses and refractors in luminaire doors.

E. Reflecting surfaces shall have minimum reflectance as follows unless otherwise indicated:

1. White Surfaces: 85 percent.

2. Specular Surfaces: 83 percent.

3. Diffusing Specular Surfaces: 75 percent.

F. Housings:

1. Rigidly formed, weather- and light-tight enclosure that will not warp, sag, or deform in use.

2. Provide filter/breather for enclosed luminaires.

G. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps. Labels shall be located where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.

1. Label shall include the following lamp characteristics:
   a. "USE ONLY" and include specific lamp type.

b. Lamp diameter, shape, size, wattage and coating.
c. CCT and CRI for all luminaires.

2.6 ELECTRICAL AREA CLASSIFICATION

A. Lighting fixtures installed in Class I and Class II Hazardous locations must be UL listed and marked with the maximum operating temperature identification number which shall not exceed the temperature rating indicated on the Area Classification Plans.

2.7 LUMINAIRE SUPPORT COMPONENTS

A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for luminaire electrical conduit to verify actual locations of conduit connections before luminaire installation.

C. Examine walls, ceilings, etc for suitable conditions where luminaires will be installed.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 GENERAL INSTALLATION REQUIREMENTS

A. Comply with NECA 1.

B. Use fastening methods and materials selected to resist seismic forces defined for the application and approved by manufacturer.

C. Fasten luminaire to structural support.

D. Supports:

1. Sized and rated for luminaire weight.

2. Able to maintain luminaire position after cleaning and relamping.

3. Support luminaires without causing deflection of finished surface.

4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.

E. Coordinate layout and installation of luminaires with other construction.

F. Adjust luminaires that require field adjustment or aiming.

G. Adjust photoelectric device to prevent false operation of relay by artificial light sources, favoring a north orientation.

H. Install all fixtures to comply with applicable provisions of National Electrical Code.

I. Install in accordance with manufacturers instructions.

J. Install suspended luminaires using pendants supported from swivel hangers. Provide pendant length required to suspend luminaire at indicated height.

K. Pendant fixtures by means of suitable outlet box cover type aligners, each having flexible joint permitting unit to hang plumb. Install stems of 3/4 in. galvanized steel conduits, unless otherwise specified.

L. Use aligners of shock absorbing type, where indicated.

M. Support luminaires independent of ceiling framing. The supports shall consist of not less than 2 separate No.12 (or larger) steal wires. These wires must extend from opposite corners of the fixture with each wire independently attached to the building structure.

N. Locate ceiling luminaires as indicated on plan drawings.

O. Install surface mounted luminaires plumb and adjust to align with building lines and with each other. Secure to prohibit movement.

P. Install wall mounted exit signs at height 12" above doors, unless indicated otherwise on drawings.

Q. Install accessories furnished with each luminaire.

R. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.

S. Bond luminaires and metal accessories to branch circuit equipment grounding conductor.

T. Install specified lamps in each luminaire, emergency lighting unit, and exit sign.

U. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" and Section 260533 "Raceways and Boxes for Electrical Systems" for wiring connections and wiring methods.

3.3 INSTALLATION OF INDIVIDUAL GROUND-MOUNTED LUMINAIRES

A. Aim as indicated on Drawings.

B. Install on concrete base with top 12 inches above finished grade or surface at luminaire location. Cast conduit into base, and finish by troweling and rubbing smooth. Concrete materials, installation, and finishing are specified in Section 033000 "Cast-in-Place Concrete.

3.4 CORROSION PREVENTION

A. Aluminum: Do not use in contact with earth or concrete. When in direct contact with a dissimilar metal, protect aluminum by insulating fittings or treatment.

B. Steel Conduits: Comply with Section 260533 "Raceways and Boxes for Electrical Systems." In concrete foundations, wrap conduit with 0.010-inch- (0.254-mm-) thick, pipe-wrapping plastic tape applied with a 50 percent overlap.

3.5 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.6 FIELD QUALITY CONTROL

A. Inspect each installed luminaire for damage. Replace damaged luminaires and components.

B. Perform the following tests and inspections.

1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.

2. Verify operation of photoelectric controls.

C. Illumination Tests:

1. Measure light intensities at night. Use photometers with calibration referenced to NIST standards. Comply with the following IES testing guide(s):
   a. IES LM-5.
   b. IES LM-50.
   c. IES LM-52.
   d. IES LM-64.
   e. IES LM-72.

2. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.

D. Luminaire will be considered defective if it does not pass tests and inspections.

E. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

3.7 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain luminaires and photocell relays.

END OF SECTION

DIVISION 27 – NOT USED

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

Section 28 31 11

Digital Addressable Fire-Alarm System

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.

B. The work covered by this section is to be coordinated with related work as specified elsewhere in the specifications. Requirements of the following sections apply:

1. Specification Section 078400: Firestopping.
2. Division 13: Special Construction.
3. Division 21: Fire Suppression & Sprinkler Systems.
4. Division 23: HVAC Systems.
5. Division 26: Electrical Systems.

C. The system and all associated operations shall be in accordance with all applicable codes and standards, including the following:

1. NFPA 72, National Fire Alarm Code.
2. NFPA 70, National Electrical Code.
3. NFPA 101, Life Safety Code.
4. NFPA 90A, Standard for the Installation of Air Conditioning and Ventilating Systems.
5. Other applicable NFPA standards.
6. Local Jurisdictional Adopted Codes and Standards.
7. ADA Accessibility Guidelines.
8. ANSI.
9. ASME.

1.2 SUMMARY

A. Network fire alarm control panels shall include all features as described in this specification for stand-alone FACP's and shall have network communication capabilities as described herein.

1. All points monitored and controlled by a single node shall be capable of being programmed as "Public." Each point made public to the network may be programmed to be operated by any other node connected to the network.

2. Network communications shall be capable of supporting "point lists" that can be handled as though they were a single point.

B. The network shall provide a means to log into any node on the system via a laptop computer or CRT/Keyboard and have complete network access (Set Host) for diagnostics, maintenance reporting, and information gathering of all nodes in the system. Systems not meeting this requirement must provide all diagnostic tools required to support this function from selected points on the network. This Section covers fire alarm systems, including initiating devices, notification appliances, controls, and supervisory devices.

C. Work covered by this section includes the furnishing of labor, equipment, and materials for the extension of the existing fire alarm system per the contract documents, and as necessary to provide a complete and functional system.

D. All Fire Alarm System equipment/devices furnished and installed shall match existing installed equipment/devices or shall be the direct manufacturer's replacement of equivalent technical and operational specifications as applicable.

E. The Fire Alarm System shall consist of all necessary hardware equipment and software programming to perform the following functions:

1. Fire alarm system detection and notification operations.

2. Control and monitoring of elevators, door hold-open devices, fire suppression systems, smoke purge fans and /or dampers (if applicable) and other equipment as indicated in the drawings and specifications.

3. One-way supervised voice evacuation operations, including digitized pre-recorded messaging.

4. Provide audible and visual notification for partial and full evacuation of personnel.

F. The Fire Detection/Alarm System (FAS) shall also meet but not be limited to providing the following operational requirements:

1. The Fire Detection/Alarm System (FAS) shall be a digital addressable system. The system shall be of a modular design.

2. The FAS shall incorporate a manually operated Emergency Voice/alarm communication system.

3. The FAS shall incorporate the capability to automatically activate audible and visual evacuation signals after a 3-minute time delay period. If manual control or cancellation of evacuation has not occurred prior to the completion of the time delay period, the FAS will have the capability to automatically activate evacuation signals.

4. The Fire Detection/Alarm System (FAS) panels will require 120 VAC, 60 HZ power fed from dedicated circuits/panels located within the LSS rooms. These dedicated power panels will be furnished and installed by the Electrical Contractor.

5. The FAS Network/backbone shall be connected Class A, Style 7 for system communication and supervision. No single cable fault shall compromise the system communication. The system shall be capable of providing annunciation of specific trouble/fault and supervisory conditions.

6. The system network shall be sized and facilitated for 20% expansion without disruption to the operating system.

7. Fire Alarm Control Panels (FACP) shall be connected to the sitewide FAS via a fiber optic communication network where applicable. The overall network includes all site buildings, with the Master control in the building control room, at the client's direction or as shown in the construction documents. Where applicable, design has provided for fire alarm network and EWSD network fiber cables routed between each of the site buildings and will share fiber/routing with IT backbone/infrastructure. The FAS integrator shall coordinate network connections with the IT discipline.

8. The system design will incorporate a workstation/server for program maintenance/ modification and operation without system upset. This workstation/server is located within the control room, at the client's direction or as shown in the construction documents.

9. The FAS system network connections shall be via single-mode 50/125 mm fiber optic cable routed in ring and/or star topology via Fiber Distribution Units (FDU) which will be located in secured rooms as shown in the construction documents, where applicable. Network interface outlets (T.O's) will be provided in rooms for FACP connections to the network. The T.O's will be installed by the FAS contractor within fiber modem cabinets provided and installed by FAS integrator. The FAS integrator shall provide fiber connections from FAS components to T.O's (jumpers, etc.). The FAS contractor/integrator shall be responsible for terminating, testing and commissioning/certifications of all FAS system fiber optic cabling per the requirements of Specification Section 271323 - Communications Optical Fiber Backbone Cabling.

10. The FAS shall provide the I/O requirements for smoke detection, HVAC duct mounted smoke detection, manual pull stations, visual and audio evacuation, elevator recall, sprinkler system supervision, fireman's control interface, special hazards fire suppression systems and monitoring/control functions, as required.

11. The system shall be FM or UL certified and meet all requirements of the applicable State Building and Fire Codes.

12. The FAS shall be designed for communication with the Early Warning Smoke Detection (EWSD) system devices, where applicable. The EWSD/VESDA units shall be network-wired into the fire alarm system via VESDA system High Level Interface (HLI) modules (or equal).

13. The EWSD system shall incorporate a graphical user interface VESDA VSM4 or equal located as shown in the construction documents. The interface shall provide the capability to monitor system component status including individual pre-alarm and alarm limits of each detector unit.

14. The FAS consists of a main system server, a graphical workstation(s) with an Operator Human-Machine-Interface (HMI) workstations, an alarm printer(s) and system operating software located as shown in the construction documents. Refer to Section 283111.01 - Fire Alarm Appendix for equipment information and quantities.

15. The Fireman's control panel does not require any automatic functionality from the FAS. The Fireman's control panel/functions will be provided via the FMCS system.

16. The system network shall be designed and facilitated for future expansion without system outage.

17. FACP’s shall include, but not be limited to Signal Line Circuit (SLC) drivers for termination and supervision of addressable I/O devices.

18. Select FACPs shall provide network interface cards to supervise EWSD detection units.

19. The FAS shall include SLCs capable of supporting intelligent FAS devices.

20. FAS amplifier circuits capable of operating speakers in an “all-call” and zoned fashion. This shall be accomplished utilizing distributed, addressable amplifiers.

21. FAS output capacity to operate evacuation strobes in an “all-call” and zoned fashion. This shall be accomplished utilizing distributed and addressable strobe booster power supplies, and addressable strobes.

22. The FAS system integrator shall be responsible for complete programming, testing and commissioning of the FAS.

G. Work covered by this section includes the fire alarm system equipment including installation, monitoring, termination, and testing of the following:

1. Area and duct smoke detection.

2. Heat detection.

3. Flame detection.

4. Audible (horn/tone/voice) evacuation system.

5. Visual (strobe) evacuation system.

6. Manual pull stations.

7. Monitoring of fire protection water flow, PIV, tamper switches and other related fire protection equipment.

8. Monitoring of safety shower/eye wash switches, where applicable.

9. Fire door release controls.

10. Smoke damper control interface.

11. Elevator control interface.

12. Early Warning Smoke Detection (EWSD) interface.

13. System printer.

1.3 DEFINITIONS

A. LED: Light-emitting diode.

B. NICET: National Institute for Certification in Engineering Technologies.

1.4 SYSTEM DESCRIPTION

A. General: Provide a complete extension of the existing system, non-coded UL-certified addressable, microprocessor-based fire alarm system with initiating devices, notification appliances, and monitoring and control devices as indicated on the drawings and as specified herein. General: The fire alarm system shall operate as a manually operated emergency voice/alarm communications system, and shall comply with the requirements of chapter 6.9, NFPA 72 (2002).

B. General: Provide a complete extension of the existing system, non-coded addressable system, with automatic sensitivity control of certain smoke detectors and multiplexed signal transmission, dedicated to fire-alarm service only.

C. Software: The fire alarm system shall allow for loading and editing instructions and operating sequences as necessary. The system shall be capable of on-site programming to accommodate system expansion and facilitate changes in operation. All software operations shall be stored in a non-volatile programmable memory within the fire alarm control unit. Loss of primary and secondary power shall not erase the instructions stored in memory. System shall be capable of storing dual configuration programs with one active and one in reserve. Panel shall be capable of full system operation during a new configuration download.

D. History Logs: The system shall provide a means to recall alarms and trouble conditions in chronological order for the purpose of recreating an event history. A separate alarm and trouble log shall be provided.

E. Recording of Events: Record all alarm, supervisory, and trouble events by means of system printer. The printout shall include the type of signal (alarm, supervisory, or trouble) the device identification, date and time of the occurrence. The printout differentiates alarm signals from all other printed indications.

F. Wire/Signal Transmission:

1. Transmission shall be hard-wired using separate individual circuits for each zone of alarm operation, as required or addressable signal transmission, dedicated to fire alarm service only.

2. All FAS/EWSD wiring/connections shall be installed per the requirements of other sections of this specification and as shown on contract drawings.

3. Circuit Supervision: Circuit faults shall be indicated by a trouble signal at the FACP. Provide a distinctive indicating audible tone and alphanumeric annunciation.

4. Constant Supervision Audio: When provided, audio notification appliance circuits shall be supervised during standby by monitoring for DC continuity to end-of-line resistors.

5. All fire alarm system and EWSD wiring/cabling shall be rated for the intended use and shall meet all requirements of applicable codes/standards and related specifications.

6. All notification appliance circuit (NAC) conductors shall be 2-hour fire rated cable (Lifeline™ CI, CIC or equal).

7. Wire/cable splicing shall be done utilizing screw terminals housed within electrical enclosures only. Wire nuts, or similar splicing methods will not be acceptable.

G. Remote Access:

1. A personal computer or technician's laptop, configured with terminal emulation software shall have the ability to access the FACP for diagnostics, maintenance reporting and information gathering.

2. FACP shall have the capability to provide remote access via an Internet/Intranet Interface. The Internet interface shall provide an alternative access to system information using the familiar interface of a standard Internet browser. A remotely located fire professional can use this access to analyze control panel status during non-alarm conditions and can also use this information to assist local fire responders during alarm conditions.

3. Any remote access to the FAS shall require prior approval of Client's personnel.

H. Network communication:

1. Network node communication shall be through a token ring, hub, or star topology configuration, or combination thereof.

2. A single open, ground or short on the network communication loop shall not degrade network communications. Token shall be passed in opposite direction to maintain communications throughout all network nodes. At the same time the status of the communication link shall be reported.

3. If a group of nodes becomes isolated from the rest of the network due to multiple fault conditions, that group shall automatically form a sub-network with all common interaction of monitoring and control remaining intact. The network shall be notified with the exact details of the lost communications.

4. Fiber optics communication shall be provided as an option via a fiber optics modem. Modem shall multiplex audio signals and digital communication via full duplex transmission over a single fiber optic cable (Multi mode).

5. The communication/supervision method shall be NFPA 72 Style 7.

I. Required Functions:

1. Priority of Signals: Fire alarm events have highest priority. Subsequent alarm events are queued in the order received and do not affect existing alarm conditions. Priority Two, Supervisory and Trouble events have second-, third-, and fourth-level priority, respectively. Signals of a higher-level priority take precedence over signals of lower priority even though the lower-priority condition occurred first. Annunciate all events regardless of priority or order received.

2. Non-interfering: An event on one zone does not prevent the receipt of signals from any other zone. All zones are manually resettable from the FACP after the initiating device or devices are restored to normal. The activation of an addressable device does not prevent the receipt of signals from subsequent addressable device activations.

3. Annunciation: Operation of alarm and supervisory initiating devices shall be annunciated at the FACP, system printer and the fire alarm system GUI/HMI, indicating the type of device, the operational state of the device (i.e. alarm, trouble or supervisory) and shall display the custom label associated with the device.

4. Activation of a system acknowledge button will be annunciated at the fire alarm system HMI and will indicate the location of the panel where the acknowledge button was activated.

5. When any system alarm, trouble, or supervisory condition has been cleared, the cleared condition shall be reported to the history log and include the time and date that the point was cleared.

6. Selective Alarm shall include:
   a. Indication of alarm condition at the FACP and the annunciator(s).
   b. Identification of the device /zone that is the source of the alarm at the FACP and the annunciator(s).
   c. Operation of audible and visible notification appliances until silenced at FACP.
   d. Selectively closing doors normally held open by magnetic door holders on the fire floor, floor above and floor below.
   e. Unlocking designated doors.
   f. Shutting down supply and return fans serving zone where alarm is initiated.
   g. Closing smoke dampers on system serving zone where alarm is initiated.
   h. Initiation of elevator Phase I functions (recall, shunt trip, illumination of indicator in cab, etc.) in accordance with ASME/ANSI A17.1, when specified detectors or sensors are activated, as appropriate.

7. Supervisory Operations: Upon activation of a supervisory device such as a fire pump power failure, low air pressure switch, and tamper switch, the system shall operate as follows:
   a. Activate the system supervisory service audible signal and illuminate the LED at the control unit.
   b. Pressing the Supervisory Acknowledge Key will silence the supervisory audible signal while maintaining the Supervisory LED "on" indicating off-normal condition.
   c. Record the event in the FACP historical log.
   d. Restoring the condition shall cause the Supervisory LED to clear and restore the system to normal.

8. Alarm Silencing: If the "Alarm Silence" button is pressed, all audible alarm signals shall cease operation.

9. System Reset:
   a. The "System Reset" button shall be used to return the system to its normal state. Display messages shall provide operator assurance of the sequential steps ("IN PROGRESS", "RESET COMPLETED") as they occur. The system shall verify all circuits or devices are restored prior to resetting the system to avoid the potential for re-alarming the system. The display message shall indicate "ALARM PRESENT, SYSTEM RESET ABORTED."
   b. Should an alarm condition continue, the system will remain in an alarmed state.

10. A manual evacuation (drill) switch shall be provided to operate the notification appliances without causing other control circuits to be activated.

11. WALKTEST: The system shall have the capacity of 8 programmable passcode protected one person testing groups, such that only a portion of the system need be disabled during testing. The actuation of the "enable one-person test" program at the control unit shall activate the "One Person Testing" mode of the system as follows:
    a. The city circuit connection/DACT and any suppression release circuits shall be by- passed for the testing group.
    b. Control relay functions associated with one of the eight testing groups shall be bypassed.
    c. The control unit shall indicate a trouble condition.
    d. The alarm activation of any initiating device in the testing group shall cause the audible notification appliances assigned only to that group to sound a code to identify the device or zone.
    e. The unit shall automatically reset itself after signaling is complete.
    f. Any opening of an initiating device or notification appliance circuit wiring shall cause the audible signals to sound for 4 seconds indicating the trouble condition.

J. Analog Smoke Sensors:

1. Monitoring: FACP shall individually monitor sensors for calibration, sensitivity, and alarm condition, and shall individually adjust for sensitivity. The control unit shall determine the condition of each sensor by comparing the sensor value to the stored values.

2. Environmental Compensation: The FACP shall maintain a moving average of the sensor's smoke chamber value to automatically compensate for dust, dirt, and other conditions that could affect detection operations.

3. Programmable Sensitivity: Photoelectric Smoke Sensors shall have seven (7) selectable sensitivity levels ranging from 0.2% to 3.7%, programmed and monitored from the FACP.

4. Sensitivity Testing Reports: The FACP shall provide sensor reports that meet NFPA 72 calibrated test method requirements. The reports shall be viewed on a CRT Display or printed for annual recording and logging of the calibration maintenance schedule.

5. The FACP shall automatically indicate when an individual sensor needs cleaning. The system shall provide a means to automatically indicate when a sensor requires cleaning. When a sensor's average value reaches a predetermined value, three (3) progressive levels of reporting are provided. The first level shall indicate if a sensor is close to a trouble reporting condition and will be indicated on the FACP as "ALMOST DIRTY." This condition provides a means to alert maintenance staff of a sensor approaching dirty without creating a trouble in the system. If this indicator is ignored and the second level is reached, a "DIRTY SENSOR" condition shall be indicated at the FACP and subsequently a system trouble is reported. The sensor base LED shall glow steady giving a visible indication at the sensor location. The "DIRTY SENSOR" condition shall not affect the sensitivity level required to alarm the sensor. If a "DIRTY SENSOR" is left unattended, and its average

value increases to a third predetermined value, an "EXCESSIVELY DIRTY SENSOR" trouble condition shall be indicated at the control unit.

6. The FACP shall continuously perform an automatic self-test on each sensor that will check sensor electronics and ensure the accuracy of the values being transmitted. Any sensor that fails this test shall indicate a "SELF TEST ABNORMAL" trouble condition.

7. Multi-Sensors shall combine photoelectric smoke sensing and heat sensing technologies. An alarm shall be determined by either smoke detection, with selectable sensitivity from 0.2 to 3.7%/ft. obscuration; or heat detection, selectable as fixed temperature or fixed with selectable rate-of-rise; or based on an analysis of the combination of smoke and heat activity.

8. Programmable bases. It shall be possible to program relay and sounder bases to operate independently of their associated sensor.

9. Magnet test activation of smoke sensors shall be distinguished by its label and history log entry as being activated by a magnet.

K. Audible Alarm Notification: By voice evacuation and tone signals on loudspeakers in areas as indicated on drawings.

1. Automatic Voice Evacuation Sequence:
   a. The audio alarm signal shall consist of an alarm tone for a maximum of five seconds followed by an automatic digital voice message. At the end of the voice message, the alarm tone shall resume. This sequence shall sound continuously until the "Alarm Silence" switch is activated.
   b. All audio operations shall be activated by the system software so that any required future changes can be facilitated by authorized personnel without any component rewiring or hardware additions.

L. Speaker: Speaker notification appliances shall be listed to UL 1480.

1. The speaker shall operate on a 70.7VRMS NAC using twisted/shielded wire.

2. The following taps are available: 0.25W, 0.50W, 1.0W and 2.0W. At the 1.0W tap, the speaker has minimum UL rated sound pressure level of 84dBA at 10 feet.

3. The speaker shall have a frequency response of 400 to 4,000 Hz for Fire Alarm and 125 to 12kHz for general signaling.

4. The speakers shall match the existing speakers installed at the facility, unless otherwise noted on the drawings.

M. Strobe: Strobe/visual notification appliances shall be listed to UL 1971.

1. The strobe shall be xenon with clear polycarbonate lens.

2. The following selectable candela ratings shall be provided: 15, 30, 75, 110 and 135 cd output.

3. Strobes installed on ceilings shall be listed for ceiling applications.

4. The strobes shall be addressable devices and shall match the existing strobes installed at the facility, where applicable, unless otherwise noted on the drawings.

N. Manual Voice Paging:

1. The system shall be configured to allow voice paging. Upon activation of any speaker manual control switch, the alarm tone shall be sounded over all speakers in that group.

2. The control panel operator shall be able to make announcements via the push-to-talk paging microphone over the pre-selected speakers.

3. Total building paging shall be accomplished by the means of an "All Call" switch.

O. Fire Suppression Monitoring:

1. Water flow: Activation of a water flow switch shall initiate general alarm operations.

2. Sprinkler valve tamper switch: The activation of any valve tamper switch installed on water supply control valve shall activate system supervisory operations.

3. WSO: Water flow switch and sprinkler valve tamper switch shall be capable of existing on the same initiating zone. Activation of either device shall distinctly report which device is in alarm on the initiating zone.

4. Water level supervision: A pressure tank supervisory attachment shall indicate both high- and low-level conditions in water storage. A signal shall be obtained when the water level is lowered or raised 3 inches (76 mm) from the required level. A supervisory attachment for other than pressure tanks should indicate a low-level condition and a signal obtained when the water level is lowered 12 inches (300 mm) from the required level.

5. Water Temperature supervision: For exposed water storage containers, one separate and distinct signal shall indicate that the temperature of the water has been lowered to 40 deg. F (4.4 deg C), and another distinct signal indicates restoration to the required temperature.

6. Fire Pump supervision: Supervise fire pump(s) per local AHJ requirements. At a minimum provide supervision of electric drive (pump running, power failure, phase reversal), engine drive (pump running, controller not in “auto” condition, high engine temperature, low lubricating oil pressure, failure to start, over-speed shutdown, battery failure).

P. Power Requirements:

1. The control unit shall receive AC power via a dedicated CPS power fused disconnect circuit.

2. The system shall be provided with sufficient battery capacity to operate the entire system upon loss of normal AC power in a normal supervisory mode for a period of 24 hours with 15 minutes of alarm operation at the end of this period. The system shall automatically transfer to battery standby upon power failure. All battery charging and recharging operations shall be automatic.

3. All circuits requiring system-operating power shall be 24 VDC and shall be individually fused at the control unit.

4. The incoming power to the system shall be supervised so that any power failure will be indicated at the control unit. A green "power on" LED shall be displayed continuously at the user interface while incoming power is present.

5. The system batteries shall be supervised so that a low battery or a depleted battery condition, or disconnection of the battery shall be indicated at the control unit and displayed for the specific fault type.

6. The system shall support NAC Lockout feature to prevent subsequent activation of Notification Appliance Circuits after a Depleted Battery condition occurs in order to make use of battery reserve for front panel annunciation and control.

7. The system shall support 100% of addressable devices in alarm or operated at the same time, under both primary (AC) and secondary (battery) power conditions.

8. Loss of primary power shall sound a trouble signal at the FACP. FACP shall indicate when the system is operating on an alternate power supply.

1.5 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Fire-alarm control unit and raceways shall withstand the effects of earthquake motions determined according to SEI/ASCE 7, calculated with an importance factor of 1.5. Manufacturer shall submit certification for Fire-alarm control unit showing it has been tested and passed to this standard.

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

1.6 SUBMITTALS

A. General Submittal Requirements:

1. Submittals shall be approved by authorities having jurisdiction prior to submitting them to Architect.

2. Submittals and shop drawings shall comply with the requirements of the State Building Code (Fire alarm and detection systems), and all other requirements listed within contract documents.

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 III minimum. FAS designer shall submit proof of valid certification with submittal.
   c. Licensed or certified by authorities having jurisdiction. Fire alarm system designer shall submit proof of valid license or certification with submittal.

B. Product Data: Product data sheets for system components highlighted to indicate the specific products, features, or functions required to meet this specification. Alternate or as-equal products submitted under this contract must provide a detailed line-by-line comparison of how the submitted product meets, exceeds, or does not comply with this specification.

C. Shop Drawings: For fire-alarm system. Include plans, elevations, diagrams, sections, details, and attachments to other work.

1. Comply with recommendations in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72.

2. System operation description including method of operation and supervision of each type of circuit and sequence of operations for all manually and automatically initiated system inputs and outputs. A list of all input and output points in the system shall be provided with a label indicating location or use of IDC, SLC, NAC, relay, sensor, and auxiliary control circuits.

3. Include voltage drop calculations for notification appliance circuits to assure that the system will operate in accordance with all voltage conditions per UL and NFPA standards.

4. Include battery-size calculations, which shall indicate amp/hour rating of all system batteries. Batteries shall be sized to provide secondary power as required by other sections of this specification.

5. Include performance parameters and installation details for each detector, verifying that each detector is listed for complete range of air velocity, temperature, and humidity possible when air-handling system is operating.

6. Include plans, sections, and elevations of heating, ventilating, and air-conditioning ducts, drawn to scale and coordinating installation of duct smoke detectors and access to them. Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators. Locate detectors according to manufacturer's written recommendations.

7. Include voice/alarm signaling-service equipment rack or console layout, grounding schematic, amplifier power calculation, and single-line connection diagram.

8. Include floor plans to indicate all FAS device locations showing the system address of each addressable device. Indicate circuit number and device number identification/tag for all non-addressable devices. Indicate conduit and routing plans for all FAS devices/circuits. FAS devices shall be coordinated with other building trades and structures i.e., smoke detectors located in beam pockets as required, and shown on floor plan drawings in coordination with those other entities.

9. Include floor plans to indicate evacuation zones, and associated notification appliance circuits serving those evacuation zones.

10. Include complete point-to-point wiring and interconnection diagrams for all system components.

11. Include floor plans to indicate EWSD detector locations, sample piping and sample point layout. Include isometric piping network diagrams for each sample pipe network. Provide manufacturer’s software airflow calculations and response time(s) for each sample pipe network.

12. Include complete FAS riser diagrams indicating circuiting arrangement and equipment interconnections.

13. Coordinate exact requirements for fire protection/sprinkler system supervision with the fire protection contractor design. Indicate locations and quantities of fire alarm system components on shop drawing floor plans and include details for each sprinkler system riser with all fire alarm monitoring associated with the riser.

14. Product certification signed by the manufacturer of the fire alarm system components certifying that their products comply with indicated requirements.

15. Record of field tests of system.

D. Qualification Data: For qualified Installer.

E. Seismic Qualification 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.

F. Field quality-control reports.

G. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals. Include data for each type product, including all features and operating sequences, both automatic and manual. Provide the names, addresses, and telephone numbers of service organizations. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:

1. Comply with the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.

2. Provide "Record of Completion Documents" according to NFPA 72 article "Permanent Records" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter.

3. Record copy of site-specific software.

4. Provide "Maintenance, Inspection and Testing Records" according to NFPA 72 article of the same name and include the following:
   a. Frequency of testing of installed components.
   b. Frequency of inspection of installed components.
   c. Requirements and recommendations related to results of maintenance.
   d. Manufacturer's user training manuals.

5. Manufacturer's required maintenance related to system warranty requirements.

6. Abbreviated operating instructions for mounting at fire-alarm control unit.

H. Software and Firmware Operational Documentation and Licensing:

1. Software operating and upgrade manuals.

2. Program Software Backup: On magnetic media or compact disk, complete with data files.

3. Device address list.

4. Printout of software application and graphic screens.

5. Provide software licensing for all HMI/GUI/operating software interface.

1.7 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 II technician.

C. Source Limitations for Fire-Alarm System and Components: Obtain fire-alarm system from single source from single manufacturer. Components shall be compatible with, and operate as, an extension of existing system.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

E. NFPA Certification: Obtain certification according to NFPA 72 by an NRTL.

1.8 PROJECT CONDITIONS

A. Interruption of Existing Fire-Alarm Service: Do not interrupt fire-alarm service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary guard service according to requirements indicated:

1. Notify Owner no fewer than two days in advance of proposed interruption of fire-alarm service.

2. Do not proceed with interruption of fire-alarm service without Owner's written permission.

1.9 MAINTENANCE SERVICE AGREEMENT

A. Comply with UL 864.

B. Technical Support: Beginning with completion, provide software support for two years.

C. Fire alarm system vendor/integrator/contractor shall provide a two-year Maintenance and Service agreement as a separate contract to Global Foundries, which shall commence upon completion/certification of the installation of the fire alarm system under this contract. The services provided under this agreement shall include, but not be limited to the following:

1. Annual and semi-annual testing and certification as required by NFPA 72, and local codes/standards.

2. Response time shall not exceed 2 hours for system trouble calls, 24 hours per day, 7 days per week. A service technician shall be dispatched to the facility and be on-site within 2 hours of the call.

3. Service technicians must have (at a minimum) NICET Level II certification in fire alarm systems, or equivalent certification.

4. The fire alarm system manufacturer's representative shall carry a complete stock of common system devices and components.

5. All required testing/certification documentation as required by NFPA 72, and/or local codes/authorities. Documentation shall be signed by service technician upon completion of the service and submitted to the Client.

D. Upgrade Service: Update software to latest version at Project completion. Install and program software upgrades that become available within two years from date of completion at no additional cost. Upgrading software shall include operating system. Upgrade shall include new or revised licenses for use of software.

1. Provide 30 days' notice to the Owner to allow scheduling and access to system and to allow the Owner to upgrade computer equipment if necessary.

1.10 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Lamps for Remote Indicating Lamp Units: Quantity equal to 10 percent of amount installed, but no less than 1 unit.

2. Lamps for Strobe Units: Quantity equal to 10 percent of amount installed, but no fewer than 1 unit.

3. Keys and Tools: One extra set for access to locked and tamper proofed components.

4. Fuses: Two of each type installed in the system.

5. Break Rods for Manual Stations: Furnish quantity equal to 15 percent of the number of manual stations installed; minimum of 6 rods.

6. Notification Appliances: Furnish quantity equal to 10 percent of each type and number of units installed, but not less than one of each type.

7. Smoke Detectors or Sensors, Fire Detectors, and Flame Detectors: Furnish quantity equal to 10 percent of each type and number of units installed but not less than one of each type.

8. Detector or Sensor Bases: Furnish quantity equal to 2 percent of each type and number of units installed but not less than one of each type.

9. Printer Cartridges: Furnish (6) spare printer cartridges.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements. Provide products by one of the following available manufacturers offering products that may be incorporated into the Work, but are not limited to, the following:

1. Simplex-Grinnell LP (a Tyco International company)

2. Equivalent manufacture

2.2 SYSTEMS OPERATIONAL DESCRIPTION

A. Fire-alarm signal initiation shall be by one or more of the following devices and systems:

1. Manual stations.

2. Heat detectors.

3. Flame detectors.

4. Smoke detectors.

5. Duct smoke detectors.

6. Photo-beam smoke detectors.

7. Verified automatic alarm operation of smoke detectors.

8. Automatic sprinkler system water flow.

9. Heat detectors in elevator shaft and pit.

10. Fire-extinguishing system operation, including tool and chemical distribution equipment.

11. Fire standpipe system.

B. Fire-alarm signal shall initiate the following actions, as well as those shown on input/output matrix drawing:

1. Continuously operate alarm notification appliances.

2. Identify alarm at fire-alarm control unit.

3. Unlock electric door locks in designated egress paths.

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. Activate stairwell and elevator-shaft pressurization systems.

8. Close smoke dampers in air ducts of designated air-conditioning duct systems.

9. Recall elevators to primary or alternate recall floors.

10. Record events in the system memory.

11. Record events by the system printer.

C. Supervisory signal initiation shall be by one or more of the following devices and actions, as well as those shown on input/output matrix drawing:

1. Valve supervisory switch.

2. Low-air-pressure switch of a dry-pipe sprinkler system.

3. Elevator shunt-trip supervision.

D. System trouble signal initiation shall be by one or more of the following devices and actions, as well as those shown on input/output matrix drawing:

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 primary power at fire-alarm control unit.

4. Ground or a single break in fire-alarm control unit internal circuits.

5. Abnormal ac voltage at fire-alarm control unit.

6. Break in standby battery circuitry.

7. Failure of battery charging.

8. Abnormal position of any switch at fire-alarm control unit or annunciator.

9. Fire-pump power failure, including a dead-phase or phase-reversal condition.

10. Low-air-pressure switch operation on a dry-pipe or pre-action sprinkler system.

E. System Trouble and Supervisory Signal Actions: Initiate notification appliance and annunciate at fire-alarm control unit. Record the event on system printer.

2.3 NETWORK ANNUNCIATORS

A. Network Display Unit shall contain the following features:

1. 80 columns by 2-line back-lighted LCD readout of point status.

2. Capacity to annunciate 12,000 network point and/or point lists.

3. Historical event logs shall maintain separate 600 Alarm and 600 Trouble events.

4. The network shall provide a means to log into any node on the system via a laptop computer or CRT/Keyboard and have complete network access (Set Host) for diagnostics, maintenance reporting, and information gathering of all nodes in the system. Systems not meeting this requirement must provide all diagnostic tools required to support this function from selected points on the network.

B. Graphic User Interface shall include the following features:

1. High resolution, color, touch screen display. From the touch screen the operator shall be able to perform the following tasks:
   a. Silence signals.
   b. Acknowledge all alarm and return to normal conditions.
   c. Reset system.
   d. Display list menus.
   e. Select the individual message screens.
   f. Perform manual operation of system(s) control points.
   g. Request the "HELP" menu.
   h. Perform operator login / logout.
   i. Connect (Set Host) to other nodes.
   j. Perform graphic editing functions.
   k. Set the system time and date.

2. Keys to perform Acknowledge, Signal Silence, and System Reset.

3. Capacity to annunciate 50,000 network points and/or point lists.

4. Historical event logs shall maintain up to 500,000 system events.

5. Built-in diagnostics shall provide graphical views of the network topology and status. Network communication breaks or inactive nodes shall be clearly indicated as a guide in returning the system to normal.

6. Individual point access shall display "real-time" analog sensor point information.

7. Message Editor - System shall have the capability of on-site adding, changing, deleting or assigning of message screens.

8. List Editor - System shall have the capability of on-site editing of customer user lists.

9. Capacity for up to 25,000 Graphic Screens.

10. Graphics Editor - System shall have the capability of on-site editing of graphics screens. Graphics editor shall have the capability of changing background graphics and adding or deleting point symbols.

11. The existing graphic display shall be revised so that each sprinkler zone of the facility shall have a separate touch button that will cause the display to “zoom” to the floor plan depicting that fire zone. The purpose of this is so that it is easier to navigate around the floor plan views more easily.

12. Operate as a fully functional Network Node communicating on the network. Capability to interface with up to four (4) Network Loops.

13. Full function battery back-up.

2.4 FIRE-ALARM CONTROL UNIT

A. General Requirements for Fire-Alarm Control Panel (FACP):

1. Field-programmable, microprocessor-based, modular, power-limited design with electronic modules, complying with UL 864 and listed and labeled by an NRTL.
   a. System software and programs shall be held in flash electrically erasable programmable read-only memory (EEPROM), retaining the information through failure of primary and secondary power supplies.
   b. Include a real-time clock for time annotation of events on the event recorder and printer.
   c. Power Limited base panel with red cabinet and door, 120 VAC input power.

2. Addressable initiation devices that communicate device identity and status.
   a. Smoke sensors shall additionally communicate sensitivity setting and allow for adjustment of sensitivity at fire-alarm control unit.
   b. Temperature sensors shall additionally test for and communicate the sensitivity range of the device.

3. Addressable control circuits for operation of mechanical equipment.

B. Alphanumeric Display and System Controls: Arranged for interface between human operator at fire-alarm control unit and addressable system components including annunciation and supervision. Display alarm, supervisory, and component status messages and the programming and control menu.

1. Annunciator and Display: Liquid-crystal type, 2 line(s) of 40 characters, minimum.

2. Keypad: Arranged to permit entry and execution of programming, display, and control commands and to indicate control commands to be entered into the system for control of smoke-detector sensitivity and other parameters.

C. Circuits:

1. Signaling Line Circuits: NFPA 72, Class A.
   a. Signaling Line Circuits: Style 6.

2. Initiating Device, Notification Appliance: NFPA 72, Class B.
   a. Initiating Device Circuits: Style B.
   b. Notification Appliance Circuits: Style Y.

3. Serial Interfaces: RS-232 ports for printers.

D. Stairwell Pressurization: If applicable, provide an output signal using an addressable relay to start the stairwell pressurization system. Signal shall remain on until alarm conditions are cleared, and fire-alarm system is reset. Signal shall not stop in response to alarm acknowledge or signal silence commands.

1. Pressurization starts when any alarm is received at fire-alarm control unit.

2. Alarm signals from smoke detectors at pressurization air supplies have a higher priority than other alarm signals that start the system.

E. Smoke-Alarm Verification:

1. Initiate audible and visible indication of an "alarm-verification" signal at fire-alarm control unit.

2. Activate an NRTL-listed and -approved "alarm-verification" sequence at fire-alarm control unit and detector.

3. Record events by the system printer.

4. Cancel fire-alarm control unit indication and system reset if the alarm is not verified.

F. Elevator Recall:

1. Smoke detectors at the following locations shall initiate automatic elevator recall. Alarm-initiating devices, except those listed, shall not start elevator recall.
   a. Elevator lobby detectors except the lobby detector on the designated floor.

b. Smoke detector in elevator machine room.
c. Smoke detectors in elevator hoistway.

2. Elevator lobby detectors located on the designated recall floors shall be programmed to move the cars to the alternate recall floor.

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. Voice/Alarm Signaling Service: Central emergency communication system with redundant microphones, preamplifiers, amplifiers, and tone generators.

1. Indicated 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,"Amplifiers for Fire Protective Signaling Systems" and be listed by an NRTL.
   a. Allow the application of and evacuation signal to indicated number of zones and, at 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.

3. Preamplifiers, amplifiers, and tone generators shall automatically transfer to backup units, on primary equipment failure.
   a. Amplifiers shall provide an onboard local mode temporal coded horn tone as a default backup tone. Test switches on the amplifier shall be provided to test and observe amplifier backup switchover. Each amplifier shall communicate to the host panel amplifier and NAC circuit voltage and current levels for display on the user interface.
   b. All announcements are made over dedicated, supervised communication lines. All risers shall support Class A wiring for each audio channel.

c. Emergency voice communication audio controller module shall provide up to 32 minutes of message memory for digitally stored messages. Provide supervised connections for master microphone and up to 5 remote microphones.
d. Status annunciator indicating the status of the various voice alarm speaker zones.
e. When required, Redundant Voice Command Centers shall be capable of generating voice paging from more than one node in a network audio system.

J. Printout of Events: On receipt of signal, print alarm, supervisory, and trouble events. Identify zone, device, and function. Include type of signal (alarm, supervisory, or trouble) and date and time of occurrence. Differentiate alarm signals from all other printed indications. Also print system reset event, including same information for device, location, date, and time. Commands initiate the printing of a list of existing alarm, supervisory, and trouble conditions in the system and a historical log of events.

K. Primary Power: 24 V dc obtained from dedicated 120 V ac service and a power-supply module. Initiating devices, notification appliances, signaling lines, trouble signals, shall be powered by 24-V dc source.

1. Alarm current draw of entire fire-alarm system shall not exceed 80 percent of the power- supply module rating.

L. Secondary Power: 24-V dc supply system with batteries, automatic battery charger, and automatic transfer switch.

1. Batteries: Sealed lead acid.

2. Batteries: Adequate to serve control panel modules, remote detectors, remote annunciators, door holders, smoke dampers, relays, and alarm indicating devices. Include battery operated emergency power supply with capacity for operating system in standby mode for 24 hours followed by alarm mode for 15 minutes.

M. 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.

2.5 MANUAL FIRE-ALARM BOXES

A. 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. Single-action mechanism, 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.

3. Weatherproof Protective Shield: Factory-fabricated clear plastic enclosure hinged at the top to permit lifting for access to initiate an alarm.

2.6 SYSTEM SMOKE DETECTORS

A. General Requirements for System Smoke Detectors:

1. Comply with UL 268; operating at 24-V dc, nominal.

2. Detectors shall be two-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. Remote LED indicators are required to be used when any detector is not visible.

7. Remote Control: Unless otherwise indicated, detectors shall be analog-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 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 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. Provide multiple levels of detection sensitivity for each sensor.

B. 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. The address for each detector shall be maintained in the base of each unit.

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.).

C. 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.

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: Rated to interrupt fan motor-control circuit.

7. Provide remote test/indicator for each duct detector installed in concealed locations more than 10 ft (3m) above the finished floor per NFPA 72.

D. Single-Station Duct Smoke Detectors:

1. Comply with UL 268A; operating at 120 V ac.

2. Sensor: LED or infrared light source with matching silicon-cell receiver.
   a. Detector Sensitivity: Smoke obscuration between 3.5 percent/foot (0.011 percent/mm) when tested according to UL 268A.

3. Base Mounting: Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. The fixed base shall be designed for mounting directly to air duct. Provide terminals in the fixed base for connection to building wiring.
   a. Weatherproof Duct Housing Enclosure: NEMA 250, Type 4X; NRTL listed for use with the supplied detector.

4. Sampling Tubes: Design and dimensions as recommended by manufacturer for specific duct size, air velocity, and installation conditions where applied.

5. Relay Fan Shutdown: Rated to interrupt fan motor-control circuit.

2.7 HEAT DETECTORS

A. General Requirements for Heat Detectors: Comply with UL 521.

B. 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. The address for each detector shall be maintained in the base of each unit.

   2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

C. Heat Detector, Fixed-Temperature Type: Actuated by temperature that exceeds a fixed temperature of 190 deg F (88 deg. C).

   1. Mounting: Twist-lock base interchangeable with smoke-detector bases. The address for each detector shall be maintained in the base of each unit.

   2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

2.8 FLAME DETECTORS

A. General Requirements for flame detector: Ultraviolet/infrared radiation standalone type that can be connected to any FM Approved or UL Listed fire alarm panel utilizing relay outputs; rated for indoor/outdoor use and suitable for hazardous installations. Detector shall be capable at a minimum of multiple sensitivity level adjustments, a wide field-of-view and also be able to compensate for false alarms.

B. Base Mounting: The detector shall be of the swivel bracket assembly type. The fixed base shall be designed for mounting directly to column or wall.

C. Housing: NEMA-4 tamper resistant with integral dual 3/4 NPT conduit openings, or Stainless-steel housing.

D. Electrical Classification: The detector shall be capable of operating at a nominal voltage of 24 VDC.

E. Explosion-Proof: The detector shall be suitable for operation within hazardous environment that meets Class 1, Div. 1 & 2, Groups B, C, & D, Class II, Div. 1 & 2, Groups E, F, & G and Class III requirements.

2.9 NOTIFICATION APPLIANCES

A. General Requirements for Notification Appliances/strobes: Individually addressed, connected to a signaling line circuit, equipped for mounting as indicated and with screw terminals for system connections.

B. General Requirements for Notification Appliances/speakers: 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.

C. Horns: Electric-vibrating-polarized type, 24-Vdc; 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.

D. Visible Notification Appliances: Xenon strobe lights comply with UL 1971, with clear polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch- (25-mm-) high letters on the lens.

1. Rated Light Output:
   a. 15/30/75/110/135cd, selectable in the field or programmed via the programming interface.

2. Mounting: Wall mounted unless otherwise indicated.

3. For units with guards to prevent physical damage, light output ratings shall be determined with guards in place.

4. Flashing shall be in a temporal pattern, synchronized with other units.

5. Strobe Leads: Factory connected to screw terminals.

6. Mounting Faceplate: Factory finished, red.

E. Voice/Tone Notification Appliances:

1. Appliances shall comply with UL 1480 and shall be listed and labeled by an NRTL.

2. High-Range Units: Rated 2 to 15 W.

3. Low-Range Units: Rated 1/4 to 2 W.

4. Matching Transformers: Tap range matched to acoustical environment of speaker location.

2.10 MAGNETIC DOOR HOLDERS

A. Description: Units are equipped for wall or floor mounting as indicated and are complete with matching doorplate.

1. Electromagnet: Requires 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 VAC or VDC.

4. Rating: 120 VAC.

B. Material and Finish: Match door hardware.

2.11 ADDRESSABLE INTERFACE DEVICE

A. Description: Microelectronic monitor module, NRTL listed for use in providing a system address for alarm-initiating devices for wired applications with normally open contacts.

B. Integral Relay: Capable of providing a direct signal to elevator controller to initiate elevator recall to circuit-breaker shunt trip for power shutdown.

2.12 SYSTEM PRINTER

A. Printer shall be listed and labeled by an NRTL as an integral part of fire-alarm system.

2.13 SECURITY SYSTEM INTEGRATION

A. Provide a serial integration from the FACP to the Card Access/Security System to annunciate all fire alarm points on the head end card access graphic user interface.

2.14 FIELD WIRING TEST UNIT

A. Provide the equipment manufacturers hand-held portable field circuit and wiring test unit. Device shall provide an efficient and convenient means to test supervised system Initiating Device Circuits (IDC), Notification Appliance Circuits (NAC), and Signaling Line Circuit (SLC) addressable device wiring. Device shall have the ability to simulate control panel connected circuit operation and allow for more cost effective and immediate response by the installing contractor to identify, locate and repair circuit faults and device addressing before final connections requests and return site visits for final check-out.

B. Device shall be battery operated and provided with charger.

C. Device shall have a Liquid Crystal Display and membrane keypad.

D. Circuit test results shall be downloadable through unit's computer port.

E. Circuit verification test capability shall include:

1. Grounds.

2. Short circuit.

3. Open circuit.

4. Full SLC addressable circuit testing and auxiliary device activation.

5. Test Result Report generation.

6. Extended testing in accordance with section 3.5 FIELD QUALITY CONTROL subsection B.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION

A. Comply with NFPA 72 for installation of fire-alarm equipment.

B. Equipment Mounting: Install fire-alarm control unit on concrete base with tops of cabinets not more than 72 inches (1830 mm) above the finished floor. Comply with requirements for concrete base specified in Division 03.

1. Install seismic bracing. Comply with requirements in Division 26 Section Vibration and Seismic Controls for Electrical Systems.

2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around the full perimeter of concrete base.

3. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.

4. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

5. Install anchor bolts to elevations required for proper attachment to supported equipment.

C. Equipment Mounting: Install fire-alarm control unit on finished floor with tops of cabinets not more than 72 inches (1830 mm) above the finished floor.

1. Comply with requirements for seismic-restraint devices specified in Division 26 Section Vibration and Seismic Controls for Electrical Systems.

2. Comply with requirements for seismic-restraint devices specified in Division 26 Section Vibration and Seismic Controls for Electrical Systems.

D. Smoke- or Heat-Detector Spacing:

1. Comply with NFPA 72, "Smoke-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for smoke-detector spacing.

2. Comply with NFPA 72, "Heat-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, 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 Appendix A in NFPA 72.

5. HVAC: Locate detectors not closer than 3 feet (1 m) 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.

E. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of duct.

F. Heat Detectors in Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location.

G. Remote Status and Alarm Indicators: Install near each smoke detector and each sprinkler water- flow switch and valve-tamper switch that is not readily visible from normal viewing position.

H. 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.

I. Visible Alarm-Indicating Devices: Install adjacent to each alarm bell or alarm horn and at least 6 inches (150 mm) below the ceiling.

J. Device Location-Indicating Lights: Locate in public space near the device they monitor.

K. Fire-Alarm Control Unit: Surface mounted, with tops of cabinets not more than 72 inches (1,830 mm) above the finished floor.

L. Annunciator: Install with top of panel not more than 72 inches (1,830 mm) above the finished floor.

3.2 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 Division 08 Section Door Hardware. Connect hardware and devices to fire-alarm system.

1. Verify that hardware and devices are NRTL listed for use with fire-alarm system in this Section before making connections.

B. Make addressable input and control output connections with a FAS interface device to the following devices and systems, where applicable. Install the interface device less than 3 feet (1 m) from the device controlled. Fire alarm system contractor shall coordinate connections with other building systems/owners prior to making connections.

1. Control output- connection to stairwell and elevator-shaft pressurization systems.

2. Control output - Smoke dampers in air ducts of designated air-conditioning duct systems.

3. Control output - connection to elevator recall system and components.

4. Control output - connection to activate emergency shutoffs for gas and fuel supplies.

5. Addressable input - connections at valve supervisory switches.

6. Addressable input - connections at low-air-pressure switch of each dry-pipe sprinkler system.

7. Control output - Supervisory connections at elevator shunt trip breaker.

8. Addressable input - connections at fire-pump engine control panel.

9. Control output – connections for AHU shutdown upon automatic smoke detection.

3.3 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Division 26 Section Identification for Electrical Systems.

B. Install framed instructions in a location visible from fire-alarm control unit.

3.4 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.

3.5 FIELD QUALITY CONTROL

A. Field tests shall be witnessed by authorities having jurisdiction, Construction Manager.

B. Prior to pretest and commissioning as supervised by the Manufacturer's Field Service Representative, the installing contractor shall verify that all wiring and system field circuits have been tested with the manufacturers recommended testing device and procedures to ensure efficient, cost effective and scheduled final check-out completion. This includes all fiber optic testing and certification.

C. All system wiring and circuits shall be tested and verified for the following prior to requesting the services of the manufacturer’s service representative for final connections:

1. Absent of grounds per UL 864 (both high impedance and low impedance).

2. Absent of shorts (wire-to-wire and wire-to-ground).

3. Absent of open circuits.

4. Absence of induced and unwanted voltages.

5. Proper end-of-line resistor value.

6. Check that all addressable signaling line circuits for:
    a. Accurate device addresses.
    b. Missing devices.
    c. Duplicate devices.
    d. Out-of-range (extra device/addresses).
    e. Cross coupling of signaling line circuits.
        1) High.
        2) Moderate.
        3) Low.
        4) Individually operate each relay base relay.
        5) Individually operate each sounder base audible.

D. Provide hard or electronic downloaded test documentation directly from field wiring test tool to be reviewed by manufacturer's service representative prior to site visit for final connections and pretest.

E. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

F. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

G. Tests and Inspections:

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 NFPA 72 in its "Completion Documents, Preparation" Table in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter.
   b. Comply with "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 "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.

4. Test audible appliances for the private operating mode according to manufacturer's written instructions.

5. Test visible appliances for the public operating mode according to manufacturer's written instructions.

6. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.

H. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.

I. Fire-alarm system will be considered defective if it does not pass tests and inspections.

J. Prepare test and inspection reports.

K. Maintenance Test and Inspection: Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.

L. 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.

3.6 DEMONSTRATION AND TRAINING

A. Train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system.

B. Provide fire alarm manufacturer training for two (2) owner’s representatives in the operation and maintenance of the FAS system software and hardware. This training shall consist of two sessions, each having a duration of one week.

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 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.

Material	Test Number	Test Frequency	
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 25 13

TEMPORARY EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.01 RELATED REQUIREMENTS

A. Section 31 20 00 - Earthmoving.

B. Section 32 92 19 - Seeding.

1.02 REFERENCE STANDARDS

A. Erosion and Sediment Control Guidelines: Conform to the latest edition of "NEW YORK STANDARDS and SPECIFICATIONS for EROSION and SEDIMENT CONTROL" by NYS Department of Environmental Conservation DOW (i.e., Bluebook). Refer to these guidelines for construction and maintenance of all items (Temporary and Permanent Structural, Vegetative and Biotechnical) included in the Storm Water Pollution and Prevention Plan (SWPPP).

B. Storm Water Management: Conform to the latest edition of "NEW YORK STATE STORMWATER MANAGEMENT DESIGN MANUAL" prepared by Center for Watershed Protection for NYS Department of Environmental Conservation.

1.03 PERFORMANCE REQUIREMENTS

A. A Storm Water Pollution and Prevention Plan (SWPPP) is not required for this project. The contractor though shall install and maintain the temporary storm water and diversion control items as shown on the drawings before starting any grading or excavation and maintain compliance of all Storm Water Pollution SPDES regulations. Provide any temporary sediment and erosion control measures that may be required within limits of the work, including any staging areas, throughout construction in conformance with the plan, and as directed by the Owner's Representative. Place the permanent control practices required before the removal of the temporary storm water diversion and control items.

B. During construction conduct operations in such a manner as to prevent or reduce to a minimum any damage to any drainage system from pollution by debris, sediment, chemical or other foreign material, or from the manipulation of equipment and/or materials in or near a drainage way flowing directly to a stream. Any water which has been used for wash purposes or other similar operations which become polluted with sewage, silt, cement, concentrated chlorine, oil, fuels, lubricants, bitumens, or other impurities shall not be discharged into any drainage system or water body.

C. In the event of conflict between these specifications and the regulation of other Federal, State, or local jurisdictions, the more restrictive regulations shall apply.

D. The Contractor shall adhere to all requirements of the Storm Water Pollution Prevention Plan as presented on Drawing No(s). BG-C01 & BG-C500. Comply with all applicable NYSDEC regulatory requirements.

E. The Contractor will submit copies of certificates documenting that on-site workers have completed a NYS Department of Environmental Conservation endorsed Erosion & Sediment Control training as required by General Permit GP-0-25-001.

F. Verify that all applicable permits have been obtained prior to beginning earth disturbing activities on site.

1. Owner will obtain permits and pay for securities required by authority having jurisdiction.

2. Owner will withhold payment to Contractor equivalent to all fines resulting from non-compliance with applicable regulations.

G. Provide to Owner a Performance Bond covering erosion and sedimentation preventive measures only, in an amount equal to 100 percent of the cost of erosion and sedimentation control work.

1.04 DESCRIPTION

A. The Work shall consist of furnishing, installing, inspecting, maintaining, and removing soil and erosion control measures as shown on the contract documents or as ordered by the Owner's Representative during the life of the contract to provide erosion and sediment control.

B. Temporary structural measures provide erosion control protection to a critical area for an interim period. A critical area is any disturbed, denuded slope or disturbed area subject to erosion. These are used during construction to prevent offsite sedimentation. Temporary structural measures shall include stabilized construction entrance, dust control, sediment traps, silt fence, storm drain inlet protection, or other erosion control devices or methods as required.

C. Permanent structural measures also control protection to a critical area. They are used to convey runoff to a safe outlet. They remain in place and continue to function after completion of construction. Permanent structural measures shall include land grading, rock outlets, and or other erosion control devices or methods as required.

D. Vegetative measures shall include mulching, protecting vegetation, seeding, and topsoiling or other methods as required.

E. Weekly/bi-weekly inspections will be completed by the Owner's Representative. The Contractor shall comply with and correct all deficiencies found as a result of these inspections. At the end of the construction season when soil disturbance activities will be finalized or suspended until the following spring, the frequency of the inspections may be reduced. If soil disturbance is completely suspended and the site is properly stabilized, a minimum of monthly inspections must be maintained. The stabilization activities must be completed before snow cover or frozen ground. If vegetation is required, seeding, planting and/or sodding must be scheduled to avoid die-off from fall frosts and allow for proper germination/establishment. Weekly inspections must resume no later than March 15.

1.05 DEFINITIONS – VEGETATIVE MATERIALS MEASURES

A. Mulching: Applying coarse plant residue or chips, other suitable materials, to cover the soil surface to provide initial erosion control while seeding is establishing. Includes hay, straw, wood cellulose, fiber mats, flexible growth medium and other materials approved by the Owner's Representative.

B. Protecting Vegetation: The protecting of trees, shrubs, ground cover and other vegetation from damage by construction equipment to preserve existing vegetation determined important for soil erosion control, water quality protection, shade, screenings, buffers, wildlife habitat, wetland protection, and other values.

C. Temporary Seeding: Erosion control protection to a critical area for an interim period. A critical area is any disturbed, denuded slope subject to erosion. Temporary control is achieved by covering all bare ground areas that exist as a result of the construction activities.

D. Permanent Seeding: Grasses established and combined with shrubs to provide perennial vegetative cover on disturbed, denuded, slopes subject to erosion. Provide permanent stabilization to all disturbed areas void of, or having insufficient, cover to prevent erosion and sediment transport.

E. Topsoiling: Spreading of a specified quality and quantity of topsoil materials on graded or constructed subsoil areas to provide acceptable plant cover growing conditions, thereby reducing erosion, reducing irrigation needs, and the need for nitrogen fertilizer application. Placed before permanent seeding is installed.

F. Sodding: Stabilizing disturbed soil areas with a permanent stand of grass with sod and preventing runoff with sediment to downstream areas.

1.06 DEFINITIONS – TEMPORARY STRUCTURAL MEASURES

A. Stabilized Construction Entrance: A stabilized pad of aggregate underlain with geo-textile located at any point where traffic enters or leaves a construction site to or from a public right-of-way, street, alley, sidewalk, or parking area to reduce or eliminate tracking of sediment onto public rights-of-way or streets.

B. Dust Control: Prevent surface and air movement of dust from disturbed soil surfaces that may cause off-site damage, health hazards, and/or traffic safety problems.

C. Silt Fence: A temporary barrier of geo-textile fabric installed on contours across the slope to intercept sediment laden runoff from small drainage areas. The silt fence shall reduce runoff velocity and effect deposition of transported sediment load. Replace after **9-months**.

D. Storm Drain Inlet Protection: A temporary, semi-permeable barrier installed around storm inlets to prevent sediment laden water from entering a storm drainage system.

E. Turbidity Curtain: A flexible, impenetrable barrier used to trap sediment in water bodies. This curtain is weighted at the bottom to achieve closure while supported at the top through a flotation system. The curtain prevents the migration of silt from the work area into the larger body of water.

F. Check Dam: Small barriers or dams constructed of stone bagged sand or gravel, or other durable material across a drainage way. Used to reduce erosion in a drainage channel by restricting the velocity of flow in the channel.

G. Sediment Trap: A temporary sediment control device formed by excavation and/or embankment to intercept sediment laden runoff and retain sediment in order to protect drainage ways, properties, and rights-of-way downstream of the sediment trap from sedimentation.

1.07 DEFINITIONS – PERMANENT STRUCTURAL MEASURES

A. Riprap: A layer of stone designed to protect slopes that are subject to erosion.

B. Rock Outlet Protection: A section of rock protection placed at the outlet end of the culverts, conduits, or channels to reduce the depth, velocity, and energy of water such that the flow will not erode the receiving downstream reach.

C. Grass Lined Waterway: A natural or man-made channel of parabolic or trapezoidal cross-section that is below adjacent ground level and is stabilized by suitable vegetation. Used to convey runoff without causing damage by erosion.

1.08 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Manufacturers cut sheets for erosion control materials; including silt fence (fabric & mesh), stone materials, tree protection fencing, turbidity curtains, and erosion control blankets.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Mulch: Use one of the following:

1. Straw or hay.

2. Wood chips, or bark.

3. Erosion control matting or netting.

B. Seeding: Temporary, see Seeding Section 32 92 19.

C. Silt Fence Fabric: Polypropylene geotextile resistant to common soil chemicals, mildew, and insects; non-biodegradable; in longest lengths possible; fabric including seams with the following minimum average roll lengths:

1. Equivalent Opening Size: 40-80 U.S. Std. Sieve, maximum, when tested in accordance with ASTM D4751.

2. Flow Through Rate: 25 gal/min/sf, minimum, when tested in accordance with ASTM D4491.

3. Ultraviolet Resistance: Retaining at least 70 percent of tensile strength, when tested in accordance with ASTM D4355 after 500 hours exposure.

4. Grab Tensile Strength: 110 lb-f, minimum, in cross-machine direction; 124 lb-f, minimum, in machine direction; when tested in accordance with ASTM D4632.

5. Elongation at Failure: 20 percent, when tested in accordance with ASTM D4632.

6. Mullen Burst Strength: 300 PSI, when tested in accordance with ASTM D3786.

7. Puncture Strength: 60 lbs, when tested in accordance with ASTM D4833.

8. Minimum Trapezoidal Tear Strength: 50 lb-f, minimum, when tested in accordance with ASTM D4533.

9. Color: Manufacturer's standard, with embedment and fastener lines preprinted.

10. Manufacturers:
    a. Ten Cate Geosynthetics; Mirafi 170N: www.tencate.com.
    b. US Fabrics; US180NW: www.usfabricsinc.com.
    c. Propex Operating Company; Geotex 701: www.geotextile.com
    d. Willacoochee Industrial Fabrics; WINfab 800N: www.winfabusa.com
    e. Substitutions: See Section 01 60 00 - Product Requirements, and as listed on the current NYSDOT List of Approved Materials.

D. Wire Fence for Reinforced Silt Fence: Minimum 14 gage with a maximum 6-in. mesh opening.

E. Silt Fence Posts: One of the following, minimum 3.5-feet long with minimum 18-in embedment:

1. Steel U- or T-section, with minimum mass of 1.33 lb per linear foot.

2. Softwood, 4-inch by 4-inch in cross section.

3. Hardwood, 2-inch by 2-inch in cross section.

F. Gravel: See Section 31 20 00 for aggregate.

G. Riprap & Outlet Protection Stone: See Section 31 20 00.

PART 3 - EXECUTION

3.01 WORK AREAS

A. The Owner's Representative has the authority to limit the surface area of erodible earth exposed by earthwork operations and to direct the Contractor to provide immediate temporary or permanent erosion measures to minimize damage to property and contamination of watercourses and water impoundments. Under no circumstances will the area of erodible earth material exposed at one time exceed 42,000 sq. ft., unless a waiver has been obtained from the NYSDEC Regional office for which the project site is located. The Owner's Representative may increase or decrease this area of erodible earth material exposed at one time as determined by his analysis of project, weather and other conditions. The Owner's Representative may limit the area of clearing and grubbing and earthwork operations in progress commensurate with the Contractor's demonstrated capability in protecting erodible earth surfaces with temporary, permanent, vegetative or biotechnical erosion control measures. All limitations shall be at no additional cost to the Owner.

B. Schedule the work so as to minimize the time that earth areas will be exposed to erosive conditions. Provide temporary structural measures immediately to prevent any soil erosion.

C. Provide temporary seeding on disturbed earth or soil stockpiles exposed for more than **7-days** or for any temporary shutdown of construction. See Section 32 92 19 for types and rates. Also, apply hay or straw at a rate of 3 bales/1000 sq. ft. (2 tons per acre) or wood fiber hydromulch at the manufacturer's recommended rate when seeding alone is not sufficient to provide stabilization. Hay or straw shall be anchored.

D. Coordinate the use of permanent controls or finish materials shown with the temporary erosion measures.

E. All erosion and sediment control devices must be maintained in working order until the site is stabilized. All preventative and remedial maintenance work, including clean out, repair, replacement, re-grading, re-seeding, or re-mulching, must be performed immediately.

F. After final stabilization (80% minimum vegetative cover) has been achieved temporary sediment and erosion controls must be removed. Areas disturbed during removal must be stabilized immediately.

3.02 PREPARATION

A. Schedule work so that the minimum amount of soil practical is exposed at any one time.

3.03 SCOPE OF PREVENTIVE MEASURES

A. In all cases, if permanent erosion resistant measures have been installed temporary preventive measures are not required.

B. Stabilized Construction Entrances: Traffic-bearing aggregate surface.

1. Width: As required; 20-feet, minimum.

2. Length: 50-feet, minimum.

3. Provide at each construction entrance from public right-of-way.

4. Where necessary to prevent tracking of mud onto right-of-way, provide wheel washing area out of direct traffic lane, with drain into sediment trap or basin.

C. Linear Sediment Barriers: Silt fences.

1. Provide linear sediment barriers:
   a. Along downhill perimeter edge of disturbed areas, including soil stockpiles.
   b. Along the top of the slope or top bank of drainage channels and swales that traverse disturbed areas.
   c. Along the toe of cut slopes and fill slopes.

d. Perpendicular to flow across the bottom of existing and new drainage channels and swales that traverse disturbed areas or carry runoff from disturbed areas; space at maximum of 200-feet apart.

e. Across the entrances to culverts that receive runoff from disturbed areas.

2. Space sediment barriers with the following maximum slope length upslope from barrier fence:

		Slope Length / Fence Length	
a.	Slope of Less Than 2 Percent:	NA	NA
b.	Slope Between 2 and 10 Percent:	250-feet /	2,000-feet
c.	Slope Between 10 and 20 Percent:	150-feet /	1,000-feet
d.	Slope Between 20 and 33 Percent:	80-feet /	750-feet
e.	Slope Between 30 and 50 Percent:	70-feet /	350-feet
f.	Slope Greater Than 50 Percent:	30-feet /	175-feet

D. Storm Drain Inlet Protection: Protect each inlet using one of the following measures:

1. Filter fabric wrapped around hollow concrete blocks blocking entire inlet face area; use one piece of fabric wrapped at least 1-1/2 times around concrete blocks and secured to prevent dislodging; orient cores of blocks so runoff passes into inlet.

2. Stone and block protection with concrete blocks placed around the inlet and then wrapped with fabric and surrounded with stone.

3. Paved surface inlet protection consisting of sandbags or manufactured surface barriers placed around the inlet in a manner that does not divert flow away from the inlet.

4. Manufactured insert inlet protection shall be installed and anchored in accordance with manufacturer's recommendations and design details.

E. Soil Stockpiles: Protect using one of the following measures:

1. Cover with mulch at least 4-inches thickness of pine needles, sawdust, shredded bark, wood chips, or 6-inches of straw or hay.

2. Apply temporary seed and hydromulch.

F. Mulching: Use only for areas that may be subjected to erosion for less than 6-months.

1. Wood Chips: Use only on slopes 3:1 or flatter; no anchoring required.

G. Temporary Seeding: Use where temporary vegetated cover is required. Includes all disturbed areas that have been inactive for greater than **7-days**.

H. Check Dams: Use in drainage channels where the maximum drainage area does not exceed two (2) acres.

1. Shall not have a height greater than 2-ft. Center shall be maintained 9-in lower than abutments at natural ground elevation.

2. Side slopes shall be 2:1 or flatter.

3. Spacing shall be in accordance with the NYS Bluebook, or as shown on the project plans.

I. Turbidity Curtains: Shall be installed within waterways located adjacent to active construction disturbances. These shall be installed beyond the lateral limits of the construction site and firmly anchored in place. The alignment should be set as close to the work area as possible but not too close as to be disturbed by the applicable construction equipment.

3.04 INSTALLATION

A. Stabilized Construction Entrance and Other Traffic-Bearing Aggregate Surfaces:

1. Excavate minimum of 6-inches.

2. Place geotextile fabric full width and length, with minimum 12-inch overlap at joints.

3. Place and compact at least 6-inches of 1.5 to 3.5-inch diameter stone.

B. Silt Fences:

1. Store and handle fabric in accordance with ASTM D4873.

2. Where slope gradient is less than 3:1 or barriers will be in place less than 6-months, use nominal 16-inch high barriers with minimum 36-inch long posts spaced at 6-feet maximum, with fabric embedded at least 4-inches in ground.

3. Where slope gradient is steeper than 3:1 or barriers will be in place over 6-months, use nominal 28-inch high barriers, minimum 48-inch long posts spaced at 6-feet maximum, with fabric embedded at least 6-inches in ground.

4. Where slope gradient is steeper than 3:1 and vertical height of slope between barriers is more than 20-feet, use nominal 32-inch high barriers with woven wire reinforcement and steel posts spaced at 4-feet maximum, with fabric embedded at least 6-inches in ground.

5. Install with top of fabric at nominal height and embedment as specified.

6. Embed bottom of fabric in a trench on the upslope side of fence, with 2-inches of fabric laid flat on bottom of trench facing upslope; backfill trench and compact.

7. Do not splice fabric width; minimize splices in fabric length; splice at post only, overlapping at least 18-inches, with extra post.

8. Fasten fabric to wood posts using one of the following:
   a. Four nails per post with 3/4 inch diameter flat or button head, 1-inch long, and 14 gage, 0.083 inch shank diameter.
   b. Five staples per post with at least 17 gage, 0.0453 inch wire, 3/4-inch crown width and 1/2-inch long legs.

9. Fasten fabric to steel posts using wire, nylon cord, or integral pockets.

10. Wherever runoff will flow around end of barrier or over the top, provide temporary splash pad or other outlet protection; at such outlets in the run of the barrier, make barrier not more than 12-inches high with post spacing not more than 4-feet.

C. Inlet Protection:

1. Store and handle fabric in accordance with ASTM D4873.

2. For lawn areas where drainage area is 1-acre or less per structure, use Fabric Drop Inlet Protection practice. Install in accordance with NYS Bluebook guidelines.

3. For paved areas where drainage area is 1-acre or less per structure, use Stone and Block Drop Inlet Protection practice. Install in accordance with NYS Bluebook guidelines.

D. Mulching Over Large Areas:

1. Dry Straw and Hay: Apply 2-1/2 tons per acre; anchor using dull disc harrow or emulsified asphalt applied using same spraying machine at 100 gallons of water per ton of mulch.

2. Erosion Control Matting: Comply with manufacturer's instructions.

E. Mulching Over Small and Medium Areas:

1. Dry Straw and Hay: Apply 4 to 6-inches depth.

2. Erosion Control Matting: Comply with manufacturer's instructions.

F. Temporary Seeding:

1. When hydraulic seeder is used, seedbed preparation is not required.

2. When surface soil has been sealed by rainfall or consists of smooth undisturbed cut slopes, and conventional or manual seeding is to be used, prepare seedbed by scarifying sufficiently to allow seed to lodge and germinate.

3. If temporary mulching was used on planting area but not removed, apply nitrogen fertilizer at 1 pound per 1000 sq ft.

4. On soils of very low fertility, apply 10-10-10 fertilizer at rate of 12 to 16 pounds per 1000 sq ft.

5. Incorporate fertilizer into soil before seeding.

6. Apply seed uniformly; if using drill or cultipacker seeders place seed 1/2 to 1 inch deep.

7. Irrigate as required to thoroughly wet soil to depth that will ensure germination, without causing runoff or erosion.

8. Repeat irrigation as required until grass is established.

3.05 MAINTENANCE

A. Inspect preventive measures weekly, and within 24-hours after the end of any storm that produces 0.5-inches or more rainfall at the project site, and daily during prolonged rainfall.

B. Repair deficiencies immediately.

C. Silt Fences:

1. Promptly replace fabric that deteriorates unless need for fence has passed.

2. Remove silt deposits that exceed one-third of the height of the fence.

3. Repair fences that are undercut by runoff or otherwise damaged, whether by runoff or other causes.

D. Stabilized Construction Entrance:

1. Maintain entrance in a condition which will prevent tracking of sediment onto public rights-of-way or streets.

2. Top dress as needed with additional aggregate.

3. Any sediment tracked onto adjacent streets shall be removed immediately.

E. Clean out temporary sediment control structures weekly and relocate soil on site.

F. Place sediment in appropriate locations on site; do not remove from site.

3.06 CLEAN UP

A. Remove temporary measures after permanent measures have been installed, unless permitted to remain by Project Representative.

B. Clean out temporary sediment control structures that are to remain as permanent measures. Dispose of materials in accordance with all appropriate local, state, and federal disposal regulations.

C. Where removal of temporary measures would leave exposed soil, shape surface to an acceptable grade and finish to match adjacent ground surfaces.

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. 2. Acceptable manufactures include US 270, WINfab 270W, Mirafi 550X, or approved equal.

3. Non-woven Stabilization/Drainage geotextile. Acceptable manufacturer's include "Geotex 351" by Propex Geosynthetics; "Mirafi 160N" by Mirafi Inc.; 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 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.

3.05 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.

3.06 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.

3.07 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.

3.08 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.

3.09 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.

3.10 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.

3.11 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.

3.12 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.

3.13 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 33-34 – NOT USED