New York State
Parks, Recreation and
Historic Preservation

Agency 1290000

PROJECT MANUAL

FL-SM-2023-001
New Regional Maintenance Storage Barn
Sampson State Park

BID PROPOSALS FOR THE FOLLOWING CONTRACT(S):
General Construction – D006392
Electrical – D006390
Mechanical – D006391
Plumbing – D006393

Are Due via email at:
1:00 p.m.
on
October 15, 2025

Bid proposals will be opened exclusively via Webex at:
1:30 p.m.
on
October 15, 2025

Webex Link at attend:
https://meetny-gov.webex.com/meetny-gov/j.php?MTID=mb3c05c5aa3582fbbaff9f2d0d1f4e1e1

CONTACT PERSONS:	Assistant District Manager	Brian Burnett/315-479-3252 email: Brian.burnett@parks.ny.gov
	Project Manager	David Green/607-539-4048 email: David.green@parks.ny.gov
	Administrative	Lynda Shute/315-479-3257 email: Lynda.shute@parks.ny.gov

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NEW YORK STATE OFFICE OF PARKS, RECREATION AND HISTORIC PRESERVATION

NOTICE TO BIDDERS

Sealed bids for New Regional Maintenance Storage Barn at Sampson State Park, Romulus, Seneca County, New York will be received by the New York State Office of Parks, Recreation and Historic Preservation (OPRHP), via email at MidState.Capital.Procurement@parks.ny.gov. Electronically submitted bids must only be attached in PDF format– hyperlinks will not be accepted. Note: There is a 20MB limit when submitting attachments via email. If email is not an option for the bidder an alternate address will be provided upon written request to a designated contact. Deadline for bid submission is 1:00 p.m. **local time, October 15, 2025.** Sealed bids will be publicly opened and read via **WebEx only** at 1:30 p.m. local time, October 15, 2025. The Contract D number should be clearly marked in the subject line of your email, along with the words "BID SUBMISSION". Each bid must be prepared and submitted in accordance with the Instructions to Bidders and must be accompanied by a scanned Bid Security in the form of a certified check, bank check, or bid bond in the amount(s) listed with each contract below.

Note: The original hardcopy bid bonds for the two lowest bidders must be postmarked and sent via certified mail within 48 hours of receiving the bid summary from the Office.

General Construction Contract Contract includes all work not specifically assigned to any other Contract and includes but is not limited to: Providing all labor, material, and equipment necessary to provide a 11,000 square foot pre-engineered metal building, and related site improvements. Work includes site utilities and connection. Engineer's Estimate range: $2,513,106 - $3,400,085	D006392	$147,850.00	One hundred forty-seven thousand, eight hundred fifty dollars and zero cents.
Mechanical Contract Contract includes but is not limited to: Providing all labor, material, and equipment necessary for installing: all exhaust fans, ductwork, grills, ventilation fans, electric heaters, and energy recovery units. Include all required concrete mounting pads. Engineer's Estimate range: $152,873 - $206,828	D006391	$9,000	Nine thousand dollars and zero cents
Electrical Contract Contract includes but is not limited to: Providing all labor, material, and equipment necessary for installing: all wiring, switches, outlets, boxes	D006390	$21,150	Twenty-one thousand, one hundred fifty dollars and zero cents

and light fixtures; enhanced testing and commissioning of the lighting systems as outlined in Specification Section 26 08 00. Includes furnishing and installing all items specified and shown on the Drawings for the following: electrical equipment, and HVAC equipment. Providing site electrical power connections and distribution, including trenching, bedding, backfill, conduit, primary and secondary conductors, and medium voltage transformers. Coordination with NYSOPRHP to facilitate power tap-in at existing Regional Maintenance Building transformer. Engineer's Estimate range: $359,525 – 486,416			
Plumbing Contract Work includes providing all labor, material, and equipment necessary for installing all domestic water piping, valves, fixtures, hot water heaters and connections, as well as all sanitary piping, and sanitary connections. Engineer's Estimate range: $239,564 - $324,115	D006393	$14,100	Fourteen thousand one hundred dollars and zero cents

The Bid opening will be conducted **ONLY** via WebEx at the link listed below:

https://meetny-gov.webex.com/meetny-gov/j.php?MTID=mb3c05c5aa3582fbbaff9f2d0d1f4e1e1

MINORITY AND WOMEN-OWNED BUSINESS ENTERPRISE PARTICIPATION GOALS (MWBE)

The following goals for MWBE participation on **General Contract D006392** have been established at:
Minority Owned Business Enterprise (MBE) 13%
Women Owned Business Enterprise (WBE) 17%

The following goals for MWBE participation on **Electrical Contract D006390** have been established at:
Minority Owned Business Enterprise (MBE) 26%

Women Owned Business Enterprise (WBE) 4%

The following goals for MWBE participation on **Mechanical Contract D006391** have been established at:
Minority Owned Business Enterprise (MBE) 21%
Women Owned Business Enterprise (WBE) 9%

The following goals for MWBE participation on **Plumbing Contract D006393** have been established at:
Minority Owned Business Enterprise (MBE) 6%
Women Owned Business Enterprise (WBE) 6%

SERVICE-DISABLED VETERAN OWNED BUSINESS (SDVOB) GOALS
The following goals for SDVOB participation for **all contracts** have been established at:

Service-Disabled Veteran Owned Business	6%

PUBLIC BUILDING LAW § 8(6)

Pursuant to Public Building Law § 8(6), any contracts over $5,000 for the work of construction, reconstruction, alteration, repair, or improvement of any State building, a responsible and reliable NYS-certified Minority or Women-Owned Business Enterprise that submits a bid within ten percent of the lowest bid will be deemed the apparent low bidder provided that the bid is $1,677,139 or less (maximum amount has been adjusted for inflation effective January 1, 2025). If more than one responsible and reliable MWBE firm meets the requirements, the MWBE firm with lowest bid will be deemed the apparent low bidder.

PROJECT COMPLETION

The completion date for this project is 590 days after agreement has been approved by the NYS Comptroller's Office. The date of substantial completion is May 28, 2027.

Project Specific Liquidated Damages please refer to Article 14.10 of the General Conditions for a schedule of liquidated damages.

Starting on the advertisement date, the Bidding and Contract Documents may be examined free of charge and obtained via email from Lynda Shute at Lynda.shute@parks.ny.gov.

In accordance with State Finance Law, Section 139-j, the following agency staff have been designated as contacts for this contract:

David Green	607-539-4048	David.Green@parks.ny.gov
Lynda Shute	315-479-3257	Lynda.Shute@parks.ny.gov

Please note that contacting any other agency staff regarding this contract may be a violation of State Finance Law, Section 139-j, resulting in a determination of contractor non-responsibility.

CONTRACTOR REGISTRY REQUIREMENT in December 2024

Newly established subsection 220-i to NYS Labor Law Article 8 requires contractors and subcontractors to register with the Bureau of Public Work and Prevailing Wage Enforcement for public work. Contractors must complete registration prior to bidding on public work projects covered under Article 8 of Labor Law.

The effective date of the registration requirement was **December 30, 2024**. Bidders must prove they are registered at the time of bid opening by submitting a digital copy of their company's registration certificate with their bid. **Failure to provide the registration certificate at bid opening will result in automatic disqualification.** The apparent low bidder will additionally be held responsible to provide copies of registration certificates for all subcontractors on their approved Utilization Plan before subcontractors commence work.

Please refer to this website for information: https://dol.ny.gov/contractor-and-subcontractor-landing
The registration login page is found here: Log In - Management System for Protecting Workers' Rights

EXECUTIVE ORDER No. 16

The successful bidder will be required to furnish an Executive Order No. 16 certification form prior to contract award.

The Executive Order can be found here: https://www.governor.ny.gov/executive-order/no-16-prohibiting-state-agencies-and-authorities-contracting-businesses-conducting

The Executive Order Certification Form can be found here:
https://ogs.ny.gov/system/files/documents/2022/04/eo16_certification.pdf

BONDS

The successful bidder will be required to furnish a Performance Bond and a Labor and Material Bond/Payment Bond in the statutory form of public bonds required by Sections 136 and 137 of the State Finance Law, each for 100% of the amount of the Contract.

All Requests For Information (RFIs) are due by:	4:00 p.m.	on	October 2, 2025

RFIs received after this due date and time will not be processed.

A pre-bid meeting will not be held. The site is open for inspection during normal park hours. Park staff are not authorized to answer questions. Any information or clarification needed must be submitted as an RFI per the Instruction to Bidders.

State's Rights to Proposals

By submitting a bid, the Bidder agrees not to make any claim for, or have any right to, damages because of any misinterpretation or misunderstanding of the specifications, or because of any misinformation or lack of information. OPRHP reserves the right to exercise the following:

- Change any of the scheduled dates herein;
- Amend IFB requirement(s) after their release to correct errors or oversights, or to supply additional information as it becomes available;
- Withdraw the IFB, at its sole discretion without any obligation or liability to any vendor;
- Eliminate any mandatory, non-material requirement that cannot be complied with by all of the prospective Bidders;
- Evaluate, accept and/or reject any and all bids, in whole or in part, and to waive technicalities, irregularities, and omissions if, in OPRHP's judgement, the best interests of OPRHP will be served. In the event compliant bids are not received, OPRHP reserves the right to consider late or non-conforming bids as offers;
- Require the Bidder to demonstrate, to the satisfaction of OPRHP, any information presented as part of their proposal;
- Require clarification at any time during the procurement process and/or require correction of arithmetic or other apparent errors for the purpose of assuring a full and complete understanding of a Bidder's proposal and/or to determine a Bidder's compliance with the requirements of this solicitation;
- Disqualify any Bidder whose conduct and/or bid fails to conform to the requirements of the solicitation;
- Use proposal information obtained through OPRHP investigation of a Bidder's qualifications, experience, ability or financial standing, and any material or information submitted by the Bidder in response to OPRHP's request for clarifying information in the course of evaluation and selection under this IFB;
- Prior to the award, determine a tie breaking mechanism for award of the Contract to serve the best interests of OPRHP and the State of New York;
- Negotiate with the successful Bidder within the scope of the IFB to serve the best interests of OPRHP and the State of New York;
- Conduct Contract negotiations with the next ranked responsible Bidder, should OPRHP be unsuccessful in negotiating an Agreement with the selected Bidders;
- Move to the next ranked responsible low Bidder should the low bidder fail to implement the requirements of the bid;

- If OPRHP terminates the Contract for non-performance, OPRHP reserves the right, with the approval of the New York State Office of the Attorney General and the Office of the State Comptroller, to award a contract to the next highest ranked Bidder of the original bid submission within the first twelve months of the award;
- Utilize any and all ideas submitted in the bids received;
- Make an award under the IFB in whole or in part; and
- Seek revisions of bids.

Bids containing false or misleading statements, or which provide project contacts that do not support an attribute or condition claimed by a Bidder, may be disqualified from consideration. If, in the opinion of OPRHP, a statement is intended to mislead OPRHP in its evaluation of the bid, and the attribute, condition, or capability is a requirement of the IFB, the bid shall be disqualified from consideration.

Response to Bidder Questions and Requests for Clarification

OPRHP will provide a written response to all substantive questions and requests for clarification.

Tie Bids

In the event there is a tie final determination will be made by the OPRHP Deputy Commissioner for Capital.

Modification or Withdrawal of Bids

Bid modifications that are submitted in writing and signed by an authorized representative of the bidding firm will be considered for award if received by OPRHP prior to the scheduled proposal due date. Bids may be withdrawn or cancelled prior to the scheduled proposal due date. A bid may be rejected by OPRHP: if it shows any alteration of terms, conditions, or requirements; for any other irregularities; if it is incomplete, or if it offers an alternate bid not invited by the specifications.

Freedom of Information Law

Your bid to OPRHP, including accompanying documents, is subject to the Freedom of Information Law (FOIL) found in Article 6 of the N.Y. Public Officer Law. FOIL provides that certain records are exempt from disclosure, including those that contain (1) trade secrets, (2) information that, if disclosed, would cause substantial injury to the competitive position of your organization, or (3) critical infrastructure information. Records may be redacted to protect only the portions of documents that fall within a FOIL exemption. An entire document may not be withheld if only a portion of the document is exempt from disclosure. Blanket assertions that information is a trade secret, confidential, or proprietary are insufficient to justify withholding information under FOIL. If you identify information seeking an exemption from public disclosure due to the above-mentioned reasons such request will be reviewed, and a determination will be made as to whether the information is exempt from disclosure under FOIL. However, such submissions seeking non-disclosure will not be considered unless it is accompanied with an explanation justifying the privilege. The State's determination may be appealed pursuant to POL §89(5)(c). Pursuant

to POL §87(2)(b), the State, without having to request it, will redact information that "if disclosed would constitute an unwarranted invasion of personal privacy."

Timely Submission

The Bidders are solely responsible for timely delivery of their bid to the location set forth by the stated bid due date/time and are solely responsible for delays in receipt, including but not limited to those due to third-party carriers.

Bidder Proposal Clarification

Prior to award, OPRHP reserves the right to seek clarifications, request proposal revisions, or to request any information deemed necessary for proper evaluation of proposals from all Bidders deemed to be eligible for Contract award. Failure of a bidder to cooperate with OPRHP's effort to clarify a proposal may result in the proposal being labeled as non-responsive and be given no further consideration.

Additionally, OPRHP reserves the right to use information submitted by the Bidder in response to OPRHP's request for clarifying information in the course of evaluation and selection under this IFB.

Bid Review and Contract Approval

The Contract resulting from this IFB will not be effective until approved by the Office of the Attorney General and the Office of the State Comptroller.

Debriefing Sessions

A debriefing is available to any entity that submitted a proposal or bid in response to a solicitation ("Bidder"). A Bidder will be accorded fair and equal treatment with respect to its opportunity for debriefing.

Debriefing must be requested in writing by any bidder within fifteen (15) calendar days of OPRHP notifying the unsuccessful bidders that another vendor was selected.

A bidder's written request for a debriefing must be submitted to the designated contact listed on the cover of this IFB.

The debriefing will be scheduled within ten (10) business days of receipt of written request by OPRHP or as soon after that time as practicable under the circumstances.

Bid Protest Procedure

OPRHP procedures for handling protests of bid awards are set forth in the Bid Protest Procedures which can be found at the end of this document.

Indemnification

The Contractor agrees to indemnify, defend, save, and hold harmless the State of New York, OPRHP, and their officers, employees, and agents of and from any claims, demands, actions, or causes of action of any kind arising out of the services of the Contractor provided for in this agreement.

Solicitation

This IFB is a solicitation to bid, not an offer of a contract.

Bid Protest Procedures

It is the policy of the Office of Parks, Recreation and Historic Preservation (OPRHP) to provide bidders with an opportunity to administratively resolve disputes or inquiries related to OPRHP contract awards. Bidders are encouraged to seek resolution of disputes through consultation with the Designated Contact(s). After being notified of the results of this contract opportunity, any entity or individual that participated in the procurement may submit a protest of the resulting contract award.

OPRHP reserves the right to suspend, modify, or cancel this procurement at any time during the procurement process. OPRHP also reserves the right to waive or extend the deadlines in this procedure.

Submission of Formal Written Protests

Protests must be received by the Designated Contact no later than five (5) business days after a debriefing or ten (10) business days after the written notice of selection or non-selection for contract award, whichever is later.

Protests must be submitted in writing, clearly marked as a protest on the envelope or in the email subject line, and include the following information:

1. Solicitation or contract number
2. Name, address, email address and telephone number of the filer
3. Detailed statement of the legal and factual grounds for the protest
4. Statement of the relief requested
5. Copies of relevant documents

Agency Response

Within 30 business days of receipt of a protest, OPRHP's protest officer (the Director of Audit or her designee) will respond with a protest determination stating the agency's decision on the protest and the reasoning on which it is based. In making a determination, the protest officer will consider the legal and factual grounds stated in the protest, consult with the Designated Contact and appropriate program staff, and review all relevant documents.

Finality; Appeal

For contract opportunities subject to the approval of the Office of the State Comptroller, the protesting party may appeal OPRHP's protest determination to the Office of the State Comptroller in accordance with the regulations contained in Part 24 of Title 2 of the New York Codes, Rules and Regulations.

For contract opportunities that are not subject to the approval of the Office of the State Comptroller, OPRHP's protest determination is the conclusive and final determination of the protest.

Nothing in these bid protest procedures is intended to limit or impair the rights of any bidder to seek and pursue remedies of law through the judicial process.

NEW YORK STATE OFFICE OF PARKS, RECREATION AND HISTORIC PRESERVATION

INSTRUCTIONS TO BIDDERS

EXAMINATION OF DOCUMENTS

Carefully examine and be familiar with the Bidding and Contract Documents.

Examine the information concerning subsurface or other latent physical conditions. It is presentedin good faith but is not intended as a substitute for personal investigation, interpretations or judgmentof the Contractor.

VISIT TO THE SITE

Visit the site of the work prior to submitting bid. Phone Designated Contact listed on the Notice toBidders for appointment 24 hours in advance of visit. For further information on site visit instructions, please refer to the Notice To Bidders.

Become familiar with restrictions and regulations relating to the Facility. Existing restrictions andregulations will not be considered as grounds for any additional cost over the Contract sum.

Assume the risk of encountering any subsurface or other latent physical condition which can be reasonably anticipated on the basis of documentary information provided by the Office of Parks, Recreation and Historic Preservation (the Office) and from inspection and examination of the site.

Interpretations of Contract Documents by Facility personnel are not binding.

RESOLUTION OF DISCREPANCIES AND AMBIGUITIES

Direct all questions regarding the intent or meaning of the drawings or specifications to the contactperson identified on the cover of the Contract Documents. Such an inquiry may be telephoned orsubmitted in writing using provided RFI form. The reply to such an inquiry, when deemed necessary, will be communicated by Addendum to all persons who have obtained drawings and specifications.

Pre-bid inquiries answered by means other than Addenda will not be binding.

PREPARATION OF BIDS

Bidders shall submit bids on the official form furnished by the Office. Make no changes of any kindin the bid form phraseology, or anywhere on the bid form. Fill in all blank spaces legibly and in ink. Once the form has been completed in ink, bidders shall scan and email the bid form and

bid security to the email address listed on the Notice to Bidders. The document must be in PDF format – any hyperlink to the file will not be accepted. Please note, there is a 20MB limit when submitting attachments via email. If email is not available to the bidder, an address for hard copies can be obtained from the designated contact identified on the Notice to Bidders. All amounts shall be given in full in both writing and also in figures. In case of a discrepancy between the amount written in words and that given in figures, the amount written in words is binding. Make no erasures on the bid form. If a mistake is made, use a new bid form. New formsmay be obtained at the email address shown on the Notice to Bidders.

When the Contract Documents require alternate price quotations, indicate the amounts to be addedto or deducted from the base bid. If the work is to be performed at no change in cost, indicate theword "NONE". Any bid which fails to indicate a sum or the word "NONE", shall be considered informal and may be rejected.

Sign the bid form in the space provided. An officer or a principal of a corporation or a partnership signing for the bidder shall print or type the legal name of the person, partnership or corporation onthe line provided and place his or her signature after "SIGN BID HERE". The same procedure shallapply to the bid of a joint venture by two or more firms, except that the signature and title of an officer or a principal of each member firm of the joint venture shall be required.

Note in the spaces provided on the bid form, the Addenda, by numbers and dates, which have beenreceived. If no Addenda have been received, insert the word "NONE".

ADDRESS OF PROSPECTIVE BIDDER

Use street address in addition to a Post Office Box address (if any).

BID SECURITY INFORMATION

Bid Security, in the amount shown on the Notice to Bidders, is required to be submitted with the bid as a guarantee that the bidder will enter into the Contract if awarded, and that the bidder will furnish all required information to enter into the Contract within ten days after receipt of notice of award. All bidders are required to scan their bid security and include the copy with their electronically submitted bid. The document must be in PDF format – any hyperlink to the file will not be accepted. Please note, there is a 20MB limit when submitting attachments via email. Bid Security shall consist of a bid bond or a certified check or a bank check drawn upon a legally incorporated bank or trust company and payable to the Office of Parks, Recreation and Historic Preservation. The bid bond must be from a Surety company approved by the State. The form of any bid bond and the surety issuing it shall be subject to the approval of the Office. The original hardcopy bid bonds for the two lowest bidders must be postmarked and sent via certified mail within 48 hours of receiving the bid summary from the Office. The Bid Security of the two lowest bidders will be returned upon the acceptance of the Performance and the Labor and Material Bonds and the execution of the Contract by the lowest bidder. The Bid Security of all other bidders will be returned as soon as possible after the low bidder is determined.

NEW YORK STATE BUSINESSES INFORMATION

Contractors are encouraged to use and work with New York State Businesses. Accordingly, bidders are required to complete and submit the form which will allow us to track this information. Please complete and include the form "Encouraging Use of New York State Businesses in Contract Performance" with your bid. The apparent low bidder will be asked to identify the New York State businesses that will be used.

SUBMISSION OF BID

Submit Bid Form and Bid Security, if required in the Notice to Bidders, via scanned hard copies to the emailed listed in the notice to bidders.

The Contract D number and Company Name should be clearly marked in the subject line of the email, along with the words "BID SUBMISSIONS".

All bids must be received at or before the time specified on the Notice to Bidders, whether to the email address or the physical mailing address designated for bid opening.

A late bid will be considered if (1) its arrival at the place designated after the time specified can beshown by documentary or other proofs to be due to the mishandling by employees of the Office and
(2) that absent such mishandling, the bid would have arrived timely. Delays in the U.S. Mail or anyother means of transmittal, including by couriers or agents of the State of New York (State), otherthan employees of the Office will not suffice to excuse late arrival.

A late bid not eligible for consideration will be returned unopened with notification of the reason forits refusal.

MODIFICATION OF BID

Bid modifications by amendment may be considered on condition that:

1. The amendment arrives before the time set for the bid opening.
2. The amendment is in writing and signed by the bidder.
3. The bid, as amended, conforms in all respects with the Contract Documents.

WITHDRAWAL OF BID

A bid may be withdrawn at any time prior to the time specified for opening.

After the bid opening, a bidder may request the withdrawal of its bid by a written application on thegrounds of a demonstrable mistake. Such written application must be made within seven days afterthe bid opening unless the Office, at its sole discretion, grants a time extension. Upon receiving suchwritten application, the Office will review and decide the bidder's withdrawal request based on thethree elements below. A bid may be withdrawn if, before any detrimental change of position by theState has occurred, the bidder establishes that:

1. a verifiable error occurred in the computation of the bid, and
2. absent the mistake the bid would have been substantially higher, and
3. if directed to proceed with the Contract at the price set forth in the bid, the bidder wouldsuffer a substantial loss on the contract.

Each element must be proven by clear and convincing evidence in order to justify withdrawal. Thejudgment of the Office shall be final and conclusive. Should the judgment be against allowing withdrawal, then the failure of the bidder to proceed would be cause for forfeiture of its bid bond.

DISQUALIFICATION OF BIDDERS

The State reserves the right to disqualify bids, before or after opening, upon evidence of collusion with intent to defraud or other illegal practices upon the part of the bidder.

OPENING OF BIDS

Bids shall be opened as announced in the Notice to Bidders. Bidders or their authorized agents are invited to attend via Webex.

AWARD OF CONTRACT

The Contract may be awarded to the lowest responsible and reliable bidder as will best promote public interest.

If alternates are included in the bidding documents, the Office reserves the right to accept or rejectany or all alternates. The lowest bid will be determined by the sum of the base bid and, where applicable, the accepted alternates and/or unit pricing in the manner prescribed on the Bid Form.

If alternate base bids are indicated in the bidding documents, the low bid will be determined by thelowest amount bid for any of the alternate base bids.

The Office reserves the right to reject any or all bids, and advertise for new bids, if in its opinion thebest interest of the Office will hereby be promoted. In the event that all bids are rejected, each bidderwill be so notified.

No later than 45 days after the bid opening, the Office shall accept bids or reject all bids. Written notification of acceptance with the final Contract shall be emailed or delivered to the selected bidder. If the selected bidder fails to execute and return the Contract with the bidder's Performance Bond,Labor and Material Bond, and Certificate of Insurance, within ten days of receipt of notification, theOffice shall have the right to reject the bid and select next lowest bidder. In this case, the Bid Security of the first bidder shall be forfeit.

INFORMALITIES

Any bid which fails to conform to the requirements of the Bidding and Contract Documents may berejected.

The Commissioner or Commissioner's Representative reserves the right to waive as an informalityany irregularity contained in any bid or afford the bidder an opportunity to remedy any deficiencyresulting from a minor irregularity.

EQUAL EMPLOYMENT OPPORTUNITY

If the value of this contract exceeds $25,000, no later than seven days after being notified of the award of the contract, the Bidder shall submit, an Equal Employment Opportunity Policy Statementon a form to be provided by the Office.

DETERMINATION OF CONTRACTOR'S RESPONSIBILITY

1. The State Finance Law requires that contracts for public work in the State of New York be awarded to the lowest responsible and reliable bidders as will best promote the public interest.

2. In order to assist the State in determining the responsibility and reliability of the apparentlow bidder for any competitively bid contract of $100,000 or more, and any proposed subcontract work valued at $100,000 or more, each apparent low bidder and all proposed subcontractors will be required to submit a "New York State Vendor Responsibility Questionnaire For-Profit Construction" (Form CCA-2) prior to contract award or subcontractor approval.

3. The apparent low bidder must submit a completed "New York State Vendor ResponsibilityQuestionnaire For-Profit Construction" (Form CCA-2) to the foregoing address within 24hours after the bids are opened.

4. The Office recommends that vendors file the required Vendor Responsibility Questionnaireonline via the New York State VendRep System, however, vendors may choose to completeand submit a paper questionnaire. To enroll in and use the New York State VendRep System, see the VendRep System Instructions available at : *http://www.osc.state.ny.us/vendrep/vendor_index.htm* or go directly to the VendRep Systemonline at https://portal.osc.state.ny.us. For direct VendRep System user assistance,

the Officeof the State Comptroller's Help Desk may be reached at 866-370-4672 or 518-408-4672 orby email at *ciohelpdesk@osc.state.ny.us*. Vendors opting to file a paper questionnaire canobtain the appropriate questionnaire from the VendRep websitewww.osc.state.ny.us/vendrep or may contact the Office of Parks Recreation and HistoricPreservation (if not included already in these documents).

5. ADDITIONAL CONTRACTOR RESPONSIBILITY

(A) Contractor shall at all times during the Contract term remain a responsible vendor. Contractor agrees, if requested by the Office, to present evidence of its continuing legal authority to do business in New York State, its integrity, experience, ability, prior performance, and organizational and financial capacity to carry out the terms of this Contract.

(B) The Office reserves the right to suspend any or all activities under this Contract, at any time, when the Office discovers information that calls into question the responsibility of Contractor. In the event of such suspension, Contractor will be given written notice outliningthe particulars of such suspension. Upon issuance of such notice, Contractor must complywith the terms of the suspension order. Contractual activities may resume at such time as theOffice issues a written notice authorizing resumption of contractual activities.

(C) Notwithstanding the provision of Article 15 of the General Conditions of the Contract pertaining to Termination and Revocation, upon written notice to Contractor and a reasonable opportunity to be heard with appropriate Office staff, this Contract may be terminated by the Office at Contractor's expense where Contractor is determined by the Offices to be non-responsible. In such event, State Parks may pursue available legal or equitable remedies for breach.

OMNIBUS PROCUREMENT ACT OF 1992

1. It is the policy of the New York State Office of Parks, Recreation and Historic Preservation to maximize opportunities for the participation of New York State business enterprises, including minority and women-owned enterprises, as bidders, subcontractors and supplierson its procurement contracts.

2. Information on the availability of New York State subcontractors and suppliers is available from:

NYS Department of Economic Development
Division for Small Business
One Commerce Plaza, 9th Floor
Albany, NY 12245
Telephone: (212) 803-3149 E-mail: nylovessmbiz@esd.ny.gov

NOTE: Companies requesting lists of potential subcontractors and suppliers are encouraged toidentify the NAICS code, size and location of vendors.

3. A directory of certified minority and women-owned business enterprises is available onlineat **https://ny.newnycontracts.com/FrontEnd/searchcertifieddirectory.asp** or from:

NYS Department of Economic Development
Division of Minority and Women's Business Development
625 Broadway
Albany, New York 12207
Telephone: (646) 846-7364 E-mail: MWBEBusinessDev@esd.ny.gov

4. Bidders located in foreign countries are hereby notified that New York State may seek to obtain and assign or otherwise transfer offset credits created by this procurement contractto third parties located in New York State. The successful contractor shall agree to cooperate with the State in efforts to get foreign countries to recognize offset credits createdby the procurement contract.

5. When the bid amount is equal to or greater than $1,000,000, the bidder is required to certifycompliance with the Omnibus Procurement Act of 1992 to the Office in its bid proposal.

6. The apparent low bidder will be required to submit documentation of such compliance withthe requested documents.

LIQUIDATED DAMAGES

The agreement documents contain a provision that the Contractor will pay liquidated damages foreach day of delay in the physical completion of the work.

WORKERS' COMPENSATION INSURANCE AND DISABILITY BENEFITSREQUIREMENTS

A policy covering the obligations of the Contractor in accordance with the Workers' CompensationLaw and the Disability Benefits Law covering all operations under the contract, whether performedby the contractor or the subcontractor is required for all contracts. See Article 21.4 and 21.5 of theGeneral Conditions.

ELECTRONIC PAYMENTS

The Office encourages all Contractors and Vendors doing business with New York State to enroll in and receive payments electronically. Visit the State Comptroller's web site: *http://www.osc.state.ny.us/vendors/index.htm#epayment* to enroll in the ePayments Program.

FORMS

Various provisions of the bidding and contract documents may require a bidder or contractor to submit certain forms. Not all forms will be required of all bidders, and some forms, such as Bid Bonds, Performance Bonds and Labor and Material Bonds will generally be provided by others(e.g., the American Institute of Architects - AIA). However, samples and/or copies of all forms are available from the Contact Person(s) designated on the first page of the Bidding and Contract documents. Forms available from the Contact Person include but are not limited to: Reporting forms for State and Federal programs which provide for participation by minority groupmembers and women as suppliers, subcontractors and employees; Contractor's Monthly Activity Report and Application for Payment; Certificate of Acceptance (final payment); Prime Contractor's Certification; Subcontractor's Certification; Workers Compensation and Payroll Forms.

NYS Office of Parks, Recreation and Historic Preservation
Mid-State Capital District

REQUEST FOR INFORMATION (RFI)
OPR-103

Project: New Regional Maintenance Storage Building

Contract Number: Click here to enter Contract Number.

Request From: Click here to enter Your Name .

Reply Email Address: Click here to enter Parks reply email.

Email Request to :Click here to enter Parks Name and , email address.

Request Number:Click here to enter text. Date: Click here to enter a date.

Spec Section No.: Click here to enter text. Drawing No:Click here to enter text.

Remarks:

Question: Click here to enter text.

Answer: Click here to enter text.

Sample Forms

Sample Forms

Forms Provided to All Bidder**s, but for use by Low Bidder**(s)

Form	**Purpose/Use**
Intent to Award Letter	Information for Selected Low Bidder *
Sample OPRHP Agreement	See Intent to Award letter for more information
Vendor Responsibility Questionnaire Acknowledgement	Vendor Responsibility Questionnaire found on OSC website: https://www.osc.ny.gov/state-vendors/vendrep/vendrep-system
EO 16 Certification	See Intent to Award letter for more information
Bid Confirmation Form	See Intent to Award letter for more information
Cost Estimating workbook	See the Intent to Award letter for more information
Construction Summary of Sub-Contractors	See Intent to Award letter for more information

* This document outlines various submittal documents that will have to be submitted by the **selected bidder.** If the selected bidder fails to meet the prescribed submittal deadlines, the Office shall have the right to reject the bid and proceed with the next lowest bidder. In this case, the Bid Security of the first low bidder shall be forfeit.

April 22, 2025

Recipient Name
Company Name
Street Address
City, State Zip Code

Re: Project Name
Location or State Park Name
Contract # D00XXXX
Notice of Intent to Award Contract

SAMPLE

I am pleased to inform you that the NYS Office of Parks, Recreation & Historic Preservation (OPRHP) has accepted your bid in the amount of $Amount in numbers (Dollar amount in words dollars and Cent amount in words cents) for the above project as the identified low bidder and is offering to enter into a contract for the proposed work, subject to necessary approvals.

After you have received this letter - **the following submittals shall be completed and sent electronically to the designated contact, Name of admin contact Admin e-mail address of OPRHP, within three (3) business days**:

- Signed Bid Confirmation form
- OPR 102 form – Itemized Breakdown/Schedule of Values
- NYS Vendor Responsibility Questionnaire (CCA-2) – complete all sections.
  - This submission can be completed on-line as noted below:
    Please note: ALL vendors required to complete the CCA-2 must be registered for an SFS vendor ID, regardless of whether completed online or in hardcopy format.
    - ❖ Please use the following web address to sign in: Log In – New York State VendRep System
    - ❖ It is recommended that you complete the CCA-2 online. If you have completed a hardcopy CCA-2 within the past 6 months, please complete and sign the attached certification form. This document signifies that your questionnaire is current within the designated period.
  - All sub-contractors anticipated to earn $100,000.00 or more from this contract must each update their own CCA-2 at this time as well.

Also, within ten (10) business days the selected low bidder shall submit the following:

- **MWBE Utilization Plan – an approved Utilization Plan is required as part of the contract packet that is sent to the approving agencies, so it is crucial MWBE/SDVOB information is submitted to the Diversity Compliance team in a timely manner. Please adhere to the time submission listed above.** The Utilization Plan is now done in electronic form. Once Diversity Compliance is notified of this award, expect an email with further instructions within the next few business days.

- Agreement - signed, dated, and notarized. Date used on the agreement and notary pages **must** be the same date.

(Continued on next page->)

- EO 16 Certification (Prohibition of contracting with businesses conducting business in Russia)
- Summary of Subcontractors and Estimated Earnings Form - must match approved MWBE Utilization Plan
- DOL Registration Certificates for ALL subcontractors on approved MWBE Utilization Plan
- Original ACORD 25 Insurance Certificates (for Liability Coverage) *
- Original ACORD 855 Insurance Certificates (for Liability Coverage) *
- Workers Compensation Certificate (provide on Form C-105.2 as issued by NYS) *
- NYS Disability Benefit Certificate (provide on Form DB-120.1 as issued by NYS) *

  * **Make sure the Certificate Holder box has the following address for all Insurance Certificates**:
  NYS OPRHP
  625 Broadway
  Albany, NY 12207

- 1 executed copy of the Performance Bond/Payment Bond AND 1 executed copy of the Labor and Material Bond
  – Contractor's signature and Surety signature must be notarized, and each bond must have a separate, original notary page. The bond date, construction date, and notary acknowledgement need to be the same date and **cannot be dated prior to the date on the Agreement**. Bonds must include Surety's Financial Statement and Power of Attorney.

SAMPLE

OPRHP reserves the right to move to the next responsible low bidder if good-faith efforts are not made by the low bidder to provide all requested documentation within ten (10) business days.

DOL Public Work Contractor and Subcontractor Registration

Newly established subsection 220-i to NYS Labor Law Article 8 requires contractors and subcontractors to register with the Bureau of Public Work and Prevailing Wage Enforcement for public work. This registration must be completed prior to bidding on public work projects covered under Article 8 of Labor Law.

The effective date of the registration requirement is **December 30, 2024**. No contractors or subcontractors are required to register prior to that date; however, **bidders may be found to be non-responsive if they fail to provide a registration number on the project bid form after the effective date**. Bidders will also be held responsible to verify that all subcontractors are registered at that time as well.

Please refer to this website for information: NYS DOL Public Work Contractor & Subcontractor Registry
The registration login page is found here: Log In – Management System for Protecting Workers' Rights

Electronic Payments (ePayments)

If not already enrolled, you must update your payment method in the SFS Vendor Portal to electronic deposit, per the General Conditions article 23 section 12 in the project manual.

Additional information can be found at: Log In – Vendor Portal

A completely executed contract will be returned to you after the necessary approvals are obtained. At that time, we will schedule a preconstruction meeting to discuss the project and specific contract requirements. No project work can physically start until all necessary approvals have been granted. Please be advised that this office will retain your bid bond in the amount of $Bid Bond amount in numbers until such time that the enclosed contract documents are executed and returned along with the Performance, Labor and Material Bond/Payment Bond.

We look forward to a great working relationship throughout this contract.

Sincerely,

Name
Title – District

SAMPLE

SAMPLE

NEW YORK STATE
OFFICE OF PARKS, RECREATION AND HISTORIC PRESERVATION

SAMPLE AGREEMENT – PROVIDED HERE FOR INFORMATIONAL PURPOSES ONLY

This Agreement made by and between the State of New York, acting by and through the Office of Parks, Recreation and Historic Preservation, hereinafter referred to as the "Office" or the "State" and_____hereinafter referred to as the "Contractor".

W I T N E S S E T H

1) The Contractor agrees to perform the Work in accordance with the Contract Document which is incorporated herein

PROJECT NAME
STATE PARK
Contract # D00XXXX

2) The Contractor agrees to complete the Work no later than **XXX days after contract is approved by the NYS Comptroller's Office.**

3) The Contractor agrees, in the event the Contractor fails to complete all the work on time, to pay the Office liquidated damages as per the General Conditions, Article 14.10, for each day of delay in the physical completion of the Work.

4) The Office agrees to pay the Contractor in accordance with the Contract Documents and in consideration of the completion of the Work, as follows:

IN WORDS:

IN NUMBERS:

5) Goals for the participation of minority group members and women on this project shall be in accordance to the approved utilization plan for this project.

SAMPLE

CONTRACT SIGNATURE PAGE

PARKS certifies that copies of this signature page with original signatures will be attached to all other exact copies of the contract.

IN WITNESS WHEREOF, PARKS and the CONTRACTOR have executed this agreement on the date and year indicated.

NEW YORK STATE OFFICE OF PARKS,
RECREATION AND HISTORIC PRESERVATION

_____ By: _____
Date Bevin Collins
Title: Deputy Commissioner for Capital Programs

CONTRACTOR

_____ By: _____
Date (signature)

Name: _____
(print)

Title: _____
(print)

Federal ID Number: _____

Approved as to Form:

ATTORNEY GENERAL

By:_____

Date:_____

Thomas P. DiNapoli
State Comptroller

By: _____

Date: _____

- Contractor's signature must be notarized on the following page.

SAMPLE

CONTRACTOR'S SIGNATURE MUST BE NOTARIZED. USE EITHER THE INDIVIDUAL, PARTNERSHIP, OR CORPORATION FORM, AS APPROPRIATE

INDIVIDUAL

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

On this day of , 2021, before me personally came , to me known and known to me to be the person described in and who executed the foregoing instrument, and he or she acknowledged to me that he or she executed the same.

Notary Public

PARTNERSHIP

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

On this day of , 2021, before me personally came , to me known and known to me to be the person who executed the above instrument, who, being duly sworn by me, did for himself or herself depose and say that he or she is a member of the firm of , consisting of himself or herself and , and that he or she executed the foregoing instrument in the firm name of , had authority to sign same, and did duly acknowledge to me that he or she executed the same as the act and deed of said firm for the uses and purposes mentioned therein.

Notary Public

CORPORATION

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

On this day of , 2021, before me personally came , to me known, who being by me duly sworn, did depose and say that he or she is the of , the corporation described in and which executed the foregoing instrument; that he or she has been duly authorized by the Board of Directors of said corporation to execute the foregoing instrument on behalf of said corporation and that he or she signed his or her name thereto by order of said corporation for the purposes and uses therein described.

Notary Public

SAMPLE

VENDOR RESPONSIBILITY QUESTIONNAIRE ACKNOWLEDGEMENT

Please check ***one*** of the following:

☐ A Vendor Responsibility Questionnaire has been filed online with the NYS Office of the State Comptroller and has been certified/update within the last six months.

☐ A Vendor Responsibility Questionnaire is attached

SFS Vendor ID# _____ EIN# _____

If online version used, please complete the following:

Vendor/Contractor:

_____

Contact Person:

_____

Name (Print) Title

Address:

_____

City: _____ State: _____ Zip Code: _____

Signature: _____

SAMPLE

Certification Under Executive Order No. 16
Prohibiting State Agencies and Authorities from Contracting with Businesses Conducting Business in Russia

Executive Order No. 16 provides that "all Affected State Entities are directed to refrain from entering into any new contract or renewing any existing contract with an entity conducting business operations in Russia." The complete text of Executive Order No. 16 can be found here.

The Executive Order remains in effect while sanctions imposed by the federal government are in effect. Accordingly, vendors who may be excluded from award because of current business operations in Russia are nevertheless encouraged to respond to solicitations to preserve their contracting opportunities in case the sanctions are lifted during a solicitation or even after award in the case of some solicitations.

As defined in Executive Order No. 16, an "entity conducting business operations in Russia" means an institution or company, wherever located, conducting any commercial activity in Russia or transacting business with the Russian Government or with commercial entities headquartered in Russia or with their principal place of business in Russia in the form of contracting, sales, purchasing, investment, or any business partnership.

Is Vendor an entity conducting business operations in Russia, as defined above? Please answer by checking one of the following boxes:

- ☐ 1. No, Vendor does not conduct business operations in Russia within the meaning of Executive Order No. 16.
- ☐ 2.a. Yes, Vendor conducts business operations in Russia within the meaning of Executive Order No. 16 but has taken steps to wind down business operations in Russia or is in the process of winding down business operations in Russia. (Please provide a detailed description of the wind down process and a schedule for completion.)
- ☐ 2.b. Yes, Vendor conducts business operations in Russia within the meaning of Executive Order No. 16 but only to the extent necessary to provide vital health and safety services within Russia or to comply with federal law, regulations, executive orders, or directives. (Please provide a detailed description of the services being provided or the relevant laws, regulations, etc.)
- ☐ 3. Yes, Vendor conducts business operations in Russia within the meaning of Executive Order No. 16.

The undersigned certifies under penalties of perjury that they are knowledgeable about the Vendor's business and operations and that the answer provided herein is true to the best of their knowledge and belief.

Vendor Name: (legal entity) _____

By: (signature) _____

Name: _____

Title: _____

Date: _____

SAMPLE

Bid Confirmation

Contract

SAMPLE

I have reviewed the bid submitted by _____ for the above referenced contract and have found no errors or omissions. _____ will perform the work as stated in the Contract Documents.

Base Bid: $_____

Allowance: $_____

Total Bid: $_____

If Applicable

Special Allowance: $_____

Total Unit Price: $_____

Alternate(s): $_____

$_____

$_____

$_____

$_____

In support of this, included is a copy of form OPR-102 : Itemized Breakdown of Bid.

_____ _____

Printed Name Company Position/Title

_____ _____

Signature Date

NYS OPRHP Project No:	**(Project Number)**	Vendor Name:	**(Vendor)**	Date:	**(Date)**
Project Title:	**(Project Title)**	Office Manager:	**(Name)**		
Facility:	**(Facility)**	Estimator:	**(Name)**	Trade:	**GC/EC/MC/PC**
Street:	**(Street)**	E-mail:	**(E-mail)**	OPRHP D#:	**D#**
City, Zip, County:	**(City, State, Zip, County)**	Phone:	**(Phone)**	OPRHP PM:	**PARKS PM**
Project Type:	**(New/Rehab)**			OPRHP CMS:	**PARKS CMS**

CONSTRUCTION COST

FILL IN THE TAN SECTIONS ONLY (ROWS 77-87)

	Material	Labor	Total	$/GSF
01 - General Requirements / General Condition	$ -	$ -		
Subtotal General Requirements:	$ -	$ -	$ -	
02 - Existing Conditions	$ -	$ -		
03 - Concrete	$ -	$ -		
04 - Masonry	$ -	$ -		
05 - Metals	$ -	$ -		
06 - Wood, Plastics, and Composites	$ -	$ -		
07 - Thermal and Moisture Protection	$ -	$ -		
08 - Openings	$ -	$ -		
09 - Finishes	$ -	$ -		
10 - Specialties	$ -	$ -		
11 - Equipment	$ -	$ -		
12 - Furnishings	$ -	$ -		
13 - Special Construction	$ -	$ -		
14 - Conveying Equipment	$ -	$ -		
21 - Fire Suppression	$ -	$ -		
22 - Plumbing	$ -	$ -		
23 - HVAC	$ -	$ -		
25 - Integrated Automation	$ -	$ -		
26 - Electrical	$ -	$ -		
27 - Communications	$ -	$ -		
28 - Electronic Safety and Security	$ -	$ -		
31 - Earthwork	$ -	$ -		
32 - Exterior Improvements	$ -	$ -		
33 - Utilities	$ -	$ -		
34 - Transportation	$ -	$ -		
Other: 1	$ -	$ -		
Other: 2	$ -	$ -		
Subtotal:	$ -	$ -	$ -	
Construction Cost Subtotal:	$ -	$ -	$ -	

BID ALTERNATES (List Bid Alternates)

Alternate No.	Description	Amount
1	ALTERNATE 1 DESCRIPTION	$ -

Alternate No.	Description	Amount
2	ALTERNATE 2 DESCRIPTION	$ -

Alternate No.	Description	Amount
3	ALTERNATE 3 DESCRIPTION	$ -

Alternate No.	Description	Amount
4	ALTERNATE 4 DESCRIPTION	$ -

Construction Cost + Alternates (if applicable) Subtotal:	$ -

Administrative Costs	Percentage	Amount
General Conditions		$ -
Bonds (On Construction Cost)		$ -
Insurance (On Construction cost)		$ -
Overhead (On Construction Cost + Bonds + Insurance)		$ -
Profit (On Construction Cost + Bonds + Insurance)		$ -
		$ -
		$ -
		$ -
Total Administrative Costs		$ -

Allowance (provided in specification documents)	

TOTAL COST ESTIMATE (AS BID)	**$ -**

SAMPLE

New York State
Parks, Recreation and
Historic Preservation

Summary of Subcontractors and Estimated Earnings

This form must be submitted with contract documentation for potential award and match the finalized Utilization Plan approved by OPRHP's Diversity Compliance Unit. Any subcontractor anticipated to make 100K or more on this contract must have a Vendor Responsibility questionnaire certified within the last six months.

Effective December 30, 2024 - ALL subcontractors must have a valid Department of Labor Public Work Registration ID before commencing work. It is the prime contractor's responsibility to confirm subcontractors performing work are in compliance with Labor Law Article 8 section 220-i and to provide copies of their subcontractors' registration certificates to the Capital Unit. Contractors and subcontractors who fail to comply with registration requirements or contractors, owners, or developers who knowingly allow unregistered contractors or subcontractors to commence work on a covered project may face a civil penalty up to $1,000 and the issuance of a stop work order.

Contract #	Contractor's Name	Date Prepared
Subcontractor's Name	DOL Public Work Registration #	Est. Amount Payable

SAMPLE

Legal name of Company

Preparer's Name

Phone Number

Title

E-mail Address

SUMMARY OF AND IMPLEMENTATION GUIDELINES FOR
§ 139-J OF THE STATE FINANCE LAW

* This summary is not intended to replace the need for persons to become familiar with the full requirements of the law. Please refer to the full text of the law to resolve any questions you may have with regard to your conduct under it.

Section 139-j of the State Finance Law imposes restrictions on the type of communications that a person may make to a governmental entity, such as the Office of Parks, Recreation and Historic Preservation (hereafter, referred as "OPRHP"), concerning a governmental procurement during a period of time which the law terms the "restricted period." These new requirements cover a wide range of government contracting transactions, including, the purchase of a commodity, service, technology, public work, construction and revenue contract, or the purchase, sale or lease of real property or the acquisition or the granting of other interests in real property (hereafter referred as "governmental procurement or procurement contract." Any person in the private sector (hereinafter referred to as "person") interested in contacting OPRHP concerning anyone of these types of transactions is covered under the provisions of the new law, which limits the way that such person can communicate with OPRHP during the "restricted period", which is defined broadly as the period of time commencing from the earliest written notice announcing a government procurement all the way until the award is approved by the comptroller.

For each governmental procurement OPRHP will designate an employee or employees that may be contacted by persons concerning all aspects of the governmental procurement. The law requires that each person that contacts (in writing, orally, or via email) OPRHP concerning a governmental procurement may only make what the law terms "permissible contacts", which means that the person: 1) shall contact only the designated person or persons identified by OPRHP in the governmental procurement documents and 2) shall not attempt to influence the procurement in a manner that would result in violation of §73(5) of the Public Officers Law (Ethical Prohibitions on Gifts to Public Officers and Employees) or in a manner that would result in violation of §74 of the Public Officers Law (The Code of Ethics).

The law specifically permits certain types of contacts by persons to OPRHP concerning the governmental procurement. These are:

- the submission of written proposals in response to a request for proposal, invitation for bids or any other method for soliciting a response from interested parties;
- the submission of written questions to a designated contact, when all written questions and responses are to be disseminated to all persons interested in such procurement;
- participation in a conference where all interested parties are invited to attend;

- written complaints made to the General Counsel's Office of OPRHP concerning the timely response to issues posed to the designated person, provided that such written complaints are made part of the procurement record;
- communications where the contract award has been tentatively made and where such communications are necessary to negotiate the terms of the procurement contract;
- requests made to the designated person or persons to review the procurement award;
- written protests, appeals, or other review proceedings to either OPRHP or an outside agency.

All communications which are reasonably inferred by OPRHP to be intended to influence the governmental procurement process or the award of such procurement in violation of the law will be recorded and made a part of the procurement record, whether such communications are made to the designated employee/s or another employee of OPRHP. Contacts made to persons other than the designated OPRHP employee shall also be deemed an impermissible contact.

Any contact which is alleged to be an impermissible contact under the law will be immediately referred to and investigated by OPRHP's Ethics Officer. The Ethics Officer shall promptly investigate the allegation by interviewing all employees reasonably involved or who are believed to have information about the impermissible contact. If sufficient cause exists to believe that such allegation is true, the person being investigated shall be given notice that an investigation is ongoing and such person shall be afforded an opportunity to be heard in response to the allegation either by responding in writing or by providing a statement before the Ethics Officer, who shall record by appropriate means such statement for the record. The Ethics Officer shall keep a record of the investigation and shall make a written finding of the results of such investigation and report these findings to the Commissioner.

In addition, a finding by the Ethics Officer that a person has knowingly and willingly violated the law by making an impermissible contact shall result in a determination of non-responsibility and such person and all associated subsidiaries of such person shall not be awarded the procurement contract. The determination of non-responsibility shall also be forwarded to the Commissioner of the Office of General Services (or his or her designee), which by law is required to keep a list of such determinations for public inspection. Determinations of non-responsibility must be disclosed in all future responses to New York State procurements. With few exceptions, no procurement contract shall be awarded to any person who fails to disclose findings of non-responsibility within the previous four years.

NEW YORK STATE OFFICE OF PARKS, RECREATION AND HISTORIC PRESERVATION

GENERAL CONDITIONS

Table of Articles

1. The Contract Documents
2. Defined Terms
3. Interpretation of the Contract Documents
4. Shop Drawings and Other Submittals
5. Schedule
6. Materials
7. Contractor's Supervision
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14. Time of Completion and Termination for Cause
15. Termination for Contractor's Employment for the Convenience of the State of New York
16. Disputes
17. Statutory Requirements for the Utilization of Minority and Women Owned Business Enterprises
18. Subcontracts
19. Coordination of Separate Contracts (WICKS Projects)
20. Responsibility for Damage and Indemnification
21. Insurance
22. Occupancy Prior to Completion and Acceptance; Substantial Completion
23. Payment
24. Audits and Records
25. Labor Law and Prevailing Wages Notifications Provisions
26. Statutory Requirements for Restrictions on Contracts during the Procurement Process and Disclosure of Contacts and Responsibility of Offerors
27. Embodied Carbon Disclosures & Clean Concrete Requirements
28. Miscellaneous Provisions
29. Appendices

Appendices:

Appendix A - Standard Clauses for all New York State Contracts

Appendix B

Appendix C – Specific Insurance Coverages and Limits

ARTICLE 1 – THE CONTRACT DOCUMENTS

1.1 The Contract Documents are comprised of the following documents, all of which are hereby incorporated by reference and shall hereinafter be referenced as the "Contract."

- Appendix A - Standard Clauses For New York State Contracts;
- Agreement;
- General Conditions;
- Supplemental Conditions;
- Appendix B;
- Appendix C – Specific Insurance Coverages and Limits;
- Specifications;
- Drawings;
- Instructions to Bidders;
- Performance and Payment Bond;
- Labor and Materials Bond;
- All Required Certificates of Insurance;
- All Addenda issued prior to the receipt of bids;
- An Approved MWBE Utilization Plan, if required;

1.2 The Contract Documents form the Contract. The Contract represents the entire and integrated agreement between the parties and supersedes all prior negotiations, representations and agreements, either written or oral, including Bidding Documents.

1.3 The Contract may not be modified except in accordance with the General Conditions.

ARTICLE 2 – DEFINED TERMS

2.1 The following terms shall have the meanings ascribed to them in this Article, wherever they appear in the Contract Documents.

2.2 The term "Bid" means the approved prepared bid form on which the Bidder is to submit or has submitted a bid for the Project contemplated.

2.3 The term "Bidder" means any individual, firm or corporation submitting a Bid for the Project contemplated, acting directly or through a duly authorized representative.

2.4 The term "Bid Security" means the collateral in the form of a certified check, bank check or bid bond to be furnished by the Bidder as a guarantee of his or her ability to procure the minimum equipment and liquid assets specified and that Bidder shall enter into a Contract with the Office for the performance of the Work.

2.5 The term "Certificate of Acceptance" means the certificate prepared by the Director's Representative evidencing the Work is physically completed and setting forth the Physical Completion Date.

2.6 The term “Certificate of Substantial Completion” means the certificate prepared by the Director’s Representative evidencing that the Work is substantially completed and setting forth the date of Substantial Completion.

2.7 The term “Change Order” means a written order to the Contractor signed by the Contractor, Director’s Representative, and NYS Office of State Comptroller, issued after the execution of the Contract, authorizing a Change in the Work or an adjustment in the Contract Sum or the Contract Time. The Contract Sum and the Contract Time may be changed only by Change Order.

2.8 The term “Commissioner” means the Commissioner of Parks, Recreation and Historic Preservation.

2.9 The term “Comptroller” means the Comptroller of the State of New York.

2.10 The term “Contractor” means the person, firm, partnership or corporation executing the Contract or the successor or assignee of the Contractor approved in writing by the Commissioner.

2.11 The term “Days” shall mean calendar days.

2.12 The term “Designated Payment Office” shall be the regional office as identified on the cover of the Project Manual.

2.13 The term “Director” means the Director of Capital Programs or equivalent for the Office of Parks, Recreation and Historic Preservation, who will have general direction and supervision of the Work, except for Appendix B where the term “Director” means the Director of the Division on Minority and Women’s Business Development.

2.14 The “Director’s Representative” means an employee of the Office designated by the Director as the Director’s authorized representative. Under the direction of the Director, the Representative shall have complete charge of the Work and shall exercise full supervision and direction of the Work. Except where noted, the Contract Documents specifically designate a person to perform a function or duty, it shall mean the Director’s Representative but only for the performance of that function or duty. Where the word “directed” appears in the Contract Documents, the words “by the Director’s Representative” shall be deemed inserted thereafter in each case except where it is obviously inappropriate in context.

2.15 The term “Environmental Product Declaration” or “EPD” is a standardized, third-party verified report that quantifies environmental information over the life cycle of a product to enable comparisons of environmental impact between products fulfilling the same function. An EPD is required for certain construction materials and concrete mixes under Article 27 of this Contract.

2.16 The term “Labor and Materials Bond” is a bond guaranteeing prompt payment of monies due to all persons furnishing labor or materials to the Contractor or any Subcontractor in the prosecution of the Work provided for as set forth in State Finance Law Section 137.

2.17 The term “Liquidated Damages” means the total amount of money to be assessed against the Contractor for delay in completion of the Contract. The total amount of such damages shall not exceed the amount per day stipulated in Article 14.10 times the numbers of Days completion is delayed, unless otherwise specified in the Notice to Bidders.

2.18 The term “Material” means any approved material acceptable to the Director’s Representative and conforming to the requirements of the Specifications. All processes and materials shall at all times be open to inspection and testing by the Office and its authorized representatives.

2.19 The term “Offerer” shall mean the individual or entity, or any employee, agent of consultant or person acting on behalf of such individual or entity that contacts a governmental entity about a governmental procurement during the restricted period of such governmental procurement.

2.20 The term “Office” or “OPRHP” means the New York State Office of Parks, Recreation and Historic Preservation.

2.21 The term “Performance Bond” means a written guaranty from a third party guarantor provided to the Office by Contractor upon the award of the Contract to ensure the full performance of the Work and completion of the Project as set forth in the Contract Documents. The form of the Performance Bond is subject to the approval of the Office and the Attorney General.

2.22 The term “Physical Completion Date” means the date upon which Director’s Representative deems that all deficiencies noted on the Punch List have been corrected or completed as evidenced by the issuance of the Certificate of Acceptance.

2.23 The term “Plan” or “Drawings” means an illustrated graphic that typically includes technical layout information, specification data, and details as required to facilitate the construction of an entire project or smaller unit of work.

2.24 The term “Premises” means all land, buildings, structures, or other items of any kind located around or adjacent to the Site and owned, occupied or otherwise used by the State.

2.25 The term “Project” means Work at the site carried out pursuant to one or more sets of Contract Documents.

2.26 The term “Project Manual” means the combined Notice to Bidders, Instructions to Bidders, Supplementary Conditions, the Summary of and Implementation Guidelines for § 139-J of the State Finance Law, Sample Forms, Bid Forms, General Conditions, All Referenced Appendices, Prevailing Wage Rates, the Drawings and Specifications; the Invitation for Bids and the Bid, issued prior to the receipt of bids.

2.27 The term “Provide” means to furnish and install, complete, in place and ready for operation and use.

2.28 The term “Punch List” means a document that is attached to the Certificate of Substantial Completion prepared by the Director’s Representative or their designee listing work that does not conform to the Contract Documents that the Contractor must complete or correct after Substantial Completion, but before the Physical Completion Date and final payment.

2.29 The term “Samples” are physical examples submitted by the Contractor of materials, equipment or workmanship to establish a standard, which the Contractor is required to meet.

2.30 The term “Schedule of Values” means a breakdown of the Contract Sum in tabular form that lists the dollar value of individual work items. Schedule to be provided in accordance with specific Division 01 requirements and in enough detail to facilitate evaluation of the Payment Application by the Director’s Representative.

2.31 The term “Shop Drawings” are drawings, diagrams, illustrations, schedules, test data, performance charts, cuts, brochures and other data which are prepared by the Contractor or any Subcontractor, manufacturer, supplier or distributor, and submitted by the Contractor and which illustrate a portion of the Work.

2.32 The term “Site” means the area within the contract limit lines as identified in the drawings, or adjacent areas designated in writing by the Director’s Representative. Some contracts might involve separate and distinct sites.

2.33 The term “Specifications” means the body of directions and/or requirements contained in this document, together with all documents of any description, and agreements made (or to be made), pertaining to the methods (or manner), of performing the work and quality (as shown by test records) of accepted materials to be furnished under this Contract.

2.34 The term “State” means the State of New York.

2.35 The term “Subcontractor” means a person, firm, partnership or corporation executing a portion of the Work for the “Contractor,” who has the sole responsibility for his or her performance.

2.36 The term “Substantial Completion” means that the Work is sufficiently completed in the sole discretion of the Director’s Representative in accordance with the the Contract, so that OPRHP may occupy or use the Work for its intended purpose without unscheduled interruption caused by the needed completion of any remaining or unfinished work, as evidenced by the issuance of a Certificate of Substantial Completion. The terms “Substantially Complete” and “Substantially Completed” as applied to the work refer to Substantial Completion of the Work.

2.37 The term “Surety” means the entity which is bound with and for the Contractor, and which is engaged to be responsible for the Contractor’s acceptable performance of the Project for which he or she has contracted and for all Labor, Performance, and Material Bonds.

2.38 The term “Work” means the total sum of labor, supervision, materials and equipment necessary for the proper completion of the Contract as set forth in the Contract Documents.

ARTICLE 3 – INTERPRETATION OF CONTRACT DOCUMENTS

The Plans, Drawings and Specifications are complementary, and what is called for by one shall be as binding as if called for by all. It is not intended to include work not properly inferable from the Plans, Drawings and Specifications. In all cases, labelled dimensions shall take precedence over scaled dimensions, and the larger scale details take precedence over smaller scale drawings. In the case of difference between Drawings and Specifications, the Specifications shall govern.

3.1 Upon his or her own initiative or the Contractor's written request, the Director's Representative may issue written interpretation or drawings necessary for the proper execution or progress of the work which interpretation shall be consistent with and reasonably inferable from the Contract Documents.

3.2 The language of the Contract Documents is directed at the Contractor unless specifically stated otherwise.

3.3 The organization of the Specifications into divisions, sections and articles, and the 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.

3.4 In the event of conflicting provisions in the Contract Documents, the Specifications shall take precedence over the Drawings.

3.5 If during the performance of the Work, the Contractor identifies a conflict in the Contract Documents, or a variation from any applicable statute, rule or regulation, the Contractor shall promptly notify the Director’s Representative in writing of the conflict. The Director’s Representative shall promptly acknowledge the notification in writing and advise the Contractor, pursuant to Paragraph 3.2 of these General Conditions, as to the interpretation to be followed in the performance of the Work.

ARTICLE 4 – SHOP DRAWINGS AND OTHER SUBMITTALS

4.1 Shop Drawings (see Article 2.28)

4.2 Product data are manufacturer's catalog sheets, brochures, standard diagrams, illustrations, schedules, performance charts, test data, standard schematic drawings, specifications and installation instructions.

4.3 Samples are physical examples submitted by the Contractor of materials, equipment or workmanship to establish a standard that the Contractor is required to meet.

4.4 The Contractor and the Director's Representative shall adhere to the submittal and scheduling requirements for Shop Drawings, product data and Samples set out in the Specifications.

4.5 By approving and submitting Shop Drawings and samples, the Contractor represents that the Contractor has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data and that he or she has checked and coordinated each Shop Drawing and Sample with the requirements of the Contract Documents.

4.6 The Director's Representative's approval of Shop Drawings, product data and Samples shall not relieve the Contractor of responsibility for any deviation from the requirements of the Contract Documents unless the Contractor has previously informed the Director's Representative of the deviation in a separate writing at the time of submission and received written approval for the specific deviations. The Director's Representative's approval shall not relieve the Contractor from responsibility for errors or omissions in the shop drawings, product data or samples.

4.7 No portion of the Work requiring Shop Drawings, product data or Sample submission shall be commenced until the appropriate submission has been approved by the Director's Representative.

4.8 Any portions of the Work requiring Shop Drawings, product data and Samples shall be installed in accordance with the approved Shop Drawings, product data and Samples.

ARTICLE 5 – SCHEDULE

5.1 Each Contractor shall deliver to the Director's Representative and receive approval prior to commencing work, a detailed schedule concerning his or her operations upon the Project on a form acceptable to the Office, which shall indicate completion within the specified time frame, to the satisfaction of the Director'sRepresentative.

5.2 During the term of this Agreement, the Director's Representative may require any Contractor to modify any schedules which he or she has submitted either before or after they are approved so that:

(a) The Work or the Project may be properly progressed.

(b) Changes in the Work or the Work of other Contractors are properly reflected in these schedules.

ARTICLE 6 - MATERIALS

6.1 All materials, equipment and articles used permanently in the Work that become the property of the State shall be new unless specifically stated otherwise in the Contract.

6.2 Except where specifically provided otherwise, whenever any product is specified by the name, trade name, make, model or catalog number of any manufacturer or supplier, the intent is not to limit competition, but to establish a standard of quality that the Director's Representative has determined is necessary. The words "or equal" shall be deemed inserted in each instance. The Contractor may use any product equal to that named in the Contract Documents that is approved by the Director's Representative and which meets the requirements of the Contract Documents provided the Contractor gives timely notice of his or her intent in accordance with the submittal and scheduling requirements.

6.3 The Contractor shall have the burden of proving at the Contractor's own cost and expense to the satisfaction of the Director's Representative that the proposed product is equal tothe named product. The Director's Representative may establish criteria for product approval. The Director's Representative shall determine in his or her absolute discretion whether a proposed product is to be approved.

6.4 If the Contractor fails to comply with the provisions of this Article, or if the Director's Representative determines that the proposed product is not equal to that named, the Contractor shall supply the product named.

6.5 The Contractor shall have and make no claim for the extension of time or for damages because the Director's Representative requires a reasonable period of time to consider a product proposed by the Contractor or because the Director's Representative disapproves such a product.

6.6 Where optional materials or methods are specified, or where "or equal" submissions are approved, the Contractor shall make all adjustments to contingent work, whether the contingent work be the Work of its contract or the Work of another Contract, necessary to accommodate the option or "or equal" product it selects without extra or additional cost.

6.7 The Contractor shall within 48 hours remove from the Premises all materials rejected by the Director's Representative as failing to conform to the Contract, whether incorporated in the Work or not, and the Contractor shall promptly substitute satisfactory materials in accordance with the Contract and without expense to the Office. In addition, the Contractor shall bear the expense of making good all work of other contractors destroyed or damaged by such removal or replacement.

6.8 Royalties and patents: The Contractor shall pay all royalties and license fees. The Contractor shall defend all suits or claims for infringement of any patent rights and shall defend, indemnify and save the State harmless from loss on account thereof, except that the State shall be responsible for all such loss when a particular design, process or the product of a particular manufacturer or manufacturers is specified.

6.9 Asbestos Free Materials: All materials used for construction shall be free of asbestos containing materials. If asbestos is found in installed products not previously approved by the State, then it will be the responsibility of the contractor to abate the asbestos containing material and replace the work with new asbestos free materials at no cost to the State.

6.10 The contractor agrees that if the value of this contract exceeds $100,000 all structural steel,

reinforcing steel and other major steel items to be incorporate in the Work of this Contract shall be produced and made in whole or substantial part in the United States, its territories or possessions.

ARTICLE 7 – CONTRACTOR'S SUPERVISION

7.1 The Contractor shall designate a competent supervisor for the Work to represent the Contractor at the site at all times with authority to act for the Contractor ("Contractor's Representative"). The Contractor shall notify the Director's Representative in writing of the identity of the Contractor's Representative prior to the commencement of the Work. All directions given the Contractor's Representative shall be as binding as if given to the Contractor.

7.2 Should the Director's Representative deem any employee of the Contractor incompetent or negligent or for any cause unfit for his or her duty, the Contractor shall dismiss such employee and he or she shall not again be employed on the Work.

7.3 The Contractor's use of any Subcontractor shall not diminish the Contractor's obligations to complete the Work in accordance with the Contract. The Contractor shall control and coordinate the Work of its Subcontractors.

7.4 The Contractor shall be responsible for informing its Subcontractors and suppliers of all the terms, conditions and requirements of the Contract Documents including, but not limited to the General Conditions, Supplemental Conditions, the Drawings and Specifications, Appendix A, and changes made by Addenda.

ARTICLE 8 – USE OF PREMISES

8.1 If the Premises are occupied, the Contractor, the Contractor's Subcontractors and their employees shall comply with the regulations governing access to, operation of, and conduct while in or on the Premises and shall perform the Work in such a manner as not to unreasonably interrupt or interfere with the conduct of business.

8.2 The Contractor, the Contractor's Subcontractors and their employees shall not have access to or be admitted into any area of the Premises outside the Site except with the written permission of the Director's Representative.

ARTICLE 9 – PERMITS AND COMPLIANCE WITH APPLICABLE LAWS

9.1 The Contractor shall obtain, maintain and pay for all permits and licenses legally required and shall give all notices, pay all fees, and comply with all laws, rules and regulations applicable to the Work at no additional cost.

9.2 Contractor shall comply with all federal and state laws, codes and regulations applicable to the conduct of the activities authorized by this Contract.

9.3 If, in carrying out this Work, a harmful dust hazard is created for which appliances or methods for the elimination of harmful dust have been approved by the Industrial Board of

Appeals, then the Contractor shall install, maintain and effectively operate such appliances and methods during the life of this Contract; and in case of Contractor's failure to comply, as provided by Section 222-a of the Labor Law, the Contract shall be void.

9.4 In accordance with Worker's Compensation Law (WCL) §141-b (Suspension and Debarment), any person subject to a final assessment of civil fines or penalties or a stop-work order, or that has been convicted of a misdemeanor for a violation of WCL §§ 26 (Enforcement of Payment in Default), 52 (Effect of Failure to Secure Compensation) or 131 (Payroll Records), and any substantially-owned affiliated entity of such person, shall be ineligible to submit a bid on or be awarded any such public work contract or subcontract with the State, any municipal corporation or public body for a period of one (1) year from the final determination or conviction. Any person convicted of a felony under Article 8 (Administration) of the WCL, or a misdemeanor under WCL §§125 (Job Description Prohibited Based on Prior Receipt of Benefits) and 125-a (Civil Enforcement) shall be ineligible to submit a bid or be awarded any public work contract or subcontract with the State, any municipal corporation or public body for a period of five (5) years from such conviction.

9.5 The Contractor certifies and warrants that all heavy-duty vehicles, as defined in New York State Environmental Conservation Law (ECL) section 19-0323, to be used under this Contract will comply with the specifications and provisions of ECL section 19-0323, as well as any regulations promulgated pursuant thereto, including NYCRR Part 248; which, requires the use of Best Available Retrofit Technology (BART) and Ultra-Low Sulfur Diesel (ULSD) fuel.

9.6 During the term of this Contract, the Contractor agrees to report any observed or suspected illegal activity of its employees, agents or other third parties, to the assigned Director's Representative, OPRHP Director of Capital Programs,OPRHP Counsel's Office, the State Inspector General or other law enforcement agency. Failure to report criminal conduct associated with a contract awarded by the Office, shall be considered a material breach of this Contract and may provide grounds for disqualification of the subject Contractor or Subcontractor for award of future contracts. The Contractor shall include the provisions of this section in every subcontract, in such a manner that the provisions will be binding upon each Subcontractor as to work performed in connection with this Contract.

ARTICLE 10 – INSPECTION AND MATERIAL ACCEPTANCE

10.1 The Director's Representative will inspect and test the Work at reasonable times at the Site, unless the Director's Representative determines to make an inspection or test at the place of production, manufacture or shipment. Such inspection or test shall be conclusive as to whether the material and workmanship inspected or tested conforms to the requirements of the Contract. Such inspection or test shall not relieve the Contractor of responsibility for damage to or loss of the material prior to acceptance. Conducting inspections or tests shall not diminish the Director's Representative the right to reject the completed Work.

10.2 The Contractor shall, without charge, promptly correct any Work the Director's Representative determines does not conform to the Contract Documents unless in the public interest the Director's Representative consents to accept such Work with an appropriate adjustment in the Contract price. The Contractor shall promptly remove rejected material from the Premises.

10.3 If the Contractor does not promptly correct rejected Work including the Work of another contractor or Subcontractor destroyed or damaged by removal, replacement, or correction, the Director's Representative may (1) correct such Work and charge the cost thereof to the Contractor; or (2) terminate the Contract in accordance with Article 15 of General Conditions.

10.4 The Contractor shall furnish promptly, without additional charge, all facilities, labor, material and equipment reasonably needed to perform in a safe and convenient manner such inspections and tests, as the Director's Representative requires.

10.5 The Contractor shall keep the Director's Representative informed of the progress of the Work and particularly when the Contractor intends to cover Work not yet inspected or tested. All inspection and tests by the Director's Representative shall be performed in such manner as not to unreasonably delay the Work. The Contractor shall be charged with any additional cost of inspection when the Work is not ready at the time specified by the Director's Representative for inspection.

10.6 Should the Director's Representative determine at any time before acceptance of the entire Work to examine Work already completed by removing, uncovering or testing the same, the Contractor shall, on request, promptly furnish all necessary facilities, labor, materials and equipment to conduct such inspection, examination or test. If such Work is found to be defective or nonconforming in any material respect, the Contractor shall defray all the expenses of such examination and satisfactory reconstruction. If the Work is found to meet the requirements of the Contract Documents, the Director's Representative shall compensate the Contractor for additional services involved in such examination and reconstruction. If completion of the Work has been delayed, the contractor may request a suitable extension of time.

10.7 No previous inspection or certificates of payment shall relieve the Contractor from the obligation to perform the Work in accordance with the Contract Documents.

10.8 The Contractor shall remedy all defects and pay for the cost of any damage to other Work resulting therefrom, notice of which shall have been provided within a period of one year from the Physical Completion Date in accordance with the General Conditions.

ARTICLE 11 – CHANGE ORDERS

11.1 The Office may make changes by altering, adding to or deducting from the Work, and adjusting the Contract price accordingly. All changes Work shall be executed in

conformity with the terms and conditions of the Contract Documents unless otherwise provided in the Order on Contract. Any change in the Contract sum or time for completion shall be adjusted prior to issuing the Order on Contract.

11.2 No written or oral instructions shall be construed as directing a change in the Work unless in the form of an Order of Contract signed by the Office and the Contractor and signed by the NYS Office of State Comptroller. The Order of Contract shall describe or enumerate the Work to be performed and state the price to be added to or deducted from the Contract sum. If the extent or cost of the Work is not determinable until after the changed Work is performed, the Order on Contact shall specify the method for determining the cost and extent of the changed Work when completed. If the Contractor disagrees as to any element of the Order on Contract, the Contractor shall indicate the disagreement in writing on the face of the Order on Contract and promptly proceed in accordance with the Order on Contract.

11.3 If the Contractor is directed to perform Work for which the Contractor believes he or she is entitled to an Order of Contract, the Contractor shall give the Director prompt written notice and await instructions before proceeding to execute such Work. The Director may order the Contractor to execute the Work and proceed under the Disputes Clause.

11.4 The value of any Order of Contract shall be determined by one or more of the following methods:

(a) By acceptance of prices negotiated or established based on estimated cost plus overhead and profit as applicable.

(b) By Prices specifically named in the Specifications or Bid Form.

(c) By acceptance of agreed unit prices based on estimated cost plus overhead and profit as applicable.

(d) By estimate of the actual cost of labor and materials plus overhead and profit, cost to be determined as the work progresses.

(e) By actual cost of labor and materials plus overhead and profit, cost to be determined as the work progresses.

(f) By estimate of the value as deducible from the approved detailed estimate.

11.5 Overhead shall be defined as an allowance to compensate for all costs, charges and expenses, direct or indirect, except for the actual cost of labor and materials as defined by paragraph 11.6. Overhead shall be considered to include, but not limited to insurance (other than as mentioned in paragraph 11.6) bond or bonds, field and office supervisors and assistants above the level of foreman, use of small tools and minor equipment, incidental job burdens, general office expenses, etc.

11.6 Actual cost of labor and material shall be defined as the amount paid for the following costs, to the extent determined reasonable and necessary:

(a) Cost of materials delivered to the job site for incorporation into the Contract Work. The value of any material removed and disposed of by the Contractor shall be a credit to the Office.

(b) Wages paid to workers and foreman and wage supplements paid to labor organizations in accordance with current labor agreements.

(c) Premiums or taxes paid by the Contractor for Worker's compensation insurance, unemployment insurance, FICA tax and other payroll taxes as required by law, net of actual and anticipated refunds and rebates.

(d) Sales taxes paid as required by law.

(e) Allowance for use of construction equipment (exclusive of hand tools and minor equipment), as approved for use by the Director's Representative.

i. Rented equipment will be paid for at the actual rental cost.

ii. Gasoline, oil and grease required for operation and maintenance will be paid for at the actual cost.

iii. When, in the opinion of the Contractor, and as approved by the Director's Representative, suitable equipment is not available on the site, the moving of said equipment to and from the site will be paid for at actual cost.

iv. Self-owned equipment, including equipment rented from controlled or affiliated companies. The rate on self-owned equipment used for periods of under five days will be an hourly rate established by taking any published rate which is mutually acceptable to the Contractor and the Director's Representative and determining an hourly rate on the basis of 22 days per month and eight hours per day. Equipment used for periods of five days or more will be billed at a rate equal to 45% of the monthly rate. In the alternative, the Director's Representative may approve for reimbursement a rate representing the allocable costs of ownership.

11.7 Regardless of the method used to determine the value of any Order of Contract, the Contractor will be required to submit evidence satisfactory to the Director to substantiate each and every item that constitutes his or her proposal of the value of the change. The amounts allowed for overhead and profit shall not exceed the applicable percentages as established in the two following paragraphs.

11.8 If the work is done directly by the Contractor, overhead in an amount of 10% may be added

if method (a), (c), (d) or (e) is used, and to the cost of the labor and materials plus overhead there may be added 10% for profit. The percentages for overhead and profit may vary accordingly to the nature, extent and complexity of the Work involved, but in no case shall exceed the percentages set forth in this paragraph and in paragraph 11.9. No percentages for overhead and profit will be allowed on payroll taxes or on the premium portion of overhead pay.

11.9 If the Work is done by a subcontractor, subcontractor's overhead in the amount of 5% may be added to the cost of labor and materials if method (a), (c), (d), and (e) is used and to the cost of labor and materials plus overhead there may be added 10% for the subcontractor's profit. No percentage for overhead and profit will be allowed on payroll taxes or on the premium portion of overtime pay. However, to the extent that the aggregate dollar value of Orders on Contract exceeds $75,000, the 10% overhead applied to total costs of labor and materials incurred by the prime Contractor shall be reduced to 5%. In addition, on all individual Orders of Contract in excess of $75,000, the overhead shall be no more than 5% of the total actual cost of labor and materials incurred by the Contractor, and the combined Contractor's overhead and profit allowance applied to subcontract billings shall be no more than 5%.

11.10 The Director shall determine by which of the foregoing methods of value of any changes shall be computed.

11.11 In computing the value of an Order on Contract which involved additions and deductions of Work and the added Work exceeds the omitted Work, overhead and profit shall be computed on the amount by which the cost of additional labor material exceeds the cost of the omitted labor and material, except no additional overhead and profit shall be allowed on value of work determined by method (b) or (f).

11.12 In computing the value of an Order of Contract which involves deductions and additions of Work and the omitted work exceeds the added Work, the Contractor will be allowed to retain the overhead and profit on the amount by which the omitted Work exceeds the added Work, except that no overhead and profit shall be retained on value of Work determined by method (b) or (f).

11.13 The Contractor may retain overhead and profit on an Order of Contract which involved deductions only, except that no overhead and profit shall be considered on value of Work determined by method (b) or (f).

ARTICLE 12 – SITE CONDITIONS

12.1 If the Contractor encounters subsurface or other latent physical conditions at the Site which differ substantially from those shown, described or indicated in such information provided in the Contract Documents or from any information which is a public record and which subsurface or other latent physical condition could not have been reasonably anticipated from that information or from the Contractor's own inspection and

examination of the Site, the Contractor shall give immediate written notice to the Director's Representative before any such condition is disturbed. The Director's Representative shall promptly investigate and, if it is determined that the conditions substantially differ from those that should have been reasonably anticipated, shall make such changes in the Contract Documents as may be required. If necessary, the Contract sum and completion date shall be adjusted by Change Order, to reflect any increase or decrease in the cost of, or time required for, performance of the Contract.

12.2 The Contractor shall protect trees, shrubbery and other natural features or structures within the Premises from being cut, trimmed, or injured, unless directed by the Director's Representative for preparing the Site for the Work. The Contractor shall prevent employees from tramping in the shrubbery and vehicles from being driven through wooded lands. When necessary, the Contractor shall protect trees adjacent to the premises in a matter satisfactory to the Director's Representative.

12.3 The Contractor shall provide and replant at its own expense trees, shrubbery, and other natural features destroyed or damaged. The Contractor shall conduct its operations within the Premises as directed by the Director's Representative.

ARTICLE 13 – SUSPENSION OF WORK

13.1 Suspension of Work: The Director may order the Contractor in writing to suspend, delay, or interrupt performance of all or any part of the Work for a reasonable period of time as the Director, in his or her sole discretion, may determine ("Suspension Order"). The order shall contain the reason or reasons for issuance that may include but shall not be limited to the following: latent field conditions, substantial program revisions, civil unrest, acts of God.

(a) Upon receipt of a Suspension Order, the Contractor shall, as soon as practicable, cease performance of the Work as ordered and take immediate affirmative measures to protect such Work from loss or damage.

(b) The Contractor specifically agrees that a suspension, interruption or delay of the performance of the Work pursuant to this Article shall not increase the cost of performance of the Work of this Contract.

(c) A Suspension Order issued by the Director pursuant to this Article shall have duration not to exceed 30 days. If the Contractor is not directed to resume performance of the Work affected by said Suspension Order prior to the expiration of 30 days, the Contract may be terminated for the convenience of the State and the Contractor shall be reimbursed as provided by Article 15.

13.2 Stop Work Orders: If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to furnish or perform the Work in such a way that the completed Work will conform to the Contract Documents,

the Director's Representative may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of the Director's Representative to stop the Work shall not give rise to any duty on the part of the Director's Representative to exercise this right for the benefit of Contractor or any other party.

(a) Contractor shall bear all direct, indirect and consequential costs of such order to Contractor to stop Work including but not limited to fees and charges of engineers, architects, attorneys and other professionals, any additional expenses incurred by the Office due to delays to others performing work under a separate contract with the Director's Representative, and other contractual obligations, and Contractor shall further bear the responsibility for maintaining schedule and shall not be entitled to any extension of contract time or recovery of any delay damages due to the order to stop Work.

(b) In the event that Contractor fails to pay such costs within thirty days after receipt of an invoice from Office, a Change Order or proposed Change Order may be issued incorporating the unpaid amount as an appropriate reduction in the Contract Price. If the parties are unable to agree as to the amount thereof, the Contractor may make a claim therefore as provided in Article 11 of the General Conditions.

ARTICLE 14 – TIME OF COMPLETION AND TERMINATION FOR CAUSE

14.1 All time limits set forth in this Contract are of the Essence. Failure by the Contractor to meet with the Contract deadlines shall be cause for the Office to assess Liquidated Damages.

14.2 Termination for Cause. In addition to all other rights of termination provided by law and in this Contract, if any one or more of the following events shall occur, that is to say.

(a) If Contractor commences a voluntary case under any chapter of the Bankruptcy Code, as now or hereafter in effect, or if Contractor takes any equivalent or similar action by filing a petition or otherwise under any other federal or state law in effect at such time relating to the bankruptcy or insolvency;

(b) If a petition is filed against Contractor under any chapter of the Bankruptcy Code as now or hereafter in effect at the time of filing, or if a petition is filed seeking any such equivalent or similar relief against Contractor under any other federal or state law in effect at the time relating to bankruptcy or insolvency;

(c) If Contractor makes a general assignment for the benefit of creditors;

(d) If a trustee, receiver, custodian or agent of Contractor is appointed under applicable law or under contract, whose appointment or authority to take charge of property of Contractor is for the purpose of enforcing a lien against such property or for the purpose of general administration of such property for the benefit of Contractor's creditors;

(e) If Contractor admits in writing an inability to pay its debts generally as they become due;

(f) If Contractor fails to perform the Work in accordance with the Contract documents, including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment, or failure to adhere to the progress scheduled established under Article 5.1, as revised from time to time, or failure to submit an updated schedule as required by Article 5.2;

(g) If Contractor disregards the authority of the Director's Representative;

(h) If Contractor filed certification in accordance with New York State Finance Law § 139-k and such certification was intentionally false or intentionally incomplete.

14.3 If in the judgment of the Director, the Contractor fails or refuses to prosecute the Work in accordance with the Contract, or fails to complete the Work within the time provided by the Contract, the Director may terminate the Contract by written notice to the Contractor in the manner set forth in Article 28.2 herein and to the Surety in the manner set forth in the Performance Bond. In such event, the Director shall direct the Surety to complete the Work. If the Surety fails or refuses to complete the Work, the Director may take over the Work and prosecute it to completion by contract publicly let or otherwise and may take possession of and utilize in completing the Work, such of the Contractor's materials, equipment and plant as may be on the Site of the Work. Whether or not the right to terminate is exercised, the Contractor and the Surety shall be liable for any damage to the State resulting from the Contractor's failure or refusal to complete the Work in accordance with the Contract or his or her failure to complete the Work within the time provided by the Contract.

14.4 If the Director terminates the Contract for failure to prosecute the Work, in addition to any damages provided for by law, the delay shall occasion the payment of damages by Contractor which shall consist of Liquidated Damages until the Work is physically completed, plus any increased costs the Office incurs in completing the Work.

14.5 The Contract shall not be so terminated, nor the Contractor charged with resulting damage if:

(a) The delay in the completion of the Work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor including, but not restricted to, acts of God, acts of the public enemy, acts of another Contractor in the performance of a contract with the Office, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, unusually severe weather, or delays of subcontractors or suppliers arising from unforeseeable causes beyond the control

and without the fault or negligence of both the Contractor and such subcontractors or suppliers; and

(b) The Contractor shall notify the Director's Representative in writing of the causes of delay within fifteen (15) days from when the Contractor knew or ought to have known of any such delay.

14.6 The Director's Representative will ascertain the facts and the extent of the delay and extend the time for completing the Work when, in the Director's Representative's judgment, the findings of fact justify such an extension, and his or her findings of fact shall be final and conclusive unless within twenty (20) Days from the date of receipt of the decision, the Contractor serves upon the Director a written appeal by certified mail. Upon appeal, the decision of the Director shall be final and conclusive.

14.7 If after notice of termination of the Contract, it is determined for any reason that the Contractor was not in default or that the delay was excusable, the rights and obligations of the parties shall be the same as if the notice of termination had been issued pursuant to the termination for convenience clause.

14.8 The rights and remedies of the Office provided in this clause are in addition to any other rights and remedies provided by law or under this Contract, provided that damages for delay incurred by the Contractor shall be as specified in Articles 14.3 and 14.4.

14.9 The Office reserves the right to terminate this Contract in the event it is found that the certification filed by the Contractor in accordance with New York State Finance Law §139-k was intentionally false or intentionally incomplete. Upon such finding, the Office may exercise its termination right by providing written notification to the Contractor in accordance with the written notification terms of the Contract.

14.10 Liquidated Damages: The work represented in this Contract is part of a comprehensive program, undertaken by the Office on behalf of the People of the State of New York in the belief that the expenditures are justified by the benefits which accrue to the public. If the public does not get the full and complete use of facilities for which the expenditures are made, a resulting financial loss cannot be exactly computed. Accordingly, a deduction, indicated below or in the Notice to Bidders, will be made from the Contract price for every calendar day after the completion date specified in the Contract Documents for which the Contract is not completed in every detail. Said sum, because of the difficulty in determining accurately the loss to the State, is hereby fixed and agreed as the Liquidated Damages that the State will suffer by reason of such delay, and not as a penalty; such Liquidated Damages, as defined for this Project, are understood and agreed to be the actual cost of all extra inspection, salaries of contingent force, and other engineering expenses entailed upon the State as a result of such delay. The Liquidated Damages set forth herein apply only to a delay in completion of the Project and in no way are such damages to be interpreted as being the Office's exclusive remedy under the Contract or in Law.

SCHEDULE OF LIQUIDATED DAMAGES		
Original Total Contract Bid Price		Liquidated Damages per Calendar Day
From More Than	**To and Including**	
$0	$100,000	$500
$100,000	$500,000	$1,000
$500,000	$1,000,000	$1,500
$1,000,000	$2,000,000	$1,750
$2,000,000	$5,000,000	$2,000
$5,000,000	$10,000,000	$2,500
$10,000,000	$20,000,000	$4,000
$20,000,000		$7,000

14.11 Contractor Responsibility:

(a) Contractor shall at all times during the contract term remain a responsible vendor. Contractor agrees, if requested by OPRHP, to present evidence of its continuing legal authority to do business in New York State, its integrity, experience, ability, prior performance and organizational and financial capacity to carry out the terms of this contract.

(b) OPRHP reserves the right to suspend any or all activities under this contract, at any time, when OPRHP discovers information that calls into question the responsibility of Contractor. In the event of such suspension, Contractor will be given written notice outlining the particulars of such suspension. Upon issuance of such notice, Contractor must comply with the terms of the suspension order. Contractual activities may resume at such time as OPRHP issues a written notice authorizing resumption of contractual activities.

(c) Notwithstanding the provision of Article 14 of the contract pertaining to Termination and Revocation, upon written notice to Contractor and a reasonable opportunity to be heard with appropriate OPRHP staff, this contract may be terminated by OPRHP at Contractor's expense where Contractor is determined by OPRHP to be non-responsible. In such event, OPRHP may pursue available legal or equitable remedies for breach.

ARTICLE 15 – TERMINATION OF CONTRACTOR'S EMPLOYMENT FOR THE CONVENIENCE OF THE STATE OF NEW YORK

15.1 The Director may terminate this Contract whenever in the Director's judgment the public interest so requires by delivering to the Contractor a notice of termination specifying the extent to which performance of Work under the Contract is terminated and the date upon which such termination becomes effective. Upon receipt of the notice of termination, the Contractor shall act promptly to minimize the expenses resulting from such termination. The Office shall pay the Contractor the sum of:

(a) The costs actually incurred up to the effective date of such termination,

(b) The cost of settling and paying claims arising out of the termination of Work under subcontracts or orders exclusive of the amounts paid or payable on account of supplies or materials delivered or services furnished by the subcontractor prior to the effective date of the Notice of Termination of Work under this Contract, which amounts shall be included in the cost on account of which payment is made under (a) above, and

(c) The rate of profit and overhead on (a) and (b) as prescribed in Division 01- General Requirements. If the Contractor would have sustained a documentable loss on the entire Contract, had it been completed, no profit shall be included or allowed under this subparagraph and an appropriate adjustment shall be made reducing the amount of the settlement to reflect the indicated rate ofloss.

15.2 In no event shall the Contractor's compensation exceed the total Contract amount.

15.3 The amount of progress payments made to the Contractor prior to the date of termination was effective shall not be conclusive evidence of costs incurred, but progress payments shall be offset against any payment which the Office makes to the Contractor as a result of such termination.

ARTICLE 16 – DISPUTES

16.1 The Contractor shall submit notice of any dispute relating to the performance of this Contract to the Director's Representative no more than fifteen (15) days after he or she knew or should have known of the facts which are the basis of the dispute. The notice shall be in writing and shall be transmitted:

i. via certified or registered United States mail, return receipt requested;

ii. by facsimile transmission;

iii. by personal delivery;

iv. by expedited delivery service; or

v. by e-mail.

16.2 The Director's Representative shall acknowledge receipt of such notice by providing written acknowledgement to the Contractor; however, failure to provide written acknowledgment shall not be a breach of contract or in any way alter the Contractor's obligation to provide timely notice. The Contractor's notice shall identify the nature of the dispute; identify the person who rendered the decision or interpretation involved, and the date of the decision or interpretation with which the Contractor disputes, attaching a copy of such decision or interpretation; contain a statement of the contractual basis for the dispute; and identify the relief sought. The Contractor shall have a continual duty to promptly provide the Director's Representative with up to date information related to the dispute.

16.3 The Contractor agrees that Article 16 does not apply to any dispute which involves delay (see Article 14), acceleration, interference or any other act or omission constituting a breach of contract; any matter relating to extensions of time, bonuses or liquidated damages; to the value of any order on contract or field order; determination of Substantial Completion, determination that Punch List items have been completed, or to any termination for cause or convenience.

16.4 The Director's Representative shall reduce his or her decision to writing and furnish a copy thereof to the Contractor. The decision of the Director's Representative shall be final and conclusive unless within twenty (20) Days from the date of receipt of the decision, the Contractor serves upon the Director a written appeal by certified mail.

16.5 Upon appeal, the decision of the Director shall be final and conclusive. In connection with any appeal proceeding held pursuant to this Article, the Contractor shall be afforded an opportunity to be heard and to offer evidence in support of his or her appeal. Pending final determination of a dispute hereunder, the Contractor shall proceed diligently with the performance of the Contract in accordance with the Director's Representative's decision. Nothing in this Contract shall be construed as making final the decision of any administrative official upon a question of law.

ARTICLE 17 – STATUTORY REQUIREMENTS FOR THE UTILIZATIONS OF MINORITY AND WOMEN OWNED BUSINESS ENTERPRISES

17.1 Pursuant to Section 313 of Article 15-A of the Executive Law of the State of New York, the Director of the Division of Minority and Women's Business Development has promulgated rules and regulations (Parts 140 through 145 of Subtitle N of Title 9 New York Code of Rules and Regulations) (the "Regulations") for the purposes of ensuring that certified Minority and Women owned Business Enterprises shall be given the opportunity for meaningful participation in the performance of State contracts and to facilitate the award of a fair share of State contracts and subcontracts to such business enterprises.

17.2 The Contractor shall make a good faith effort to solicit active participation in the Work by enterprises identified in the directory of certified businesses obtainable from the Division of Minority and Women's Business Development, New York State Department of Economic Development.

17.3 The Contractor agrees, as a material condition of this contract, to be bound by the provisions of Section 316 of Article 15-A of the Executive Law of the State of New York, which relates to the resolution of disputes, which may arise under this Article.

17.4 The Contractor agrees to include the provisions of Articles 17.2 and 17.3 of these General Conditions in every subcontract it enters into as to Work in connection with this Contract in such a manner that the provisions will be binding upon such Subcontractor. However, the provisions of this paragraph shall not be binding upon the Contractor or its subcontractors in the performance of work or the provision of services that are unrelated, separate or distinct from this Contract as expressed by its terms.

17.5 The Regulations referred to in Article 17.1 of these General Conditions require, among other things, that a bidder or proposer for a State contract submit a utilization plan which shall identify certified Minority or Women Owned Business Enterprises which the bidder/proposer intends to use in connection with the performance of the proposed State contract. Such a utilization plan shall be submitted after bids are opened but prior to contract award.

(a) Pursuant to the Regulations: (1) the Commissioner may require the submission by the Contractor of compliance reports relating to the implementation of and adherence to the utilization plan in performing the Contract; (2) the Commissioner shall allow the Contractor to apply for a partial or total waiver of the Minority and Women Owned Business participation requirements; (3) the Contractor may file a complaint with the Executive Director of the Division of Minority and Women's Business Development regarding a denial of a request for waiver of Minority and Women Owned Business participation requirements; (4) the Commissioner may file a complaint with the Executive Director of the Division of Minority and Women's Business Development in the event the Contractor fails to comply with the Minority and Women Owned Business participation requirements set forth in this Contract; and (5) the Commissioner may disqualify the Contractor's bid or proposal as being non-responsive for failure to remedy notified deficiencies contained in the Contractor's utilization plan for an administrative hearing on the record, reviewing all grounds for the disqualification state by the Commissioner and taking into consideration all of the criteria set forth in § 313 of the Executive Law.

(b) The Contractor is referred to the entirety of the provisions of Section 316 of Article 15-A of the Executive Law of the State of New York and of the Regulations for the Contractor's full familiarization with their applicable provisions as terms of this Contract.

ARTICLE 18 – SUBCONTRACTS

18.1 Before any part of the Contract shall be sublet, the Contractor shall submit to the Director's Representative in writing the name of each proposed Subcontractor and supplier and obtain the Director's Representative's written consent to such Subcontractor and supplier. The names shall be submitted in ample time to permit acceptance or rejection of each proposed Subcontractor by the Director's Representative without causing delay in the work of the Project.

18.2 If the value of the Subcontract is $10,000 or more, the Contractor shall promptly furnish a "NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE FOR PROFIT CONSTRUCTION (CCA-2)" for each Subcontractor and receive approval of the same prior to delivery of materials or performance of work from this Subcontractor.

18.3 The Contractor's use of subcontractors shall not diminish the Contractor's obligations to complete the work in accordance with the Contract. Each Contractor shall control and coordinate the work of his or her Subcontractors.

18.4 The Contractor shall be responsible for informing the Subcontractors of all the terms, conditions and requirements of the Contract Documents including, but not limited to the General Conditions and the Detailed Specifications.

ARTICLE 19 - COORDINATION OF SEPARATE CONTRACTS (WICKS PROJECTS)

19.1 The Office may award other contracts related to the Work. In that event, the Contractor shall coordinate his or her work with the Work of other contractors in such manner as the Office may direct. All contractors shall exchange working drawings, examine them and report any interferences or objections to the Director's Representative, in order to avoid delays. Each contractor shall control and coordinate the work of his or her Subcontractors, if any. The Office shall approve or require the modification of the work schedules of all contractors to the end that the Project may be progressed as expeditiously as the case permits.

19.2 If any part of the Work depends for proper execution or results upon the work of any other contractor, the Contractor shall inspect and promptly report in writing to the Director's Representative any defects in such work. The failure to inspect and report shall constitute an acceptance of the other contractor's work as fit and proper for the reception of the Contractor's Work.

19.3 The Director's Representative shall issue appropriate directions and take such other measure to coordinate and progress the Work as may be reserved to the Office in the Contract, and which an ordinarily reasonable project owner in similar circumstances would be expected to take. However, the Office shall not be liable for mere errors in judgment as

to the best course of action to adopt among the alternatives available in any given instance.

19.4 The award of more than one contract for the Project requires sequential or otherwise interrelated contractor operations and will involve inherent coordination in the progress of any individual contractor's work. Accordingly, the Office cannot guarantee the unimpeded operations of any contractor. The Contractor acknowledges these conditions and understands that he or she shall bear the risk of all ordinary delays caused by the presence or operations of other contractors engaged upon the project, and ordinary delays attendant upon any Office approved construction schedule. Should a contractor sustain damage through any act or omission of any other contractor, the contractor shall have no claim against the Office.

19.5 The Office shall not be liable for ordinary delays in any case nor for extraordinary delays that occur due to any contractor's failure to comply with directions of the Office or because of the neglect, failure or inability of any contractor to perform his or her work efficiently.

19.6 Any claim for extraordinary delay caused by an allegedly unreasonable or arbitrary act, or failure to act, by the Director's Representative in the exercise of his or her responsibility for supervision and coordination of the Work, shall be waived, released and discharged unless the Contractor whose work is impeded or delayed thereby, shall give notice in writing to the Director's Representative as promptly as possible and in sufficient time to permit the Director's Representative to investigate appropriate instructions.

19.7 The neglect or refusal of a Contractor to comply with supervisory directions issued by the Director's Representative pursuant to his or her responsibility for supervision of the Work shall constitute a failure to progress the work diligently in accordance with the Contract requirements and shall justify withholding payments otherwise due, or termination of the Contract as detailed in Article 15.

19.8 The Contractor shall indemnify the Office for damages recovered against the Office by another contractor to the extent that any such claim or judgment is the proximate cause of the Contractor's failure to progress the work in accordance with Contract requirements.

ARTICLE 20 – RESPONSIBILITY FOR DAMAGE AND INDEMNIFICATION

20.1 The Contractor shall faithfully perform and complete all of the work required by the Contract, and has full responsibility for the following risks:

(a) Loss or damage, direct or indirect; to the Work including the building or structure in which the Work is being performed, or any other construction in progress, whether being performed by any other contractor or by the Office, or to any plant, equipment, tools, materials or property furnished, used, installed, or received by the Director's Representative under this Contract or any other contract. The Contractor shall bear all such risk of loss or damage, until all of the Work covered by the Contract has been finally accepted. In the event of such loss or damage, the

Contractor shall forthwith repair, replace, and make good any such loss or damage without additional costs.

(b) Injury to persons (including death resulting therefrom), or damage to property caused by an occurrence arising out of the performance of this Contract for which the Contractor may be liable under any theory of law.

20.2 Contractor assumes all risks in the performance of all activities authorized by this Contract and agrees to defend, indemnify and hold harmless the People of the State of New York, the Office, their officers, employees, agents and assigns (hereinafter, collectively the "Indemnitees") from and against any and all claims, suits, losses, damage or injury to persons or property of whatsoever kind and nature, whether direct or indirect, caused or contributed to by Contractor and Contractor's sub-contractors, vendors, material suppliers, employees, agents, invitees and guests, and/or arising out of Contractor's conduct and/or Contractor's performance pursuant to this Contract, provided however that Contractor's indemnity shall not extend to any claims, liabilities, losses, damages, expenses, accidents or occurrences arising out of, relating to, or in connection with: (i) the negligence of any Indemnitee; or (ii) the Indemnitees' ordinary upkeep and maintenance of the Park and its grounds and facilities outside of the Premises. Contractor shall defend at its sole cost and expense any action commenced for the purpose of asserting any claim of whatsoever character arising out of this Contract. Contractor's responsibility under this section shall not be limited to the required or available insurance coverage.

20.3 For all purposes hereunder, the Office shall not be liable for any injury, loss or damage to Contractor, its agents, servants, sub-contractors, vendors, invitees and guests, or to any person happening on, in or about the Premises or its appurtenances, nor for any injury or damage to the Premises or to any property belonging to Contractor or to any other person, that may be caused by fire, theft, breakage, vandalism or any other use or misuse or abuse of any portion of the Premises, including but not limited to any common areas, sidewalks, roads, or water in or adjacent to the Premises, or that may arise from any other cause whatsoever, unless, and only to the extent of the proportion of which any such injury, loss or damage is determined to be caused by the negligence of the Office.

20.4 The Office shall not be liable to Contractor, its agents, contractors, vendors, invitees and guests, or any other person, for any failure of water supply, gas supply or electric current, nor for any injury or damage to any property of Contractor or any other person or to the Premises, caused by or resulting from spill or release of gasoline, oil, steam, gas, or electricity, or caused by leakage of any substance from pipes, appliances, sewers or plumbing works, or caused by hurricane, flood, tornado, wind or similar storm or disturbance, or caused by water, rain or snow that may leak or flow from the street, sewers or subsurface areas, or from any part of the Premises or any body of water within or adjacent to the Premises, or caused by any public or quasi-public work, unless, and only to the extent of the proportion by which any such injury, loss or damage is determined to be caused by the negligence of the Office.

20.5 The Office may retain such monies from the amount due the Contractor as may be

necessary to satisfy any claim for damages recovered against the State. The Contractor's obligations under this paragraph shall not be deemed waived by the failure of the Office to retain the whole or any part of such monies due the Contractor, nor shall such obligation be deemed limited or discharged by the enumeration or procurement of any insurance for liability for damages imposed by law upon the Contractor, Subcontractor or the State.

20.6 The Contractor agrees to make no claim for damages in the performance of the Contract occasioned by any act or omission to act of the Office or its representatives and agrees that any such claim shall be fully compensated for by an extension of time to complete performance of the Work as provided herein.

20.7 The Contractor shall not create or cause to be created any lien, encumbrance or charge upon the Premises, the Office or any part thereof. If any mechanics, laborers or similar statutory or common law lien (including tax liens, provided that the underlying tax is an obligation of Contractor by law or by a provision of this Contract) caused or created by Contractor is filed against the Premises, or if any public improvement lien created or caused to be created by Contractor is filed against any assets of, or funds appropriated by the Office, then Contractor shall, within forty-five (45) days after receipt of notice of the lien, cause it to be vacated or discharged of record by payment, deposit, bond, court order, or otherwise. However, Contractor shall not be required to discharge any such lien if Contractor shall have: (i) furnished the Office with, at Contractor's option, a cash deposit, bond, letter of credit (from an institutional lender in a form satisfactory to the Office), or other security reasonably satisfactory to the Office in an amount sufficient to discharge the lien and all applicable interest, penalties and/or costs; and (ii) brought an appropriate legal proceeding to discharge the lien and is prosecuting such proceeding with diligence and continuity; except that if despite Contractor's efforts to discharge the lien the Office reasonably believes the lien is about to be foreclosed and so notifies Contractor, Contractor shall immediately cause such lien to be discharged of record or the Office may use the security furnished by Contractor in order to discharge the lien.

ARTICLE 21 - INSURANCE

21.1 General Requirements. During the term of the Contract, and any renewal or extensions thereof, the Contractor shall maintain in force, at its sole cost and expense, policies of insurance as required in this Article ("Insurance"). All Insurance shall be written by companies that have an A.M. Best Company rating of "A-" Class "VII" or better. In addition, companies writing the Insurance should be licensed or authorized by the New York State Department of Financial Services to issue the Insurance in the State of New York. OPRHP may, at its sole discretion, accept Insurance written by a non-authorized company or companies when certificates and/or other policy documentation are accompanied by a completed Excess Lines Association of New York (ELANY) Affidavit or other documents demonstrating the company's strong financial rating (such companies identified in the preceding sentences, whether authorized or non-authorized, referred to hereafter as "Insurer"). If during the term of a policy, the company's A.M. Best rating falls below "A-," Class "VII," the Insurance must be replaced, on or before the renewal date of the policy with Insurance that meets the requirements above.

(a) The Contractor shall deliver to OPRHP evidence of the Insurance in a form acceptable to OPRHP. Policies must be written in accordance with the requirements

of this Article, as applicable. Acceptance and/or approval by OPRHP does not, and shall not be construed to, relieve the Contractor of any obligations, responsibilities, or liabilities under the Contract.

(b) The Contractor shall not take any action or omit to take any action that would suspend or invalidate any of the required coverages during the term of the Contract, and any extension or holdover thereof.

21.2 Conditions of Coverage. All Insurance must comply with the following conditions:

(a) Coverage Types and Policy Limits. The types of coverage and policy limits required from the Contractor are specified below in Section 21.3, Specific Coverages and Limits.

(b) Policy Forms. Except as otherwise specifically provided herein, or agreed to in writing by OPRHP, all Insurance shall be written on an occurrence basis. Under certain circumstances, OPRHP may elect to accept policies written on a claims-made basis provided that, at a minimum, the policy remains in force throughout the performance of the services and for three (3) years after completion of the Contract. If the policy is cancelled or not renewed during that time, the Contractor must purchase, at its sole expense, tail coverage sufficient to cover the 3-year period after completion of the Contract. Written proof of this extended reporting period must be provided to OPRHP prior to the policy's expiration or cancellation.

(c) Certificates of Insurance/Notices. The Contractor shall provide a Certificate or Certificates of Insurance, in a form satisfactory to OPRHP (i.e., an ACORD Certificate), before commencing any Work under the Contract, and thereafter, pursuant to the timelines set forth in Section 21.2(p) below. Certificates shall reference the Contract number and shall name OPRHP as the Certificate holder. Certificates shall be mailed to the:

ATTN: Capital Bureau
New York State Office of Parks, Recreation and Historic Preservation
625 Broadway
Albany, NY 12238

(d) Certificates of Insurance shall:

i. Be in a form acceptable to OPRHP an in accordance with the New York State Insurance Law (i.e., an ACORD certificate);

ii. Be filled out completely, and include without limitation, the date of issuance, names of the insured, insurer, insurer's National Association of Insurance Commissioner's (NAIC) number, policy numbers, coverage period, any deductible or self-insured retention amounts, each occurrence and aggregate limits, and exclusions or additional coverages, or additional insured endorsements to the policy;

iii. Disclose any deductible, self-insured retention, aggregate limit or any exclusion to the policy that materially changes the coverage required by the Contract;

iv. Refer to the Contract by number (i.e. D00XXXX);

v. Be signed by an authorized representative of the Insurer; and

vi. Include the following provision:

"Consistent with the requirements of Contract D00XXXX, The People of the State of New York and The New York State Office of Parks, Recreation and Historic Preservation, and their officers, agents, and employees are endorsed to all policies of liability insurance as Additional Insured."

Simply designating OPRHP as a certificate holder shall not constitute compliance with this Article.

(e) Only original documents (Certificate(s) and any endorsements or other attachments) or electronic versions of the same that can be directly traced back to the Insurer, Agent or Broker via e-mail distribution or similar means will be accepted.

(f) OPRHP has not requested that the Contractor submit copies of its entire Insurance policies. Generally, OPRHP only requests specific documentation regarding proof of coverage, such as Certificates and endorsements. The Contractor is asked to refrain from submitting entire Insurance policies, unless specifically requested by OPRHP. If an entire Insurance policy is submitted but not requested, OPRHP shall not be obligated to review and shall not be chargeable with knowledge of its contents. In addition, submission of an entire Insurance policy not requested by OPRHP does not constitute proof of compliance with the Insurance requirements and does not discharge the Contractor from submitting the documentation required by this Article.

(g) Primary Coverage. All liability Insurance policies shall provide that the required coverage shall be primary and non-contributory to other insurance available to OPRHP. Any other insurance maintained by OPRHP shall be excess of and shall not contribute with the Contractor's Insurance. For purposes of clarity, no insurance policies maintained by any Additional Insured, whether primary or excess, and which also apply to a loss covered hereunder, shall be called up on to contribute to a loss until Contractor's primary and excess liability policies are exhausted.

(h) Claims Made Policies. If any of the required policies provide coverage on a claims-made basis, then:

i. The retroactive date must be shown and must be before the date the Work under the Contract is to commence.

ii. Insurance must be maintained, and evidence of insurance provided, for at least three (3) years after completion of the Work under the Contract.

iii. If coverage is canceled or non-renewed and not replaced with another claims-made policy form with a retroactive date prior to the date the work under the Contract commenced, the Contractor must purchase extended reporting coverage for a minimum of three (3) years after completion of the Work.

(i) Breach for Lack of Proof of Coverage. The term of the Contract shall not commence if the coverage provisions and limits of the Insurance provided by the Contractor do not meet the provisions and requirements of this Article or proof of compliance is not provided to OPRHP. In addition, the failure to comply with the requirements of this Article at any time during the term of the Contract, and any

extension or holdover thereof, shall be considered a breach of Contract and shall allow OPRHP to avail itself of all remedies available under the Contract, at law or in equity.

(j) Self-Insured Retention/Deductibles. Certificates of Insurance must indicate the applicable deductibles or self-insured retentions for each listed policy. deductibles or self-insured retentions above $100,000.00 are subject to approval from OPRHP. Such approval shall not be unreasonably withheld, conditioned, or delayed. The Contractor shall be solely responsible for all claim expenses and loss payments within the deductible or self-insured retentions. If the Contractor is providing the required insurance through self-insurance, evidence of the financial capacity to support the self-insurance program along with a description of that program, including, but not limited to, information regarding the use of a third-party administrator shall be provided upon request.

(k) Subcontractors. Prior to the commencement of any work by a subcontractor, the Contractor shall require such subcontractor to procure Insurance that comply with the requirements of this Article and maintain the same in force during the term of any work performed by that subcontractor. An Additional Insured Endorsement CG 20 38 12 19 (or the equivalent) evidencing such coverage shall be provided to the Contractor prior to the commencement of any work by a subcontractor, pursuant to the timelines set forth in Section 21.2(p) below, as applicable, and to OPRHP upon request. For subcontractors that are self-insured, the subcontractor shall be obligated to defend and indemnify the above-named Additional Insureds with respect to required liability insurance policies, in the same manner that the subcontractor would have been required to pursuant to this section had the subcontractor obtained such insurance policies

(l) Additional Insured. The Contractor shall cause to be included in each of the liability policies required below, ISO form CG 20 10 11 85 (or a form or forms that provide equivalent coverage, such as the combination of the CG 20 10 12 19 and CG 20 37 12 19) and form CA 20 48 10 13 (or a form or forms that provide equivalent coverage), naming as Additional Insureds: The People of the State of New York, The New York State Office of Parks, Recreation and Historic Preservation, and their officers, agents, and employees. An Additional Insured Endorsement evidencing such coverage shall be provided to OPRHP prior to the commencement of the Contractor and pursuant to the timelines set forth in Section A.14. below. A blanket Additional Insured Endorsement CG 20 38 12 19 (or the equivalent) evidencing such coverage for Commercial General Liability Insurance is also acceptable. If the Contractor is self-insured, the Contractor shall be obligated to defend and indemnify the above-named Additional Insureds with respect to required liability insurance policies, in the same manner that the Contractor would have been required to pursuant to this Article had the Contractor obtained such policies.

(m) Excess/Umbrella Liability Policies. Required liability insurance coverage limits may be provided through a combination of primary and excess liability and umbrella liability policies. If coverage limits are provided through excess liability and umbrella liability policies, then a “Schedule of Underlying Insurance,” or other such schedule, listing policy information for all underlying insurance policies

(Insurer, policy number, policy term, coverage, and limits of insurance), including proof that the excess liability and umbrella liability insurance follows form, must be provided upon request.

(n) Notice of Cancellation or Non-Renewal. Policies shall be written to include the requirements for notice of cancellation or non-renewal in accordance with the New York State Insurance Law. Within five (5) business days of receipt of any notice of cancellation or non-renewal of Insurance, the Contractor shall provide OPRHP with a copy of any such notice received from an Insurer together with proof of replacement coverage that complies with the requirements of this section.

(o) Policy Renewal/Expiration. Upon policy renewal/expiration, evidence of renewal or replacement of coverage that complies with the requirements of this section shall be delivered to OPRHP. If, at any time during the term of the Contract, and any extension or holdover thereof, the coverage provisions and limits of the policies required herein do not meet the provisions and limits set forth in this Article, or proof thereof is not provided to OPRHP, OPRHP shall have the right to avail itself of all remedies available under the Contract, at law or in equity.

(p) Deadlines for Providing Insurance Documents after Renewal or Upon Request. As set forth herein, certain documents must be provided to OPRHP after renewal or upon request. This requirement means that the Contractor shall provide the applicable document to OPRHP as soon as practicable, but in no event later than the following time periods:

i. For Certificates of Insurance: five (5) business days from the request or renewal, whichever is later;

ii. For information on self-insurance of self-insurance retention programs: fifteen (15) calendar days from request or renewal, whichever is later;

iii. For other requested documentation evidencing coverage: fifteen (15) calendar days from request or renewal, whichever is later.

iv. For Additional Insured and waiver of subrogation endorsements: thirty (30) calendar days from request or renewal, whichever is later.

Notwithstanding the foregoing, if the Contractor shall have promptly requested the Insurance documents from its broker or insurer and shall have thereafter diligently taken all steps necessary to obtain such documents from its insurer and submit them to OPRHP, OPRHP shall extend the time periods set forth above for a reasonable period, that shall in no event exceed thirty (30) calendar days from request or renewal, whichever is later.

21.3 Specific Coverages and Limits. Prior to performing any Work under this Contract, the Contractor shall obtain, at its sole cost and expense, all insurance required in Appendix C – Specific Insurance Coverages and Limits

ARTICLE 22 - COMPLETION AND ACCEPTANCE

22.1 The Office shall have the right to take possession of or use any completed or partially

completed portion of the Work. Written notice of such possession shall be given to the Contractor by the Director's Representative. The notice shall identify the date when such possession shall commence and the area, equipment or system involved. Written notice shall also be given to the Contractor for any cessation of such possession by the State. Such possession or use shall not be deemed an acceptance of any Work. While the State is in such possession, the Contractor, notwithstanding the provisions of Article 20 of the Contract, shall be relieved of the responsibility for the risk of loss or damage to the Work except for that resulting from the Contractor's fault or negligence. If such possession or use by the State delays the progress of the Work or causes additional expense to the Contractor, an adjustment in the Contract price and/or the time of completion shall be made and the Contract modified in writing accordingly. The provisions relating to an adjustment in the Contract price or the time of completion contained in this paragraph shall not apply to occupancy or possession after Substantial Completion.

22.2 Contractor will notify the Director's Representative in writing when Contractor believes that the Work is Substantially Complete and request that the Director's Representative issue a Certificate of Substantial Completion. Contractor shall prepare and submit at the same time as the notice required in this Article 22.2, an initial list of items to be completed or corrected before final payment.

22.3 Upon receipt of the Contractor's list, the Director's Representative or their designee will inspect the Work to determine whether the Work is Substantially Complete in their sole discretion. Such determination shall not be subject to any dispute provisions available under this Contract.

(a) If Director's Representative or their designee determines that the Work is not Substantially Complete, the Director's Representative will notify the Contractor in writing of the Work that must be sufficiently complete to deem the Work Substantially Complete. Contractor will promptly complete all Work contained within that notice and follow the same process set forth in this Article for notifying Director's Representative upon such completion.

(b) If the Director's Representative or their designee determines that the Work is Substantially Complete, the Director's Representative will deliver to the Contractor a Certificate of Substantial Completion setting forth the date of Substantial Completion and Punch List. The Punch List may include Work additional to or removed from the Contractor's initial list provided under Article 22.2.

(c) Upon issuance of the Certificate of Substantial Completion, Contractor shall submit a payment application for Substantial Completion under Article 23.6.

22.4 The Director's Representative will update the Punch List as the remaining items of Work are satisfactorily completed or corrected.

22.5 Contractor will notify the Director's Representative in writing when the Contractor believes that all items on the Punch List have been completed or corrected.

22.6 Upon receipt of the Contractor's notification that the Punch List has been completed, the Director's Representative or their designee will inspect the Punch List items to determine whether the Punch List has been completed. Such determination shall not be subject to any dispute provisions available under this Contract.

(a) If Director's Representative or their designee determines that the Punch List is not completed, the Director's Representative will notify the Contractor in writing of the Punch List items that must be completed or corrected to deem the Punch List completed. Contractor will promptly complete all items contained within that notice and follow the same process set forth in this Article for notifying Director's Representative upon such completion.

(b) If the Director's Representative or their designee determines that the Punch List is completed, the Director's Representative will deliver to the Contractor a Certificate of Acceptance setting forth the Physical Completion Date.

(c) Upon issuance of the Certificate of Acceptance, Contractor shall submit a payment application for final payment under Article 23.7.

ARTICLE 23 – PAYMENT

23.1 The Contractor may submit monthly payment applications, or more frequently if permitted by making a request in writing to the Director's Representative, a requisition for a progress payment for Work performed and materials furnished to the date of the requisition, less any amount previously paid to the Contractor. Except as otherwise provided by this Contract, the Director's Representative shall approve and pay the requisition for the progress payment less an amount necessary to satisfy any claims, liens or judgments against the Contractor which have not been suitably discharged and less any amount authorized by law or Contract to be retained. The requisition shall be in such form and supported by such evidence as the Director's Representative may reasonably require.

23.2 The Contractor agrees that, if the Contract Documents for this Contract includes Performance and Payment Bonds, the State shall retain five percent of the amount of each progress payment in accordance with Section 139-f of the State Finance Law. The Contractor further agrees that, it the Contract Document for this Contract do not include Performance and Payment Bonds, the State shall retain ten percent of the amount of each progress payment in accordance with Section 139-f of the State Finance Law.

23.3 All requisitions for payments shall be submitted to the designated payment office. The designated payment office shall notify the Contractor of any defect in any requisition within twenty (20) days of the receipt of such requisition and shall complete the review and audit of each complete requisition within forty-five (45) days of receipt thereof.

23.4 The Director's Representative may refuse to approve the requisition or a portion thereof if in the Director's Representative's judgment the Contractor is failing or refusing to prosecute the Work in accordance with the Contract.

23.5 Payment may be made for approved materials not yet incorporated in the Work in accordance with the Schedule of Values and Section 139(f) of the State Finance Law. Requisitions, which require payment for materials, shall be accompanied by a notarized statement certifying that the materials for which payment is requisitioned are the Contractor's property and have been suitably stored and insured. The Contractor shall provide such evidence of the value of the material stored as the Director's Representative may reasonably require. The Contractor shall have full

continuing responsibility to insure and protect such materials and maintain them in proper condition to fulfill Contract requirements when installed.

23.6 When the Work is Substantially Completed, the Contractor shall submit to the Director's Representative a requisition for payment of the remaining amount of the Contract balance. The Contractor shall attach a copy of the Certificate of Substantial Payment to such requisition. Upon receipt of such requisition the Director's Representative shall, except as otherwise provided by this Contract, approve and pay the remaining amount of the Contract balance less two times the value of any remaining items identified on the Punch List, and an amount necessary to satisfy any claims, liens or judgments against the Contractor which have not been suitably discharged. As the remaining items of Work are satisfactorily completed or corrected, the Director's Representative shall approve, upon receipt of a requisition, for these remaining items less an amount necessary to satisfy any claims, liens or judgments against the Contractor, which have not been suitably discharged.

23.7 When the Punch List is completed, the Contractor shall submit to the Director's Representative a requisition for final payment. The Contractor shall attach a copy of the Certificate of Acceptance to such requisition. The final payment will not be issued until all the labor and material required by the Contract has been furnished and completed, all disputes relating to the performance of the Contract considered and disposed of and all accounts for extra work and materials and allowances for omissions have been rendered and considered.

23.8 The final payment will constitute the acceptance of the Work by the Office except as to Work thereafter found to be defective. The date of the Certificate of Acceptance shall be regarded as the date of acceptance of the Work.

23.9 No payment will be made to a foreign Contractor until the Contractor furnishes satisfactory proof that he or she has paid all taxes required of foreign Contractors under the provisions of the Tax Law. A foreign Contractor as used in this paragraph shall mean a Contractor denominated "foreign" by the Tax Law.

23.10 Acceptance by the Contractor, or by anyone claiming by or through him or her, of the final payment shall constitute and operate as a release to the State from any and all claims of any liability to the Contractor for anything theretofore done or furnished for or relating to or arising out of the work done thereunder, and for any prior act, neglect, or default on the part of the State or any of its officers, agents, or employees unless the Contractor serves a detailed and verified statement of claim upon the Office not later than 40 days after the mailing of such final payment. Such statement shall specify the items and details upon which the claim will be based and any such claim shall be limited to such items. Should the Contractor refuse to accept the final payment as tendered by the Comptroller, it shall constitute a waiver of any right to interest thereon.

23.11 The Contractor is advised that consistent with Subdivision 3-a, of Section 220 of the Labor Law, the filing of certified payroll records is a condition precedent to payment of any sums due and owing to any person performing work on this project. The failure to file pursuant to this section will result in a payment delay until the filing occurs.

23.12 The Contractor acknowledges that it shall not receive payment on any requests for payment unless the Contractor complies with the Comptroller's electronic payment deposit procedures. Payments requested by the Contractor shall only be facilitated via electronic deposit, except where the Commissioner has expressly authorized payment by paper check.

ARTICLE 24 – AUDITS AND RECORDS

24.1 The Contractor shall maintain on the Site the original certified payrolls or certified transcripts thereof, subscribed and affirmed by the Contractor and all Subcontractors as true under the penalties of perjury, showing the hours and days worked by each worker, laborer or mechanic, the occupation at which he or she worked, the hourly wage rate paid and the supplements paid or provided. The Contractor shall maintain with the payrolls or transcripts thereof, the statements signed by each worker pursuant to Article 25 of the General Conditions.

24.2 The Director's Representative, the Comptroller and their representatives who are employees of the State shall have the right to examine all books, records, documents, and other data of the Contractor, any Subcontractor, materialmen or suppliers relating to the bidding, pricing or performance of this Contract or any change or modification thereto for the purpose of evaluating the accuracy, completeness, and currency of the cost or pricing data submitted. This right of examination shall extend to all documents necessary to permit adequate evaluation of the cost or pricing data submitted along with the computations and projections used therein.

24.3 The above materials shall be made available at the office of the Contractor, Subcontractors, materialmen or suppliers at all reasonable times for inspection, audit or reproduction until the expiration of six (6) years from the date of the final certificate for the Contract.

24.4 If this Contract is completely or partially terminated, the records relating to the Work terminated shall be made available for a period of six (6) years from the date of any resulting final settlement.

24.5 Records that relate to the Disputes Clause of this Contract or litigation or the settlement of claims arising out of the performance of this Contract shall be made available until the disposal of such appeals, litigation or claims.

24.6 The Contractor shall insert a clause containing all of the provisions of Article 24 in all subcontracts or purchase orders issued hereunder.

24.7 The Contractor shall make available to the Director, upon written request, all records required to be kept by Article 3-A of the Lien Law. The failure to provide said records upon the receipt of the written request shall bar any recovery for claimed extra or additional costs under this Contract.

ARTICLE 25 – LABOR LAW AND PREVAILING WAGES NOTIFICATIONS PROVISIONS

25.1 In addition to any other provisions of this Contract in relation to prevailing wage rates, the Contractor shall be responsible for the certain notifications.

25.2 The Contractor shall post, in a location designated by the Office, a copy of the New York State Department of Labor schedules of prevailing wages and supplements for this Project, a copy of all re-determinations of such schedules for the Project, all other notices required by law to be posted at the Site, the Department of Labor notice that this Project is a public work project on which each worker is entitled to receive the prevailing wages and supplements for the occupation at which he or she is working, and all other notices which the Office directs the Contractor to post. The Contractor shall provide a surface for such notices, which is satisfactory to the Office. The Contractor shall maintain such notices in a legible manner and shall replace any notice or schedule that is damaged, defaced, illegible or removed for any reason. The Contractor shall post such notices before commencing any Work on the Site and shall maintain such notices until all Work on the Site is complete.

25.3 The Contractor shall distribute to each worker for this Contract a notice, in a form provided by the State, that this project is a public work project on which each worker is entitled to receive the prevailing wage and supplements for the occupation at which he or she is working. Worker includes employees of Contractor and all Subcontractors and all employees of suppliers entering the Site. Such notice shall be distributed to each worker in accordance with Labor Law 220 3-a.

25.4 In addition to the requirements of Appendix A, paragraph 6 entitled "Wage and Hours Provisions", the Contractor is responsible for any additional costs related to new determinations of the wage rates. The annual determination of the prevailing rates of wages and supplements are usually published on May 31st of each year and are in effect July 1st through June 30th. New determinations shall supersede the original schedule or any prior issued annual determination. Any rate change from a previously issued determination becomes effective July 1st, regardless of whether the new determination has been received by the Contractor.

ARTICLE 26 - STATUTORY REQUIREMENTS FOR RESTRICTIONS ON CONTACTS DURING THE PROCUREMENT PROCESS AND DISCLOSURE OF CONTACTS AND RESPONSIBILITY OF OFFERERS MISCELLANEOUS PROVISIONS

26.1 New York State Finance Law §139-k requires that every procurement contract award subject to the provisions of State Finance Law §139-k or §139-j shall contain a certification by the Offerer that all information provided to the procuring governmental agency with respect to State Finance Law §139-k is complete, true and accurate. The Contractor shall provide that certification in his or her contract or agreement.

26.2 New York State Finance Law

(a) New York State Finance Law § 139-k(2) requires the Office to obtain specific information regarding prior non-responsibility determinations. This information must be collected in addition to the information that is separately obtained pursuant

to State Finance Law § 163 (9). In accordance with State Finance Law § 139-k, an Offerer must be asked to disclose whether there has been a finding of non-responsibility made within the previous four (4) years by any Governmental Entity due to: (a) a violation of State Finance Law § 139-j or (b) the intentional provision of false or incomplete information to a Governmental Entity.

(b) As part of its responsibility determination, State Finance Law § 139-k(3) mandates consideration of whether an Offerer fails to timely disclose or complete information regarding the above non-responsibility determination. In accordance with law, no procurement contract shall be awarded to any Offerer that fails to timely disclose accurate or complete information under this section, unless a finding is made that the award of a procurement contract to the Offerer is necessary to protect public property or public health safety, and that the Offerer is the only source capable of performing the required Work within the necessary timeframe. The required forms to be completed by the Offerer must be submitted to the Office.

ARTICLE 27 – EMBODIED CARBON DISCLOSURE & CLEAN CONCRETE COMPLIANCE

27.1 Executive Order 22: Leading by Example: Directing State Agencies to Adopt a Sustainability and Decarbonization Program (EO 22) requires the disclosure of embodied carbon that will result from all OPRHP construction projects costing over $1 million that use certain minimum quantities of concrete mixes, asphalt mixes, steel, and glass ("Covered Construction Materials") as those quantities are set forth in the GreenNY Council Embodied Carbon Guidance. The GreenNY Council Embodied Carbon Guidance is available here: https://ogs.ny.gov/executive-order-22-embodied-carbon-guidance. Contractor warrants that Contractor has reviewed and is familiar with all GreenNY Council Embodied Carbon guidance and/or guidelines.

27.2 Contractor shall be required to submit EPDs for all Covered Construction Materials, if available, used in the Project. EPDs must be Product Specific Type III (Third-Party Reviewed), in adherence with ISO 14025 Environmental labels and declarations, ISO 14044 Environmental management-life cycle assessment, and ISO 21930 Core rules for environmental product declarations of construction products and services. Digitized EPDs can be found on EPD databases and sent as a link to the Director's Representative as part of the submittals process and in relation to the disclosure required in this Article 27.2.

27.3 For Covered Construction Materials, Contractors shall disclose with each payment application, the exact Covered Construction Materials and estimated quantities used in the Project whether or not an EPD exists for that particular material/product.

27.4 Section 136-d ("SFL § 136-d") of the State Finance Law requires the Office of General Services ("OGS") to establish guidelines requiring the procurement of low embodied carbon concrete on projects deemed appropriate by OGS. The NYS Buy Clean Concrete Guidelines established by OGS require that building construction projects costing over $1 million that use 50 or more cubic yards of concrete procure low embodied carbon concrete that has a Global Warming Potential ("GWP") value below the maximum GWP limits set forth in the Guidelines. Contractor warrants that Contractor has reviewed and is familiar with the NYS Buy Clean Concrete Guidelines available here: https://ogs.ny.gov/nys-buy-clean-concrete-

guidelines-0.

27.5 Contractor shall be required to certify, with the product submittal, that all procured concrete utilized on the project meet the minimum standards set forth in the NYS Buy Clean Concrete Guidelines, which include submission of an acceptable EPD with a GWP lower than the maximum limit. If Contractor is unable to meet the minimum standards for a concrete mix, Contractor must obtain an exemption from OPRHP to be provided in accordance with Division 01- General Requirements specific to Environmental Product Declarations and Clean Concrete Requirements.

ARTICLE 28 – MISCELLANEOUS PROVISIONS

28.1 Commencement of Actions: The time, as prescribed by law, within which an action on the contract against the Contractor must be commenced shall be computed from the date of completion of physical work. The Contractor shall notify the Office in writing that the physical work of the contract has been completed by specifying a completion date, which date shall be no more than thirty days prior to the date of such notice. The completion date set forth in such notice shall be deemed the date of completion of the physical work unless the Office, within thirty days of receipt of such notice, notifies the Contractor of a dispute in writing. Any notice pursuant to this paragraph shall be sent by the Contractor by Certified Mail and sent to the parties set forth in the Notice provision of this Article.

(a) In the event that the Contractor fails to provide notice as set forth herein or the Office disputes the completion date in the manner provided for herein, the date of completion of the physical work shall be determined in any other manner provided by law.

(b) Choice of Law/Damages: This Contract shall be governed and interpreted in accordance with the laws of the State of New York. Any and all claims against the State, the Office, its Commissioner, employees, officers or agents arising out of this Contract shall be limited to money damages and commenced exclusively in, and subject to the jurisdiction of the New York State Court of Claims or any other court of competent jurisdiction located in Albany County, New York. Any such claim shall not be removed to federal court.

28.2 Notice

(a) Unless otherwise indicated in these General Conditions, all notices permitted or required hereunder shall be in writing and shall be transmitted either:

i. via certified or registered United States mail, return receipt requested;

ii. by facsimile transmission;

iii. by personal delivery;

iv. by expedited delivery service; or

v. by e-mail.

Such notices shall be addressed as follows or to such different addresses as the parties may from time-to-time designate:

If to the Office:

Capital Unit
New York State Office of Parks, Recreation and Historic Preservation
Albany, NY 12238
Phone (518) 473-7435
Fax: (518) 486-2372
E-Mail Address: capital@parks.ny.gov

and

General Counsel
New York State Office of Parks, Recreation and Historic Preservation
Albany, NY 12238
Phone (518) 486-2921
Fax: (518) 474-5106
E-Mail Address: counsel@parks.ny.gov

(b) Any such notice shall be deemed to have been given either at the time of personal delivery or, in the case of expedited delivery service or certified or registered United States mail, as of the date of first attempted delivery at the address and in the manner provided herein, or in the case of facsimile transmission or email, upon receipt.

(c) The parties may, from time to time, specify any new or different address in the United States as their address for purpose of receiving notice under this Contract by giving fifteen (15) days written notice to the other party sent in accordance herewith. The parties agree to mutually designate individuals as their respective representatives for the purposes of receiving notices under this Contract.. Additional individuals may be designated in writing by the parties for purposes of implementation and administration/billing, resolving issues and problems and/or for dispute resolution.

28.3 Severability: If any provision, term or condition of this contract is held to be invalid, illegal, or unenforceable, such determination shall not affect the validity, legality or enforceability of any other part of this Contract and the remaining parts of this Contract shall be enforced as if the invalid, illegal or unenforceable provisions, terms or conditions are not contained herein.

28.4 Integration Clause: This Contract shall not be materially amended, changed or otherwise modified except in writing signed by both parties and approved by the Attorney General and Office of the State Comptroller. Except to the extent that documents are incorporated herein by reference, this Contract constitutes the entire agreement between the parties concerning the subject matter hereof and supersedes all prior agreements and

understandings of the parties in connection therewith. No covenant, representation or condition not expressed herein shall be effective to interpret, change or restrict the express provisions of this Contract.

APPENDICES

29.1 The following appendices are attached hereto and hereby made a part of this agreement as if set forth fully herein.

(a) Appendix A -Standard Clauses for All New York State Contracts;

(b) Appendix B;

(c) Appendix C - Specific Insurance Coverages and Limits.

APPENDIX A

STANDARD CLAUSES FOR NEW YORK STATE CONTRACTS

PLEASE RETAIN THIS DOCUMENT
FOR FUTURE REFERENCE.

June 2023

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STANDARD CLAUSES FOR NYS CONTRACTS

The parties to the attached contract, license, lease, amendment or other agreement of any kind (hereinafter, "the contract" or "this contract") agree to be bound by the following clauses which are hereby made a part of the contract (the word "Contractor" herein refers to any party other than the State, whether a contractor, licenser, licensee, lessor, lessee or any other party):

1. EXECUTORY CLAUSE. In accordance with Section 41 of the State Finance Law, the State shall have no liability under this contract to the Contractor or to anyone else beyond funds appropriated and available for this contract.

2. NON-ASSIGNMENT CLAUSE. In accordance with Section 138 of the State Finance Law, this contract may not be assigned by the Contractor or its right, title or interest therein assigned, transferred, conveyed, sublet or otherwise disposed of without the State's previous written consent, and attempts to do so are null and void. Notwithstanding the foregoing, such prior written consent of an assignment of a contract let pursuant to Article XI of the State Finance Law may be waived at the discretion of the contracting agency and with the concurrence of the State Comptroller where the original contract was subject to the State Comptroller's approval, where the assignment is due to a reorganization, merger or consolidation of the Contractor's business entity or enterprise. The State retains its right to approve an assignment and to require that any Contractor demonstrate its responsibility to do business with the State. The Contractor may, however, assign its right to receive payments without the State's prior written consent unless this contract concerns Certificates of Participation pursuant to Article 5-A of the State Finance Law.

3. COMPTROLLER'S APPROVAL. In accordance with Section 112 of the State Finance Law, if this contract exceeds $50,000 (or $75,000 for State University of New York or City University of New York contracts for goods, services, construction and printing, and $150,000 for State University Health Care Facilities) or if this is an amendment for any amount to a contract which, as so amended, exceeds said statutory amount, or if, by this contract, the State agrees to give something other than money when the value or reasonably estimated value of such consideration exceeds $25,000, it shall not be valid, effective or binding upon the State until it has been approved by the State Comptroller and filed in his office. Comptroller's approval of contracts let by the Office of General Services, either for itself or its customer agencies by the Office of General Services Business Services Center, is required when such contracts exceed $85,000. Comptroller's approval of contracts established as centralized contracts through the Office of General Services is required when such contracts exceed $125,000, and when a purchase order or other procurement transaction issued under such centralized contract exceeds $200,000.

4. WORKERS' COMPENSATION BENEFITS. In accordance with Section 142 of the State Finance Law, this contract shall be void and of no force and effect unless the Contractor shall provide and maintain coverage during the life of this contract for the benefit of such employees as are required to be covered by the provisions of the Workers' Compensation Law.

5. NON-DISCRIMINATION REQUIREMENTS. To the extent required by Article 15 of the Executive Law (also known as the Human Rights Law) and all other State and Federal statutory and constitutional non-discrimination provisions, the Contractor will not discriminate against any employee or applicant for employment, nor subject any individual to harassment, because of age, race, creed, color, national origin, citizenship or immigration status, sexual orientation, gender identity or expression, military status, sex, disability, predisposing genetic characteristics, familial status, marital status, or domestic violence victim status or because the individual has opposed any practices forbidden under the Human Rights Law or has filed a complaint, testified, or assisted in any proceeding under the Human Rights Law. Furthermore, in accordance with Section 220-e of the Labor Law, if this is a contract for the construction, alteration or repair of any public building or public work or for the manufacture, sale or distribution of materials, equipment or supplies, and to the extent that this contract shall be performed within the State of New York, Contractor agrees that neither it nor its subcontractors shall, by reason of race, creed, color, disability, sex, or national origin: (a) discriminate in hiring against any New York State citizen who is qualified and available to perform the work; or (b) discriminate against or intimidate any employee hired for the performance of work under this contract. If this is a building service contract as defined in Section 230 of the Labor Law, then, in accordance with Section 239 thereof, Contractor agrees that neither it nor its subcontractors shall by reason of race, creed, color, national origin, age, sex or disability: (a) discriminate in hiring against any New York State citizen who is qualified and available to perform the work; or (b) discriminate against or intimidate any employee hired for the performance of work under this contract. Contractor is subject to fines of $50.00 per person per day for any violation of Section 220-e or Section 239 as well as possible termination of this contract and forfeiture of all moneys due hereunder for a second or subsequent violation.

6. WAGE AND HOURS PROVISIONS. If this is a public work contract covered by Article 8 of the Labor Law or a building service contract covered by Article 9 thereof, neither Contractor's employees nor the employees of its subcontractors may be required or permitted to work more than the number of hours or days stated in said statutes, except as otherwise provided in the Labor Law and as set forth in prevailing wage and supplement schedules issued by the State Labor Department. Furthermore, Contractor and its subcontractors must pay at least the prevailing wage rate and pay or provide the prevailing supplements, including the premium rates for overtime pay, as determined by the State Labor Department in

accordance with the Labor Law. Additionally, effective April 28, 2008, if this is a public work contract covered by Article 8 of the Labor Law, the Contractor understands and agrees that the filing of payrolls in a manner consistent with Subdivision 3-a of Section 220 of the Labor Law shall be a condition precedent to payment by the State of any State approved sums due and owing for work done upon the project.

7. NON-COLLUSIVE BIDDING CERTIFICATION. In accordance with Section 139-d of the State Finance Law, if this contract was awarded based upon the submission of bids, Contractor affirms, under penalty of perjury, that its bid was arrived at independently and without collusion aimed at restricting competition. Contractor further affirms that, at the time Contractor submitted its bid, an authorized and responsible person executed and delivered to the State a non-collusive bidding certification on Contractor's behalf.

8. INTERNATIONAL BOYCOTT PROHIBITION. In accordance with Section 220-f of the Labor Law and Section 139-h of the State Finance Law, if this contract exceeds $5,000, the Contractor agrees, as a material condition of the contract, that neither the Contractor nor any substantially owned or affiliated person, firm, partnership or corporation has participated, is participating, or shall participate in an international boycott in violation of the federal Export Administration Act of 1979 (50 USC App. Sections 2401 et seq.) or regulations thereunder. If such Contractor, or any of the aforesaid affiliates of Contractor, is convicted or is otherwise found to have violated said laws or regulations upon the final determination of the United States Commerce Department or any other appropriate agency of the United States subsequent to the contract's execution, such contract, amendment or modification thereto shall be rendered forfeit and void. The Contractor shall so notify the State Comptroller within five (5) business days of such conviction, determination or disposition of appeal (2 NYCRR § 105.4).

9. SET-OFF RIGHTS. The State shall have all of its common law, equitable and statutory rights of set-off. These rights shall include, but not be limited to, the State's option to withhold for the purposes of set-off any moneys due to the Contractor under this contract up to any amounts due and owing to the State with regard to this contract, any other contract with any State department or agency, including any contract for a term commencing prior to the term of this contract, plus any amounts due and owing to the State for any other reason including, without limitation, tax delinquencies, fee delinquencies or monetary penalties relative thereto. The State shall exercise its set-off rights in accordance with normal State practices including, in cases of set-off pursuant to an audit, the finalization of such audit by the State agency, its representatives, or the State Comptroller.

10. RECORDS. The Contractor shall establish and maintain complete and accurate books, records, documents, accounts and other evidence directly pertinent to performance under this contract (hereinafter, collectively, the "Records"). The Records must be kept for the balance of the calendar year in which they were made and for six (6) additional years thereafter. The State Comptroller, the Attorney General and any other person or entity authorized to conduct an examination, as well as the agency or agencies involved in this contract, shall have access to the Records during normal business hours at an office of the Contractor within the State of New York or, if no such office is available, at a mutually agreeable and reasonable venue within the State, for the term specified above for the purposes of inspection, auditing and copying. The State shall take reasonable steps to protect from public disclosure any of the Records which are exempt from disclosure under Section 87 of the Public Officers Law (the "Statute") provided that: (i) the Contractor shall timely inform an appropriate State official, in writing, that said records should not be disclosed; and (ii) said records shall be sufficiently identified; and (iii) designation of said records as exempt under the Statute is reasonable. Nothing contained herein shall diminish, or in any way adversely affect, the State's right to discovery in any pending or future litigation.

11. IDENTIFYING INFORMATION AND PRIVACY NOTIFICATION. (a) Identification Number(s). Every invoice or New York State Claim for Payment submitted to a New York State agency by a payee, for payment for the sale of goods or services or for transactions (e.g., leases, easements, licenses, etc.) related to real or personal property must include the payee's identification number. The number is any or all of the following: (i) the payee's Federal employer identification number, (ii) the payee's Federal social security number, and/or (iii) the payee's Vendor Identification Number assigned by the Statewide Financial System. Failure to include such number or numbers may delay payment. Where the payee does not have such number or numbers, the payee, on its invoice or Claim for Payment, must give the reason or reasons why the payee does not have such number or numbers.

(b) Privacy Notification. (1) The authority to request the above personal information from a seller of goods or services or a lessor of real or personal property, and the authority to maintain such information, is found in Section 5 of the State Tax Law. Disclosure of this information by the seller or lessor to the State is mandatory. The principal purpose for which the information is collected is to enable the State to identify individuals, businesses and others who have been delinquent in filing tax returns or may have understated their tax liabilities and to generally identify persons affected by the taxes administered by the Commissioner of Taxation and Finance. The information will be used for tax administration purposes and for any other purpose authorized by law. (2) The personal information is requested by the purchasing unit of the agency contracting to purchase the goods or services or lease the real or personal property covered by this contract or lease. The information is maintained in the Statewide Financial System by the Vendor Management Unit within the Bureau of State Expenditures, Office of the State Comptroller, 110 State Street, Albany, New York 12236.

12. EQUAL EMPLOYMENT OPPORTUNITIES FOR MINORITIES AND WOMEN. In accordance with Section 312 of the Executive Law and 5 NYCRR Part 143, if this contract is: (i) a written agreement or purchase order instrument, providing for a total expenditure in excess of $25,000.00, whereby a contracting agency is committed to expend or does expend funds in return for labor, services, supplies, equipment, materials or any combination of the foregoing, to be performed for, or rendered or furnished to the contracting agency; or (ii) a written agreement in excess of $100,000.00 whereby a contracting agency is committed to expend or does expend funds for the acquisition, construction, demolition, replacement, major repair or renovation of real property and improvements thereon; or (iii) a written agreement in excess of $100,000.00 whereby the owner of a State assisted housing project is committed to expend or does expend funds for the acquisition, construction, demolition, replacement, major repair or renovation of real property and improvements thereon for such project, then the following shall apply and by signing this agreement the Contractor certifies and affirms that it is Contractor's equal employment opportunity policy that:

(a) The Contractor will not discriminate against employees or applicants for employment because of race, creed, color, national origin, sex, age, disability or marital status, shall make and document its conscientious and active efforts to employ and utilize minority group members and women in its work force on State contracts and will undertake or continue existing programs of affirmative action to ensure that minority group members and women are afforded equal employment opportunities without discrimination. Affirmative action shall mean recruitment, employment, job assignment, promotion, upgradings, demotion, transfer, layoff, or termination and rates of pay or other forms of compensation;

(b) at the request of the contracting agency, the Contractor shall request each employment agency, labor union, or authorized representative of workers with which it has a collective bargaining or other agreement or understanding, to furnish a written statement that such employment agency, labor union or representative will not discriminate on the basis of race, creed, color, national origin, sex, age, disability or marital status and that such union or representative will affirmatively cooperate in the implementation of the Contractor's obligations herein; and

(c) the Contractor shall state, in all solicitations or advertisements for employees, that, in the performance of the State contract, all qualified applicants will be afforded equal employment opportunities without discrimination because of race, creed, color, national origin, sex, age, disability or marital status.

Contractor will include the provisions of "(a), (b) and (c)" above, in every subcontract over $25,000.00 for the construction, demolition, replacement, major repair, renovation, planning or design of real property and improvements thereon (the "Work") except where the Work is for the beneficial use of the Contractor. Section 312 does not apply to: (i) work, goods or services unrelated to this contract; or (ii) employment outside New York State. The State shall consider compliance by a contractor or subcontractor with the requirements of any federal law concerning equal employment opportunity which effectuates the purpose of this clause. The contracting agency shall determine whether the imposition of the requirements of the provisions hereof duplicate or conflict with any such federal law and if such duplication or conflict exists, the contracting agency shall waive the applicability of Section 312 to the extent of such duplication or conflict. Contractor will comply with all duly promulgated and lawful rules and regulations of the Department of Economic Development's Division of Minority and Women's Business Development pertaining hereto.

13. CONFLICTING TERMS. In the event of a conflict between the terms of the contract (including any and all attachments thereto and amendments thereof) and the terms of this Appendix A, the terms of this Appendix A shall control.

14. GOVERNING LAW. This contract shall be governed by the laws of the State of New York except where the Federal supremacy clause requires otherwise.

15. LATE PAYMENT. Timeliness of payment and any interest to be paid to Contractor for late payment shall be governed by Article 11-A of the State Finance Law to the extent required by law.

16. NO ARBITRATION. Disputes involving this contract, including the breach or alleged breach thereof, may not be submitted to binding arbitration (except where statutorily authorized), but must, instead, be heard in a court of competent jurisdiction of the State of New York.

17. SERVICE OF PROCESS. In addition to the methods of service allowed by the State Civil Practice Law & Rules ("CPLR"), Contractor hereby consents to service of process upon it by registered or certified mail, return receipt requested. Service hereunder shall be complete upon Contractor's actual receipt of process or upon the State's receipt of the return thereof by the United States Postal Service as refused or undeliverable. Contractor must promptly notify the State, in writing, of each and every change of address to which service of process can be made. Service by the State to the last known address shall be sufficient. Contractor will have thirty (30) calendar days after service hereunder is complete in which to respond.

18. PROHIBITION ON PURCHASE OF TROPICAL HARDWOODS. The Contractor certifies and warrants that all wood products to be used under this contract award will be in accordance with, but not limited to, the specifications and provisions of Section 165 of the State Finance Law, (Use of Tropical Hardwoods) which prohibits purchase and use of tropical hardwoods, unless specifically exempted, by the State or any governmental agency or political subdivision or public benefit corporation. Qualification for an exemption under this

law will be the responsibility of the contractor to establish to meet with the approval of the State.

In addition, when any portion of this contract involving the use of woods, whether supply or installation, is to be performed by any subcontractor, the prime Contractor will indicate and certify in the submitted bid proposal that the subcontractor has been informed and is in compliance with specifications and provisions regarding use of tropical hardwoods as detailed in § 165 State Finance Law. Any such use must meet with the approval of the State; otherwise, the bid may not be considered responsive. Under bidder certifications, proof of qualification for exemption will be the responsibility of the Contractor to meet with the approval of the State.

19. MACBRIDE FAIR EMPLOYMENT PRINCIPLES. In accordance with the MacBride Fair Employment Principles (Chapter 807 of the Laws of 1992), the Contractor hereby stipulates that the Contractor either (a) has no business operations in Northern Ireland, or (b) shall take lawful steps in good faith to conduct any business operations in Northern Ireland in accordance with the MacBride Fair Employment Principles (as described in Section 165 of the New York State Finance Law), and shall permit independent monitoring of compliance with such principles.

20. OMNIBUS PROCUREMENT ACT OF 1992. It is the policy of New York State to maximize opportunities for the participation of New York State business enterprises, including minority- and women-owned business enterprises as bidders, subcontractors and suppliers on its procurement contracts.

Information on the availability of New York State subcontractors and suppliers is available from:

NYS Department of Economic Development
Division for Small Business and Technology Development
625 Broadway
Albany, New York 12245
Telephone: 518-292-5100

A directory of certified minority- and women-owned business enterprises is available from:

NYS Department of Economic Development
Division of Minority and Women's Business Development
633 Third Avenue 33rd Floor
New York, NY 10017
646-846-7364
email: mwbebusinessdev@esd.ny.gov
https://ny.newnycontracts.com/FrontEnd/searchcertifieddirectory.asp

The Omnibus Procurement Act of 1992 (Chapter 844 of the Laws of 1992, codified in State Finance Law § 139-i and Public Authorities Law § 2879(3)(n)–(p)) requires that by signing this bid proposal or contract, as applicable, Contractors certify that whenever the total bid amount is greater than $1 million:

(a) The Contractor has made reasonable efforts to encourage the participation of New York State Business Enterprises as suppliers and subcontractors, including certified minority- and women-owned business enterprises, on this project, and has retained the documentation of these efforts to be provided upon request to the State;

(b) The Contractor has complied with the Federal Equal Opportunity Act of 1972 (P.L. 92-261), as amended;

(c) The Contractor agrees to make reasonable efforts to provide notification to New York State residents of employment opportunities on this project through listing any such positions with the Job Service Division of the New York State Department of Labor, or providing such notification in such manner as is consistent with existing collective bargaining contracts or agreements. The Contractor agrees to document these efforts and to provide said documentation to the State upon request; and

(d) The Contractor acknowledges notice that the State may seek to obtain offset credits from foreign countries as a result of this contract and agrees to cooperate with the State in these efforts.

21. RECIPROCITY AND SANCTIONS PROVISIONS. Bidders are hereby notified that if their principal place of business is located in a country, nation, province, state or political subdivision that penalizes New York State vendors, and if the goods or services they offer will be substantially produced or performed outside New York State, the Omnibus Procurement Act 1994 and 2000 amendments (Chapter 684 and Chapter 383, respectively, codified in State Finance Law § 165(6) and Public Authorities Law § 2879(5)) require that they be denied contracts which they would otherwise obtain. NOTE: As of May 2023, the list of discriminatory jurisdictions subject to this provision includes the states of South Carolina, Alaska, West Virginia, Wyoming, Louisiana and Hawaii.

22. COMPLIANCE WITH BREACH NOTIFICATION AND DATA SECURITY LAWS. Contractor shall comply with the provisions of the New York State Information Security Breach and Notification Act (General Business Law §§ 899-aa and 899-bb and State Technology Law § 208).

23. COMPLIANCE WITH CONSULTANT DISCLOSURE LAW. If this is a contract for consulting services, defined for purposes of this requirement to include analysis, evaluation, research, training, data processing, computer programming, engineering, environmental, health, and mental health services, accounting, auditing, paralegal, legal or similar services, then, in accordance with Section 163 (4)(g) of the State Finance Law (as amended by Chapter 10 of the Laws of 2006), the Contractor shall timely, accurately and properly comply with the requirement to submit an annual employment report for the contract to the agency that awarded the contract, the Department of Civil Service and the State Comptroller.

24. PROCUREMENT LOBBYING. To the extent this agreement is a "procurement contract" as defined by State Finance Law §§ 139-j and 139-k, by signing this agreement the contractor certifies and affirms that all disclosures made in accordance with State Finance Law §§ 139-j and 139-k are complete, true and accurate. In the event such certification is found to be intentionally false or intentionally incomplete, the State may terminate the agreement by providing written notification to the Contractor in accordance with the terms of the agreement.

25. CERTIFICATION OF REGISTRATION TO COLLECT SALES AND COMPENSATING USE TAX BY CERTAIN STATE CONTRACTORS, AFFILIATES AND SUBCONTRACTORS.
To the extent this agreement is a contract as defined by Tax Law § 5-a, if the contractor fails to make the certification required by Tax Law § 5-a or if during the term of the contract, the Department of Taxation and Finance or the covered agency, as defined by Tax Law § 5-a, discovers that the certification, made under penalty of perjury, is false, then such failure to file or false certification shall be a material breach of this contract and this contract may be terminated, by providing written notification to the Contractor in accordance with the terms of the agreement, if the covered agency determines that such action is in the best interest of the State.

26. IRAN DIVESTMENT ACT. By entering into this Agreement, Contractor certifies in accordance with State Finance Law § 165-a that it is not on the "Entities Determined to be Non-Responsive Bidders/Offerers pursuant to the New York State Iran Divestment Act of 2012" ("Prohibited Entities List") posted at: https://ogs.ny.gov/iran-divestment-act-2012

Contractor further certifies that it will not utilize on this Contract any subcontractor that is identified on the Prohibited Entities List. Contractor agrees that should it seek to renew or extend this Contract, it must provide the same certification at the time the Contract is renewed or extended. Contractor also agrees that any proposed Assignee of this Contract will be required to certify that it is not on the Prohibited Entities List before the contract assignment will be approved by the State.

During the term of the Contract, should the state agency receive information that a person (as defined in State Finance Law § 165-a) is in violation of the above-referenced certifications, the state agency will review such information and offer the person an opportunity to respond. If the person fails to demonstrate that it has ceased its engagement in the investment activity which is in violation of the Act within 90 days after the determination of such violation, then the state agency shall take such action as may be appropriate and provided for by law, rule, or contract, including, but not limited to, imposing sanctions, seeking compliance, recovering damages, or declaring the Contractor in default.

The state agency reserves the right to reject any bid, request for assignment, renewal or extension for an entity that appears on the Prohibited Entities List prior to the award, assignment, renewal or extension 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.

27. ADMISSIBILITY OF REPRODUCTION OF CONTRACT. Notwithstanding the best evidence rule or any other legal principle or rule of evidence to the contrary, the Contractor acknowledges and agrees that it waives any and all objections to the admissibility into evidence at any court proceeding or to the use at any examination before trial of an electronic reproduction of this contract, in the form approved by the State Comptroller, if such approval was required, regardless of whether the original of said contract is in existence.

PARTICIPATION BY MINORITY GROUP MEMBERS AND WOMEN WITH RESPECT TO STATE CONTRACTS: REQUIREMENTS AND PROCEDURES

I. General Provisions

A. The New York State Office of Parks, Recreation and Historic Preservation is required to implement the provisions of New York State Executive Law Article 15-A and 5 NYCRR Parts 140-145 ("MWBE Regulations") for all State contracts as defined therein, with a value (1) in excess of $25,000 for labor, services, equipment, materials, or any combination of the foregoing or (2) in excess of $100,000 for real property renovations and construction.

B. The Contractor to the subject contract (the "Contractor" and the "Contract," respectively) agrees, in addition to any other nondiscrimination provision of the Contract and at no additional cost to the New York State Office of Parks, Recreation and Historic Preservation, to fully comply and cooperate with the New York State Office of Parks, Recreation and Historic Preservation in the implementation of New York State Executive Law Article 15-A. These requirements include equal employment opportunities for minority group members and women ("EEO") and contracting opportunities for certified minority and women-owned business enterprises ("MWBEs"). The Contractor's demonstration of "good faith efforts" pursuant to 5 NYCRR § 142.8 shall be a part of these requirements. These provisions shall be deemed supplementary to, and not in lieu of, the nondiscrimination provisions required by New York State Executive Law Article 15 (the "Human Rights Law") or other applicable federal, state or local laws.

C. Failure to comply with all of the requirements herein may result in a finding of non-responsiveness, non-responsibility and/or a breach of contract, leading to the withholding of funds or such other actions, liquidated damages pursuant to Section VII of this Appendix or enforcement proceedings as allowed by the Contract.

II. Contract Goals

A. For purposes of this procurement, the New York State Office of Parks, Recreation and Historic Preservation hereby establishes New York State certified minority-owned business enterprises ("MBE") participation and New York State certified women-owned business enterprises ("WBE") participation (collectively, "MWBE Contract Goals") based on the current availability of qualified MBEs and WBEs as defined in the bidders documentation provided at the time of solicitation. After contract approval, MWBE Contract Goals as defined on the approved utilization plan will be endorsed to determine compliance for the contract term.

B. For purposes of providing meaningful participation by MWBEs on the Contract and achieving the MWBE Contract Goals established in Section II-A hereof, the Contractor should reference the directory of New York State Certified MBWEs found at the following internet address: https://ny.newnycontracts.com.

Additionally, the Contractor is encouraged to contact the Division of Minority and Woman Business Development ((518) 292-5250; (212) 803-2414; or (716) 846-8200) to discuss additional methods of maximizing participation by MWBEs on the Contract.

C. Where MWBE Contract Goals have been established herein, pursuant to 5 NYCRR § 142.8, the Contractor must document "good faith efforts" to provide meaningful participation by MWBEs as subcontractors or suppliers in the performance of the Contract. In accordance with Section 316-a of Article 15-A and 5 NYCRR § 142.13, the Contractor acknowledges that if it is found to have willfully and intentionally failed to comply with the MWBE participation goals set forth in the Contract, such a finding constitutes a breach of contract and the Contractor shall be liable to the New York State Office of Parks, Recreation and Historic Preservation for liquidated or other appropriate damages, as set forth herein.

III. Equal Employment Opportunity (EEO)

A. The provisions of Article 15-A of the Executive Law and the rules and regulations promulgated thereunder pertaining to equal employment opportunities for minority group members and women shall apply to the Contract.

B. In performing the Contract, the Contractor shall:

1. Ensure that each Contractor and subcontractor performing work on the Contract shall undertake or continue existing EEO programs to ensure that minority group members and women are afforded equal employment opportunities without discrimination because of race, creed, color, national origin, sex, age, disability or marital status. For these purposes, EEO shall apply in the areas of recruitment, employment, job assignment, promotion, upgrading, demotion, transfer, layoff, or termination and rates of pay or other forms of compensation.
2. The Contractor shall submit an EEO policy statement to the New York State office of Parks, Recreation and Historic Preservation within seventy-two (72) hours after the date of the notice by the New York State Office of Parks, Recreation and Historic Preservation to award the Contract to the Contractor.
3. If the Contractor, or any of its subcontractors, does not have an existing EEO policy statement, the New York State office of Parks, Recreation and Historic Preservation may require the Contractor or subcontractor to adopt a model statement (see Form – Equal Employment Opportunity Policy Statement).
4. The Contractor's EEO policy statement shall include the following language:

    a. The Contractor will not discriminate against any employee or applicant for employment because of race, creed, color, national origin, sex, age, disability, or marital status, will undertake or continue existing EEO programs to ensure that minority group members and women are afforded equal employment opportunities without discrimination, and shall make and document its conscientious and active efforts to employ and utilize minority group members and women in its work force.

b. The Contractor shall state in all solicitations or advertisements for employees that, in the performance of the contract, all qualified applicants will be afforded equal employment opportunities without discrimination because of race, creed, color, national origin, sex, age, disability or marital status.
c. The Contractor shall request each employment agency, labor union, or authorized representative of workers with which it has a collective bargaining or other agreement or understanding, to furnish a written statement that such employment agency, labor union, or representative will not discriminate on the basis of race, creed, color, national origin, sex age, disability or marital status and that such union or representative will affirmatively cooperate in the implementation of the Contractor's obligations herein.
d. The Contractor will include the provisions of Subdivisions (a) through (c) of this Subsection 4 and Paragraph "E" of this Section III, which provides for relevant provisions of the Human Rights Law, in every subcontract in such a manner that the requirements of the subdivisions will be binding upon each subcontractor as to work in connection with the Contract.

C. Staffing Plan

To ensure compliance with this Section, for those contracts reaching $250,000 or greater, the Contractor shall submit a staffing plan to document the composition of the proposed workforce to be utilized in the performance of the Contract by the specified categories listed, including ethnic background, gender, and Federal occupational categories. The Contractor shall complete the Staffing plan form and submit it as part of their bid or proposal or within a reasonable time, but no later than the time of award of the contract.

D. Workforce Utilization Report

1. The Contractor shall submit a Workforce Utilization Report, and shall require each of its subcontractors to submit a Workforce Utilization Report, in such form as shall be required by the New York State Office of Parks, Recreation and Historic Preservation on a [MONTHLY/QUARTERLY] basis during the term of the Contract.
2. Separate forms shall be completed by the Contractor and any subcontractors.
3. Pursuant to Executive Order #162, Contractors and subcontractors are also required to report the gross wages paid to each of their employees for the work performed by such employees on the contract on a quarterly basis.

E. The Contractor shall comply with the provisions of the Human Rights Law, and all other State and Federal statutory and constitutional non-discrimination provisions. The Contractor and its subcontractors shall not discriminate against any employee or applicant for employment because of race, creed (religion), color, sex, national origin, sexual orientation, military status, age, disability, predisposing genetic characteristic, marital status or domestic violence victim status, and shall also follow the requirements of the Human Rights Law with regard to non-discrimination on the basis of prior criminal conviction and prior arrest.

IV. MWBE Utilization Plan

A. The Contractor represents and warrants that Contractor has submitted an MWBE Utilization Plan, by submitting evidence thereof through the New York State Contract System ("NYSCS"), which can be viewed at https://ny.newnycontracts.com, provided, however, that the Contractor may arrange to provide such evidence via a non-electronic method to the New York State Office of Parks, Recreation and Historic Preservation, either prior to, or at the time of, the execution of the contract.

B. The Contractor agrees to use such MWBE Utilization Plan for the performance of MWBEs on the Contract pursuant to the prescribed MWBE goals set forth in Section III-A of this Appendix.

C. The Contractor further agrees that a failure to submit and/or use such MWBE Utilization Plan shall constitute a material breach of the terms of the Contract. Upon the occurrence of such a material breach, New York State Office of Parks, Recreation and Historic Preservation shall be entitled to any remedy provided herein, including but not limited to, a finding of the Contractor non-responsiveness.

V. Waivers

A. For Waiver Requests, the Contractor should use the NYSCS, provided, however, that Bidder may arrange to provide such evidence via a non-electronic method to New York State Office of Parks, Recreation and Historic Preservation.

B. If the Contractor, after making good faith efforts, is unable to comply with MWBE goals, the Contractor may submit a Request for Waiver documenting good faith efforts by the Contractor to meet such goals. If the documentation included with the waiver request is complete, the New York State Office of Parks, Recreation and Historic Preservation shall evaluate the request and issue a written notice of acceptance or denial within twenty (20) days of receipt.

C. If the New York State Office of Parks, Recreation and Historic Preservation, upon review of the MWBE Utilization Plan and updated MWBE Contractor Compliance Reports determines that the Contractor is failing or refusing to comply with the MWBE Contract Goals and no waiver has been issued in regards to such non-compliance, the New York State Office of Parks, Recreation and Historic Preservation may issue a notice of deficiency to the Contractor. The Contractor must respond to the notice of deficiency within seven (7) business days of receipt. Such response may include a request for partial or total waiver of MWBE Contract Goals.

VI. MWBE Contractor Compliance Report

The Contractor is required to submit MWBE Contractor Compliance Reports through the NYSCS, provided, however, that Bidder may arrange to provide such evidence via a non-electronic method to the New York State Office of Parks, Recreation and Historic Preservation. Reports will be generated by the NYSCS for completion upon the generation of a payment to the Contractor. Reports should be completed for the term of the Contract documenting the progress made towards achievement of the MWBE goals of the Contract.

VII. Liquidated Damages - MWBE Participation

A. Where New York State Office of Parks, Recreation and Historic Preservation determines that the Contractor is not in compliance with the requirements of the Contract and the Contractor refuses to comply with such requirements, or if the Contractor is found to have willfully and intentionally failed to comply with the MWBE participation goals, the Contractor shall be obligated to pay to the New York State Office of Parks, Recreation and Historic Preservation liquidated damages.

B. Such liquidated damages shall be calculated as an amount equaling the difference between:
   1. All sums identified for payment to MWBEs had the Contractor achieved the contractual MWBE goals; and
   2. All sums actually paid to MWBEs for work performed or materials supplied under the Contract.

C. In the event a determination has been made which requires the payment of liquidated damages and such identified sums have not been withheld by the New York State Office of Parks, Recreation and Historic Preservation, the Contractor shall pay such liquidated damages to the New York State Office of Parks, Recreation and Historic Preservation within sixty (60) days after they are assessed by the New York State Office of Parks, Recreation and Historic Preservation unless prior to the expiration of such sixtieth day, the Contractor has filed a complaint with the Director of the Division of Minority and Woman Business Development pursuant to Subdivision 8 of Section 313 of the Executive Law in which event the liquidated damages shall be payable if the Director renders a decision in favor of the New York State Office of Parks, Recreation and Historic Preservation.

PARTICIPATION OPPORTUNITIES FOR NEW YORK STATE CERTIFIED SERVICE-DISABLED VETERAN OWNED BUSINESSES

Article 17-B of the New York State Executive Law provides for more meaningful participation in public procurement by certified Service-Disabled Veteran-Owned Businesses ("SDVOB"), thereby further integrating such businesses into New York State's economy. The New York State Office of Parks, Recreation and Historic Preservation recognizes the need to promote the employment of service-disabled veterans and to ensure that certified service-disabled veteran-owned businesses have opportunities for maximum feasible participation in the performance of the New York State Office of Parks, Recreation and Historic Preservation contracts.

In recognition of the service and sacrifices made by service-disabled veterans and in recognition of their economic activity in doing business in New York State, Bidders are expected to consider SDVOBs in the fulfillment of the requirements of the Contract. Such participation may be as subcontractors or suppliers, as protégés, or in other partnering or supporting roles.

I. Contract Goals

A. For purposes of this procurements, the New York State Office of Parks, Recreation and Historic Preservation hereby establishes SDVOB participation, based on the current availability of qualified SDVOB as defined in the bidder's documentation provided at the time of solicitation. For purposes of providing meaningful participation by SDVOBs, the Bidder/Contractor should reference the directory of New York State Certified SDVOBs found at: https://online.ogs.ny.gov/SDVOB/search Questions regarding compliance with SDVOB participation goals should be directed to the Minority Business Specialist, 518-486-2636. Additionally, following Contract execution, Contractor is encouraged to contact the Office of General Services' Division of Service-Disabled Veterans' Business Development at 518-474-2015 or VeteransDevelopment@ogs.ny.gov to discuss additional methods of maximizing participation by SDVOBs on the Contract.

B. Contractor must document "good faith efforts" to provide meaningful participation by SDVOBs as subcontractors or suppliers in the performance of the Contract (see clause IV below).

II. SDVOB Utilization Plan

A. In accordance with 9 NYCRR § 252.2(i), Contractors are required to submit a completed SDVOB Utilization Plan. This should be done utilizing the New York State Contracting system and the SDVOB Capital Construction Worksheet.

B. The Utilization Plan shall list the SDVOBs that the Bidder intends to use to perform the Contract, a description of the work that the Bidder intends the SDVOB to perform to meet the goals on the Contract, the estimated dollar amounts to be paid to an SDVOB, or, if not known, an estimate of the percentage of Contract work the SDVOB will perform. By signing the Utilization Plan, the Bidder acknowledges that making false representations or providing information that shows a lack of good faith as part of, or in

conjunction with, the submission of a Utilization Plan is prohibited by law and may result in penalties including, but not limited to, termination of a contract for cause, loss of eligibility to submit future bids, and/or withholding of payments. Any modifications or changes to the agreed participation by SDVOBs after the Contract award and during the term of the Contract must be reported on a revised SDVOB Utilization Plan and submitted to the New York State Office of Parks, Recreation and Historic Preservation.

C. The New York State Office of Parks, Recreation and Historic Preservation will review the submitted SDVOB Utilization Plan and advise the Contractor of the New York State Office of Parks, Recreation and Historic Preservation acceptance or issue a notice of deficiency within 20 days of receipt.

D. If a notice of deficiency is issued, Contractor agrees that it shall respond to the notice of deficiency, within seven business days of receipt, by submitting to the New York State Office of Parks, Recreation and Historic Preservation a written remedy in response to the notice of deficiency. If the written remedy that is submitted is not timely or is found by the New York State Office of Parks, Recreation and Historic Preservation to be inadequate, the New York State Office of Parks, Recreation and Historic Preservation shall notify the Contractor and direct the Contractor to submit, within five business days of notification by the New York State Office of Parks, Recreation and Historic Preservation, a request for a partial or total waiver of SDVOB participation goals. Failure to file the waiver form in a timely manner may be grounds for disqualification of the bid or proposal.

E. The New York State Office of Parks, Recreation and Historic Preservation may disqualify a Contractor's bid or proposal as being non-responsive under the following circumstances:

(a) If a Contractor fails to submit an SDVOB Utilization Plan;
(b) If a Contractor fails to submit a written remedy to a notice of deficiency;
(c) If a Contractor fails to submit a request for waiver; or
(d) If the New York State Office of Parks, Recreation and Historic Preservation determines that the Contractor has failed to document good faith efforts.

F. Contractor certifies that it will follow the submitted SDVOB Utilization Plan for the performance of SDVOBs on the Contract pursuant to the prescribed SDVOB contract goals set forth above.

G. Contractor further agrees that a failure to use SDVOBs as agreed in the Utilization Plan shall constitute a material breach of the terms of the Contract. Upon the occurrence of such a material breach, the New York State Office of Parks, Recreation and Historic Preservation shall be entitled to any remedy provided herein, including but not limited to, a finding of Contractor non-responsibility.

III. Request for Waiver

A. Prior to submission of a request for a partial or total waiver, Bidder/Contractor shall speak to the Minority Business Specialist 518-486-2636 for guidance.

B. In accordance with 9 NYCRR § 252.2(m), a Contractor that is able to document good faith efforts to meet the goal requirements, as set forth in clause IV below, may submit a request for a partial or total waiver on Form SDVOB 200, accompanied by supporting documentation. A Bidder may submit the request for waiver at the same time it submits its SDVOB Utilization Plan. If a request for waiver is submitted with the SDVOB Utilization Plan and is not accepted by the New York State Office of Parks, Recreation and Historic Preservation at that time, the provisions of clauses II (C), (D) & (E) will apply. If the documentation included with the Bidder's/Contractor's waiver request is complete, the New York State Office of Parks, Recreation and Historic Preservation shall evaluate the request and issue a written notice of acceptance or denial within 20 days of receipt.

C. Contractor shall attempt to utilize, in good faith, the SDVOBs identified within its SDVOB Utilization Plan, during the performance of the Contract. Requests for a partial or total waiver of established goal requirements made subsequent to Contract award may be made at any time during the term of the Contract to the New York State Office of Parks, Recreation and Historic Preservation, but must be made no later than prior to the submission of a request for final payment on the Contract.

D. If the New York State Office of Parks, Recreation and Historic Preservation, upon review of the SDVOB Utilization Plan and SDVOB Compliance Report determines that Contractor is failing or refusing to comply with the contract goals and no waiver has been issued in regards to such non-compliance, the New York State Office of Parks, Recreation and Historic Preservation may issue a notice of deficiency to the Contractor. The Contractor must respond to the notice of deficiency within seven business days of receipt. Such response may include a request for partial or total waiver of SDVOB contract goals.

Waiver requests should be sent to the New York State Office of Parks, Recreation and Historic Preservation.

IV. Required Good Faith Efforts

In accordance with 9 NYCRR § 252.2(n), Contractors must document their good faith efforts toward utilizing SDVOBs on the Contract. Evidence of required good faith efforts shall include, but not be limited to, the following:

(1) Copies of solicitations to SDVOBs and any responses thereto.

(2) Explanation of the specific reasons each SDVOB that responded to Bidders/Contractors' solicitation was not selected.

(3) Dates of any pre-bid, pre-award or other meetings attended by Contractor, if any, scheduled by the New York State Office of Parks, Recreation and Historic Preservation

with certified SDVOBs whom the New York State Office of Parks, Recreation and Historic Preservation determined were capable of fulfilling the SDVOB goals set in the Contract.

(4) Information describing the specific steps undertaken to reasonably structure the Contract scope of work for the purpose of subcontracting with, or obtaining supplies from, certified SDVOBs.

(5) Other information deemed relevant to the waiver request.

V. SDVOB Contractor Compliance Report

In accordance with 9 NYCRR § 252.2(q), Contractor is required to report SDVOB Contractor Compliance to the New York State Office of Parks, Recreation and Historic Preservation during the term of the Contract documenting progress made towards achieving the Contract SDVOB goals. This information must be submitted through the NYSCS. Reports will be generated by the NYSCS for completion upon the generation of a payment to the Contractor. Reports should be completed for the term of the Contract documenting the progress made towards achievement of the SDVOB goals of the Contract.

VI. Breach of Contract and Damages

In accordance with 9 NYCRR § 252.2(s), any Contractor found to have willfully and intentionally failed to comply with the SDVOB participation goals set forth in the Contract, shall be found to have breached the contract and Contractor shall pay damages as set forth therein.

Damages shall be calculated based on the actual cost incurred by the State agency related to the State agency's expenses for personnel, supplies and overhead related to establishing, monitoring, and reviewing certified service disabled veteran owned business enterprise programmatic goals.

Appendix C – Specific Insurance Coverages and Limits

The types of Insurance and minimum policy limits shall be as follows:

Workers' Compensation

For work to be performed in New York State, the Contractor shall provide and maintain full New York State (NYS listed in item 3A of the policy's Information Page) coverage during the life of the Contract for the benefit of such employees as are required to be covered by the New York State Workers' Compensation Law.

If the Contract involves work on or near a shoreline, or navigable waters (i.e. work in adjoining areas customarily used in the loading, unloading, repairing, or building of a vessel), a U.S. Longshore and Harbor Workers' Compensation Act and/or Jones Acts policy as applicable must be provided. Any waiver of this requirement must be approved by OPRHP and will only be granted in unique or unusual circumstances.

Evidence of Workers' Compensation and Employers Liability coverage must be provided on one of the following forms specified by the Chair of the New York State Workers' Compensation Board:

(1) C-105.2 (September 2007, or most current version) – Certificate of Workers' Compensation Insurance;

(2) U-26.3 – Certificate of Workers' Compensation Insurance from the State Insurance Fund;

(3) GSI-105/SI-12 – Certificate of Workers' Compensation Self-Insurance; or

(4) CE-200 – Attestation of Exemption – When Contractor meets the requirements.

All forms are valid for one year from the date the form is signed/ stamped, or until policy expiration, whichever is earlier.

Disability Benefits

For work to be performed in New York State, the Contractor shall provide and maintain coverage during the life of the Contract for the benefit of such employees as are required to be covered by the New York State Disability Benefits Law. Any waiver of this requirement must be approved by OPRHP and will only be granted in unique or unusual circumstances.

Evidence of Disability Benefits coverage must be provided on one of the following forms specified by the Chair of the Workers' Compensation Board:

(1) DB-120.1 (May 2006 or most current version) – Certificate of Insurance Coverage under the New York State Disability Benefits Law;

(2) DB-155 – Certificate of Disability Self-Insurance; or

(3) CE-200 – Certificate of Attestation of Exemption.

All forms are valid for one year from the date the form is signed/stamped, or until policy expiration, whichever is earlier.

Commercial General Liability

Commercial General Liability Insurance, (CGL) covering the liability of the Contractor for bodily injury, property damage, and personal and advertising Injury arising from all work and operations under the Contract, using form CG 00 01 or a policy providing equivalent coverage. The per occurrence and general aggregate limits under such policy shall not be less than the following based on the estimated value of the project:

Estimated Project Value	***Each Occurrence Limit***	***General Aggregate***
Less than $10 million	$2,000,000	$2,000,000
$10 million, up to and including $50 million	$5,000,000	$5,000,000
Over $50 million	$10,000,000	$10,000,000

Limits for other coverages under such policy, regardless of the estimated value of the project, shall be as follows:

- Products/Completed Operations – equal to amount of General Aggregate;
- Personal and Advertising Injury – $1,000,000;
- Damage to Rented Premises - $50,000; and
- Medical Expense – $5,000.

Coverage shall include, but not be limited to, the following:

- Premises liability;
- Independent contractors/subcontractors;
- Blanket contractual liability, including tort liability of another assumed in a contract;
- Defense and/or indemnification obligations, including obligations assumed under the contract;
- Cross liability for additional insureds;
- Products/completed operations for a term of no less than 3 years, commencing upon acceptance of the work, as required by the contract;
- Explosion, collapse, and underground hazards,
- Contractor means and methods; and
- liability resulting from section 240 or section 241 of the New York State Labor Law.

The CGL aggregate shall be endorsed to apply on a per project basis for construction contracts.

Contractor shall submit to OPRHP an Acord 25 Certificate of Liability Insurance and an Acord 855 Construction Certificate of Liability Insurance, or their successor forms, to document proof of the required coverages.

When the work involves construction or demolition within 50 feet of rail stations, yards, tracks, or other railroad property, the exclusion for work done within 50 feet of railroad property (the "Railroad" exclusion) must be deleted.

Commercial Automobile Liability

Commercial Auto Liability Insurance covering liability arising out of the use of any motor vehicle in connection with the Contract, including owned, leased, hired and non-owned vehicles bearing or, under the circumstances under which they are being used, required by the Motor Vehicle Laws of the State of New York to bear, license plates. Such policy shall have a combined single limit for Bodily Injury and Property Damage of at least $1,000,000. If the Contract involves the removal of hazardous waste or otherwise transporting hazardous materials, pollution liability coverage for covered automobiles shall be provided by form CA 01 12 03 06 and the Motor Carrier Act Endorsement (MCS-90) shall be attached.

If the Contractor does not own, lease or hire any motor vehicles used in connection with performance under this Contract, the Contractor need not obtain Comprehensive Automobile Liability Insurance, but must submit a written attestation stating that the Contractor does not own, lease or hire any automobiles used in connection with performance under this Contract. If Contractor later acquires, leases or hires, any automobiles that will be used in connection with performance under this Contract after this its effective date, the Contractor must obtain Comprehensive Automobile Liability Insurance that meets all of the requirements of this section and provide proof of such coverage to OPRHP within fifteen (15) days following the date the coverage is bound.

Notwithstanding the foregoing, in the event that the Contractor does not own or lease any motor vehicles used in connection with the performance under this Contract, but the Contractor does hire and/or utilize non-owned motor vehicles in connection with performance under this Contract, the Contractor must: (1) obtain Commercial Automobile Liability Insurance as required by this section, except that such insurance may be limited to liability arising out of hired and/or non-owned automobiles, as applicable; and (2) submit a written attestation stating that the Contractor does not own or lease any automobiles used in connection with performance under this Contract. If Contractor later acquires or leases any motor vehicles that will be used in connection with performance under this Contract, the Contractor must obtain Commercial Automobile Liability Insurance that meets all the requirements of this section and provide proof of such coverage to OPRHP within fifteen (15) days following the date the coverage is bound.

Umbrella and Excess Liability Policies

When the limits of the any Liability policies procured are insufficient to meet the limits specified, the Contractor shall procure and maintain commercial Umbrella and/or Excess Liability policies with limits in excess of the primary; provided, however, that the total amount of Insurance coverage is at least equal to the requirements for that Liability policy as set forth in this section. Such Umbrella and/or Excess Liability policies shall provide coverage at least as broad as the underlying policies and must be endorsed to be primary with respect to the coverage afforded the Additional Insureds. Any Insurance maintained by OPRHP or any Additional Insured shall be considered excess of and shall not contribute with any other Insurance procured and maintained by the Contractor including primary, Umbrella and Excess Liability Policies regardless of the other Insurance clause contained in either parties' policy.

Builder's Risk Insurance

The Contractor shall provide a Builder's Risk Insurance policy in completed value form. Such policy shall cover the total value of the work performed in accordance with the Contract, as well as the value of any equipment, supplies and/or material to be installed in the project that may be in storage (on or off the site) or in transit. The policy shall cover the cost of removing debris, including demolition as may be legally necessary by the operation of any law, ordinance or regulation, and property of the State held in its care, custody and/or control. The Builder's Risk Insurance policy shall contain endorsements that provide for the following:

- The State and the Contractor shall be named as loss Payees for the work in order of precedence, as their interest may appear; and
- In the event the loss occurs at an occupied facility, the policy shall contract occupancy without the consent of the Insurer; and
- In the event that the insurance policy has been issued by a mutual insurance company, the following language shall be included: the "New York State Office of Parks, Recreation and Historic Preservation is not liable for any premium or assessment under this policy of Insurance. The First Named Insured is solely liable therefor."

Environmental Liability

Contractor's Pollution Liability (CPL)

If the work performed under the Contract involves abatement, handling, removal, repair, replacement, enclosure, encapsulation and/or disposal of any pollutants, which includes but are not limited to, petroleum, petroleum product, hazardous materials or substances including asbestos, lead, fungus and those as defined by applicable State and federal laws and regulations, and the need to monitor, clean up, remove, contain, treat, detoxify, or assess the effects of a pollution-related event or condition, the Contractor shall procure, or otherwise obtain through an approved subcontractor, and maintain in full force and effect throughout the term of the Contract, and for two years after the work's completion,

Contractor's Pollution Liability (CPL) Insurance, including coverage for non-owned disposal sites. The limits of such CPL Policy shall not be less than: 1) $2,000,000, if the value of work to be performed under the Contract is less than $10 million, 2) $5,000,000, if the value of the work to be performed under the Contract is $10 million or more and up to and including $50 million, or 3) $10,000,000 if the value of the work to be performed under the Contract is more than $50 million. Such CPL policy shall provide coverage for bodily injury and property damage, including loss of use of damaged property or of property that has not been physically injured and for actual, alleged or threatened emission, discharge, dispersal, seepage, release or escape of pollutants, including any loss, cost or expense incurred as a result of any cleanup of pollutants or in the investigation, settlement or defense of any claim, suit, or proceedings against OPRHP arising from the Contractor's work.

This requirement applies to mold as well, if excluded in the Commercial General Liability Insurance policy.

If automobiles are to be used for transporting hazardous materials, the Contractor shall provide pollution liability broadened coverage for covered automobiles (Endorsement CA 01 12 or its equivalent) as well as proof of MCS-90.

Pollution Legal Liability (PLL)

If any work performed under the Contract includes operations that could involve the release of pollutants, Contractor shall procure and maintain Pollution Legal Liability (PLL) Insurance providing coverage for bodily injury, property damage or environmental contamination, including natural resource damage, resulting from the release of any pollutants from property Contractor owns, leases, or operates. Such policy shall provide coverage for actual, alleged or threatened emission, discharge, dispersal, seepage, release or escape of pollutants, including any loss, cost or expense incurred as a result of any cleanup of pollutants or in the investigation, settlement or defense of any claim, suit or proceedings against the insured, Additional Insureds, including OPRHP, or any authorized user arising from the Contractor's or their subcontractor's operations, with limits not less than $1,000,000 per claim. If automobiles are to be used for transporting hazardous materials, the Contractor shall provide pollution liability broadened coverage for covered autos (endorsement CA 99 48 03 06 or CA 01 12 03 06) as well as proof of MCS 90.

Aviation Liability

If any of the work performed under this Contract involves the use or operation of an aircraft, including but not limited to unmanned aircraft systems, Aviation Liability Insurance is required covering the liability of the owner and operator for bodily injury, property damage, and personal injury arising from all operation in the amount of at least $1,000,000 per Occurrence. If applicable, such Aviation Liability Insurance policy shall also protect against risk involving passengers, pilots, crew members, baggage, and cargo carried on the aircraft, including medical coverage for passengers, pilots and crew members; and damage to individuals or property outside aircraft itself with a liability limit of at least $1,000,000 each occurrence and $100,000 passenger liability.

Railroad Protective Liability Insurance

In the event that any work under the Contract is to be performed on or within 50 ft. of railroad property or a railroad right-of-way, the Contractor shall provide and maintain a Railroad Protective Liability (RPL) Insurance Policy in the amounts required by the respective railroad.

The policy must name the Railroad as the Named Insured. No Additional Insureds can be listed on the policy (see requirements for the deletion of the 50' Railroad Exclusion on the Commercial General Liability policy), and the definition of "physical damage to property" must be amended to mean direct and accidental loss of or damage to "all property of any Named Insured and all property in any Named Insured's care, custody or control."

Evidence of Railroad Protective Liability Insurance must be provided on the Certificate of Insurance, and a detailed Binder pending issuance of the policy, or on an ISO-RIMA or equivalent form approved by the railroad, and meet any other requirements as specified by the railroad and or OPRHP.

Professional Liability Insurance/Errors and Omissions Liability Insurance

If any work under the Contract involves professional design services in which any negligent act, error, or omission in the rendering of or failure to render may result in claims of financial loss, bodily injury, property damage, or personal injury, the Contractor and any subcontractor retained by the Contractor and providing such professional services, shall procure and maintain during and for a period of three (3) years after completion of the work provided under the Contract, Professional Liability Insurance/Errors and Omissions Liability Insurance issued to and covering damage for liability imposed on the Contractor by the Contract or law arising out of any negligent act, error, or omission in the render of or failure to render professional design services required by the Contract. The limits of such policy shall not be less than $2,000,000 each occurrence, if the value of work to be performed under the Contract is less than $25 million, or 2) $5,000,000 each occurrence, if the value of the work to be performed under the Contract is $25 million or more. Such policies do not require an Additional Insured endorsement.

Kathy Hochul, Governor

Roberta Reardon, Commissioner

NYS OPRHP

Lynda Shute, Contract Management Specialist
6105 E. Seneca Turnpike
Central Region Office
Jamesville NY 13078

Schedule Year	2024 through 2025
Date Requested	04/02/2025
PRC#	2025003950

Location	Sampson State Park
Project ID#	D006390-D006393
Project Type	constuction of a new maintenance pole barn and associated site work

PREVAILING WAGE SCHEDULE FOR ARTICLE 8 PUBLIC WORK PROJECT

Attached is the current schedule(s) of the prevailing wage rates and prevailing hourly supplements for the project referenced above. A unique Prevailing Rate Case Number (PRC#) has been assigned to the schedule(s) for your project.

The schedule is effective from July 2024 through June 2025. All updates, corrections, posted on the 1st business day of each month, and future copies of the annual determination are available on the Department's website www.labor.ny.gov. Updated PDF copies of your schedule can be accessed by entering your assigned PRC# at the proper location on the website.

It is the responsibility of the contracting agency or its agent to annex and make part, the attached schedule, to the specifications for this project, when it is advertised for bids and /or to forward said schedules to the successful bidder(s), immediately upon receipt, in order to insure the proper payment of wages.

Please refer to the "General Provisions of Laws Covering Workers on Public Work Contracts" provided with this schedule, for the specific details relating to other responsibilities of the Department of Jurisdiction.

Upon completion or cancellation of this project, enter the required information and mail **OR** fax this form to the office shown at the bottom of this notice, **OR** fill out the electronic version via the NYSDOL website.

NOTICE OF COMPLETION / CANCELLATION OF PROJECT

Date Completed: _____ Date Cancelled: _____

Name & Title of Representative: _____

Phone: (518) 457-5589 Fax: (518) 485-1870
W. Averell Harriman State Office Campus, Bldg. 12, Room 130, Albany, NY 12240

General Provisions of Laws Covering Workers on Article 8 Public Work Contracts

Introduction

The Labor Law requires public work contractors and subcontractors to pay laborers, workers, or mechanics employed in the performance of a public work contract not less than the prevailing rate of wage and supplements (fringe benefits) in the locality where the work is performed.

Responsibilities of the Department of Jurisdiction

A Department of Jurisdiction (Contracting Agency) includes a state department, agency, board or commission: a county, city, town or village; a school district, board of education or board of cooperative educational services; a sewer, water, fire, improvement and other district corporation; a public benefit corporation; and a public authority awarding a public work contract.

The Department of Jurisdiction (Contracting Agency) awarding a public work contract MUST obtain a Prevailing Rate Schedule listing the hourly rates of wages and supplements due the workers to be employed on a public work project. This schedule may be obtained by completing and forwarding a "Request for wage and Supplement Information" form (PW 39) to the Bureau of Public Work. The Prevailing Rate Schedule MUST be included in the specifications for the contract to be awarded and is deemed part of the public work contract.

Upon the awarding of the contract, the law requires that the Department of Jurisdiction (Contracting Agency) furnish the following information to the Bureau: the name and address of the contractor, the date the contract was let and the approximate dollar value of the contract. To facilitate compliance with this provision of the Labor Law, a copy of the Department's "Notice of Contract Award" form (PW 16) is provided with the original Prevailing Rate Schedule.

The Department of Jurisdiction (Contracting Agency) is required to notify the Bureau of the completion or cancellation of any public work project. The Department's PW 200 form is provided for that purpose.

Both the PW 16 and PW 200 forms are available for completion online.

Hours

No laborer, worker, or mechanic in the employ of a contractor or subcontractor engaged in the performance of any public work project shall be permitted to work more than eight hours in any day or more than five days in any week, except in cases of extraordinary emergency. The contractor and the Department of Jurisdiction (Contracting Agency) may apply to the Bureau of Public Work for a dispensation permitting workers to work additional hours or days per week on a particular public work project.

Wages and Supplements

The wages and supplements to be paid and/or provided to laborers, workers, and mechanics employed on a public work project shall be not less than those listed in the current Prevailing Rate Schedule for the locality where the work is performed. If a prime contractor on a public work project has not been provided with a Prevailing Rate Schedule, the contractor must notify the Department of Jurisdiction (Contracting Agency) who in turn must request an original Prevailing Rate Schedule form the Bureau of Public Work. Requests may be submitted by: mail to NYSDOL, Bureau of Public Work, State Office Bldg. Campus, Bldg. 12, Rm. 130, Albany, NY 12226; Fax to Bureau of Public Work (518) 485-1870; or electronically at the NYSDOL website www.labor.ny.gov.

Upon receiving the original schedule, the Department of Jurisdiction (Contracting Agency) is REQUIRED to provide complete copies to all prime contractors who in turn MUST, by law, provide copies of all applicable county schedules to each subcontractor and obtain from each subcontractor, an affidavit certifying such schedules were received. If the original schedule expired, the contractor may obtain a copy of the new annual determination from the NYSDOL website www.labor.ny.gov.

The Commissioner of Labor makes an annual determination of the prevailing rates. This determination is in effect from July 1st through June 30th of the following year. The annual determination is available on the NYSDOL website www.labor.ny.gov.

Payrolls and Payroll Records

Every contractor and subcontractor MUST keep original payrolls or transcripts subscribed and affirmed as true under penalty of perjury. As per Article 6 of the Labor law, contractors and subcontractors are required to establish, maintain, and preserve for not less than six (6) years, contemperaneous, true, and accurate payroll records. At a minimum, payrolls must show the following information for each person employed on a public work project: Name, Address, Last 4 Digits of Social Security Number, Classification(s) in which the worker was employed, Hourly wage rate(s) paid, Supplements paid or provided, and Daily and weekly number of hours worked in each classification.

The filing of payrolls to the Department of Jurisdiction is a condition of payment.Every contractor and subcontractor shall submit to the Department of Jurisdiction (Contracting Agency), within thirty (30) days after issuance of its first payroll and every thirty (30) days thereafter, a transcript of the original payrolls, subscribed and affirmed as true under penalty of perjury. The Department of Jurisdiction (Contracting Agency) shall collect, review for facial validity, and maintain such payrolls.

In addition, the Commissioner of Labor may require contractors to furnish, with ten (10) days of a request, payroll records sworn to as their validity and accuracy for public work and private work. Payroll records include, but are not limited to time cards, work description sheets, proof that supplements were provided, cancelled payroll checks and payrolls. Failure to provide the requested information within the allotted ten (10) days will result in the withholding of up to 25% of the contract, not to exceed $100,000.00. If the contractor or subcontractor does not maintain a place of business in New York State and the amount of the contract exceeds $25,000.00, payroll records and certifications must be kept on the project worksite.

The prime contractor is responsible for any underpayments of prevailing wages or supplements by any subcontractor.

All contractors or their subcontractors shall provide to their subcontractors a copy of the Prevailing Rate Schedule specified in the public work contract as well as any subsequently issued schedules. A failure to provide these schedules by a contractor or subcontractor is a violation of Article 8, Section 220-a of the Labor Law.

All subcontractors engaged by a public work project contractor or its subcontractor, upon receipt of the original schedule and any subsequently issued schedules, shall provide to such contractor a verified statement attesting that the subcontractor has received the Prevailing Rate Schedule and will pay or provide the applicable rates of wages and supplements specified therein. (See NYS Labor Laws, Article 8 . Section 220-a).

Determination of Prevailing Wage and Supplement Rate Updates Applicable to All Counties

The wages and supplements contained in the annual determination become effective July 1st whether or not the new determination has been received by a given contractor. Care should be taken to review the rates for obvious errors. Any corrections should be brought to the Department's attention immediately. It is the responsibility of the public work contractor to use the proper rates. If there is a question on the proper classification to be used, please call the district office located nearest the project. Any errors in the annual determination will be corrected and posted to the NYSDOL website on the first business day of each month. Contractors are responsible for paying these updated rates as well, retroactive to July 1st.

When you review the schedule for a particular occupation, your attention should be directed to the dates above the column of rates. These are the dates for which a given set of rates is effective. To the extent possible, the Department posts rates in its possession that cover periods of time beyond the July 1st to June 30th time frame covered by a particular annual determination. Rates that extend beyond that instant time period are informational ONLY and may be updated in future annual determinations that actually cover the then appropriate July 1st to June 30th time period.

Withholding of Payments

When a complaint is filed with the Commissioner of Labor alleging the failure of a contractor or subcontractor to pay or provide the prevailing wages or supplements, or when the Commissioner of Labor believes that unpaid wages or supplements may be due, payments on the public work contract shall be withheld from the prime contractor in a sufficient amount to satisfy the alleged unpaid wages and supplements, including interest and civil penalty, pending a final determination.

When the Bureau of Public Work finds that a contractor or subcontractor on a public work project failed to pay or provide the requisite prevailing wages or supplements, the Bureau is authorized by Sections 220-b and 235.2 of the Labor Law to so notify the financial officer of the Department of Jurisdiction (Contracting Agency) that awarded the public work contract. Such officer MUST then withhold or cause to be withheld from any payment due the prime contractor on account of such contract the amount indicated by the Bureau as sufficient to satisfy the unpaid wages and supplements, including interest and any civil penalty that may be assessed by the Commissioner of Labor. The withholding continues until there is a final determination of the underpayment by the Commissioner of Labor or by the court in the event a legal proceeding is instituted for review of the determination of the Commissioner of Labor.

The Department of Jurisdiction (Contracting Agency) shall comply with this order of the Commissioner of Labor or of the court with respect to the release of the funds so withheld.

Summary of Notice Posting Requirements

The current Prevailing Rate Schedule must be posted in a prominent and accessible place on the site of the public work project. The prevailing wage schedule must be encased in, or constructed of, materials capable of withstanding adverse weather conditions and be titled "PREVAILING RATE OF WAGES" in letters no smaller than two (2) inches by two (2) inches.

The "Public Work Project" notice must be posted at the beginning of the performance of every public work contract, on each job site.

Every employer providing workers. compensation insurance and disability benefits must post notices of such coverage in the format prescribed by the Workers. Compensation Board in a conspicuous place on the jobsite.

Every employer subject to the NYS Human Rights Law must conspicuously post at its offices, places of employment, or employment training centers, notices furnished by the State Division of Human Rights.

Employers liable for contributions under the Unemployment Insurance Law must conspicuously post on the jobsite notices furnished by the NYS Department of Labor.

Apprentices

Employees cannot be paid apprentice rates unless they are individually registered in a program registered with the NYS Commissioner of Labor. The allowable ratio of apprentices to journeyworkers in any craft classification can be no greater than the statewide building trade ratios promulgated by the Department of Labor and included with the Prevailing Rate Schedule. An employee listed on a payroll as an apprentice who is not registered as above or is performing work outside the classification of work for which the apprentice is indentured, must be paid the prevailing journeyworker's wage rate for the classification of work the employee is actually performing.

NYSDOL Labor Law, Article 8, Section 220-3, require that only apprentices individually registered with the NYS Department of Labor may be paid apprenticeship rates on a public work project. No other Federal or State Agency of office registers apprentices in New York State.

Persons wishing to verify the apprentice registration of any person must do so in writing by mail, to the NYSDOL Office of Employability Development / Apprenticeship Training, State Office Bldg. Campus, Bldg. 12, Albany, NY 12226 or by Fax to NYSDOL Apprenticeship Training (518) 457-7154. All requests for verification must include the name and social security number of the person for whom the information is requested.

The only conclusive proof of individual apprentice registration is written verification from the NYSDOL Apprenticeship Training Albany Central office. Neither Federal nor State Apprenticeship Training offices outside of Albany can provide conclusive registration information.

It should be noted that the existence of a registered apprenticeship program is not conclusive proof that any person is registered in that program. Furthermore, the existence or possession of wallet cards, identification cards, or copies of state forms is not conclusive proof of the registration of any person as an apprentice.

Interest and Penalties

In the event that an underpayment of wages and/or supplements is found:

- Interest shall be assessed at the rate then in effect as prescribed by the Superintendent of Banks pursuant to section 14-a of the Banking Law, per annum from the date of underpayment to the date restitution is made.
- A Civil Penalty may also be assessed, not to exceed 25% of the total of wages, supplements, and interest due.

Debarment

Any contractor or subcontractor and/or its successor shall be ineligible to submit a bid on or be awarded any public work contract or subcontract with any state, municipal corporation or public body for a period of five (5) years when:

- Two (2) willful determinations have been rendered against that contractor or subcontractor and/or its successor within any consecutive six (6) year period.
- There is any willful determination that involves the falsification of payroll records or the kickback of wages or supplements.

Criminal Sanctions

Willful violations of the Prevailing Wage Law (Article 8 of the Labor Law) may be a felony punishable by fine or imprisonment of up to 15 years, or both.

Discrimination

No employee or applicant for employment may be discriminated against on account of age, race, creed, color, national origin, sex, disability or marital status.

No contractor, subcontractor nor any person acting on its behalf, shall by reason of race, creed, color, disability, sex or national origin discriminate against any citizen of the State of New York who is qualified and available to perform the work to which the employment relates (NYS Labor Law, Article 8, Section 220-e(a)).

No contractor, subcontractor, nor any person acting on its behalf, shall in any manner, discriminate against or intimidate any employee on account of race, creed, color, disability, sex, or national origin (NYS Labor Law, Article 8, Section 220-e(b)).

The Human Rights Law also prohibits discrimination in employment because of age, marital status, or religion.

There may be deducted from the amount payable to the contractor under the contract a penalty of $50.00 for each calendar day during which such person was discriminated against or intimidated in violation of the provision of the contract (NYS Labor Law, Article 8, Section 220-e(c)).

The contract may be cancelled or terminated by the State or municipality. All monies due or to become due thereunder may be forfeited for a second or any subsequent violation of the terms or conditions of the anti-discrimination sections of the contract (NYS Labor Law, Article 8, Section 220-e(d)).

Every employer subject to the New York State Human Rights Law must conspicuously post at its offices, places of employment, or employment training centers notices furnished by the State Division of Human Rights.

Workers' Compensation

In accordance with Section 142 of the State Finance Law, the contractor shall maintain coverage during the life of the contract for the benefit of such employees as required by the provisions of the New York State Workers' Compensation Law.

A contractor who is awarded a public work contract must provide proof of workers' compensation coverage prior to being allowed to begin work.

The insurance policy must be issued by a company authorized to provide workers' compensation coverage in New York State. Proof of coverage must be on form C-105.2 (Certificate of Workers' Compensation Insurance) and must name this agency as a certificate holder.

If New York State coverage is added to an existing out-of-state policy, it can only be added to a policy from a company authorized to write workers' compensation coverage in this state. The coverage must be listed under item 3A of the information page.

The contractor must maintain proof that subcontractors doing work covered under this contract secured and maintained a workers' compensation policy for all employees working in New York State.

Every employer providing worker's compensation insurance and disability benefits must post notices of such coverage in the format prescribed by the Workers' Compensation Board in a conspicuous place on the jobsite.

Unemployment Insurance

Employers liable for contributions under the Unemployment Insurance Law must conspicuously post on the jobsite notices furnished by the New York State Department of Labor.

NYS OPRHP

Lynda Shute, Contract Management Specialist
6105 E. Seneca Turnpike
Central Region Office
Jamesville NY 13078

Schedule Year 2024 through 2025
Date Requested 04/02/2025
PRC# 2025003950

Location Sampson State Park
Project ID# D006390-D006393
Project Type constuction of a new maintenance pole barn and associated site work

Notice of Contract Award

New York State Labor Law, Article 8, Section 220.3a requires that certain information regarding the awarding of public work contracts, be furnished to the Commissioner of Labor. One "Notice of Contract Award" (PW 16, which may be photocopied), **MUST** be completed for **EACH** prime contractor on the above referenced project.

Upon notifying the successful bidder(s) of this contract, enter the required information and mail **OR** fax this form to the office shown at the bottom of this notice, **OR** fill out the electronic version via the NYSDOL website.

Contractor Information
All information must be supplied

Federal Employer Identification Number: _____

Name: _____

Address: _____

_____

City: _____ State: _____ Zip: _____

Amount of Contract: $_____

Approximate Starting Date: ____/____/____

Approximate Completion Date: ____/____/____

Contract Type:
[ ] (01) General Construction
[ ] (02) Heating/Ventilation
[ ] (03) Electrical
[ ] (04) Plumbing
[ ] (05) Other : _____

Phone: (518) 457-5589 Fax: (518) 485-1870
W. Averell Harriman State Office Campus, Bldg. 12, Room 130, Albany, NY 12226

Social Security Numbers on Certified Payrolls:

The Department of Labor is cognizant of the concerns of the potential for misuse or inadvertent disclosure of social security numbers. Identity theft is a growing problem and we are sympathetic to contractors' concern regarding inclusion of this information on payrolls if another identifier will suffice.

For these reasons, the substitution of the use of the last four digits of the social security number on certified payrolls submitted to contracting agencies on public work projects is now acceptable to the Department of Labor. This change does not affect the Department's ability to request and receive the entire social security number from employers during its public work/ prevailing wage investigations.

Construction Industry Fair Play Act: Required Posting for Labor Law Article 25-B § 861-d

Construction industry employers must post the "Construction Industry Fair Play Act" notice in a prominent and accessible place on the job site. Failure to post the notice can result in penalties of up to $1,500 for a first offense and up to $5,000 for a second offense. The posting is included as part of this wage schedule. Additional copies may be obtained from the NYS DOL website, https://dol.ny.gov/public-work-and-prevailing-wage
If you have any questions concerning the Fair Play Act, please call the State Labor Department toll-free at 1-866-435-1499 or email us at: dol.misclassified@labor.ny.gov .

Worker Notification: (Labor Law §220, paragraph a of subdivision 3-a)

Effective June 23, 2020

This provision is an addition to the existing wage rate law, Labor Law §220, paragraph a of subdivision 3-a. It requires contractors and subcontractors to provide written notice to all laborers, workers or mechanics of the *prevailing wage and supplement rate* for their particular job classification *on each pay stub**. It also requires contractors and subcontractors to *post a notice* at the beginning of the performance of every public work contract *on each job site* that includes the telephone number and address for the Department of Labor and a statement informing laborers, workers or mechanics of their right to contact the Department of Labor if he/she is not receiving the proper prevailing rate of wages and/or supplements for his/her job classification. The required notification will be provided with each wage schedule, may be downloaded from our website *www.labor.ny.gov* or be made available upon request by contacting the Bureau of Public Work at 518-457-5589. *In the event the required information will not fit on the pay stub, an accompanying sheet or attachment of the information will suffice.

(12.20)

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

Budget Policy & Reporting Manual

B-610

Public Work Enforcement Fund

effective date December 7, 2005

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1. Purpose and Scope:

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

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

2. Background and Statutory References:

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

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

3. Procedures and Agency Responsibilities:

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

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

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

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

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

Reports should contain the following information:

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

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

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

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

NEW YORK STATE OF OPPORTUNITY. Department of Labor

Required Notice under Article 25-B of the Labor Law

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

The law says that you are an employee unless:

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

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

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

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

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

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

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

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

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

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

Employer Name:

IA 999 (09/16)

WE ARE YOUR DOL

NEW YORK STATE | Department of Labor

New York State Department of Labor
Bureau of Public Work

Attention Employees

THIS IS A:

PUBLIC WORK PROJECT

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

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

Chapter 629 of the Labor Laws of 2007:

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

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

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

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

Contractor Name: _____

Project Location: _____

Requirements for OSHA 10 Compliance

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

The Bureau will enforce the statute as follows:

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

Proof of completion may include but is not limited to:

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

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

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

WICKS

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

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

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

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

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

Contractors must pay subcontractors within a 7 days period.

(07.19)

Introduction to the Prevailing Rate Schedule

Information About Prevailing Rate Schedule

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

Classification

It is the duty of the Commissioner of Labor to make the proper classification of workers taking into account whether the work is heavy and highway, building, sewer and water, tunnel work, or residential, and to make a determination of wages and supplements to be paid or provided. It is the responsibility of the public work contractor to use the proper rate. If there is a question on the proper classification to be used, please call the district office located nearest the project. District office locations and phone numbers are listed below.

Prevailing Wage Schedules are issued separately for "General Construction Projects" and "Residential Construction Projects" on a county-by-county basis.

General Construction Rates apply to projects such as: Buildings, Heavy & Highway, and Tunnel and Water & Sewer rates.

Residential Construction Rates generally apply to construction, reconstruction, repair, alteration, or demolition of one family, two family, row housing, or rental type units intended for residential use.

Some rates listed in the Residential Construction Rate Schedule have a very limited applicability listed along with the rate. Rates for occupations or locations not shown on the residential schedule must be obtained from the General Construction Rate Schedule. Please contact the local Bureau of Public Work office before using Residential Rate Schedules, to ensure that the project meets the required criteria.

Payrolls and Payroll Records

Contractors and subcontractors are required to establish, maintain, and preserve for not less that six (6) years, contemporaneous, true, and accurate payroll records.

Every contractor and subcontractor shall submit to the Department of Jurisdiction (Contracting Agency), within thirty (30) days after issuance of its first payroll and every thirty (30) days thereafter, a transcript of the original payrolls, subscribed and affirmed as true under penalty of perjury.

Paid Holidays

Paid Holidays are days for which an eligible employee receives a regular day's pay, but is not required to perform work. If an employee works on a day listed as a paid holiday, this remuneration is in addition to payment of the required prevailing rate for the work actually performed.

Overtime

At a minimum, all work performed on a public work project in excess of eight hours in any one day or more than five days in any workweek is overtime. However, the specific overtime requirements for each trade or occupation on a public work project may differ. Specific overtime requirements for each trade or occupation are contained in the prevailing rate schedules.

Overtime holiday pay is the premium pay that is required for work performed on specified holidays. It is only required where the employee actually performs work on such holidays.

The applicable holidays are listed under HOLIDAYS: OVERTIME. The required rate of pay for these covered holidays can be found in the OVERTIME PAY section listings for each classification.

Supplemental Benefits

Particular attention should be given to the supplemental benefit requirements. Although in most cases the payment or provision of supplements is straight time for all hours worked, some classifications require the payment or provision of supplements, or a portion of the supplements, to be paid or provided at a premium rate for premium hours worked. Supplements may also be required to be paid or provided on paid holidays, regardless of whether the day is worked. The Overtime Codes and Notes listed on the particular wage classification will indicate these conditions as required.

Effective Dates

When you review the schedule for a particular occupation, your attention should be directed to the dates above the column of rates. These are the dates for which a given set of rates is effective. The rate listed is valid until the next effective rate change or until the new annual determination which takes effect on July 1 of each year. All contractors and subcontractors are required to pay the current prevailing rates of wages and supplements. If you have any questions please contact the Bureau of Public Work or visit the New York State Department of Labor website (www.labor.ny.gov) for current wage rate information.

Apprentice Training Ratios

The following are the allowable ratios of registered Apprentices to Journey-workers.

For example, the ratio 1:1,1:3 indicates the allowable initial ratio is one Apprentice to one Journeyworker. The Journeyworker must be in place on the project before an Apprentice is allowed. Then three additional Journeyworkers are needed before a second Apprentice is allowed. The last ratio repeats indefinitely. Therefore, three more Journeyworkers must be present before a third Apprentice can be hired, and so on.

Please call Apprentice Training Central Office at (518) 457-6820 if you have any questions.

Title (Trade)	Ratio
Boilermaker (Construction)	1:1,1:4
Boilermaker (Shop)	1:1,1:3
Carpenter (Bldg.,H&H, Pile Driver/Dockbuilder)	1:1,1:4
Carpenter (Residential)	1:1,1:3
Electrical (Outside) Lineman	1:1,1:2
Electrician (Inside)	1:1,1:3
Elevator/Escalator Construction & Modernizer	1:1,1:2
Glazier	1:1,1:3
Insulation & Asbestos Worker	1:1,1:3
Iron Worker	1:1,1:4
Laborer	1:1,1:3
Mason	1:1,1:4
Millwright	1:1,1:4
Op Engineer	1:1,1:5
Painter	1:1,1:3
Plumber & Steamfitter	1:1,1:3
Roofer	1:1,1:2
Sheet Metal Worker	1:1,1:3
Sprinkler Fitter	1:1,1:2

If you have any questions concerning the attached schedule or would like additional information, please contact the nearest BUREAU of PUBLIC WORK District Office or write to:

New York State Department of Labor
Bureau of Public Work
State Office Campus, Bldg. 12
Albany, NY 12226

District Office Locations:	Telephone #	FAX #
Bureau of Public Work - Albany	518-457-2744	518-485-0240
Bureau of Public Work - Binghamton	607-721-8005	607-721-8004
Bureau of Public Work - Buffalo	716-847-7159	716-847-7650
Bureau of Public Work - Garden City	516-228-3915	516-794-3518
Bureau of Public Work - Newburgh	845-568-5287	845-568-5332
Bureau of Public Work - New York City	212-932-2419	212-775-3579
Bureau of Public Work - Patchogue	631-687-4882	631-687-4902
Bureau of Public Work - Rochester	585-258-4505	585-258-4708
Bureau of Public Work - Syracuse	315-428-4056	315-428-4671
Bureau of Public Work - Utica	315-793-2314	315-793-2514
Bureau of Public Work - White Plains	914-997-9507	914-997-9523
Bureau of Public Work - Central Office	518-457-5589	518-485-1870

Seneca County General Construction

Boilermaker — 04/01/2025

JOB DESCRIPTION Boilermaker **DISTRICT** 7

ENTIRE COUNTIES
Cayuga, Clinton, Cortland, Franklin, Jefferson, Lewis, Madison, Oneida, Onondaga, Oswego, Seneca, St. Lawrence, Tompkins

WAGES

Per hour:	07/01/2024
Boilermaker	$ 37.98

SUPPLEMENTAL BENEFITS

Per hour:	
Journeyworker	$ 26.62* + 1.48

*This portion of the benefits subject to the same premium rate as shown for overtime wages.

OVERTIME PAY
See (B, E, Q) 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. When Christmas Day and New Year's fall on Saturday, Friday will be observed as the holiday.

REGISTERED APPRENTICES
WAGES per hour: Six (6) month terms at the following percentage of Journeyworker's wage.

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

SUPPLEMENTAL BENEFITS per hour:

$ 19.78* + 1.48	$ 19.78* + 1.48	$ 20.76* + 1.48	$ 21.73* + 1.48	$ 22.71* + 1.48	$ 23.69* + 1.48	$24.67* + 1.48	$ 25.64* + 1.48

*This portion of the benefits subject to the same premium rate as shown for overtime wages.

7-175

Carpenter - Building — 04/01/2025

JOB DESCRIPTION Carpenter - Building **DISTRICT** 6

ENTIRE COUNTIES
Cayuga, Herkimer, Madison, Oneida, Seneca, Yates

WAGES

Per hour:	07/01/2024	07/01/2025 Additional
Carpenter	$ 30.85	$ 1.30*
Floor Coverer	30.85	1.30*
Carpet Layer	30.85	1.30*
Drywall	30.85	1.30*
Diver - Wet Day	61.25	0.00
Diver - Dry Day	31.85	1.30*
Dive Tender	31.85	1.30*

*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.
- 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 $0.50 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 $0.75 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
3rd Shift - Premium of 14% of base wage per hour

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:

Journeyworker	$ 21.69

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:

$ 12.60	$ 12.61	$ 15.21	$ 15.21

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.
- 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.

6-277B-Cay

Carpenter - Building / Heavy&Highway — 04/01/2025

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:	07/01/2024
Carpenter - ONLY for Artificial Turf/Synthetic Sport Surface	$ 36.48

Note - Does not include the operation of equipment. Please see Operating Engineers rates.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker	$ 26.55

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

HOLIDAY
Paid: See (5) on HOLIDAY PAGE
Overtime: See (5, 6, 16) on HOLIDAY PAGE
Notes:
When a holiday falls upon a Saturday, it shall be observed on the preceding Friday. Whan a holiday falls upon a Sunday, it shall be observed on the following Monday.
An employee taking an unexcused day off the regularly scheduled day before or after a paid Holiday shall not receive Holiday pay.

REGISTERED APPRENTICES
Wages per hour (1300 hour terms at the following percentage of Journeyworker's wage):

1st	2nd	3rd	4th
65%	70%	75%	80%

Supplemental Benefits per hour:

$18.58	$19.14	$21.24	$21.79

2-42AtSS

Carpenter - Heavy&Highway — 04/01/2025

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	07/01/2024
Carpenter	$ 38.28
Piledriver	38.28
Diver-Wet Day	63.28
Diver-Dry Day	39.28
Diver-Tender	39.28

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 $2.50 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 $.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
When project owner mandates a single irregular work shift, the Journeyworkers and Apprentices will receive an additional $3.00 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 $ 26.55

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
CAPRENTER APPRENTICES
Wages per hour (1040 hour terms at the following percentage of journeyworker's base wage):

1st	2nd	3rd	4th	5th
65%	70%	75%	80%	85%

Supplemental Benefits per hour:

$ 18.58	$ 19.14	$ 21.19	$ 21.74	$ 22.29

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:

$ 18.58	$ 19.14	$ 21.19	$ 21.74

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 $2.50 per hour.

2-277HH-Bro

Electrician 04/01/2025

JOB DESCRIPTION Electrician **DISTRICT** 7

ENTIRE COUNTIES
Yates

PARTIAL COUNTIES
Cayuga: All Townships except Genoa, Ira, Locke, Sempronius, Sterling, Summerhill, and Victory.
Onondaga: Townships of Elbridge and Skaneateles.
Ontario: Only the Townships of Canandaigua, Farmington, Geneva, Gorham, Hopewell, Manchester, Phelps, and Seneca.
Seneca: All townships except Covert and Lodi,
Wayne: Only the Townships of Arcadia, Galen, Lyons, Savannah, and the Village of Newark.

WAGES
Per hour: 07/01/2024

Electrician	$ 43.50
Teledata, Sound Wireman	43.50

IMPORTANT NOTE - WORKING ABOVE THE FLOOR:
Workmen required working 40 feet or more above a floor or working platform on swinging toothpick scaffolds or boatswain chairs, shall receive $.50 above the applicable rate of pay. Where safety nets are installed according to O.S.H.A. standards and/or other State Safety Standards and/or bucket trucks used with a safety belt and lanyards according to O.S.H.A. standards or other State Safety Standards, this high time rate shall not apply. Any workman working over 50 feet high shall receive $1.00 above the applicable rate and any workman working over 100 feet high shall receive $2.00 above the applicable rate. These rates shall not apply to workers in bucket trucks and motorized scaffolds where safety harnesses are used.

SHIFT WORK

Work from 4:30PM - 1:00AM*	$ 50.03
Work from 12:30AM - 9:00AM*	52.20

* Applies when multiple shifts of 8 hours for at least 5 days duration are mandated by the contracting agency.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker $ 27.02 plus 3% of wage paid

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) on HOLIDAY PAGE
NOTE: If a holiday falls on Saturday, it will be celebrated on the Friday before. If a holiday falls on Sunday, it will be celebrated on the following Monday.

REGISTERED APPRENTICES
WAGES: hourly terms at the following wages per hour:

1st term (0-1000 hrs)	$ 19.40
2nd term (1001-2000 hrs)	21.60
3rd term (2001-3500 hrs)	23.75
4th term (3501-5000 hrs)	28.10
5th term (5001-6500 hrs)	32.45
6th term (6501-8000 hrs)	36.80

SUPPLEMENTAL BENEFITS per hour worked:

Appr. 1st and 2nd term	$ 12.50 plus 3% of wage paid
All other terms	$ 25.02 plus 3% of wage paid

7-840 Z1

Electrician — 04/01/2025

JOB DESCRIPTION Electrician **DISTRICT** 6

ENTIRE COUNTIES

PARTIAL COUNTIES
Cayuga: Only the Township of Genoa.
Schuyler: Only the Townships of Cayuta, Catharine, and Hector.
Seneca: Only the Townships of Lodi and Covert.
Tioga: Only the Townships of Spencer and Candor.
Tompkins: Entire county except the Township of Groton.

WAGES

Per hour:	07/01/2024
Electrician	$ 42.00

Additional $1.00 per hour for work from trusses, scaffolds, frames, spider baskets, ladders, etc. 40 feet or more from ground floor or in underground mines or tunnels. Work done from personal lift equipment that complies with OSHA requirements are excluded.

Additional $2.00 per hour when required to work under compressed air, on radio towers, on asbestos abatement projects which require the use of a respirator, work of a hazardous nature, work where gas masks are required or work requiring use of protective arc flash suits.

NOTE: Additional amounts subject to premiums.

SHIFT WORK
THE FOLLOWING RATES WILL APPLY WHEN SHIFT WORK IS MANDATED EITHER IN THE JOB SPECIFICATION OR BY THE CONTRACTING AGENCY:

1ST SHIFT	8:00 AM to 4:30 PM	Regular wage rate
2ND SHIFT	4:30 PM to 1:00 AM	Regular wage rate plus 17.3%
3RD SHIFT	12:30 AM to 9:00 AM	Regular wage rate plus 31.4%

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker	$ 29.55 plus 3% of hourly wage paid*

* NOTE: The 3% is based on the hourly wage paid, straight time rate or premium rate.

OVERTIME PAY
See (B, *E, Q) on OVERTIME PAGE
* NOTE: On Saturday the first 8 hours worked shall be paid at a rate of one and one-half times the applicable rate. All additional hours are payable at double the straight time rate.
WAGE CAP - Double the straight time hourly base wage shall be the maximum hourly wage compensation for any hour worked. Contractor is still responsible to pay the hourly benefit amount for each hour worked.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
NOTE: When a holiday falls on a Saturday, the day preceding shall be celebrated as such, and when falling on a Sunday, Monday will be celebrated as the holiday.

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

1st year (47.5%)	$ 19.95
2nd year (52.5%)	22.05
3rd year (65%)	27.30
4th year (75%)	31.50
5th year (85%)	35.70

SUPPLEMENTAL BENEFITS per hour:

1st year	$ 13.75*
2nd year	13.75*
3rd year	22.47*
4th year	23.97*
5th year	25.46*

* PLUS 3% OF HOURLY WAGE PAID, STRAIGHT TIME RATE OR PREMIUM RATE.

6-241

Elevator Constructor — 04/01/2025

JOB DESCRIPTION Elevator Constructor **DISTRICT** 5

ENTIRE COUNTIES
Chemung, Livingston, Monroe, Ontario, Schuyler, Seneca, Steuben, Wayne, Yates

WAGES
Per hour worked: 07/01/2024

Elevator Constructor	$ 58.98
Helper	47.18

SUPPLEMENTAL BENEFITS
Per hour:
$ 39.185
*Add 6% of regular hourly rate for all hours worked.

OVERTIME PAY
See (D, O) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6, 15, 16) on HOLIDAY PAGE
Overtime: See (5, 6, 15, 16) on HOLIDAY PAGE

REGISTERED APPRENTICES
850 hours terms at the following percentage of journeyman's wage.

1st	2nd	3rd	4th	5th	6th	7th	8th
50*	55%	65%	65%	70%	70%	80%	80%

*Zero benefits paid for first term.

Supplemental Benefits per hour:
$ 39.185*

*Add 6% of regular hourly rate for all hours worked

5-27

Glazier — 04/01/2025

JOB DESCRIPTION Glazier **DISTRICT** 5

ENTIRE COUNTIES
Jefferson, Lewis, Livingston, Monroe, Ontario, Seneca, St. Lawrence, Wayne, Yates

WAGES
Per hour: 07/01/2024

Glazier $ 29.05

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman	$ 30.70

OVERTIME PAY
See (B, E, E2*, Q, Note) on OVERTIME PAGE.
*Note - Or circumstances beyond the control of the employer.

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

REGISTERED APPRENTICES
1000 hour terms

Appr. 1st term:	$ 18.00
Appr. 2nd term:	19.00
Appr. 3rd term:	20.00
Appr. 4th term:	21.00
Appr. 5th term:	22.00
Appr. 6th term:	23.00
Appr. 7th term:	24.00
Appr. 8th term:	25.00

Supplemental Benefits per hour:

Appr. 1st term	$ 14.25
Appr. 2nd term	14.25
Appr. 3rd term	20.25
Appr. 4th tern	20.25
Appr. 5th term	21.25
Appr. 6th term	21.25
Appr. 7th term	22.25
Appr. 8th term	22.25

5-677.1

Insulator - Heat & Frost — 04/01/2025

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: 07/01/2024

Asbestos Installer	$ 41.50
Insulation Installer	41.50
(On mechanical systems only)	

SHIFT WORK
The following rates will apply on all contracting agency-mandated shifts worked:

1st Shift	$ 41.50
2nd Shift	47.72
3rd Shift	49.80

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker	$ 25.09

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%
$ 24.90	$ 29.05	$ 33.20	$ 37.35

SUPPLEMENTAL BENEFITS per hour:

$ 22.59	$ 22.59	$ 25.09	$ 25.09

7-30-Syracuse

Ironworker 04/01/2025

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:	07/01/2024	07/01/2025 Additional	07/01/2026 Additional
Ironworker	$ 34.65	$ 2.66*	$ 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	$ 34.65	
2nd Shift	38.12	Starting times between 2PM and 7PM
3rd Shift	39.85	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	$ 31.73

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	$ 12.53
2nd year	20.86
3rd year	22.05
4th year	23.24

6-60

Laborer - Building 04/01/2025

JOB DESCRIPTION Laborer - Building **DISTRICT** 5

ENTIRE COUNTIES
Genesee, Livingston, Monroe, Ontario, Orleans, Seneca, Wayne, Wyoming, Yates

WAGES
GROUP A: Basic Rate

GROUP D: Blaster

GROUP E: Powder Monkey

GROUP F: Air track drill, wagon drill and asphalt rakers

GROUP G: Chuck tender, all work on hanging or swinging scaffold, work at heights outside the building where safety lines and belts are required, boson's chair.

GROUP H: Jack hammers, mortar mixers, paving breakers, concrete vibrators operators other than in (J), Barco tampers, jumping jacks.

GROUP I: Pipe layers, burners and cutters for wrecking and demolition.

GROUP J: Concrete vibrators for architectural concrete.

GROUP K: Yardmen, Cleaning, Clean-up (not demolition related).

Per hour:	07/01/2024
Building Laborer:	
Group A	$ 31.07
Group D	32.40
Group E	31.94
Group F	31.47
Group G	31.27
Group H	31.37
Group I	31.37
Group J	31.51
Group K	28.22
New Chimney Work:	
Base to 100 feet	$ 31.07
101 to 150 feet	31.32
151 to 200 feet	31.57
201 to 250 feet	31.82
251 and higher	32.07

Hazardous Waste & Asbestos removal $1.50 over basic rate.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman	$ 23.37

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 at the following wage.

Hazardous Waste & Asbestos removal $1.50 over basic rate.

1st term	$ 19.24
2nd term	21.24
3rd term	23.24
4th term	25.24

Supplemental benefits per hour worked:

Appr. 1st year	$ 13.42
Appr. 2nd year	13.42
Appr. 3rd year	17.52
Appr. 4th year	23.37

5-435

Laborer - Heavy&Highway 04/01/2025

JOB DESCRIPTION Laborer - Heavy&Highway **DISTRICT** 5

ENTIRE COUNTIES
Genesee, Livingston, Monroe, Ontario, Orleans, Seneca, Wayne, Wyoming, Yates

WAGES
GROUP A: Flagperson.

GROUP B: Basic rate, Bull Float, 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 Laborer's tools, Installation of bridge drainage pipe, Vibrator type rollers, Tamper, Drill doctor, Tail or Screw operator on asphalt paver, Water pump operators (1 1/2" & single Diaph.) Nozzle (asphalt, seeding, rubbing concrete & sandblasting), Laborers on chain link fence, Rock splitter & Power unit, Pusher type concrete saw, All other Gas, Electric, Oil and Air tool opers., Form setters, Stone or Granite curb setters, Relining of Existing Pipe.

GROUP C: All Rock or Drilling machine operators (Except Quarry master and Similar type), Acetylene torch operators, Powderman, Gunite nozzleman, Pipe layer, Wrecking laborer, Asphalt rakers (Top only).

GROUP D: Blasters.

Per hour:	07/01/2024
Heavy/Highway Laborer:	
Group A	$ 32.96
Group B	33.66
Group C	33.86
Group D	34.69

Hazardous Waste $1.50 over basic rate.

SHIFT WORK
There will be an additional $1.75 for mandated night work. This amount is not subject to overtime premiums.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman	$ 25.30

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
1000 hour terms at the following wage.

1st term	$ 21.18
2nd term	23.18
3rd term	25.18
4th term	27.18

Supplemental benefits per hour worked:

Appr. 1st term	$ 14.20
Appr. 2nd term	14.20
Appr. 3rd term	19.20
Appr. 4th term	25.30

5-435H

Laborer - Tunnel 04/01/2025

JOB DESCRIPTION Laborer - Tunnel **DISTRICT** 5

ENTIRE COUNTIES
Genesee, Livingston, Monroe, Ontario, Orleans, Seneca, Wayne, Wyoming, Yates

WAGES
GROUP A :Change House Man.

GROUP B :Miners and all Machine Men, Safety Miner, All Shaftwork and Caisson work, Pit/Dumpmen, Chuck tender, Brakeman, Powderman, Drilling, Blow Pipe, all Air Tools, Tugger, Scaling, Nipper, Guniting pot to nozzle, Bit Grinder, Signal Man (top and bottom), Concrete Men, Shield driven tunnels, mixed face and soft ground, liner plate tunnels in free air.

GROUP C :Blaster.

GROUP D :Hazardous/Waste Work.

Per hour:	07/01/2024
Tunnel Laborer:	
Group A	$ 34.67
Group B	34.87
Group C	35.87
Group D*	38.87

*Work site required to be designated by State/Federal as hazardous waste site and relevant regulations require employees to use personal protection before rate applies.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman	$ 24.27

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
1000 hour terms at the following wage.

1st term	$ 21.56
2nd term	23.56
3rd term	25.56
4th term	27.56

Supplemental benefits per hour:

1st term	$ 13.92
2nd term	13.92
3rd term	18.17
4th term	24.27

5-435 T

Lineman Electrician — 04/01/2025

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:	07/01/2024
Group A:	
Lineman, Technician	$ 58.90
Crane, Crawler Backhoe	58.90
Welder, Cable Splicer	58.90
Group B:	
Digging Mach. Operator	53.01
Tractor Trailer Driver	50.07
Groundman, Truck Driver	47.12
Equipment Mechanic	47.12
Flagman	35.34

Additional $1.00 per hour for entire crew when a helicopter is used.

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	$ 58.90
Crane, Crawler Backhoe	58.90
Cable Splicer	64.79
Certified Welder, Pipe Type Cable	61.85
Group B:	
Digging Mach. Operator	53.01
Tractor Trailer Driver	50.07
Groundman, Truck Driver	47.12
Equipment Mechanic	47.12
Flagman	35.34

Additional $1.00 per hour for entire crew when a helicopter is used.

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	$ 60.22
Crane, Crawler Backhoe	60.22
Cable Splicer	66.24
Certified Welder, Pipe Type Cable	63.23
Group B:	
Digging Mach. Operator	54.20
Tractor Trailer Driver	51.19
Groundman, Truck Driver	48.18
Equipment Mechanic	48.18
Flagman	36.13

Additional $1.00 per hour for entire crew when a helicopter is used.

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	$ 61.41
Crane, Crawler Backhoe	61.41
Group B:	
Digging Mach. Operator	55.27
Tractor Trailer Driver	52.20
Groundman, Truck Driver	49.13
Equipment Mechanic	49.13
Flagman	36.85

Additional $1.00 per hour for entire crew when a helicopter is used.

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:

	07/01/2024
Group A	$ 30.90 *plus 7% of the hourly wage paid
Group B	$ 26.90 *plus 7% of the hourly wage paid

*The 7% is based on the hourly wage paid, straight time or premium time.

OVERTIME PAY

See (B, E, Q, 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, 13, 25) on HOLIDAY PAGE plus Governor of NYS Election Day.
Overtime	See (5, 6, 8, 13, 25) on HOLIDAY PAGE plus Governor of NYS Election Day.

NOTE: All paid holidays falling on Saturday shall be observed on the preceding Friday. All paid holidays falling on Sunday shall be observed on the following Monday. Supplements for holidays paid at straight time.

REGISTERED APPRENTICES

WAGES per hour: 1000 hour terms at the following percentage of the applicable Journeyworker's Lineman wage.

1st	2nd	3rd	4th	5th	6th	7th
60%	65%	70%	75%	80%	85%	90%

SUPPLEMENTAL BENEFITS per hour:

07/01/2024
$ 26.90 *plus 7% of the hourly wage paid

*The 7% is based on the hourly wage paid, straight time or premium time.

6-1249a

Lineman Electrician - Teledata 04/01/2025

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
Per hour:

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

	07/01/2024	01/01/2025
Cable Splicer	$ 39.24	$ 40.81
Installer, Repairman	$ 37.24	$ 38.73
Teledata Lineman	$ 37.24	$ 38.73
Tech., Equip. Operator	$ 37.24	$ 38.73
Groundman	$ 19.74	$ 20.53

NOTE: EXCLUDES Teledata work within ten (10) feet of High Voltage (600 volts and over) transmission lines. For this work please see LINEMAN.

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:	07/01/2024	01/01/2025
Journeyworker	$ 5.70 *plus 3% of the hour wage paid	$ 5.70 *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 04/01/2025

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:	07/01/2024
Group A:	
Lineman, Technician	$ 50.54
Crane, Crawler Backhoe	50.54
Certified Welder	53.07
Group B:	
Digging Machine	45.49
Tractor Trailer Driver	42.96
Groundman, Truck Driver	40.43
Equipment Mechanic	40.43
Flagman	30.32

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:

	07/01/2024
Group A	$ 30.90 *plus 7% of the hourly wage paid
Group B	$ 26.90 *plus 7% of the hourly wage paid

*The 7% is based on the hourly wage paid, straight time or premium time.

OVERTIME PAY

See (B, E, Q, 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, 13, 25) on HOLIDAY PAGE plus Governor of NYS Election Day.
Overtime: See (5, 6, 8, 13, 25) on HOLIDAY PAGE plus Governor of NYS Election Day.

NOTE: All paid holidays falling on Saturday shall be observed on the preceding Friday. All paid holidays falling on Sunday shall be observed on the following Monday. Supplements for holidays paid at straight time.

REGISTERED APPRENTICES

WAGES per hour: 1000 hour terms at the following percentage of the applicable Journeyworker's Lineman wage.

1st	2nd	3rd	4th	5th	6th	7th

60% 65% 70% 75% 80% 85% 90%

SUPPLEMENTAL BENEFITS per hour:

	07/01/2024
	$ 26.90 *plus 7% of the hourly wage paid

*The 7% is based on the hourly wage paid, straight time or premium time.

6-1249a-LT

Lineman Electrician - Tree Trimmer — 04/01/2025

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:	07/01/2024
Tree Trimmer	$ 31.44
Equipment Operator	27.80
Equipment Mechanic	27.80
Truck Driver	23.15
Groundman	19.07
Flag person	15.00*

*NOTE-Rate effective on 01/01/2025 - $15.50 due to minimum wage increase.

SUPPLEMENTAL BENEFITS
Per hour:

	07/01/2024
Journeyworker	$ 10.48 *plus 4.5% of the hourly wage paid

* The 4.5% is based on the hourly wage paid, 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) 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 — 04/01/2025

JOB DESCRIPTION Mason - Building **DISTRICT** 5

ENTIRE COUNTIES
Genesee, Livingston, Monroe, Ontario, Seneca, Wayne, Wyoming, Yates

WAGES
Per Hour: 07/01/2024
Building:

Bricklayer	$ 34.31
Cement Mason	34.31
Plasterer	34.31
Stone Mason	34.31
Tuck Pointer	34.31

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman	$ 28.18

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:

1st, 2nd and 3rd term 1500 hours and 4th term 1525 hours at the following wage:

1st	2nd	3rd	4th
$ 23.86	$ 25.60	$ 27.88	$ 30.84

Supplemental Benefits per hour:

1st	2nd	3rd	4th
$ 10.39	$ 14.93	$ 18.92	$ 22.24

5-3B - Z1

Mason - Heavy&Highway 04/01/2025

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: 07/01/2024
Heavy & Highway:

Cement Mason	$ 37.88
Bricklayer	37.88

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman	$ 24.53

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	$ 14.53

2nd term	$ 23.57
3rd term	$ 23.81
4th term	$ 24.05

5-3h

Mason - Tile Finisher — 04/01/2025

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

ENTIRE COUNTIES
Genesee, Livingston, Monroe, Ontario, Seneca, Wayne, Wyoming, Yates

WAGES

Per hour:	07/01/2024
Building:	
Marble, Slate, Terrazzo and Tile Finisher	$ 29.56

SUPPLEMENTAL BENEFITS
Per hour: $ 22.91

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:

1700 hrs for 1st and 2nd term, 1600 hrs for 3rd term at the following wage:

1st	2nd	3rd
$ 23.49	$ 24.50	$ 26.65

Supplemental benefits per hour:

1st	2nd	3rd
$ 7.89	$ 12.15	$ 15.27

5-3TF - Z1

Mason - Tile Setter — 04/01/2025

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

ENTIRE COUNTIES
Genesee, Livingston, Monroe, Ontario, Seneca, Wayne, Wyoming, Yates

WAGES

Per hour:	07/01/2024
Building:	
Marble, Slate, Terrazzo and Tile Setter	$ 36.95

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman $ 26.35

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:

1000 hour terms at the following wage:

1st	2nd	3rd	4th	5th	6th	7th	8th
$ 22.09	$ 24.41	$ 25.90	$ 27.76	$ 29.95	$ 31.97	$ 34.54	$ 36.01

Supplemental benefits per hour:

1st	2nd	3rd	4th	5th	6th	7th	8th
$ 12.61	$ 13.47	$ 15.15	$ 16.47	$ 17.46	$ 18.62	$ 22.40	$ 24.11

5-3TS - Z1

Millwright 04/01/2025

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:	07/01/2024	07/01/2025 Additional
Millwright - Power Generation	$ 45.00	$2.50*

* To be allocated at a later date.

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	$ 27.95*

*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	$ 11.89
Appr. 2nd year	23.14

Appr. 3rd year	24.74
Appr. 4th year	26.35

6-1163Power

Millwright 04/01/2025

JOB DESCRIPTION Millwright **DISTRICT** 6

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

WAGES

Per hour:	07/01/2024	07/01/2025 Additional
Building	$ 36.00	$ 3.00*
Heavy & Highway	39.50	3.00*

* To be allocated at a later date.

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	$ 25.54

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	$ 11.89
Appr. 2nd year	21.45
Appr. 3rd year	22.81
Appr. 4th year	24.18

6-1163 Zone 2

Operating Engineer - Building 04/01/2025

JOB DESCRIPTION Operating Engineer - Building **DISTRICT** 6

ENTIRE COUNTIES
Cayuga, Cortland, Jefferson, Lewis, Madison, Oneida, Onondaga, Oswego, Seneca, St. Lawrence, Tompkins

WAGES

NOTE:
---If a prime contract is let for site work only, meaning no buildings are involved in their site contract, the Heavy/Highway rates would be applicable. When a prime contract is let for site work and building excavation is part of that contract, the Building rates would be applicable for the Operators classification.
---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 (A1 Includes Boom Trucks over 5 tons, Cableway, Cherry Picker, Derrick, Dragline, Dredge, Overhead Crane, Pile Driver, Tower Crane**, Truck Crane, Whirlies).

CLASS A: Air Plako, Asphalt & Blacktop Roller, Automated Concrete Spreader (CMI or equivalent), Automated Fine Grade Machine (CMI), Backhoe, Barrel Shredder, Belt Placer, Blacktop Spreader (such as Barber-Greene & Blaw Knox), Blacktop Plant (automated), Blast or Rotary Drill (Truck or Cat mounted), Boom Trucks 5 ton and under, Burning Plant Operator, Caisson Auger, Central Mix Plant (automated), Concrete Pump, Crusher (Rock), De-watering Press, Diesel Power Unit, Dirt Filter Press with Operation Equipment, Dredge, Dual Drum Paver, Elevating Grader (self-propelled or towed), Elevator Hoist - Two Cage, Excavator - all purpose hydraulically operated, Fork Lift (Loed/Lull and other rough terrain type), Front End Loader (4 c.y. and over), Gradall, Grader (Power), Head Tower (Saurman or equal), Hoist (2 or 3 Drum), Hydroblaster (Laser Pump), Light Plants - Compressors and Generators, Locomotive, Maintenance Engineer, Maintenance Welder, Mine Hoist, Mucking Machine or Mole, Quarry Master or Equivalent, Refrigeration Equipment (for soil stabilization), Scraper, Sea Mule, Shovel, Side Boom, Slip Form Paver, Straddle Buggy (Ross Carrier, Lumber Carrier), Tractor Drawn Belt Type Loader (Euclid Loader), Trenching Machine (digging capacity of over 4ft. depth), Truck or Trailer Mounted Log Chipper (self-feeder), Tug Operator (Manned, rented equipment excluded), Tunnel Shovel, Vibro or Sonic Hammer Controls (when not mounted in proximity to Rig Operator), Work Boat Operator including LCM's.

CLASS B: "A" Frame Truck, Back Dumps, Blacktop Plant (non-automatic), Boring Machine, Bulldozer, Cage-Hoist, Central Mix Plant (non-automated), Compressor, Pump, Generator or Welding machine (when used in battery of not more than five (5)), Concrete Paver (single drum over 16'), Core boring machine, Drill Rigs - tractor mounted, Elevator - as material hoist, Farm Tractor (with or without accessories), Fork Lift (over 10 ton with or without attachments), Front End Loader (under 4 c.y.), Grout Pump, Gunite Machine, High Pressure Boiler (15 lbs. & over), Hoist (one drum), Hydraulic Breaking Hammer (Drop Hammer), Kolman Plant Loader (screening gravel), Maintenance Grease Man, Mixer for stabilized base - self-propelled (Seaman Mixer), Monorail Machine, Parapet Concrete or Pavement Grinder, Parts Man, Post Driver (truck or tractor mounted), Post Hole Digger (truck or tractor mounted), Power Sweeper (Wayne or similar), Pump-Crete or Squeeze-Crete, Road Widener (front end of Grader or self-propelled), Roller, Self-contained hydraulic bench drill, Shell Winder (motorized), Skid steer (Bobcat type loader), Snorkel (overhead arms), Snowblower control man, Tractor (with or without accessories), Trenching Machine (digging capacity of 4 ft. or less), Tugger Hoist, Vacuum Machine (self-propelled or mounted), Vibro Tamp, Well Drill / Well Point System (Submersible pumps when used in lieu of Well Point System), Winch (Motor driven), Winch Cat, Winch Truck.

CLASS C: Compressor (up to 500 cfm), Concrete Paver or Mixer (under 16'), Concrete Pavement Spreaders & Finishers (not automated), Conveyor (over 12 ft), Electric Submersible Pump (4" and over), Fine Grade Machine (not automated), Fireman, Fork Lift ("with or without" attachments, 10 ton and under), Form Tamper, Generator (2,500 watts and over), Hydraulic Pump, Mechanical Heaters (More than two (2) Mechanical Heaters or any Mechanical Heater or Heaters whose combined output exceeds 640,000 BTU per hour (manufacturer's rating) plus one self-contained heating unit - i.e. Sundog or Air Heat type - New Holland Hay Dryer type excluded), Mulching Machine, Oiler, Power Driven Welding Machine (300 amp and over, other than all electric. One Welding Machine under 300 amp will not require an engineer unless in a battery), Power Heaterman (hay dryer), Pumps (water and trash), Revinus Widener (road widener), Single Light Plant, Steam Cleaner or Jenny.

Per hour: Building	07/01/2024	07/01/2025
Class A1*	$ 47.62	$ 49.61
Class A	46.12	48.11
Class B	44.00	45.99
Class C	39.78	41.77

Additional $2.50 per hour if work requires Personal Protective Equipment for hazardous waste site activities with a level C or over rating.

(*) TONNAGE PREMIUMS:
All cranes up to 64 ton capacity - A1 rate
All cranes 65 ton to 110 ton capacity - A1 rate plus $ 1.50
All cranes 111 ton to 199 ton capacity - A1 rate plus $ 2.00
All cranes 200 ton to 399 ton capacity - A1 rate plus $ 3.00
All cranes 400 ton to 599 ton capacity - A1 rate plus $ 4.00
All cranes 600 ton to 799 ton capacity - A1 rate plus $ 5.00
All cranes 800 ton to 999 ton capacity - A1 rate plus $ 6.00
All cranes 1000 ton capacity and over - A1 rate plus $ 7.00

(**) Tower Cranes - A1 rate plus $2.50 (no tonnage premiums apply)

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker	$ 31.02	$ 32.12

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 celebrated on Monday.

REGISTERED APPRENTICES
WAGES per hour: One thousand hour terms at the following percentage of Journeyworker's CLASS A wage:

1st year	60%
2nd year	65%
3rd year	70%
4th year	80%

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:

	07/01/2024	07/01/2025
All Terms:	$ 30.95	$ 32.05

6-158-545b.s

Operating Engineer - Heavy&Highway **04/01/2025**

JOB DESCRIPTION Operating Engineer - Heavy&Highway **DISTRICT** 6

ENTIRE COUNTIES
Cayuga, Cortland, Jefferson, Lewis, Madison, Oneida, Onondaga, Oswego, Seneca, St. Lawrence, Tompkins

WAGES
NOTE:
---In the event that equipment listed below is operated by robotic control, the classification covering the operation will be the same as if manually operated.
---If a second employee is required by the employer for operation of any covered machine, they shall be an Engineer Class C.

CLASS A1*: All Cranes that require a NYS Crane License (Boom Truck, Cherry Picker, Derrick, Dragline, Overhead Crane (Gantry or Straddle Type), Pile Driver, Tower Cranes (including self erecting)**, Truck Crane).

CLASS A: Asphalt Curb Machine (self-propelled, slipform); Asphalt Paver; Automated Concrete Spreader (CMI type); Automatic Fine Grader; Backhoe (except tractor mounted, rubber tired); Backhoe Excavator, Full Swing (CAT 212 or similar type); Back Filling Machine; Belt Placer (CMI type); Blacktop Plant (automated);Blacktop Roller; Bull Dozer being operated with active GPS; Cableway; Caisson Auger; Central Mix Concrete Plant (automated); Concrete Curb Machine (self-propelled, slipform); Concrete Pump; Cranes - listed in A1 that do not require a NYS Crane License; Directional Boring/Drilling Machine; Dredge; Dual Drum Paver; Excavator (all purpose-hydraulic, Gradall or similar); Front End Loader (4 cu. yd. & over); Head Tower (Sauerman or equal); Hoist (two or three drum); Holland Loader; Maintenance Engineer; Mine Hoist; Mucking Machine or Mole; Pavement Breaker (SP Wertgen; PB-4 and similar type); Profiler/Milling Machine (over 105 h.p.); Power Grader; Quad 9; Quarry Master (or equivalent); Rotating Telehandler; Scraper (including challenger type); Shovel; Side Boom; Slip Form Paver; Tractor Drawn Belt-Type Loader; Truck or Trailer Mounted Chipper (self-feeder); Tug Operator (manned rented equipment excluded); Tunnel Shovel.

CLASS B: Backhoe (tractor mounted, rubber tired); Bituminous Recycler Machine; Bituminous Spreader and Mixer; Blacktop Plant (non-automated); Blast or Rotary Drill (truck or tractor mounted); Boring Machine; Bridge Deck Finishing Machine; Brokk; Cage Hoist; Central Mix Plant (non-automated) and All Concrete Batching Plants; Concrete Paver (over 16'); Crawler Drill (self-contained); Crusher; Diesel Power Unit; Drill Rigs (truck or tractor mounted); Front End Loader (under 4 cu. yd.); Greaseman - Lubrication Engineer; HiPressure Boiler (15 lbs & over); Hoist (one drum); Hydro-Axe; Kolman Plant Loader & similar type loaders; Locomotive; Material Handling Knuckle Boom; Mini Excavators (under 18,000 lbs.); Mixer (for stabilized base, self-propelled); Monorail Machine; Profiler/Milling Machine (105 h.p. and under); Plant Engineer; Prentice Loader; Pug Mill; Pump Crete; Ready Mix Concrete Plant; Refrigeration Equipment (for soil stabilization); Road Widener; Roller (all above subgrade, See Class A for Blacktop Roller); Sea Mule; Self-contained ride-on Rock Drill (excluding Air-Track type drill); Skidder; Tractor with Dozer and/or Pusher; Trencher; Tugger Hoist; Vacuum Machine (mounted or towed); Vermeer Saws (ride-on, any size or type); Welder; Winch and Winch Cat; Work Boat Operator including L.C.M.'s.

CLASS C: "A" Frame Winch Hoist (On Truck); Aggregate Plant; Articulated Heavy Hauler; Asphalt or Concrete Grooving Machine (ride-on); Ballast Regulator (ride-on); Bituminous Heater (self-propelled); Boat (powered); Boiler (used in conjunction with production); Cement & Bin Operator; Compressors***; Concrete Pavement Spreader and Finisher; Concrete Paver or Mixer (16' & under); Concrete Saw (self-propelled); Conveyor; Deck Hand; Directional Boring/Drilling Machine Locator; Drill (Core); Drill (Well); Dust Collectors***; Electric Pump When Used in Conjunction with Well Point System; Farm Tractor with accessories; Fine Grade Machine; Fireman; Fork Lift; Form Tamper; Generators***; Grout Pump; Gunite Machine; Hammers (hydraulic self-propelled); Heaters***; Hydra-Spiker (ride-on); Hydraulic Pump (jacking system); Hydro-Blaster (water); Light Plants***; Mulching Machine; Oiler; Parapet Concrete or Pavement Grinder; Post Hole Digger (excluding hand-held); Post Driver; Power Broom (towed); Power Heaterman; Power Sweeper; Pumps***; Revinius Widener; Roller (subgrade & fill); Scarifier (ride-on); Shell Winder; Skid Steer Loader (Bobcat or similar, including all attachments); Span Saw (ride-on); Steam Cleaner; Tamper (ride-on); Tie Extractor (ride-on); Tie Handlers (ride-on); Tie Inserters (ride-on); Tie Spacers (ride-on); Tire Repair; Track Liner (ride-on); Tractor; Tractor (with towed accessories); Vacuum Machine (self-propelled); Vibratory Compactor; Vibro Tamp; Welding Machines***; Well Point.

***CLASS C NOTE: Considered Hands-Off (unmanned). Includes only operation and maintenance of the equipment.

Per hour: H/H	07/01/2024	07/01/2025
CLASS A1*	$ 56.51	$ 58.85
CLASS A	53.51	55.85
CLASS B	52.63	54.97
CLASS C	49.35	51.69

(*) TONNAGE PREMIUMS:
All cranes up to 64 ton capacity - A1 rate
All cranes 65 ton to 110 ton capacity - A1 rate plus $ 1.50
All cranes 111 ton to 199 ton capacity- A1 rate plus $ 2.00
All cranes 200 ton to 399 ton capacity - A1 rate plus $ 3.00
All cranes 400 ton to 599 ton capacity - A1 rate plus $ 4.00
All cranes 600 ton to 799 ton capacity - A1 rate plus $ 5.00
All cranes 800 ton to 999 ton capacity - A1 rate plus $ 6.00
All cranes 1000 ton capacity and over - A1 rate plus $ 7.00

(**) Tower Cranes - A1 rate plus $3.00 (no tonnage premiums apply)

- Cranes in Luffer Configuration - A1 rate plus $ 5.00
- Cranes with external ballast (Tray or Wagon) - A1 rate plus $ 5.00

Additional $2.50 per hour for hazardous waste removal work on a State and/or Federally designated waste site which requires employees to wear Level C or above forms of personal protection.

SHIFT WORK

SINGLE IRREGULAR WORK SHIFT: Additional $2.50 per hour for all employees who work a single irregular work shift starting from 5:00 PM to 1:00 AM that is mandated by the Contracting Agency.

SUPPLEMENTAL BENEFITS

Per hour:	07/01/2024	07/01/2025
Journeyworker	$ 32.45	$ 33.55

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

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

NOTE: If a holiday falls on Sunday, it will be celebrated on Monday. If an employee works on this Monday, they shall be compensated at double time plus the holiday pay (triple time). If a holiday falls on a Saturday, employees who work a Saturday Holiday shall be paid double time plus the holiday pay.

REGISTERED APPRENTICES

WAGES per hour: One thousand hour terms at the following percentage of Journeyworker's CLASS B wage.

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

Additional $2.50 per hour for hazardous waste removal work on a State and/or Federally designated waste site which requires employees to wear Level C or above forms of personal protection.

SUPPLEMENTAL BENEFITS per hour: Same as Journeyworker

6-158-545h

Operating Engineer - Survey Crew — 04/01/2025

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.

	07/01/2024
Party Chief	$ 50,65
Instrument Person	46.54
Rod Person	34.55
Additional $3.00/hr. for Tunnel Work	
Additional $2.50/hr. for Hazardous Work Site	

SUPPLEMENTAL BENEFITS
Per hour worked:

Journeyman	$ 29.75

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:

	07/01/2024
0-1000	60%
1001-2000	70%
2001-3000	80%

SUPPLEMENTAL BENEFIT per hour worked:

0-1000	$ 21.53 / PHP $18.45
1001-2000	24.55 / " 20.45
2001-3000	27.58/ " 22.93

NOTE: PHP is premium hours paid when worked.

12-158-545 D.H.H.

Operating Engineer - Survey Crew - Consulting Engineer — 04/01/2025

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.

	07/01/2024
Party Chief	$ 50.65
Instrument Person	46.54
Rod Person	34.55

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	$ 29.75

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:

	07/01/2024
0-1000	60%
1001-2000	70%
2001-3000	80%

SUPPLEMENTAL BENEFIT per hour worked:

0-1000	$ 21.53 / PHP $18.45
1001-2000	$ 24.55 / " 20.45
2001-3000	$ 26.98 / " 22.93

NOTE: PHP is premium hours paid when worked.

12-158-545 DCE

Operating Engineer - Tunnel — 04/01/2025

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:	07/01/2024	07/01/2025
CLASS A	$ 55.91	$ 58.44
CLASS B	54.69	57.22
CLASS C	51.90	54.43
CLASS D	48.89	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	$ 59.91	$ 62.44
Crane 2	58.91	61.44
Crane 3	57.91	60.44

SUPPLEMENTAL BENEFITS

Per hour:		
	$ 25.05	$ 25.90
	+ 9.85*	+ 10.10*

* This portion of benefits subject to same premium rate 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 — 04/01/2025

JOB DESCRIPTION Painter **DISTRICT** 6

ENTIRE COUNTIES
Cayuga, Herkimer, Madison, Oneida, Onondaga, Seneca

PARTIAL COUNTIES
Lewis: Only the Townships of High Market, Lewis, Leyden, Lyonsdale, Osceola, Turin and West Turin.
Ontario: The City and Township of Geneva.
Oswego: Only the Townships of Amboy, Constantia, Williamstown and Oneida Lake.

WAGES

Per hour:	07/01/2024
Basic Rate (Brush & Roll)	$ 27.27
Sign Painting	27.27
Lead Based Paint Abatement	27.27
Drywall Taper/ Finisher	28.02
Wallcovering	28.02
Drywall Machine Operator	28.52
Spray	27.77
Parking Lot, Hwy Striping	27.77
Epoxy (Brush-Roller)	27.77
Epoxy (Spray)	27.77
Sandblasting (Operator)	27.77
Boatswain Chair	27.77
Swing Scaffold	27.77
Structural Steel (except bridges,tanks,tunnel)	27.77
Coal Tar epoxy	28.77
Asbestos Encapsulation	29.47

NOTE - SEE BRIDGE PAINTER RATES FOR BRIDGES, TANKS, OR TUNNELS.

SHIFT WORK
FOR ANY SHIFT WHICH STARTS PRIOR TO 6:00 AM OR AFTER 3:00 PM, ALL EMPLOYEES WHO WORK A SINGLE IRREGULAR WORK SHIFT ON GOVERNMENTAL MANDATED WORK SHALL BE PAID AN ADDITIONAL $2.00 PER HOUR ABOVE THE APPLICABLE WAGE SCALE.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker	$ 26.53

OVERTIME PAY
See (B, *F, R) on OVERTIME PAGE
* NOTE - On exterior work only, if work was missed during the week due to inclement weather, Saturday may be worked at straight time.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
NOTE: A holiday that falls on a Saturday will be celebrated on the preceding Friday. A holiday that falls on a Sunday will be celebrated on the following Monday.

REGISTERED APPRENTICES
WAGES per hour:
Painter/Decorator: 750 hour terms at the following wage rate:

1st	2nd	3rd	4th	5th	6th	7th	8th
$ 18.00	$ 18.50	$ 19.00	$ 19.50	$ 20.00	$ 21.00	$ 22.00	$ 23.00

Drywall Taper/ Finisher: 750 hour terms at the following wage rate:

1st	2nd	3rd	4th	5th	6th

$ 20.00	$ 20.50	$ 21.00	$ 21.50	$ 22.00	$ 23.00

SUPPLEMENTAL BENEFITS per hour:

Painter/Decorator:

1st	2nd	3rd	4th	5th	6th	7th	8th
$ 6.50	$ 6.50	$ 7.50	$ 7.50	$ 10.50	$ 10.50	$ 13.00	$ 13.00

Drywall Taper/ Finisher:

1st	2nd	3rd	4th	5th	6th
$ 7.50	$ 7.50	$ 7.50	$ 10.00	$ 10.00	$ 12.00

6-31

Painter — 04/01/2025

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:	07/01/2024	05/01/2025 Additional	05/01/2026 Additional
Bridge	$ 43.81	$ 2.50	$ 2.50
Tunnel	43.81		
Tank*	41.81		

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:
$ 31.39

OVERTIME PAY
Exterior work only See (B, E4, F*, R) on OVERTIME PAGE.
All other work See (B, F*, R) on OVERTIME PAGE.
*Note - Saturday is payable at straight time if the employee misses work, except where a doctor's or hospital verification of illness is produced Monday through Friday when work was available to the employee.

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 — 04/01/2025

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

	07/01/2024
Metal Polisher	$ 39.33
Metal Polisher*	40.43
Metal Polisher**	43.33

*Note: Applies on New Construction & complete renovation
** Note: Applies when working on scaffolds over 34 feet.

SUPPLEMENTAL BENEFITS

Per Hour: 07/01/2024

Journeyworker:
All classification $ 12.79

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:

	07/01/2024
1st year	$ 19.67
2nd year	21.63
3rd year	23.60
1st year*	$ 22.06
2nd year*	22.07
3rd year*	24.14
1st year**	$ 22.17
2nd year**	24.13
3rd year**	26.10

*Note: Applies on New Construction & complete renovation
** Note: Applies when working on scaffolds over 34 feet.

Supplemental benefits:
Per hour:

1st year	$ 8.69
2nd year	8.69
3rd year	8.69

8-8A/28A-MP

Plumber — 04/01/2025

JOB DESCRIPTION Plumber **DISTRICT** 5

ENTIRE COUNTIES
Livingston, Monroe, Ontario, Yates

PARTIAL COUNTIES
Allegany: Only the Townships of Alfred, Almond, Andover, Birdsall, Burns, Grove, Independence, that portion of Scio which lies east of RT. 19, Ward, Wellsville, W. Almond and Willing
Genesee: Only the Townships of Bergen, Bethany, Byron, Leroy, Pavillion and Stafford.
Orleans: Only the Townships of Albion, Barre, Carlton, Clarendon, Gaines, Kendall and Murray.
Seneca: Only the Townships of Fayette, Junius, Ovid, Romulus, Seneca Falls, Tyre, Varick and Waterloo.
Steuben: Only the Townships of Avoca, Cameron, Canisteo, Cohocton, Dansville, N. Dansville,Freemont, Greenwood, Hartsville, City of Hornell, Hornelsville, Howard, Jasper, Pulteney, Prattsburg, Rathbone, Troopsburg, Tuscarora, W. Union, Wayland, Wheeler and Woodhull.
Wayne: Only the Townships of Arcadia (Newark), Galen (Clyde), Huron, Macedon, Marion, Lyons, Ontario, Palmyra, Rose, Sodus, Walworth and Williamson.

WAGES

Per hour	07/01/2024
Plumber	$ 38.18
Steamfitter	38.18

SUPPLEMENTAL BENEFITS
Per hour:
Journeyman $ 26.63

NOTE-$ 5.50 of this amount must be paid at the same premium as the wage for overtime hours.

OVERTIME PAY
See (*Q) on OVERTIME PAGE
Site work & New const. See (B*, E,E2,Q)on OVERTIME PAGE.

All other work See (B*, E, Q)on OVERTIME PAGE.

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

REGISTERED APPRENTICES
One year terms at the following percentage of Journeyman's wage.

1st.	2nd.	3rd.	4th.	5th.
45%	50%	59%	66%	75%

Supplemental Benefits per hour:

1st year	$ 8.30
2nd year	10.87 *
3rd year	11.99**
4th year	13.05***
5th year	15.05****

*NOTE-2nd year $0.83 of this amount must be paid at the same premium as the wage for overtime hours.
**NOTE-3rd year $1.10 of this amount must be paid at the same premium as the wage for overtime hours.
***NOTE-4th year $1.49 of this amount must be paid at the same premium as the wage for overtime hours.
****NOTE-5th year $2.64 of this amount must be paid at the same premium as the wage for overtime hours.

5-13-SF

Plumber 04/01/2025

JOB DESCRIPTION Plumber **DISTRICT** 6

ENTIRE COUNTIES
Chemung, Cortland, Onondaga, Schuyler, Tompkins

PARTIAL COUNTIES
Madison: Only the Townships of Sullivan, Cazenovia and DeRuyter.
Seneca: Only the Townships of Covert and Lodi.
Steuben: Only the Townships of Addison, Bath, Bradford, Campbell, Caton, Corning, Erwin, Hornby, Lindley, Pulteney, Rathbone, Thurston, Tuscarora, Urbana and Wayne.
Tioga: Only the Townships of Barton, Berkshire, Candor, Nichols, Richford, Spencer and Tioga.

WAGES

Per hour:	07/01/2024	05/01/2025 Additional	05/01/2026 Additional
Plumber, Steamfitter, Pipefitter, Welder, HVAC, Refrigeration.	$ 45.11	$ 4.25*	$ 4.50*

*To be allocated at a later date.

SHIFT WORK
SINGLE IRREGULAR WORK SHIFT: Additional 15% premium added to the wages above for a single irregular work shift outside of normal working hours.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker $ 27.05*

*NOTE: $10.27 of the supplemental benefits are paid at the same premium as shown for overtime work performed at semi-conductor manufacturer and/or fabrication plants.

OVERTIME PAY
Time and one half for the 9th & 10th hours Monday thru Friday and first 10 hours on Saturday. All other overtime hours are double-time.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
NOTE: If a holiday falls on Saturday, the holiday will be observed on the preceding Friday. If a holiday falls on Sunday, it will be observed on the following Monday.

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

1st	2nd	3rd	4th	5th
55%	60%	70%	75%	85%

SUPPLEMENTAL BENEFITS per hour*:

1st	$ 15.13
2nd	23.89
3rd	24.44
4th	24.99
5th	25.92

*NOTE: Below is the portion of supplemental benefits paid at overtime premiums for work performed at semi-conductor manufacturer and/or fabrication plants:

1st	n/a
2nd	$ 8.58
3rd	$ 8.77
4th	$ 9.14
5th	$ 9.71

6-81-SF

Roofer 04/01/2025

JOB DESCRIPTION Roofer **DISTRICT** 6

ENTIRE COUNTIES
Cayuga, Cortland, Franklin, Herkimer, Jefferson, Lewis, Madison, Oneida, Onondaga, Oswego, Seneca, St. Lawrence

WAGES

Per hour:	07/01/2024
Roofer, Waterproofer	$ 34.25

NOTE - Does not include metal roof flashings, gravel stop, or metal roofing; See Sheetmetal Worker wage schedule.

Additional per hour:	
Green Roofing**	$ 0.25
Pitch Removal & Appl.	1.50
Asbestos Abatement	1.50

** Green Roofing is any component of green technology or living roof above the roof membrane including, but not limited to, the fabric, dirt and plantings.

SHIFT WORK
WHEN MANDATED BY THE OWNER OR CONTRACTING AGENCY, THERE IS AN ADDITIONAL PREMIUM OF $4.00/HR FOR HOURS WORKED BEFORE 5:30AM AND AFTER 5:30PM.

SUPPLEMENTAL BENEFITS

Per hour:	
Journeyworker	$ 25.85
Additional contribution on any Asbestos Abatement work	0.75

OVERTIME PAY
See (B, E, E2*, Q) on OVERTIME PAGE
*NOTE - If a holiday falls in that week and 32 hours were worked, Saturday will be paid at 1 1/2 times the rate.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
NOTE: When any of these holidays falls on Sunday, the following day shall be observed as a holiday.

REGISTERED APPRENTICES
WAGES per hour: 1000 hour terms at the following percentage of the Journeyworker's wage:

1st term (0 to 999)	65%
2nd term (1000 to 1999)	70%
3rd term (2000 to 2999)	75%
4th term (3000 to 3999)	85%

Additional per hour:	
Green Roofing**	$ 0.25
Pitch Removal & Appl.	1.50
Asbestos Abatement	1.50

SUPPLEMENTAL BENEFITS per hour:

1st term	$ 19.48
2nd term	21.40
3rd term	24.85
4th term	25.85

Additional contribution on any Asbestos Abatement work	$ 0.75

6-195

Sheetmetal Worker — 04/01/2025

JOB DESCRIPTION Sheetmetal Worker **DISTRICT** 5

ENTIRE COUNTIES
Livingston, Monroe, Ontario, Seneca, Wayne, Yates

WAGES
Per hour:
Sheetmetal Worker

07/01/2024	05/05/2025 Additional	05/04/2026 Additional	05/03/2027 Additional	05/01/2028 Additional
$ 40.87	$ 2.41	$ 2.51	$ 2.56	$2.64

To include metal standing seam roofing, flashing and gravel stop.

SHIFT WORK
Work from 4:00pm to 12:30am**
$ 46.59
Work from 12:00am to 8:30am**
$ 49.04
**Applies when shift work is mandated either in the job specification or by the contracting agency.

SUPPLEMENTAL BENEFITS
Per hour:
Journeyman
$ 28.46

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
(1) year terms at the following rates.

1st.	2nd.	3rd.	4th.	5th.
19.03	21.97	24.41	28.15	33.08

Supplemental Benefits per hour:

1st.	2nd.	3rd.	4th.	5th.
$ 11.45	$ 14.79	$ 17.94	$ 19.78	$ 23.23

5-46

Sprinkler Fitter — 04/01/2025

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	07/01/2024
Sprinkler Fitter	$ 42.00

SUPPLEMENTAL BENEFITS

Per hour	
Journeyworker	$ 28.82

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
$ 20.03	$ 22.26	$ 24.24	$ 26.46	$ 28.69	$ 30.91	$ 33.14	$ 35.37	$ 37.59	$ 39.82

Supplemental Benefits per hour

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
$ 9.18	$ 9.18	$ 20.90	$ 20.90	$ 21.15	$ 21.15	$ 21.15	$ 21.15	$ 21.15	$ 21.15

1-669

Teamster - Building 04/01/2025

JOB DESCRIPTION Teamster - Building **DISTRICT** 6

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

PARTIAL COUNTIES
Allegany: Only the Townships of Almond, Burns, and Alfred.
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 Redfield, Boylston and Sandy Creek.
Otsego: Only the Townships of Butternuts, Laurens, Maryland, Millford, Morris, Oneonta, Otego, Unadilla, and Worchester.
Steuben: Only the Townships of Prattsburg, Canisteo, Fremont, Cohoctan, Dansville, Hornell, Hartsville, Greenwood, West Union, Troupsburg, and Jasper.
Tioga: Only the Townships of Berkshire, Candor, Newark Valley, Nichols, Owego, Richford, and Tioga. All territory east of Nichols/Smithboro to Broome County, within 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:	07/01/2024	06/01/2025
Building: (under $ 5 million*)		
GROUP A,B,C,D	$ 31.43	$ 34.43
Building: (over $ 5 million*)		
GROUP A,B	$ 32.48	$ 35.48
GROUP C	32.83	35.83
GROUP D	32.63	35.63

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

SUPPLEMENTAL BENEFITS
Per hour:

(under $5 million*)	$ 30.02	$ 30.87
(over $5 million*)	30.80	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 — 04/01/2025

JOB DESCRIPTION Teamster - Heavy&Highway **DISTRICT** 6

ENTIRE COUNTIES
Cayuga, Cortland, Seneca, Tompkins, Yates

PARTIAL COUNTIES
Allegany: Only the Townships of Almond, Alfred, Burns and West Almond.
Steuben: Only the Townships of Canisteo, Cohocton, Dansville, Freemont, Greenwood, Hartsville, Hornell, Jasper, Prattsburg, Troupsburg, and West Union.

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

*NOTE: Applies when a temporary warehouse structure is built/utilized specifically for a public work project.

GROUP 2: Specialized Earth Moving Equipment-Euclid type, or similar off-highway equipment, 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.

Per hour:	07/01/2024
GROUP 1	$ 34.21
GROUP 2	34.41

SUPPLEMENTAL BENEFITS

Per hour:	07/01/2024
Journeyworker	$ 28.85

OVERTIME PAY
See (*B, B2, J) on OVERTIME PAGE
*Time and one half also applicable after the 5th day worked.

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

6-317(Syr)

Welder — 04/01/2025

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	07/01/2024

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)	Saturday and Sunday may be used as a make-up day at straight time when a day is lost during that week due to inclement weather
(E5)	Double time after 8 hours on Saturdays
(F)	Time and one half of the hourly rate on Saturday and Sunday
(G)	Time and one half of the hourly rate on Saturday and Holidays
(H)	Time and one half of the hourly rate on Saturday, Sunday, and Holidays
(I)	Time and one half of the hourly rate on Sunday
(J)	Time and one half of the hourly rate on Sunday and Holidays
(K)	Time and one half of the hourly rate on Holidays
(L)	Double the hourly rate on Saturday
(M)	Double the hourly rate on Saturday and Sunday
(N)	Double the hourly rate on Saturday and Holidays
(O)	Double the hourly rate on Saturday, Sunday, and Holidays
(P)	Double the hourly rate on Sunday
(Q)	Double the hourly rate on Sunday and Holidays
(R)	Double the hourly rate on Holidays

(S) Two and one half times the hourly rate for Holidays

(S1) Two and one half times the hourly rate the first 8 hours on Sunday or Holidays One and one half times the hourly rate all additional hours.

(T) Triple the hourly rate for Holidays

(U) Four times the hourly rate for Holidays

(V) Including benefits at SAME PREMIUM as shown for overtime

(W) Time and one half for benefits on all overtime hours.

(X) Benefits payable on Paid Holiday at straight time. If worked, additional benefit amount will be required for worked hours. (Refer to other codes listed.)

Holiday Codes

PAID Holidays:

Paid Holidays are days for which an eligible employee receives a regular day's pay, but is not required to perform work. If an employee works on a day listed as a paid holiday, this remuneration is in addition to payment of the required prevailing rate for the work actually performed.

OVERTIME Holiday Pay:

Overtime holiday pay is the premium pay that is required for work performed on specified holidays. It is only required where the employee actually performs work on such holidays. The applicable holidays are listed under HOLIDAYS: OVERTIME. The required rate of pay for these covered holidays can be found in the OVERTIME PAY section listings for each classification.

Following is an explanation of the code(s) listed in the HOLIDAY section of each classification contained in the attached schedule. The Holidays as listed below are to be paid at the wage rates at which the employee is normally classified.

(1)	None
(2)	Labor Day
(3)	Memorial Day and Labor Day
(4)	Memorial Day and July 4th
(5)	Memorial Day, July 4th, and Labor Day
(6)	New Year's, Thanksgiving, and Christmas
(7)	Lincoln's Birthday, Washington's Birthday, and Veterans Day
(8)	Good Friday
(9)	Lincoln's Birthday
(10)	Washington's Birthday
(11)	Columbus Day
(12)	Election Day
(13)	Presidential Election Day
(14)	1/2 Day on Presidential Election Day
(15)	Veterans Day
(16)	Day after Thanksgiving
(17)	July 4th
(18)	1/2 Day before Christmas
(19)	1/2 Day before New Years
(20)	Thanksgiving
(21)	New Year's Day
(22)	Christmas
(23)	Day before Christmas
(24)	Day before New Year's
(25)	Presidents' Day
(26)	Martin Luther King, Jr. Day
(27)	Memorial Day
(28)	Easter Sunday

(29) Juneteenth

PROJECT MANUAL

For

NEW REGIONAL MAINTENANCE STORAGE BARN

SAMPSON STATE PARK
6096 NY STATE ROUTE 96A
ROMULUS, NY 14541

Contract #s: D006390, D006391, D006392, D006393

New York State Office of Parks,
Recreation and Historic Preservation
Central Region
6105 E. Seneca Turnpike
Jamesville, NY 13078

August 26, 2025

Final Design Submission



beardsley
architects + engineers

Beardsley Project # 22090
115 Solar Street, Suite 102
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A-202 Building Elevations - Regional Maintenance Storage Barn
A-301 Building Sections - Regional Maintenance Storage Barn
A-401 Unit Plans - Regional Maintenance Storage Barn
A-501 Wall Sections - Regional Maintenance Storage Barn
A-502 Wall Sections - Regional Maintenance Storage Barn
A-601 Exterior Details - Regional Maintenance Storage Barn

A-801 Door Schedule Door Types and Frame Types – Regional Maintenance Storage Barn
A-802 Window Type Elevations and Window Details – Regional Maintenance Storage Barn

PLUMBING DRAWINGS
P-001 Symbols and Abbreviations
P-101 Foundation Plan – Regional Maintenance Storage Barn
P-102 First Floor Plan - Regional Maintenance Storage Barn
P-401 Enlarged Plans – Base Bid - Regional Maintenance Storage Barn
P-501 Details - Regional Maintenance Storage Barn
P-601 Schedules - Regional Maintenance Storage Barn
P-901 Isometrics - Regional Maintenance Storage Barn

MECHANICAL DRAWINGS
M-001 Symbols and Abbreviations
M-101 First Floor Plan – Regional Maintenance Storage Barn
M-401 Sections - Regional Maintenance Storage Barn
M-501 Details, Schedules & Controls - Regional Maintenance Storage Barn

ELECTRICAL DRAWINGS
E-001 Symbols and Abbreviations
E-101 Regional Maintenance Storage Barn – Power Plan
E-102 Regional Maintenance Storage Barn – Lighting Plan
E-201 Enlarged Plans –Regional Maintenance Storage Barn
E-300 Electrical Diagrams
E-301 Details
E-302 Schedules

END OF SECTION

SECTION 00 03 00

INFORMATION AVAILABLE TO BIDDERS

PART 1 - GENERAL

1.1 EXISTING REPORTS AND SURVEYS

A. Prior to bidding, Bidders may at their expense make their own investigations to satisfy themselves as to site conditions, but such investigations will be performed only under time schedules and arrangements approved in advance by the Director.

B. Information described below is exclusively for use on this specific Project.

1.2 TOPOGRAPHIC SURVEY

A. A topographic survey with respect to the project site was provided by the NYSOPRHP. This survey is available for viewing at the office of the Director.

B. This survey identifies grade elevations prepared primarily for the use of the Director and Architect/Engineer, in establishing new grades, identifying natural watershed, and establishing site improvements shown on the Contract Documents. The Contractor is responsible for field verification of all survey information provided.

1.3 GEOTECHNICAL INVESTIGATION

A. Building Site Work

1. A geotechnical evaluation of the building site subsurface soil conditions including advancement of soil borings was completed for the NYSOPRHP by Ravi Engineering & Land Surveying, P.C. Refer to Geotechnical Engineering Investigation and Supplemental Letter dated February 17, 2023 and May 12, 2023 respectfully at the end of this Section.

B. This Report is not part of the Contract Documents. This Report is available for Bidder's information but are not a warrant of site conditions.

1.4 STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

A. A Stormwater Pollution Prevention Plan (SWPPP) will be held at the office of the Director and will be made available to GCW. The GCW shall implement all facets of the SWPPP during project construction.

END OF INFORMATION AVAILABLE TO BIDDERS

GEOTECHNICAL INVESTIGATION REPORT

(RAVI ENGINEERING & LAND SURVEYING, P.C.)

(For Bidders Information Not Warrant of Site Conditions)

RAVI ENGINEERING & LAND SURVEYING, P.C.

February 17, 2023

Beardsley Architects + Engineers
5789 Widewaters Parkway
DeWitt, New York 13214

Attention: Tom Ascienzo

Subject: Geotechnical Engineering Investigation
Proposed Regional Maintenance Storage Barn Improvements
Sampson State Park
Town of Romulus, Seneca County, New York

Dear Mr. Ascienzo:

Ravi Engineering & Land Surveying, P.C. is pleased to submit the Geotechnical Engineering Investigation Report for the above referenced project. If you require additional information, please contact the undersigned at (585) 697-2821. Thank you.

Respectfully submitted,

RAVI ENGINEERING & LAND SURVEYING, P.C.

James D. MacKecknie, P.G.
Project Manager

Attachment: Geotechnical Engineering Investigation Report – February 2023

REPORT

GEOTECHNICAL ENGINEERING INVESTIGATION

PROPOSED REGIONAL MAINTENANCE STORAGE BARN IMPROVEMENTS

SAMPSON STATE PARK

TOWN OF ROMULUS, SENECA COUNTY, NEW YORK

For

Beardsley Architects + Engineers

February 2023

February 17, 2023

Beardsley Architects + Engineers
5789 Widewaters Parkway
DeWitt, New York 13214

Attention: Tom Ascienzo

Subject: Geotechnical Engineering Investigation
Proposed Regional Maintenance Storage Barn Improvements
Sampson State Park
Town of Romulus, Seneca County, New York

Readers:

This report presents the results of a geotechnical engineering investigation for the project identified above. Information regarding the site and proposed construction has been provided to us by Beardsley.

UNDERSTANDING OF PROPOSED CONSTRUCTION

The project is in the northeast part of the park.

It is anticipated that the new storage barn will be a pre-engineered metal building, that it will have one story, that it will have no basement, that it will have slab-on-grade floors, that it will include a wash bay, that most of the building will not be heated, and that it will house various maintenance vehicles.

Dimensions of the building have not yet been finalized. It is currently anticipated that it may be approximately 175 feet long and 100 feet wide.

Areas of new pavement are also planned.

SUBSURFACE EXPLORATIONS

Subsurface explorations for this investigation consisted of two test borings, identified as SB-1 and SB-2. The number and locations of the borings were selected by Beardsley, and the locations are shown on the plan in attached Appendix A.

The borings were performed by Nothnagle Drilling, using an ATV-mounted rotary drilling rig, on 2/2/23. Borings SB-1 and SB-2 were advanced to respective depths of 23.3 feet and 19.7 feet below the ground surface at the time of drilling.

The logs of the borings, as prepared by Nothnagle Drilling, are presented in attached Appendix B.

It should be noted that short-term observations may not be representative of actual groundwater levels, and that groundwater levels will vary with factors including location, time, precipitation, season, and site activities.

DESIGN AND CONSTRUCTION

General

All design and construction should meet or exceed the requirements of all applicable codes.

It is recommended that consideration be given to the following three options for foundations and floors:

- Conventional footings for support of building columns and walls. Complete removal of unsuitable material below footings and floor slabs on grade. Significant earthwork. Minimal risk of noticeable floor settlement.

- Conventional footings for support of building columns and walls. Complete removal of unsuitable material below footings. Limited removal of existing material below floor slabs on grade. Less earthwork than the option above. Some risk of noticeable floor settlement.

- Drilled piers (caissons) for support of building columns and walls. Limited removal of existing material below floor slabs on grade. Least amount of earthwork of any option. Some risk of noticeable floor settlement.

A structural floor system would be a possibility, but the cost of such a floor system is likely to make that option impractical. Therefore, the option is not discussed further in this report.

Significantly different conditions were encountered by the two test borings. At the location of SB-1, materials unsuitable for the support of footings were encountered to a depth of approximately 13 feet below the ground surface at the time of drilling. At the location of SB-2, materials unsuitable for the support of footings were encountered to a depth of approximately 5 feet below the ground surface at the time of drilling. The depths of unsuitable material, between and beyond these two boring locations, will vary.

In choosing the preferred option for foundations and floors, it is likely that an estimate of required earthwork will be a significant factor. The designers may find it desirable to obtain additional information regarding the lateral and vertical extent of unsuitable materials.

Consideration could be given to a program of test pits. The objective of the test pits would be to determine the depths to the top of sufficiently dense and inorganic natural soil, similar to that encountered by SB-1 at 13 feet and SB-2 at 5 feet.

It may be possible for the test pits to be excavated by park personnel and equipment, and for the pits to be observed by Beardsley.

It is anticipated the test pits would assist in the estimation of costs and the selection of a foundation option, but that they would have no effect on the design recommendations in this report. Ravi personnel can be available to observe the test pits if desired, but that involvement may not be necessary.

The following sections of this report include more detailed discussions of seismic site class, the conventional footing foundation option for support of columns and walls, the drilled pier (caisson) foundation option for support of columns and walls, floor slabs on grade, pavement, excavation and construction dewatering, subgrade preparation, and fill and backfill.

Seismic Site Class

With regard to the Building Code of New York State, a seismic Site Class of "D" should be applied to this project. This corresponds to a "Stiff soil profile."

Conventional Footing Foundation Option for Support of Columns and Walls

All of the following requirements should be satisfied:

- No topsoil, organic matter, existing fill, remnant foundations, utilities, loose or soft natural soil, or other unsuitable materials should be left in place below a footing. Unsuitable materials were encountered to a depth of approximately 13 feet at the location of SB-1, and to a depth of approximately 5 feet at the location of SB-2. The depths of unsuitable material at other locations will vary.

- Footings should bear on suitable natural soil, or on compacted granular fill.

- Any granular fill below a footing should be placed directly on suitable natural soil. The granular fill should extend laterally beyond each edge of the footing, a distance at least as great as the vertical thickness of granular fill below the footing.

- Subgrades should be prepared, and granular fill should be placed and compacted, as described elsewhere in this report.

- Individual column footings should be designed for a bearing pressure of 4,000 pounds per square foot or less, and should in no case be less than 36 inches wide.

- Continuous wall footings should be designed for a bearing pressure of 4,000 pounds per square foot or less, and should in no case be less than 24 inches wide.

- Footings should be seated at least 4 feet below the lowest adjacent final surface.

- The imaginary slope between the bottom edges of any two footings should be no steeper than 1 vertical on 2 horizontal.

- Any stepped wall footings should be stepped in vertical increments of 12 inches or less, and horizontal increments of 24 inches or more.

Drilled Pier (Caisson) Foundation Option for Support of Columns and Walls

Drilled pier foundations should satisfy the following requirements:

- Drilled piers should bear directly on sound bedrock, below any severely weathered or fractured zones.

- Each drilled pier should be designed for a bearing pressure not exceeding 20,000 pounds per square foot, and should in no case be less than 30 inches in diameter.

- No loose, soft, wet, frozen, or otherwise unsuitable material should be left in place below a drilled pier.

- The bearing surface below each pier should be relatively level, with a slope no steeper than 1 vertical on 10 horizontal.

- Grade beams between drilled piers should be seated at least 4 feet below the lowest final adjacent surface.

Drilled piers should be installed by a contractor experienced in this specialized work. It is anticipated that each drilled pier will be installed using conventional rotary drilling methods and temporary casings. Drilling difficulties should be expected. Dewatering is likely to be necessary. All concrete should be placed in the dry, or by a suitable tremie method.

Floor Slabs on Grade

No topsoil should be left in place below a floor slab on grade.

If it is desired to minimize the risk of noticeable floor settlement, the removal requirements should be the same as those for footings. No organic matter, existing fill, remnant foundations, utilities, loose or soft natural soil, or other unsuitable materials should be left in place.

If some risk of noticeable floor settlement can be accepted, the removal requirements may be relaxed. Minor amounts of organic matter may be left in place, depending on subgrade exposure and examination during construction.

At least 12 inches of compacted granular fill should be placed beneath all floor slabs. Drained, unsaturated conditions should be maintained within the granular fill. Compacted common fill may be placed as required below the granular fill. Subgrades should be prepared, and fill should be placed and compacted, as described elsewhere in this report.

Floor slabs should be designed and constructed in accordance with ACI recommendations.

If all unsuitable materials are removed, the subgrade modulus (K) at the bottom of the compacted granular fill may be taken as 100 pounds per cubic inch. The effective modulus, at the top of the compacted granular fill, may be taken as 200 pounds per cubic inch.

If the removal of existing material is more limited, the subgrade modulus (K) at the bottom of the compacted granular fill may be taken as 50 pounds per cubic inch. The effective modulus, at the top of the compacted granular fill, may be taken as 100 pounds per cubic inch.

Pavement

A practical pavement design is based on factors including subgrade quality, frost action, traffic loads, traffic frequency, design life, and the relative importance of initial costs versus future maintenance.

At this site, the subgrade quality for flexible pavement should be represented using a California Bearing Ratio (CBR) not exceeding 5.

For auto parking areas, the recommended minimum flexible pavement section consists of a 1-inch asphaltic top course, a 2-inch asphaltic binder course, and a 12-inch subbase course of compacted granular fill.

For areas subjected to more frequent and/or heavier vehicles, the minimum combined thickness of asphaltic top and binder courses should be increased to 5 inches. The minimum thickness of the granular subbase should be increased to 16 inches.

Rigid pavement should consist of reinforced concrete, and the thickness of the concrete should be at least 6 inches. The concrete should be underlain by at least 12 inches of compacted granular fill. The subgrade modulus (K) at the bottom of the compacted granular fill may be taken as 50 pounds per cubic inch. The effective modulus, at the top of the compacted granular fill, may be taken as 100 pounds per cubic inch.

For all pavement sections, compacted common fill may be placed as required below the granular fill.

No topsoil should be left in place. Trace amounts of organic matter may be left in place, however, provided that the subgrades can be suitably prepared. Subgrades should be prepared, and fill should be placed and compacted, as described elsewhere in this report.

Drained, unsaturated conditions should be maintained within all pavement sections. Surface water should be conducted away from paved areas and structures.

The project designers may wish to consider pavement sections that are more or less conservative than those presented. This could depend on the traffic and cost factors described above, as well as the performance of existing and previous pavement sections within the park.

Excavation and Construction Dewatering

Excavation should be performed in accordance with all applicable local, state, and federal requirements. The sides of all excavations should be sloped or supported as required by safety regulations. Existing structures, utilities, and other property should be protected.

With regard to the current OSHA regulations, Type C soil should be assumed. This would apply to adequately dewatered soil.

To minimize subgrade disturbance, excavation should be performed with increasing care as subgrade levels are approached.

All work should be performed in the dry. In addition, the dewatering should be sufficient to permit suitable preparation of the subgrade and compaction of any subsequent fill materials.

The contractor should be prepared to dewater as necessary, and should choose and employ an appropriate type of dewatering system. Any dewatering system should be operated in such a way that disturbance or removal of the subgrade soil does not occur.

Subgrade Preparation

It is cautioned that the soils at this site contain fine-grained material, and that they will be sensitive to disturbance. Subgrades should be kept free of water, subjected to a minimum amount of construction traffic, exposed no longer than necessary, and not permitted to freeze.

Subgrades should be carefully prepared and thoroughly examined by qualified personnel, tamped using vibratory equipment (to the greatest extent practical without loosening or softening the subgrade soils), and proofrolled (where space permits) using a fully loaded ten-wheel dump truck or full-size roller.

No new fill or foundation concrete should be placed over material that is loose, soft, wet, frozen, or otherwise unsuitable with respect to the design recommendations.

Fill and Backfill

Granular fill should consist of a durable sand and gravel or crusher-run stone, free of any organic matter. The plasticity index should be less than 5. Granular fill should have 100 percent finer than 3 inches, 20 to 60 percent finer than the Number 4 sieve, and no more than 10 percent finer than the Number 200 sieve.

Granular fill could also be specified as meeting the NYSDOT requirements for Subbase Course Type 1, 2, or 4.

Common fill should consist of durable soil material, free of any organic matter. The plasticity index should be less than 15. Common fill should have 100 percent finer than 6 inches, at least 90 percent finer than 3 inches, and at least 20 percent finer than the Number 4 sieve.

It appears that some of the inorganic on-site soil will satisfy the material requirements for common fill. Little or none of the on-site soil, however, will satisfy the material requirements for granular fill. It should also be noted that granular fill meets all of the requirements of common fill, and that granular fill can generally be placed and compacted with less difficulty.

All fill should be compacted, in lifts of 9 inches or less, to at least 95 percent of the maximum dry density determined by ASTM D 1557.

The in-place density and water content of compacted fill should be determined by ASTM D 6938. For any compacted fill below wall footings, at least one test should be performed per 50 lineal feet of wall, per lift. For any compacted fill below column footings, at least one test should be performed per footing, per lift. For other areas such as floor slabs and pavements, at least one test should be performed per 2,500 square feet, per lift.

CLOSING COMMENTS AND RECOMMENDATIONS

Professional services for this investigation were performed in accordance with generally accepted geotechnical engineering practices, exclusively for the subject project. No warranty, expressed or implied, is made.

It should be noted that subsurface conditions are inferred from the logs of subsurface explorations; that each subsurface exploration is performed at a specific location and time; that conditions between, beyond, and below explorations are likely to vary; that conditions are often described on the basis of visual examinations of recovered samples; that visual descriptions may not always agree well with descriptions made on the basis of laboratory tests; that the distinction between fill and naturally-deposited soil can not always be readily determined on the basis of recovered samples; and that conditions can be changed by excavation and/or filling, performed after the exploration. If subsurface conditions are subsequently revealed that appear to be significantly different or less favorable than those described, we should be given the opportunity to revise the statements in this report.

Designers and contractors are advised that this report was prepared primarily for design purposes, and that it may not contain sufficient information for bidding. Contractors should visit the site, review this report and the related exploration logs, and evaluate potential construction difficulties on the basis of their own knowledge and experience.

It is recommended that qualified personnel be retained to review the geotechnical portions of the contract drawings and specifications, and to provide monitoring services during construction.

If you have questions or comments regarding this report, please contact the undersigned.

Yours truly,

RAVI ENGINEERING & LAND SURVEYING, P.C.

Nagappa Ravindra, P.E.
President

Ray M. Teeter, P.E. FOR
Geotechnical Engineer

Attachments: Appendix A – Boring Location Plan

Appendix B – Logs of Test Borings SB-1 and SB-2, by Nothnagle Drilling

Appendix A

Boring Location Plan



RAVI ENGINEERING & LAND SURVEYING, P.C.
2110 SOUTH CLINTON AVENUE, SUITE 1
ROCHESTER, NEW YORK 14618
TL: (585) 223-3660 FX: (585) 697-1764

Boring Location Plan
Proposed Regional Maintenance Storage Barn Improvements
Sampson State Park
Town of Romulus, Seneca County, New York

PROJECT NUMBER	DATE
10-22-131C	February 2023
SCALE	DRAWING NUMBER
N.T.S.	DWG-01

Appendix B

Logs of Test Borings SB-1 and SB-2, by Nothnagle Drilling

NOTHNAGLE *DRILLING*, INC.
1821 Scottsville-Mumford Road
Scottsville, New York 14546
Phone (585) 538-2328
Fax (585) 538-2357

Test Boring No. SB-1
Page 1 of 1
ND Job # 238372

Project Regional Maintenance Storage Barn Improvements, Sampson State Park, Town of Romulus, New York
Client Ravi Engineering & Land Surveying, P.C., 2110 South Clinton Ave, Suite 1, Rochester, New York 14618
Elevation _____ Start 2/2/23 Completed 2/2/23 Driller J. Schweitzer
Water Level - During Drilling 18'0" Inspector _____
Water Level - At Completion None, cave in 9'6"
Seasonal and climatic changes may alter observed water levels.

	C	Blows on Sampler 0"/6"	6"/12"	12"/18"	18"/24"	Sample N	Rec.	No.	Depth	Visual Soil and Rock Information Remarks	
0		1	7							Topsoil and organics	0'8"
				8	8	15	17"	1	0'0"-2'0"	Medium brown damp clay and silt, some medium	
		3	5							to fine sand and gravel, trace organics	
				7	8	12	22"	2	2'0"-4'0"	Medium brown damp	3'6"
5		2	2							Medium gray damp clay and silt, little medium	
				3	4	5	18"	3	4'0"-6'0"	to fine sand, trace organics	
		6	5							Soft gray moist	
				4	4	9	14"	4	6'0"-8'0"	Medium gray moist	
		1	WH							Very soft gray moist (some organics-wood)	
10				1	2	1	7"	5	8'0"-10'0"		10'0"
		WH	3							Medium gray wet clay and silt, little medium	
				3	6	6	12"	6	10'0"-12'0"	to fine sand and gravel	
											13'0"
		13	18							Dense gray moist medium to fine sand, some	
15				30	37	48	23"	7	13'0"-15'0"	clay and gravel (till)	
		6	12							Compact gray wet (some weathered shale	
20				18	26	30	18"	8	18'0"-20'0"	fragments)	
											22'0"
		50/3				50/3	3"	9	23'0"-23'3"	Very dense gray wet weathered bedrock (shale) fragments	23'3"
25											
30											
										Boring terminated at 23'3"	
										Advanced test boring with hollow stem	
										auger casing. Boring backfilled on completion.	
35											
40											

N=No. of Blows to Drive__ Spoon__ with__ lb. Wt.__ Ea. Blow
C=No. of Blows to Drive__ Casing___with___ lb. Wt.___ Ea. Blow
Transitional Depths are Estimated Based on Field Observations

NOTHNAGLE *DRILLING*, INC.
1821 Scottsville-Mumford Road
Scottsville, New York 14546
Phone (585) 538-2328
Fax (585) 538-2357

Test Boring No. SB-2
Page 1 of 1
ND Job # 238372

Project Regional Maintenance Storage Barn Improvements, Sampson State Park, Town of Romulus, New York
Client Ravi Engineering & Land Surveying, P.C., 2110 South Clinton Ave, Suite 1, Rochester, New York 14618
Elevation _____ Start 2/2/23 Completed 2/2/23 Driller J. Schweitzer
Water Level - During Drilling 18'0" Inspector _____
Water Level - At Completion None, cave in 10'0"
Seasonal and climatic changes may alter observed water levels.

	C	Blows on Sampler 0"/6"	6"/12"	12"/18"	18"/24"	Sample N	Rec.	No.	Depth	Visual Soil and Rock Information Remarks	
0		2	8							Topsoil and organics	0'6"
				7	4	15	18"	1	0'0"-2'0"	Medium brown damp clay and silt, some medium	
		10	10							to fine gravel, trace organics	
				9	10	19	22"	2	2'0"-4'0"	Stiff brown damp	
5		7	10							Stiff brown damp	5'0"
				12	14	22	22"	3	4'0"-6'0"	Firm brown damp medium to fine sand, some	
		14	17							clay, silt and gravel	
				23	30	40	20"	4	6'0"-8'0"	Compact brown damp	
		18	28							Very dense brown damp	
10				42	46	70	22"	5	8'0"-10'0"		
		20	42							Very dense brown damp	
				50/5		92/11	16"	6	10'0"-11'5"		
		18	28							Very dense brown damp (gray @ 13'6")	
15				36	50/3	64	18"	7	13'0"-14'9"		
		22	36							Very dense gray wet	19'0"
20				40	50/2	76	17"	8	18'0"-19'8"	Very dense gray wet weathered bedrock	
										(shale) fragments	19'8"
25											
30											
										Boring terminated at 19'8"	
										Advanced test boring with hollow stem	
										auger casing. Boring backfilled on completion.	
35											
40											

N=No. of Blows to Drive__ Spoon__ with__ lb. Wt.___ Ea. Blow
C=No. of Blows to Drive__ Casing___with____ lb. Wt.___ Ea. Blow
Transitional Depths are Estimated Based on Field Observations

RAVI ENGINEERING & LAND SURVEYING, P.C.

May 12, 2023

Beardsley Architects + Engineers
5789 Widewaters Parkway
DeWitt, New York 13214

Attention: Tom Ascienzo

Subject: Proposed Regional Maintenance Storage Barn Improvements
Sampson State Park
Town of Romulus, Seneca County, New York

Readers:

This letter is supplemental to our report dated 2/17/23.

The proposed outline of the building is shown on Drawing C-102. This drawing was prepared by Beardsley, is dated 5/5/23, and is presented in attached Appendix A.

Subsurface Explorations

Subsurface explorations for this project have consisted of two test borings and six test pits.

The two test borings were identified as SB-1 and SB-2. The logs of these borings, as well as a plan showing their approximate locations, are presented in our report dated 2/17/23. The approximate locations of these borings are also shown on the drawing in attached Appendix A.

The six test pits were performed on 3/21/23. The test pits were excavated and backfilled by the owner's personnel, using equipment provided by the owner. The depths of the test pits ranged from 3.5 feet to 6 feet. The test pits were observed by personnel representing the owner, Beardsley, and Ravi. The logs of the test pits were prepared by Ravi.

The approximate locations of test pits TP-1 through TP-5 are shown on the drawing in attached Appendix A. The approximate locations of all six test pits are shown on the drawing in attached Appendix B. The logs of the test pits, as prepared by Ravi, are presented in attached Appendix C.

The approximate depths of suitable natural soil were 13 feet at SB-1, 5 feet at SB-2 and TP-1, 3 feet at TP-2, 4 feet at TP-3, and 2 feet at TP-4.

At the location of TP-5, natural soil was encountered at a depth of approximately 2 feet. This soil, however, was more easily excavated than the natural soil encountered by the other explorations north of this location.

Based on the recollection of personnel representing the owner, and on some older drawings, it appears likely that one or more buried tanks had been previously removed in the vicinity of SB-1. This would tend to explain the greater depth (13 feet) of unsuitable material encountered at this location.

Design, Construction, and Closing Comments

For the building location and outline currently proposed, and as shown on the drawing in attached Appendix A, we see no need for additional test borings. Our report of 2/17/23 would remain applicable.

If you have questions or comments regarding this letter or the report, please contact the undersigned.

Yours truly,

RAVI ENGINEERING & LAND SURVEYING, P.C.

Nagappa Ravindra, P.E.
President

Ray M. Teeter, P.E.
Geotechnical Engineer

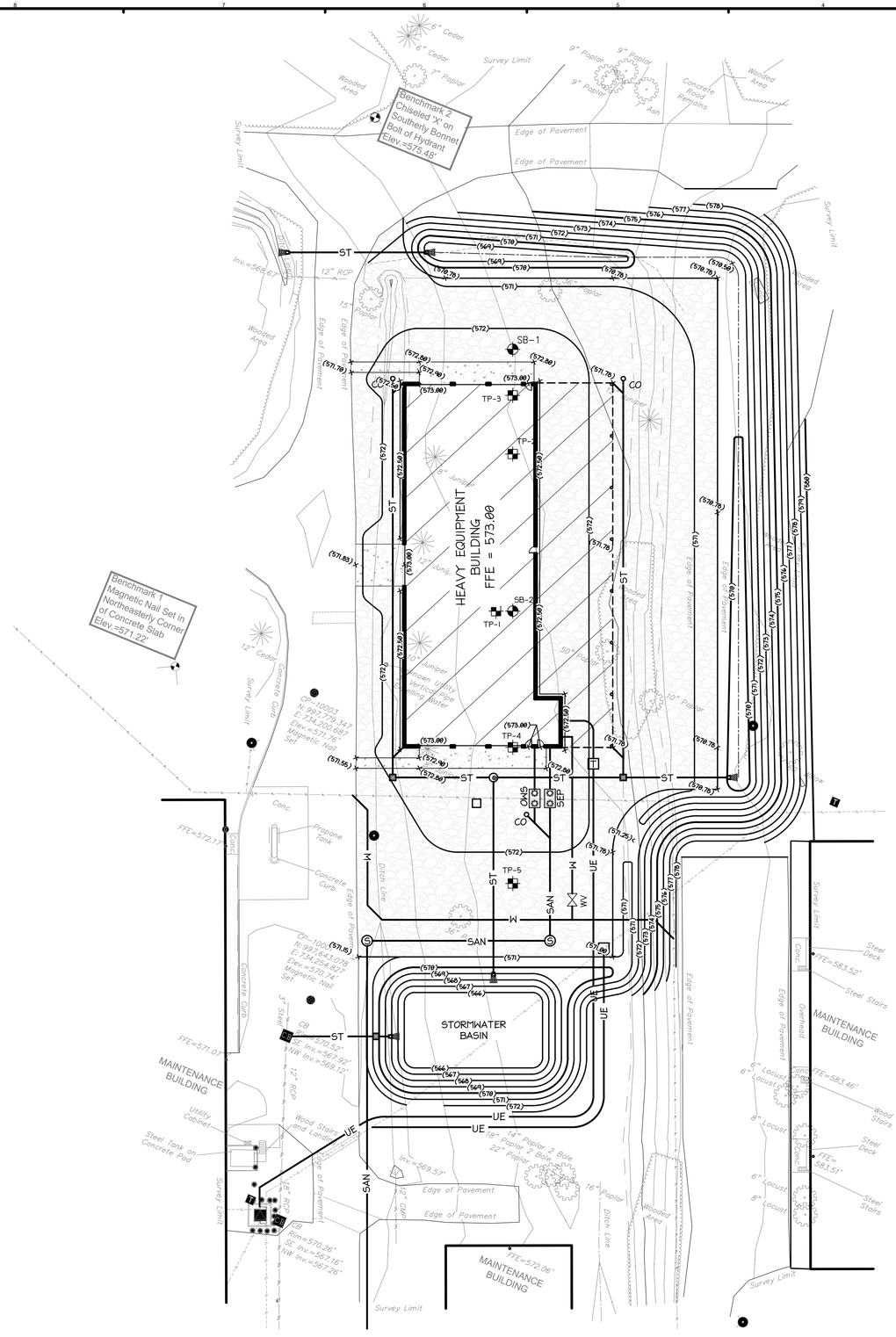
Attachments: Appendix A – Beardsley Drawing C-102, 5/5/23

Appendix B – Test Pit Location Plan

Appendix C – Test Pit Logs

Appendix A

Beardsley Drawing C-102, 5/5/23



A GRADING AND DRAINAGE PLAN
SCALE: 1" = 30'-0"

gutters

bollards at doors

LEGEND:

UE UE UE	UNDERGROUND ELECTRIC
OHW OHW	OVERHEAD ELECTRIC WIRE
UT UT UT	UNDERGROUND TELEPHONE
FC	UNDERGROUND FIBER OPTIC CABLE
SS SS SS	SANITARY SEWER LINE
SS SS SS	ABANDONED SANITARY SEWER
S S S	STORMWATER LINE
W W W	WATER SERVICE
GAS GAS	PROPANE GAS
	CONCRETE PAVEMENT
	STONE PAVEMENT
	LAWN AREA
W	DOMESTIC WATER SERVICE
WV	GATE VALVE
SAN	SANITARY SEWER
SA	SANITARY MANHOLE
OWS	OIL/WATER SEPARATOR
SEP	SEPTIC TANK
UE	ELECTRIC PRIMARY SERVICE
T	ELECTRIC TRANSFORMER

30 0 30 60
SCALE: 1" = 30'-0"

New York State Parks, Recreation and Historic Preservation

Governor Kathy Hochul — Commissioner Erik Kulleseid

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BEARDSLEY ARCHITECTS + ENGINEERS
64 SOUTH STREET
AUBURN, NY 13021

Other Consultant
CONSULTANT NAME
STREET ADDRESS
CITY, STATE, ZIP
LOGO

Name of Region:
2221 Taughannock Park Road
Trumansburg, NY 14886

Project Title:
SAMPSON REGIONAL MAINTENANCE STORAGE BARN IMPROVEMENTS

Project Location:
Sampson State Park
6096 NY-96A
Romulus, NY 14541

Key Plan

REVISIONS

Rev No.	Description	Date:

Drawn By: AJI
Design By: AJI
Checked By: --
Approved By:
Date: 05.05.2023

Seal and Signature

Sheet Title:
GRADING AND DRAINAGE PLAN

Drawing Number:
C-102

Project Number: 22090

Sheet: X of XX

Appendix B

Test Pit Location Plan

Sampson State Park Test Pit Locations

Locations of test pit sampling

Legend

- Test Pit

Test Pit 3

Test Pit 2

Test Pit 1

Test Pit 4

Test Pit 5

Test Pit 6

Sampson State Park

Sampson State Park

N

300 ft

Google Earth

Appendix C

Test Pit Logs

Test Pit Log

RAVI ENGINEERING & LAND SURVEYING, P.C.

Test Pit No. TP-1 Project Name Sampson State Park Page 1 of 1

Approx. Elev. _____ Project Number 10-22-131C Date 3-21-2023

Location: Proposed Regional Maintenance Fac. – North of Cold Storage

Field Eng./Geo. Jim MacKecknie

Weather: Sunny, 48° F

Equipment Used: CAT Excavator

Test Pit Dimensions: 6' length x 2' width x 5' depth

Ground Water Data		
Date	Actual Time	Depth
	Not encountered	X

Depth	PID Reading	Description
0 – 4.5'	NA	Medium brown silt and clay some gravel – fill material.
4.5 - 5'	N/A	Grayish brown fine sand, some clay silt and gravel.

Comments

- ☒ No rock encountered; or
- ☐ Rock encountered at _____ feet
- ☐ Perch/Seepage water encountered at _____ feet
- ☒ No groundwater encountered; or
- ☐ Ground water encountered at _____ feet

Remarks: According to the excavator operator, excavation became difficult with depth. Water seepage appeared to be associated with saturation at the surface. Test pit is located at soil boring SB-2. The southwest corner of the test pit was located with a GPS. Photographs of the test pit were taken.

Test Pit Log

RAVI ENGINEERING & LAND SURVEYING, P.C.

Test Pit No. TP-2 Project Name Sampson State Park Page 1 of 1

Approx. Elev. _____ Project Number 10-22-131C Date 3-21-2023

Location: Proposed Regional Maintenance Fac. – north of Cold Storage

Field Eng./Geo. Jim MacKecknie

Weather: Sunny, 48° F

Equipment Used: CAT Excavator

Test Pit Dimensions: 5.67' (length) x 2' (width) x 3.5' (depth)

Ground Water Data		
Date	Actual Time	Depth
	Not encountered	X

Depth	PID Reading	Description
0 - 0.5'	NA	Medium brown silt – Top soil.
0.5 – 1.0'	N/A	Black weathered asphalt.
1.0 – 2.5	N/A	Medium brown silt and clay some gravel – Fill material
2.5 – 3.5	N/A	Grayish brown fine sand, some clay silt and gravel

Comments

- ☒ No rock encountered; or
- ☐ Rock encountered at _____ feet
- ☐ Perch/Seepage water encountered at _____ feet
- ☒ No groundwater encountered; or
- ☐ Ground water encountered at _____ feet

Remarks: According to the excavator operator, excavation became difficult at 2.5'. Water seepage appeared to associated with saturation at the surface. Test pit is located 75 feet north of TP-1. The southwest corner of the test pit was located with a GPS. Photographs of the test pit were taken.

Test Pit Log

RAVI ENGINEERING & LAND SURVEYING, P.C.

Test Pit No. TP-3 Project Name Sampson State Park Page 1 of 1

Approx. Elev. _____ Project Number 10-22-131C Date 3-21-2023

Location: Proposed Regional Maintenance Fac. – north of Cold Storage

Field Eng./Geo. Jim MacKecknie

Weather: Sunny, 48° F

Equipment Used: CAT Excavator

Test Pit Dimensions: 6' (length) x 2' (width) x 5.5' (depth)

Ground Water Data		
Date	Actual Time	Depth
	Not encountered	X

Depth	PID Reading	Description
0 - 0.5'	NA	Medium brown silt – Top soil
0.5' – 4.0'	N/A	Dark grayish brown silt and clay some gravel trace organics (woody debris) – Fill material
4.0' - 5.5'	N/A	Dark grayish brown fine sand, some clay silt, gravel and clay.

Comments

- ☒ No rock encountered; or
- ☐ Rock encountered at _____ feet
- ☐ Perch/Seepage water encountered at _____ feet
- ☒ No groundwater encountered; or
- ☐ Ground water encountered at _____ feet

Remarks: According to the excavator operator, excavation became difficult at 5.5'. Water seepage appeared to be associated with saturation at the surface. Test pit is located 28 feet north of TP-2. The southwest corner of the test pit was located with a GPS. Photographs of the test pit were taken.

Test Pit Log

RAVI ENGINEERING & LAND SURVEYING, P.C.

Test Pit No. TP-4 Project Name Sampson State Park Page 1 of 1

Approx. Elev. _____ Project Number 10-22-131C Date 3-21-2023

Location: Proposed Regional Maintenance Fac. – north of Cold Storage

Field Eng./Geo. Jim MacKecknie

Weather: Sunny, 48° F

Equipment Used: CAT Excavator

Test Pit Dimensions: 7' (length) x 2' (width) x 5.5' (depth)

Ground Water Data		
Date	Actual Time	Depth
	Not encountered	X

Depth	PID Reading	Description
0 – 2.0'	NA	Medium brown silt
2.0' – 5.5'	N/A	Grayish brown fine sand, some clay silt and gravel

Comments

- ☒ No rock encountered; or
- ☐ Rock encountered at _____ feet
- ☐ Perch/Seepage water encountered at _____ feet
- ☒ No groundwater encountered; or
- ☐ Ground water encountered at _____ feet

Remarks: According to the excavator operator, excavation became difficult at 2 feet. Water seepage appeared to be associated with saturation at the surface. Test pit is located 65 feet south of TP-1. The southwest corner of the test pit was located with a GPS. Photographs of the test pit were taken.

Test Pit Log

RAVI ENGINEERING & LAND SURVEYING, P.C.

Test Pit No. TP-5 Project Name Sampson State Park Page 1 of 1

Approx. Elev. _____ Project Number 10-22-131C Date 3-21-2023

Location: Proposed Regional Maintenance Fac. – north of Cold Storage

Field Eng./Geo. Jim MacKecknie

Weather: Sunny, 48° F

Equipment Used: CAT Excavator

Test Pit Dimensions: 7' (length) x 2' (width) x 6' (depth)

Ground Water Data		
Date	Actual Time	Depth
	Not encountered	X

Depth	PID Reading	Description
0 – 3.0'	NA	Medium brown silt (possible fill)
2.0' – 5.5'	N/A	Brown fine sand and silt, little gravel and clay

Comments

- ☒ No rock encountered; or
- ☐ Rock encountered at _____ feet
- ☐ Perch/Seepage water encountered at _____ feet
- ☒ No groundwater encountered; or
- ☐ Ground water encountered at _____ feet

Remarks: According to the excavator operator, excavation was easier in TP-5 in comparison to the other test pits. Water seepage appeared to be associated with saturation at the surface. The soil was much drier in this test and the excavated material was not as cohesive in comparison to the test pits 1, 2, 3, and 4. Test pit is located 65 feet south of TP-4. The southwest corner of the test pit was located with a GPS. Photographs of the test pit were taken.

Test Pit Log

RAVI ENGINEERING & LAND SURVEYING, P.C.

Test Pit No. TP-6 Project Name Sampson State Park Page 1 of 1

Approx. Elev. _____ Project Number 10-22-131C Date 3-21-2023

Location: Proposed Regional Maintenance Fac. – south of Cold Storage

Field Eng./Geo. Jim MacKecknie

Weather: Sunny, 48° F

Equipment Used: CAT Excavator

Test Pit Dimensions: 6' (length) x 2' (width) x 4' (depth)

Ground Water Data		
Date	Actual Time	Depth
	Not encountered	X

Depth	PID Reading	Description
0 – 0.5	NA	Medium brown silt
0.5-4'	N/A	Brick, concrete, steel and wood timbers. A void was encountered at approximately 2 feet.

Comments

- ☒ No rock encountered; or
- ☐ Rock encountered at _____ feet
- ☒ Perch/Seepage water encountered at 2.5' feet
- ☐ No groundwater encountered; or
- ☐ Ground water encountered at _____ feet

Remarks: According to the excavator operator, excavation was difficult due to the amount of fill material present. Fill material consisted of brick, concrete, steel and wood timbers. A void was encountered at 2 feet. Water quickly flowed into the test pit rising to approximately 2.5 feet below grade. The source of the water was not could not be confirmed by parks personnel, but was determined not to be an active utility. The test pit was located 215 feet south of the cold storage building. The southwest corner of the test pit was located with a GPS. Photographs of the test pit were taken.

SECTION 01 12 00

MULTIPLE CONTRACT SUMMARY

PART 1 - GENERAL

1.1 MWBE REQUIREMENTS

A. Refer to front end specifications furnished by the NYSOPRHP for MWBE requirements.

1.2 PROJECT INFORMATION

A. Project Identification:
   1. Project Name: New Regional Maintenance Storage Barn
   2. Project Location: Sampson State Park, Romulus, NY
   3. Project Number: FL-SM-2023-001

B. Director:
   1. New York State Office of Parks, Recreation and Historic Preservation
   2. Director's Representative/Project Coordinator: David Green, Architect 1, Mid-State Capital District; New York State Office of Parks, Recreation and Historic Preservation; 2221 Taughannock Park Rd., Trumansburg, NY 14886

C. Architect:
   1. Beardsley Design Associates, Architecture, Engineering, Landscape Architecture, D.P.C., 115 Solar St., Suite 102, Syracuse, NY 13204
   2. Architect’s Representative: Barry Halperin, RA

1.3 PROJECT COORDINATOR

A. Project Coordinator shall be responsible for coordination between all Contracts.
   1. Project coordinator is the Director’s Representative.

1.4 COORDINATION ACTIVITIES

A. Coordination activities of Project Coordinator include, but are not limited to, the following:
   1. Provide overall coordination of the Work.
   2. Coordinate shared access to workspaces.
   3. Provide overall coordination of temporary facilities and controls.
   4. Coordinate, schedule, and approve interruptions of permanent and temporary utilities, including those necessary to make connections for temporary services.
   5. Coordinate construction and operations of the Work with work performed by each Contract.
   6. Assist in the resolution of scheduling conflict.
   7. Coordinate sequence of activities to accommodate tests and inspections, and coordinate schedule of tests and inspections.
   8. Coordinate completion of substantial completion punch list items.

9. Coordinate preparation of Project record documents if information from more than one Contractor is to be integrated with information from other Contractors to form one combined record.

1.5 GENERAL REQUIREMENTS OF CONTRACTS

A. Extent of Contract: Unless the Agreement contains a more specific description of the Work of each Contract, requirements indicated on Drawings and in Specification Sections determine which contract includes a specific element of Project.
   1. Unless otherwise indicated, the work described in this Section for each contract shall be complete systems and assemblies, including products, components, accessories, and installation required by the Contract Documents.
   2. Trenches and other excavation for the work of each contract shall be the work of each contract for its own work, unless noted otherwise.
   3. Blocking, backing panels, coring, caulking, sleeves, and metal fabrication supports for the work of each contract shall be provided under the General Construction Contract, unless noted otherwise. Each Prime Contractor shall coordinate the need of blocking, backing, sleeves, and supplies for their Work with the General Construction Contractor.
   4. Equipment pads for the work of each contract shall be the work of each contract for its own work, unless noted otherwise.
   5. Roof-mounted equipment curbs for the work of each contract shall be supplied by the Prime Contractor for this Work, and installed by the General Construction Contractor under the General Construction Contract, unless noted otherwise. Each Prime Contractor shall coordinate the need of roof equipment curb for their work with the General Construction Contractor.
   6. Painting for the work of each contract shall be the work of each contract for its own work, unless noted otherwise.
   7. Cutting and Patching: Provided under the General Construction Contract.

B. Project Informational Sign: Refer to Specification Section 01 50 00 “Temporary Facilities and Controls”.

C. Substitutions: Each Prime Contractor shall cooperate with other Prime Contractors involved to coordinate approved substitutions with remainder of the work.
   1. The Prime Contractor proposing a substitution shall coordinate that substitution.

D. Temporary Facilities and Controls: In addition to specific responsibilities for temporary facilities and controls indicated in this Section and in Section 01 50 00 "Temporary Facilities and Controls," each Prime Contractor is responsible for the following:
   1. Installation, operation, maintenance, and removal of each temporary facility necessary for its own normal construction activity, and costs and use charges associated with each facility, except as otherwise provided for in this Section.
   2. Plug-in electric power cords and extension cords, supplementary plug-in task lighting, and special lighting necessary exclusively for its own activities.
   3. Its own field office, complete with necessary furniture, utilities, and telephone service, if desired. Location to be approved by Director’s Representative.
   4. Its own storage and fabrication sheds, if desired.
   5. Temporary enclosures for its own construction activities.
   6. Staging and scaffolding for its own construction activities.

7. General hoisting facilities for its own construction activities.
8. Waste disposal facilities, including collection and legal disposal of its own hazardous, dangerous, unsanitary, or other harmful waste materials. Location to be approved by Director's Representative.
9. Progress cleaning of work areas affected by its operations on a daily basis.
10. Secure lockup of its own tools, materials, and equipment.
11. Construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities.

E. Temporary heating, cooling, or ventilation exceeding the temperature or air change levels defined in Section 01 50 00, is the responsibility of the Contractor requiring this heating, cooling, or ventilation. NYSOPRHP is not responsible for temporary heating or HVAC costs.

F. Each Contractor shall provide portable generator for their electrical power requirements in excess of those defined in Section 01 50 00, Temporary Facilities and Controls.

G. Each Contractor shall provide additional temporary electric branch distribution if distribution defined in Section 01 50 00, Temporary Facilities and Controls is not adequate for their needs.

1.6 CONTRACT DESCRIPTION

A. Contract Type: Multiple Prime Contracts as described in each Contract Agreement.

B. The work of each separate Prime Contract is identified in this section and on the Drawings.

1.7 EXISTING ITEMS

A. The Director shall remove and store the following prior to start of other demolition work, for later reinstallation by the Director:
1. None.

B. The General Contractor shall remove the following items and furnish to Director:
1. None.

1.8 WORK BY DIRECTOR

A. Director will provide special testing and inspections as specified. All other testing and inspections required as noted in the Contract Documents is by each Prime Contractor for their respective trade Work.

1.9 INFORMATION SUBMITTALS

A. For all hazardous materials brought onto the site, submit a material safety data sheet.

1.10 COORDINATION WITH OWNER

A. General: Cooperate fully with Director so work may be carried out smoothly, without interfering with or delaying work under each Prime Contract. Coordinate the Work of each Contract with Director and other Prime Contractors.

1.11 COMPLETION DATE

A. Completion date stated in the Contract Agreement is the overall project completed date, and will be established by the NYSOPRHP.

1.12 USE OF SITE AND PREMISES

A. No Smoking Policy: Smoking is banned in NYS Parks at playgrounds, swimming pools, specific swimming beaches, pavilions, and picnic shelters; developed athletic facilities; boardwalks; outdoor seating areas near food and beverage concessions; areas where outdoor environmental education programs are held; public gardens; areas where children or large numbers of visitors congregate; and within 50-feet of buildings, including buildings under construction.

B. Courteous Behavior: The Park is open to the public year-round. Contractors shall be watchful and courteous of Park Patrons and visitors, and shall make every reasonable attempt to accommodate. Harassment, disrespectful behavior and unsafe behavior will not be tolerated.

C. Construction Operations: Limited to areas noted on Drawings.

D. Arrange use of site and premises to allow:
1. Work by other Prime Contractors, for this project.
2. Work by Director.
3. Continued use of the Park by Park Patrons. The Park is open from dawn to dusk year-round, and receives heavy visitation.
4. Work by other Prime Contractors for other projects.

E. Provide access to and from site as required by law and by Director:
1. Do not obstruct roadways, sidewalks, or other public ways without permit.
2. Schedule deliveries to minimize use of driveways and entrances by construction operations.

F. Existing building spaces may not be used for storage.
1. Store materials and perform work so that pedestrians and vehicle traffic is not obstructed. Store materials in an orderly fashion.

G. Time Restrictions:
1. Conduct work to the hours of 7:30 AM to 4:30 PM, Monday through Friday, unless noted otherwise by Director.

H. Utility Outages and Shutdown:
1. Sanitary sewer services shall not be disrupted at any time.
2. Limit disruption of other utility services to hours the site is unoccupied.
3. Do not disrupt or shut down life safety systems without 7 days notice to Director and authorities having jurisdiction.
4. Limit shutdown of utility services to 4 hours at a time, arranged at least 24 hours in advance with Director, unless noted otherwise on Drawings.
5. Prevent accidental disruption of utility services to other facilities.

I. The following items are not allowed on the Site or on Facility premises.
   1. Firearms, ammunition, weapons, and dangerous instruments (other than tools required for the Work).
   2. Alcoholic beverages and person under the influence of same.
   3. Use of tobacco products and other controlled substances.
   4. Illegal controlled substances and persons under the influence of same.
   5. Radios (except with written permission from the Director's Representative).

J. Do not diminish the level of life safety during performance of the Work.

K. Portable equipment which interferes with execution of the Work will be removed and reset by Facility personnel.

L. Be responsible and accountable for employees, suppliers, subcontractors and their employees, with regard to their use of the premises. Direct them to comply with the Facility Regulations and with the security and traffic regulations.

M. Furnish Facility authorities with a telephone number or method to contact the supervisor for the Work in case of an emergency after work hour, including weekends and holidays.

N. Comply with applicable Federal and State of New York Right-to-Know Law provisions and supply copies of the appropriate Material Safety Data Sheets (MSDS) to the Owner's Representative.

O. Direct employees to be watchful for people in or near the work area where safety hazards may be present. Notify the Director's Representative, if necessary, to remove them from the work area or Site.

P. Report fire and other emergency situations to the Facility Safety/Security Department immediately.

Q. Provide portable fire extinguishing equipment at the project site.

1.13 HAZARDOUS MATERIAL

A. Not applicable.

1.14 CONFINED SPACE

A. Comply with confined space as defined in Title 29, Part 1910, Section 146 of the Code of Federal Regulations (29CFR 1910.146).

B. Indicated confined spaces are not intended to limit or define Contractor's or subcontractor's regulatory compliance requirements. In addition, confined spaces indicated on the drawings, other confined spaces may be present or created by the work of this contract. Notify the Director's Representative, in writing, of confined spaces created or eliminated during execution of the Work.

1.15 SPECIFICATION AND DRAWING CONVENTIONS

A. Comply with the requirements of the various specifications and standards referred to in these Specifications, except where they conflict with the requirements of these Specifications. Such reference specifications and standards shall be the date of latest revision in effect at the time of receiving bids, unless the date is given.

B. NYSDOT Specifications: If the abbreviation NYSDOT appears in these Specifications, it shall mean the New York State Department of Transportation, Office of Engineering Specifications entitled "STANDARD SPECIFICATIONS - CONSTRUCTION AND MATERIALS" latest editing, including all applicable Addenda in effect at the time of receipt of bids. The NYSDOT specifications may be purchased from the Department of Transportation, Plan and Publication Sales, 1220 Washington Ave., Albany, NY 12232-0204, (518) 457-2124.

C. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
   1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
   2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

D. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

E. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
   1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
   2. Abbreviations: Materials and products are identified by abbreviations schedule shown on the Drawings or reasonably inferred.

1.16 SPECIFICATION SECTIONS APPLICABLE TO ALL CONTRACTS

A. Unless otherwise noted, all provisions of Division 0 and 1 apply to all contracts. Specific items of work listed in Division 0 or 1 specification sections or under individual contract descriptions constitute exceptions.

B. The Project consists of the following separate Contracts:
   General Contract Work **(GCW)** Contract Number D006392
   Electrical Contract Work **(ECW)** Contract Number D006390
   Plumbing Contract Work **(PCW)** Contract Number D006393
   Heating, Ventilating, and Air Conditioning **(HCW)** Contract Number D006391

1.17 CONTRACT NUMBER D006390 - GENERAL CONTRACT WORK (GCW)

A. Refer to Section 00 01 15, List of Drawings, for Drawings included in General Construction Contract.
   1. Refer to Drawing Title Sheet for list of drawings included in the General Construction Contract.

B. Refer to Table 1, Table of Specification Sections, at end of this section for specification sections assigned to this Contract.
   1. All specification sections marked **GCW** in specification footer are assigned to the Contract.

C. Temporary facilities and controls in the General Contract Work include, but are not limited to, the following:
   1. Temporary facilities and controls that are not otherwise specifically assigned to the Plumbing Contract, or Electrical Contract.
   2. Sediment and erosion control.
   3. Unpiped sewers and drainage, including drainage ditches.
   4. Stormwater control.
   5. Unpiped temporary toilet fixtures, wash facilities, and drinking water facilities, including disposable supplies.
   6. Temporary enclosure for building exterior, except as indicated.
   7. Dewatering facilities and drains.
   8. Excavation support and protection, unless required solely for the Work of another contract.
   9. Project identification signs. Refer to Specification Section 01 50 00 “Temporary Facilities and Controls”.
   10. Temporary fire-protection facilities.
   11. Barricades, warning signs, and warning lights.
   12. Temporary chain link security fence and gates around project work limits.
   13. Security enclosure and lockup.
   14. Environmental protection, including the beach and all water bodies.
   15. Restoration of Owner's existing facilities used as temporary facilities.

D. Summary of Work
   1. General Contract Work
      a. Contract includes all work not specifically assigned to any other Contract and includes but is not limited to: Providing all labor, material, and equipment necessary to provide a 11,000 square foot pre-engineered metal building, and related site improvements.
      b. General Contract Work includes site utilities (conduit, sewer, and water), and connection as shown on the documents.
      c. General Contract Work includes coordinating work with Other Trade Contracts.
      d. General Contract Work includes pavement reconfiguration and landscaping around the building and site as specified.
      e. General Contract Work includes all site preparation work as shown on the Drawings unless otherwise indicated.

f. General Contract Work includes all erosion sedimentation and pollution control work as shown on the Drawings and as specified in the Stormwater Pollution Prevention Plan (SWPPP) unless otherwise indicated.
g. General Contract Work includes all earthwork as shown on the Drawings unless otherwise indicated.
h. General Contract Work includes all storm water drainage infrastructure work as shown on the Drawings unless otherwise indicated.
i. General Contract Work includes all work associated with the relocation of the sanitary force main pipes and potable water pipes and appurtenances.
j. General Contract Work includes all curbs, sidewalks and ramps.
k. General Contract Work includes all site improvements work indicated on the Drawings.
l. General Contract Work includes all lawn, vegetative ground cover and landscape planting work.

1.18 CONTRACT NUMBER D006393 - PLUMBING CONTRACT WORK (PCW)

A. Refer to Section 00 01 15, List of Drawings, for Drawings included in the Plumbing Contract.
1. Refer to Drawing Title Sheet for list of drawings included in the Plumbing Contract.

B. Refer to Table 1, Table of Specification Sections, at end of this section for specification sections assigned to this Contract.
1. All specification sections marked **PCW** in specification footer are assigned to the Contract.

C. Summary of Work
1. Plumbing Contract Work
a. Plumbing Contract Work includes coordinating work with other trade contracts.
b. Plumbing Contract Work includes furnishing and installing all items as specified and shown on the Drawings for the following:

1) Work includes providing all labor, material, and equipment necessary for installing all domestic water piping, valves, fixtures, hot water heaters and connections, as well as all sanitary piping, and sanitary connections.

1.19 CONTRACT NUMBER D006391 - HVAC CONTRACT WORK (HCW)

A. Refer to Section 00 01 15, List of Drawings, for Drawings included in the HVAC Contract.
1. Refer to Drawing Title Sheet for list of drawings included in the HVAC Contract.

B. Refer to Table 1, Table of Specification Sections, at end of this section for specification sections assigned to this Contract.
1. All specification sections marked **HCW** in specification footer are assigned to the Contract.

C. Summary of Work
1. HVAC Contract Work
a. Contract includes but is not limited to: Providing all labor, material, and equipment necessary for installing: all exhaust fans, ductwork, grills, ventilation

fans, electric heaters, and energy recovery units. Include all required concrete mounting pads.

b. HVAC Contract Work includes coordinating work with other trade contracts.

c. HVAC Contract Work includes furnishings and installing all items as specified and shown on the Drawings.

1.20 CONTRACT NUMBER D006390 - ELECTRICAL CONTRACT WORK (ECW)

A. Refer to Section 00 01 15, List of Drawings, for Drawings, included in the Electrical Contract.
1. Refer to Drawing Title Sheet for list of drawings included in the Electrical Contract.

B. Refer to Table 1, Table of Specification Sections, at end of this section for specification sections assigned to this Contract.
1. All specification sections marked **ECW** in specification footer are assigned to the Contract.

C. Temporary facilities and controls in the Electrical Contract include, but are not limited to, the following:
1. Electric power service and distribution, including loss of power and low temperature alarm systems.
2. Lighting.
3. Electrical connections to existing systems and temporary facilities and controls furnished by the General Construction Contract, Plumbing Contract, HVAC Contract, and Electrical Contract.

D. Summary of Work
1. Electrical Contract
a. Contract includes but is not limited to: Providing all labor, material, and equipment necessary for installing: all wiring, switches, outlets, boxes and light fixtures.
b. Electrical Contract Work includes enhanced testing and commissioning of the lighting systems as outlined in Specification Section 26 08 00.
c. Electrical Contract Work includes coordinating work with other trade contracts.
d. Electrical Contract Work also includes furnishing and installing all items specified and shown on the Drawings for the following: electrical equipment, and HVAC equipment.
e. Electrical Contract Work includes providing site electrical power connections and distribution, including trenching, bedding, backfill, conduit, primary and secondary conductors, and medium voltage transformers.
f. Electrical Contract Work includes coordination with NYSOPRHP to facilitate power tap-in at existing Regional Maintenance Building transformer.

1.21 OPENINGS AND CHASES IN NEW CONSTRUCTION

A. General Work Contract
1. Unless specifically indicated otherwise, provide openings, chases and similar items in new construction provided under this Contract, as required for items to be provided under related contracts.

2. After the installation and completion of the items for which openings and chases have been provided, build in, over, around and finish the openings and chases to complete the Work.
3. Provide all cutting, patching, and refinishing resulting from the failure to provide the required openings and chases, if the necessary information was furnished by the related Contractor before 24 hours of start of the applicable part of the Work.
4. If related Contractors fail to furnish Drawings or written information covering the openings and chases they require in new construction at least 24 hours before installation of the Work affected those items, the related Contractors will be required to do all cutting, patching, and refining of the construction so affected, at their own expense.

B. Plumbing Work, HVAC Work, and Electrical Work Contracts:
1. Unless specifically indicated otherwise, furnish Drawings or written information to the General Work Contractor covering the openings and chases required in new construction for the Work. If such information is not furnished at least 24 hours before start of the applicable part of the General Work Contractor's Work, all necessary cutting, patching, and refinishing will be included in the Contract at no additional cost to the Owner.

1.22 LAYOUT WORK

A. Examine the Contract Documents thoroughly and promptly report any errors or discrepancies to the Owner's Representative before commencing the Work.

B. Layout the Work in accordance with the Contract Documents.
1. Take elevations and locations from benchmarks indicated in the Contract Documents.

1.23 CONTRACTORS' MANAGEMENT

A. All Contracts
1. Provide continual on site project management for the Work, with qualified staffing personnel that are employees of the Prime Contractor.
2. The onsite Project Manager or Superintendent shall have the authority to direct the Work, and make purchase and cost decisions on behalf of the Prime Contractor.
3. Requests for modifications to the specified management staffing, must be approved by the Director's Representative.
4. Management Staffing Time Periods and Personnel
   a. Initial Job Meeting to Substantial Completion: Maintain at the site, a full-time Project Manager or Superintendent for the Contractor's staff, and Subcontractors staff while Work is in progress.
   b. Substantial Completion to Physical Completion: Maintain at the site a full-time project manager/superintendent while Work is in progress.

1.24 SPECIAL INSPECTIONS

A. Special Inspections and tests are required by Chapter 17 of the Building Code of New York State (BCNYS), 2020. A STATEMENT OF SPECIAL INSPECTIONS is included as part of the Contract Documents, refer to Specification Section 01 41 00, Special Inspections and Structural

Testing. Inspections and Testing Services required to satisfy the STATEMENT OF SPECIAL INSPECTIONS will be provided and paid for by the Director unless otherwise noted.

B. Contractors are responsible for notifying the Director's Representative regarding individual inspections listed in the STATEMENT OF SPECIAL INSPECTIONS. Contractors shall cooperate with the inspectors and testing agencies and sufficient notice and lead time (minimum 48 hours) must be allowed for inspection and testing to be performed.

C. Where deficiencies are identified, the Contractor must take corrective actions to comply with the Contract Documents.

1.25 OTHER TESTING AND INSPECTIONS

A. Testing and inspections noted in the Contract Documents that are not identified as Special Inspections shall be coordinated by each Prime Contractor for their work specified unless noted otherwise. These testing and inspections services that are not Special Inspections shall be paid by the Director.
   1. Testing or inspections identified as by Owner or Director will be paid by Director.

1.26 TABLE OF SPECIFICATION SECTIONS

A. Table 1 defines the specification sections assigned to each Prime Contract. Refer to the Table 2 for Key Note Legend.

DIVISION		GENERAL CONSTRUCTION	PLUMBING	HVAC	ELECTRICAL
No.	TITLE				
01	General Requirements	X	X, 8	X, 8	X, 8
02	Existing Conditions	X			
03	Concrete	X	1	1	1
04	Masonry	X			
05	Metals	X			
06	Wood, Plastics, and Composites	X	2	2	2
07	Thermal and Moisture Protection	X	3, 5	3, 5	3, 5
08	Openings	X			
09	Finishes	X			6
10	Specialties	X			
12	Furnishings	X			
22	Plumbing	4	X		
23	Heating, Ventilating and Air Conditioning			X	
26	Electrical	14		13	X
31	Earthwork	X	7		7

DIVISION		GENERAL CONSTRUCTION	PLUMBING	HVAC	ELECTRICAL
No.	TITLE				
32	Exterior Improvements	X			
33	Utilities	X			

KEY NOTE NO.	TABLE 2 KEY NOTE INFORMATION
X	= Division applies to this Contract
1	= Section 03 30 00, Cast-in-Place Concrete, applies to this Contract for equipment pads and other minor concrete work associated with this Contract.
2	= Section 06 10 00, Rough Carpentry, applies to the General Construction Contract for wood blocking and wood backing panels required to support Work by other Contracts.
3	= Section 07 62 00, Sheet Metal Flashing and Trim, and 07 71 00, Roof Specialties, applies to the General Construction Contract for flashing boots for penetration of roofs, where the penetrating item is required for Work by other Contracts.
4	= Section 22 05 17, Sleeve and Sleeve Seals for Plumbing Piping, applies to sleeves and sealed provided under this Contract.
5	= Section 07 92 00, Joint Sealants, applies to the General Construction Contract for sealant at non-fire rated penetrations where the penetrating item is required for Work by other Contracts.
6	= Section 09 99 00, Painting and Coating, applies to this Contract for painting of the Work of this Contract.
7	= Section 31 20 00, Earth Moving applies to this Contract for trenching and backfill required for the Work of this Contract.
8	= All sections in this division apply to this Contract for cutting and patching associated with this Contract.
9	Not Used
10	Not Used

11	Not Used
12	Not Used
13	= Section 26 05 19 Low-Voltage Electrical Power Conductors and Cables applies to this Contract.
14	=Section 26 05 44, Sleeves and Sleeve Seals for Electrical Raceways and Cabling, applies to this Contract.

END OF SECTION

SECTION 012100 - ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements governing allowances.

B. Types of allowances include the following:

1. Contingency allowances.

C. Related Requirements:
1. Section 012600 "Contract Modification Procedures" for procedures for submitting and handling Field Orders.

1.3 DEFINITIONS

A. Allowance: A quantity of work or dollar amount included in the Contract, established in lieu of additional requirements, used to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Field Order.

1.4 CONTINGENCY ALLOWANCES

A. Use the contingency allowance only as directed by Architect for Owner's purposes and only by Field Orders that indicate amounts to be charged to the allowance.

B. Contractor's overhead, profit, and related costs for products and equipment ordered by Owner under the contingency allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, insurance, equipment rental, and similar costs.

C. Field Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit.

D. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by leaving in the balance to finish column on the Fin 112A payment application form.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

A. Contingency Allowance: Include a contingency allowance for use according to Owner's written instructions for each trade as follows:

1. D006392 GCW: $138,050.00, One hundred thirty-eight thousand, fifty dollars and 00/100.

2. D006390 ECW: $19,750.00, Nineteen thousand, seven hundred fifty dollars and 00/100.

3. D006391 MCW: $8,400.00, Eight thousand, four hundred dollars and 00/100.

4: D006393 PCW: $13,200.00, Thirteen thousand, two hundred dollars and 00/100.

END OF SECTION 012100

SECTION 01 22 00

UNIT PRICES

PART 1 - GENERAL

1.1 DEFINITIONS

A. Unit price is a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.2 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, overhead, and profit.

B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

C. Director reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Director's Representative expense, by an independent surveyor acceptable to Contractor.

D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

A. Unit Price No. 1: Cut and Fill unsuitable material

1. Description: Cut and fill of unsuitable material, in accordance with Section 312000, Earth Moving.
2. Unit of Measurement: Cubic Yards.
3. As part of the base bid, include the following:
    a. 2700 cubic yards of unsatisfactory soil will need to be removed, disposed, and replaced with compacted granular fill. This is for the building footprint only, and is exclusive of the cut and fill required beyond the building footprint.

END OF SECTION

SECTION 01 29 00

PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.

1. Coordinate line items in the Schedule of Values with other required administrative forms and schedules, including the following:

   a. Application for Payment Forms with Continuation Sheets.
   b. Contractor Submittal Schedule.
   c. Items required to be indicated as separate activities in Contractor's Construction Schedule.

2. Submit the Schedule of Values to Director prior to commencing work. Allow for at least one week approval. Work shall not commence until Schedule of Values is approved by Director.

B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the Schedule of Values. Coordinate with NYSOPRHP to determine whether schedule will include separate entries for materials and labor.

1. Identification: Include the following Project identification on the Schedule of Values:

   a. Project name and location.
   b. Name of Director and Director’s Representative.
   c. Director’s project number.
   d. Director’s contract number.
   e. Contractor's name and address.
   f. Date of submittal.

2. Arrange Schedule of Values per form furnished by the Director’s Representative.
3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed. Note that in order to be eligible for payment, materials

stored off-site must be stored in an insured facility, and photographic documentation of the stored items shall be provided.

a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.

6. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work. Include separate costs for materials, installation labor, and maintenance during construction (if applicable).
7. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.

8. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum. Pay applications will not be processed without submission of an updated Schedule of Values.

1.2 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Director’s Representative and paid for by Director.

1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Director and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.

1. Submit draft copy of Application for Payment seven days prior to due date for review by Director’s Representative.

C. Application for Payment Forms: Use form as provided by the Director’s Representative for Applications for Payment.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Director’s Representative will return incomplete applications without action.

1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
4. Indicate separate amounts for work being carried out under Director-requested project acceleration.

E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
1. Provide certificate of insurance, evidence of transfer of title to Director, and consent of surety to payment, for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

    a. Value of materials previously stored and remaining stored as date of previous Applications for Payment.
    b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Applications for Payment.
    c. Value of materials stored since date of previous Application for Payment and remaining stored as date of current Application for Payment.

F. Transmittal: Submit one signed and notarized original copy of each Application for Payment to Director’s Representative by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of Values.
3. Contractor's Construction Schedule.
4. Submittal Schedule.
5. Initial progress report.

1.3 MODIFICATION PROCEDURES

A. Submit name of the individual authorized to receive changes to the Documents and who will be responsible for informing Contractor's employees or Subcontractors of changes to the Work.

B. Director's Representative will advise of minor changes in the Work not involving an adjustment to Contract Price or Contract Time as authorized by the Conditions of the Contract by issuing supplemental instructions on form as furnished by the Director's Representative.

C. Construction Change Directive: Director's Representative may issue a document, signed by Director, instructing Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. The document will describe changes in the Work, and will designate method of determining any change in Contract Price or Contract Time.
2. Promptly execute the change in Work.
3. At the time of contract award, further direction will be given with regard to the definition and implementation of change orders and field orders.

D. Field Order: Director's Representative may issue a document which includes a detailed description of a proposed change with supplementary or revised Drawings and Specifications, a change in Contract Time for executing the change. Contractor shall prepare and submit a fixed price quotation within 4 days.

E. Contractor may propose a change by submitting a request for change to Director's Representative, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Price and Contract Time with full documentation.

F. Computation of Change in Contract Amount:

1. For change requested by Director's Representative for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
2. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Director's Representative.
3. For pre-determined unit prices and quantities, the amount will be based on the fixed unit prices.

G. Substantiation of Costs: Provide full information required for evaluation.

1. On request, provide following data:

   a. Quantities of products, labor, and equipment.
   b. Taxes, insurance, and bonds.

c. Overhead and profit.
d. Justification for any change in Contract Time.
e. Credit for deletions from Contract, similarly documented.

2. Support each claim for additional costs with additional information:

a. Origin and date of claim.
b. Dates and times work was performed, and by whom.
c. Time records and wage rates paid.
d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.

H. Execution of Change Orders: Director's Representative will issue Change Orders for signatures of parties as provided in the Conditions of the Contract on form as furnished by the Director's Representative.

I. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Price.

J. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.

K. Promptly enter changes in Project Record Documents.

1.4 APPLICATION FOR PAYMENT AT SUBSTANTIAL COMPLETION

A. Application for Payment at Substantial Completion: After Director's Representative issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificates of Substantial Completion issued previously for Director occupancy of designated portions of the Work.

1.5 FINAL PAYMENT APPLICATION

A. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum, or equivalent form as furnished by the Director's Representative.
4. Contractor's Affidavit of Payment of Debts and Claims form as furnished by the Director's Representative.

5. Contractor's Affidavit of Release of Liens form as furnished by Director’s Representative.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 31 00

PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 PROJECT COORDINATION

A. Project Coordinator: Director's Representative and/or Construction Manager.
   1. Cooperate with the Director's Representative and/or Construction Manager in allocation of mobilization areas of site; for field offices and sheds, for site access, traffic, and parking facilities.
   2. During construction, coordinate use of site and facilities through the Director's Representative and/or Construction Manager.
   3. Comply with Director's Representative and/or Construction Manager procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
   4. Comply with instructions of the Director's Representative and/or Construction Manager for use of temporary utilities and construction facilities.
   5. Coordinate field engineering and layout work under instructions of the Director's Representative and/or Construction Manager.

B. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.
   1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
   2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
   3. Make adequate provisions to accommodate items scheduled for later installation.

C. The Director's Representative/Construction Manager shall prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

D. Administrative Procedures: Contractor's shall coordinate scheduling and timing of required administrative procedures with all construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
   1. Ensure preparation of Contractor's Construction Schedule.
   2. Ensure preparation of the Schedule of Values.
   3. Ensure installation and removal of temporary facilities and controls.
   4. Ensure delivery and processing of submittals.
   5. Progress meetings.
   6. Project closeout activities.

7. Startup and adjustment of systems.

E. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1.2 INFORMATIONAL SUBMITTALS

A. Make the following types of submittals to the Director through the Director's Representative and/or Construction Manager:
1. Requests for interpretation.
2. Requests for substitution.
3. Shop drawings, product data, and samples.
4. Test and inspection reports.
5. Design data.
6. Manufacturer's instructions and field reports.
7. Applications for Payment and Change Order requests.
8. Progress schedules.
9. Coordination drawings.

B. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, include the following information in tabular form:

1. Name, address, and telephone number of entity performing subcontract or supplying products.
2. Number and title of related Specification Sections(s) covered by the subcontract.
3. Drawing number and detail references, as appropriate, covered by the subcontract.

C. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project Site. Identifying individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and email addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to the Project.
1. Post copies of the list in project meeting rooms, in temporary field office and by each temporary telephone. Keep list current at all times.

1.3 COORDINATION DRAWINGS

A. Provide project sequencing drawings which specifically outline the step-by-step sequencing of the work. Drawings shall be approved by the Director's Representative.

B. Coordination Drawings: Prepare coordination drawings according to requirements in individual Sections, and additionally where work is shown schematically on Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.

1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
    a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
    b. ship of various systems and components.

1.4 REQUESTS FOR INFORMATION (RFIs)

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, all Prime Contractors shall prepare and submit an RFI to Director.
    1. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
    1. Project name.
    2. Project number.
    3. Contract number.
    4. Date.
    5. Name of Contractor and /or Subcontractor.
    6. RFI number, numbered sequentially.
    7. RFI subject.
    8. Specification Section number and title and related paragraphs, as appropriate.
    9. Drawing number and detail references, as appropriate.
    10. Field dimensions and conditions, as appropriate.
    11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
    12. Contractor's signature.
    13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
        a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. Director’s Representative and/or Construction Manager will review each RFI, determine action required, and respond. Allow seven working days for Director’s Representative and/or Construction Manager response for each RFI.
    1. The following Contractor-generated RFIs will be returned without action:
        a. Requests for approval of submittals.
        b. Requests for approval of substitutions.
        c. Request for approval of Contractor’s means and methods.
        d. Requests for coordination information already indicated in the Contract Documents.
        e. Requests for adjustments in the Contract Time or the Contract Sum.
        f. Incomplete RFIs or inaccurately prepared RFIs.

2. Director's action may include a request for additional information, in which case Director's Representative and/or Construction Manager time for response will commence from time of receipt of additional information.
3. Director's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Change Proposal.
    a. If a Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Director in writing within 10 days of receipt of the RFI response. Time extension requests not following this procedure will be denied.

D. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log at each project meeting.

1.5 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at project site, unless otherwise indicated. Project meetings shall be scheduled by NYS Office of Parks, Recreation and Historic Preservation/Director's Representative and/or Construction Manager.
1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Director and Director's Representative and/or Construction Manager of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Director and Director's Representative and/or Construction Manager, within three days of the meeting.

B. Preconstruction Conference: Director's Representative and/or Construction Manager will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Director and all Prime Contractors, but no later than 15 days after execution of the Agreement.
1. Conduct the conference to review responsibilities and personnel assignments.
2. Attendees: Director, Director's Representative and/or Construction Manager and their consultants; all Prime Contractors and its superintendents; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect progress, including the following:
    a. Tentative construction schedule.
    b. Phasing.
    c. Critical work sequencing and long-lead items.
    d. Designation of key personnel and their duties.
    e. Lines of communications.
    f. Procedures for processing field decisions and Change Orders.
    g. Procedures for RFIs.
    h. Procedures for testing and inspecting.
    i. Procedures for processing Applications for Payment.
    j. Distribution of the Contract Documents.
    k. Submittal procedures.

4. Minutes: Director's Representative and/or Construction Manager responsible for conducting meeting will record and distribute meeting minutes.

C. Progress Meetings: Project meetings will be held at the job site at a frequency as determined by the Director's Representative and/or Construction Manager as warranted by the stage and activity of construction. Generally, bi-weekly meetings may be anticipated.

1. Coordinate dates of meetings with preparation of payment requests.
2. Director's Representative and/or Construction Manager will make arrangements for meetings, and prepare agenda with copies for participants presiding at meetings.
3. Attendees shall include all Prime Contractors or his duly authorized representative, such Subcontractor representatives as may be needed, the Director's Representative and/or Construction Manager, and any other interested party, i.e.; public utility, local governmental representatives, and suppliers when needed.

4. Agenda:

   a. Review minutes of previous meetings.
   b. Review of Work progress.
   c. Field observations, problems, and decisions.
   d. Identification of problems which impede planned progress.
   e. Review of submittals schedule and status of submittals.
   f. Review of off-site fabrication and delivery schedules.
   g. Maintenance of progress schedule.
   h. Corrective measures to regain projected schedules.
   i. Planned progress during succeeding work period.
   j. Coordination of projected progress.
   k. Maintenance of quality and work standards.
   l. Effect of proposed changes on progress schedule and coordination.
   m. Other business relating to Work.

5. The Director's Representative and/or Construction Manager will record minutes of the meetings and distribute copies to all attendees and others affected by the decisions or actions resulting from each meeting.
6. In the absence of the Director's Representative and/or Construction Manager, the General Construction Contractor will record the minutes of the meetings.
7. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 32 50

CONSTRUCTION PROGRESS SCHEDULE

PART 1 - GENERAL

1.1 SUBMITTALS

A. Within 10 days after date of Agreement, submit preliminary schedule defining planned operations of Work.

B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.

C. Submit updated schedule with each Application for Payment.

1.2 SCHEDULE FORMAT

A. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number.

B. Sheet Size: Multiples of 8-1/2 x 11 inches.

C. Scale and Spacing: To allow for notations and revisions.

PART 2 - PRODUCTS – (Not Used)

PART 3 - EXECUTION

3.1 PRELIMINARY SCHEDULE

A. Prepare preliminary schedule in the form of a horizontal bar chart or preliminary network diagram.

3.2 CONTENT

A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.

1. Coordinate schedule with sequence of installation shown on Contract Drawings.

B. Identify work of separate stages and other logically grouped activities.

C. Include conferences and meetings in schedule.

D. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.

E. Coordinate content with Schedule of Values.

F. Provide legend for symbols and abbreviations used.

3.3 REVIEW AND EVALUATION OF SCHEDULE

A. Participate in joint review and evaluation of schedule with Director's Representative at each submittal.

B. Evaluate project status to determine work behind schedule and work ahead of schedule.

C. After review, revise as necessary as result of review, and resubmit within 10 days.

3.5 TIME EXTENSION

A. Requests for extension on Contract time extension, for any reason (weather, unforeseen circumstances, etc.) must be submitted in writing within ten days of discovery, or will be denied.

3.4 UPDATING SCHEDULE

A. Maintain schedules to record actual start and finish dates of completed activities.

B. Indicate progress of each activity to date of revision, with projected completion date of each activity.

C. Update diagrams to graphically depict current status of Work.

D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.

E. Indicate changes required to maintain Date of Substantial and Final Completion.

3.5 DISTRIBUTION OF SCHEDULE

A. Distribute copies of updated schedules to Contractor's project site file, to Subcontractors, Suppliers, Director's Representative, and other concerned parties.

B. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Director's Representative, Architect/Engineer's, and/or Landscape Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as action submittals.

B. Informational Submittals: Written and graphic information and physical samples that do not require Director's Representative, Architect's/Engineer's, and/or Landscape Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as informational submittals.

1.2 ACTION SUBMITTALS

A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Director's Representative, Architect/Engineer or Landscape Architect and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
2. Initial Submittal: Submit within 14 days of date established for commencement of the Work.
3. Final Submittal Schedule: Submit concurrently with the first complete submittal of Contractor's construction schedule, and prior to first Application for Payment.

    a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.

4. Format: Arrange the following information in a tabular format:

    a. Scheduled date for first submittal.
    b. Specification Section number and title.
    c. Submittal category: Action; informational.
    d. Name of subcontractor.
    e. Description of the Work covered.
    f. Scheduled date for Director's Representative final release or approval.
    g. Schedule date of fabrication.

1.3 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule. Submit items from closely related sections concurrently.
3. Submit each submittal required by the same Specification Section under separate transmittals.
4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

B. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Director's Representative receipt of submittal. Director's Representative will transmit submittals to Architect/Engineer or Landscape Architect for review immediately following receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 10 working days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Director's Representative will advise each Prime Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 10 days for review of each resubmittal.

C. Identification and Information: Attach a Submittal Transmittal, using the form indicated in the Project Manual, to each submittal item for identification.

1. Indicate name of firm or entity that prepared each submittal. Complete all information required on this form.

D. Options: Identify options requiring selection by Director's Representative.

E. Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Director's Representative on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

F. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.

2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are approved by Director's Representative.

G. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

H. Use for Construction: Retain complete copies of submittals on Project Site. Use only final action submittals that are marked with approval notation from Director's Representative.

1.4 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. General: Electronic submittals are preferred over paper media.
2. Action Submittals: Submit electronic file or four paper copies of each submittal, unless otherwise indicated. Director's Representative will return the file or two copies.
3. Informational Submittals: Submit electronic file or two paper copies of each submittal, unless otherwise indicated. Director's Representative will not return file or copies.
4. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.

1.5 SUBMITTAL PROCEDURES FOR ACTION SUBMITTALS

A. Product Data: Collect information into a single submittal for all elements of construction and types of product or equipment specified under a given section. These are considered Action submittals.

1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

    a. Manufacturer's catalog cuts.
    b. Manufacturer's product specifications.
    c. Standard color charts, if applicable.
    d. Statement of compliance with specified referenced standards.
    e. Testing by recognized testing agency.
    f. Application of testing agency labels and seals.
    g. Notation of coordination requirements.

4. For equipment, include the following in addition to the above, as applicable:

    a. Wiring diagrams showing factory-installed wiring.

b. Printed performance curves.
c. Operational range diagrams.
d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data. These are considered Action submittals.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

a. Identification of products.
b. Schedules.
c. Compliance with specified standards.
d. Notation of coordination requirements.
e. Notation of dimensions established by field measurement.
f. Relationship and attachment to adjoining construction clearly indicated.
g. Seal and signature of professional engineer if specified.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 24 by 36 inches.

C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed. These are considered Action submittals.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Attach label on unexposed side of Samples that includes the following:

a. Generic description of Sample.
b. Product name and name of manufacturer.
c. Sample source.
d. Number and title of applicable Specification Section.

3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for Contractor's Work and their intended location. These are considered Action submittals. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product or assigned by Contractor if none is indicated.
2. Manufacturer and product name, and model number if applicable.

3. Number and name of room or space.
4. Location within room or space.
5. Other information as required by individual specification section.

E. Coordination Drawing Submittals: Comply with requirements specified in Division 01 Section “Project Management and Coordination.”

F. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Schedule."

G. Application for Payment and Schedule of Values: Comply with requirements specified in Division 01 Section "Payment Procedures."

H. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 01 Section “Closeout Procedures”.

I. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required. These are considered Information submittals.

J. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents. These are considered Information submittals.

K. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents. These are considered Information submittals.

L. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency. These are considered Information submittals.

M. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents. These are considered Information submittals.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION

NEW YORK STATE OF OPPORTUNITY.

Parks, Recreation and Historic Preservation

SUBMITTAL COVER SHEET - FORM OPR 107A

THIS FORM SHALL BE COMPLETED AND ATTACHED TO EACH SUBMISSION OR MULTIPLE SUBMISSIONS OF SHOP DRAWINGS, MATERIAL SAMPLES AND/OR PRODUCT INFORMATION.

DATE OF SUBMITTAL _____ **CONTRACT NO.** _____

SUBMITTAL DESCRIPTION/CONTENT/ITEM (ATTACH ADDITIONAL SHEETS AS NECESSARY)

SUBMITTAL LOG REFERENCE NUMBER _____

SPECIFICATION REFERENCE _____

DRAWING OR DETAIL REFERENCE _____

Contractors Review & Approval Statement

The above listed submission(s) are approved to be in accordance with the Contract Documents except as noted. By the signature below, the Contractor represents that he/she has reviewed and coordinated the information contained in this submittal with the requirements of the work and the contract documents and; has determined and verified all field measurements, quantities, field construction criteria, materials, catalog numbers and similar data.

_____ _____

CONTRACTOR'S SIGNATURE **DATE** **REVIEWED BY** **DATE**

ARCHITECT/ENGINEER/DIRECTOR'S REPRESENTATIVE ACTION STAMP

☐ Approved ☐ Revise and Resubmit
☐ Approved as Noted ☐ Rejected

Approval is only for general conformance with the design concept of the Project and the information given in the Contract Documents. Contractor is responsible for dimensions to be confirmed and correlated at the job site; information that pertains solely to the fabrication process or to the means and methods of construction; coordination of the work of all trades; and performing all work in a safe and satisfactory manner. This approval does not modify Contractor's duty to comply with the Contract Documents.

Reviewer: **Review Date:**

NOTES:

THE CONTRACTOR IS NOT RELIEVED FROM COMPLIANCE WITH THE CONTRACT DOCUMENTS AND REMAINS SOLELY RESPONSIBLE FOR ALL COORDINATION, DIMENSIONS, QUANTITIES, ETC.

SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Director's Representative.

C. Product Testing: Tests and inspections that are performed by, a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

D. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.

E. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

F. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

G. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

H. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.2 CONFLICTING REQUIREMENTS

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Director's Representative for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the

minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Director's Representative for a decision before proceeding.

1.3 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.
3. Contract number.
4. Name, address, and telephone number of testing agency.
5. Dates and locations of samples and tests or inspections.
6. Names of individuals making tests and inspections.
7. Description of the Work and test and inspection method.
8. Identification of product and Specification Section.
9. Complete test or inspection data.
10. Test and inspection results and an interpretation of test results.
11. Record of temperature and weather conditions at time of testing and inspecting.
12. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
13. Recommendations on retesting and reinspecting.

B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of technical representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of factory-authorized service representative making report.
2. Statement that equipment complies with requirements.
3. Results of operational and other tests and a statement of whether observed performance complies with requirements.

4. Statement whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

D. Permits, Licenses, and Certificates: For Director's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.4 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

D. Testing Agency Qualifications: An independent agency with the experience and capability to conduct testing and inspecting indicated for this project, and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction.

1.5 QUALITY CONTROL

A. Director Responsibilities: Special Inspection services are the only quality-control services indicated as Director's responsibility. The Director will engage a qualified testing agency to perform these services.

1. Director will furnish Contractor with names, addresses, and telephone numbers of Special Inspector and Testing Agencies engaged and a description of types of testing and inspecting they are engaged to perform. Refer to Specification Section 01 41 00 Special Inspections and Structural Testing for copy of Statement of Special Inspections.
2. Payment for Special Inspection services will be made by the Director.
3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.
4. Additional testing and inspection service as noted by Director’s Representative that are not special inspection services will be paid by Director’s Representative.

B. Contractor Responsibilities: Tests and inspections not designated as Special Inspections are the responsibility of each Prime Contractor for their work performed. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.

1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
2. Where services are indicated as Prime Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
3. Notify testing agencies at least 48 hours in advance of time when Work that requires testing or inspecting will be performed.
4. Testing and inspecting requested by any Prime Contractor and not required by the Contract Documents are Contractor's responsibility.
5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section "Submittal Procedures."

D. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

E. Testing Agency Responsibilities: Cooperate with Director’s Representative and each Prime Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Director’s Representative and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
3. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
4. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
5. Do not perform any duties of Contractor.

F. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.6 PAYMENT - TESTING AND INSPECTION SERVICES

A. The Contractor shall appoint, employ and pay for the services of an independent firm to perform inspections and testing as specified herein (excluding special inspection testing), unless directed otherwise by the Director’s Representative.

B. Director will employ and pay for services of an independent testing agency to perform Special Inspection Testing as required by the Building Code. Special Inspection Testing for the project shall be as specified in Section 01 41 00 Special Inspections and Structural Testing.

C. From time to time during the progress of the Work, the Director's Representative or Director may require that testing be performed to determine that the Work complies with the specified requirements. This testing will be provided by the Contractor upon request at no cost to the Director.

D. Testing requested by Contractor for his information or convenience shall be paid for by Contractor.

E. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

1.7 REGULATORY REQUIREMENTS

A. Regulations

1. Comply with all applicable Statutory Requirements including the following:

a. New York State Municipal Law

1) Section S101, re: Separate Contracts
2) Section S103, re: Advertisement and Contract
3) Section S103, re: Equivalency (or equal) Clause
4) Section S103, re: Basis for Award of Contract
5) Section S103-d, re: Non-collusion
6) Section S106-b, re: Payment on Public Works Contracts
7) Section S108, re: Workman's Compensation Insurance
8) Section S109, re: Non-assignment of Public Contracts

b. New York State Labor Law

1) Section 220, subd. 2, 8 hour day, 5 day week
2) Section 220, subd. 3 & 220-d, re: Wage Rates
3) Section S220-e, re: Anti-discrimination
4) Section S222-e, re: Elimination of dust hazard
5) Title 12, Part 56, re: Asbestos

B. Codes

1. Conform to the requirements of all International, Federal, State, and local codes and ordinances.
2. Conform to the requirements of all public utility companies.
3. The requirements of the 2020 Building Code of New York State and related codes referenced in the above Code, apply to this Project.

a. 2020 Energy Conservation Construction Code of NY State.
b. 2020 Fire Code of NY State.
c. 2020 Fuel Gas Code of NY State.
d. 2020 Mechanical Code of NY State.
e. 2020 Plumbing Code of NY State.

4. Conform to OSHA requirements including Part 1910 “General Industry” and Part 1926 “Construction”.

C. Permits, Fees, and Inspections

1. Building Permit

a. The authority having jurisdiction (NYSOPRHP) will issue the Building Permit.

2. Other Permits, Fees and Inspections

a. All permits (other than building permits), fees, and inspections required by Governmental agencies, regulatory agencies, utility companies, or others during the course of the work shall be obtained by each Prime Contractor for their work performed.
b. Each Prime Contractor shall arrange for and pay all costs of such permits, fees, and inspections for their work performed.

1.8 REFERENCES AND STANDARDS

A. Obtain copies of standards where required by product specification sections.

B. Should specified reference standards conflict with Contract Documents, request clarification from Director's Representative before proceeding.

1.9 DATES OF REFERENCED CODES AND STANDARDS

A. Codes and standards referred to in this specification shall be the latest adopted issue at date of bid, unless otherwise specifically indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Maintain inspection log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Director’s Representative reference during normal working hours. Also, provide updated, electronic version to the Director’s Representative.

C. Comply with manufacturer’s instructions, including each step in sequence.

D. Should manufacturer’s instructions conflict with Contract Documents, request clarification from Director's Representative before proceeding.

E. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship; in such cased, more stringent standards apply.

F. Have Work performed by persons qualified to produce required and specified quality.

G. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

H. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.2 TOLERANCES

A. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Director's Representative before proceeding.

B. Adjust products to appropriate dimensions; position before securing products in place.

3.3 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, and similar services, repair damaged construction.

1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Division 01 Section "Execution."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are each Prime Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

3.4 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not conforming to specified requirements.

B. If, in the opinion of the Director’s Representative, it is not practical to remove and replace the Work, the Prime Contractor shall submit to the Director’s Representative a proposed remedy for approval.

END OF SECTION

SECTION 01 41 00

SPECIAL INSPECTIONS AND STRUCTURAL TESTS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. International Building Code
   1. Special Inspections and Structural Testing shall be in accordance with Chapter 17 of the International Building Code. References to "the Code" in this Section refer to the above code.

B. CASE National Practice Guideline for Special Inspection
   1. Special Inspections and Structural Testing shall be in accordance with CASE National Practice Guideline for Special Inspections.

C. Quality Assurance
   1. The program of Special Inspections and Structural Testing is a Quality Assurance program intended to ensure that the work is performed in accordance with the Contract Documents.

D. Owner's Quality Assurance
   1. This specification section is intended to inform the Contractor of the Director's quality assurance program and the extent of the Contractor's responsibilities.

E. Requirements and Responsibilities
   1. This specification section is also intended to notify the Special Inspector, Testing, and other Agents of the Special Inspector of their requirements and responsibilities.

1.2 QUALIFICATIONS

A. The Special Inspector shall be a licensed Professional Engineer or Structural Engineer who is approved by the Architectural Engineer of Record and the Director's Representative.

B. The Testing Laboratory and individual technicians shall be approved by the Architectural Engineer of Record and the Director's Representative.

C. The Testing Laboratory shall maintain a full time licensed Professional Engineer or Structural Engineer on staff who shall certify all test reports. The Engineer shall be responsible for the training of the testing technicians and shall be in responsible charge of the field laboratory testing operations.

D. Special Inspections shall be performed by inspectors who are either licensed Professional Engineers, Structural Engineers, or Engineers in Training with an education and background in structural engineering, except as indicated below.

1. Welding: Technicians performing visual inspections 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 ASNT-TC Level II or Level III technician.
2. Technicians performing standard tests described by 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 of a licensed Professional Engineer and shall not be permitted to independently evaluate test results.

1.3 SUBMITTALS

A. Interim Reports of Special Inspection
   1. Detailed daily reports shall be prepared of each inspection or test and assembled by the Special Inspector. Reports shall include:
      a. Date of test or inspection.
      b. Name of inspector or technician.
      c. Location of specific areas tested or inspected.
      d. Description of test or inspection and results.
      e. Applicable ASTM standard.
      f. Weather conditions.
   2. At the end of each week the Special Inspector shall submit interim reports to the Director's Representative. These shall include all inspections and test reports received that week. Copies shall be sent to the Architect/Engineer and the Contractor.
   3. Any discrepancies from the Contract Documents found during Special Inspection shall be immediately reported to the Contractor, Construction Manager, and the Architect/Engineer. If discrepancies are not corrected, the Special Inspector shall notify the Director's Representative. Reports shall document all discrepancies identified and the corrective action taken.
   4. The Testing Laboratory shall immediately notify the Special Inspector and the Architect/Engineer by telephone, email, or fax of any test results which fail to comply with the requirements of the Contract Documents.
   5. Reports shall be submitted to the Special Inspector within 7 days of the inspection or test. Hand written reports may be submitted if final typed copies are not available.
   6. At the completion of the work requiring Special Inspections, each inspection agency and testing laboratory shall provide a statement to the Special Inspector that all work was completed in substantial conformance with the Contract Documents and that all appropriate inspections have been completed.

B. Final Report of Special Inspections
   1. A Final Report of Special Inspections shall be completed by the Special Inspector and submitted to the Architect/Engineer and the Director's Representative prior to the issuance of a Certificate of Occupancy.
   2. Council of American Structural Engineers Form 101 -2004 shall be used for the Final Report of Special Inspections.
   3. The Final Report of Special Inspections will certify that all required inspections have been performed and will itemize all discrepancies that were not corrected or resolved.

C. Qualifications
   1. Special Inspector Qualifications
   2. Testing Laboratory Qualifications
      a. The Special Inspector and Testing Laboratory shall submit to the Architect/Engineer and the Director's Representative for review a copy of their qualifications which shall include the names and qualifications of each of the individual inspectors and technicians who will be performing inspections or tests.
      b. The Special Inspector and Testing Laboratory shall disclose any past or present business relationship or potential conflict of interest with the Contractor or any Subcontractors whose work will be inspected or tested.
   3.

1.4 PAYMENT

A. The Director will employ and pay for services of an independent testing agency to perform specified Special Inspections and Testing as indicated in this Specification Section.

B. Testing requested by Contractor for his information or convenience shall be paid for by Contractor.

C. When initial tests indicate non-compliance with Contract Documents, the Contractor is required to pay for all subsequent re-testing until compliance is accomplished.

D. When any materials which require Special Inspections are fabricated in a plant which is not located within 50 miles of the project, the Contractor shall be responsible for the travel expenses of the Special Inspector or Testing Laboratory.

1.5 CONTRACTOR RESPONSIBILITIES

A. Deliver to Special Inspector at designated location, adequate samples of materials proposed to be used which require testing, along with proposed mix designs.

B. Cooperate with Special Inspector's or Testing Laboratory's personnel, and provide access to the Work and to manufacturers' facilities.

C. Incidental Labor and Facilities
   1. To provide access to Work to be tested/inspected.
   2. To obtain and handle samples at the site or at source of Products to be tested/inspected.
   3. To facilitate tests/inspections.
   4. To provide storage and curing of test samples.

D. Notify Director's Representative and Special Inspector 48 hours prior to expected time for operations requiring testing/inspection services.
   1. If after such notification the Special Inspector is prevented from performing its work due to incompleteness of the project work, all extra costs for testing attributable to the delay shall be paid by the Contractor.

E. Additional Special Inspections and Testing

1. Arrange with Director's Representative and their testing agency, and pay for additional samples, tests, and inspections required by Contractor beyond specified special inspection requirements.

F. Keep at the project site the latest set of construction drawings, field sketches, approved shop drawings, and specifications for use by the inspectors and testing technicians.

G. The Special Inspection program shall in no way relieve the Contractor of his obligation to perform work in accordance with the Contract Documents or from implementing an effective Quality Control program and completing all required testing as indicated in the Contract Documents. All work that is subject to Special Inspections shall first be reviewed by the Contractor's quality control personnel prior to the Director's Representative and Special Inspector performing their inspection.

H. The Contractor shall be solely responsible for construction site safety.

1.6 LIMITS ON SPECIAL INSPECTOR'S OR TESTING LABORATORY AUTHORITY

A. Special Inspection/Testing Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.

B. Special Inspection/Testing Agency may not approve or accept any portion of the Work.

C. Special Inspection/Testing Agency may not assume any duties of Contractor.

D. Special Inspection/Testing Agency has no authority to stop the Work.

E. Special Inspection/Testing Agency shall not have control over the Contractor's means and methods of construction.

F. Special Inspection/Testing Agency shall not be responsible for construction site safety.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 SCHEDULE OF SPECIAL INSPECTIONS AND STRUCTURAL TESTING

A. Refer to Statement of Special Inspections at the end of this section for Special Inspections associated with the Building.

B. For Work associated with the site, provide inspection and testing as noted in their specific Specification Section. These testing items are not considered Special Inspections associated with the Building.

END OF SECTION

STATEMENT OF SPECIAL INSPECTIONS

Project:	Regional Maintenance Storage Barn
Location:	Sampson State Park, Romulus, NY
Owner:	State of New York – Executive Department Office of Parks, Recreation and Historic Preservation
Engineer:	Beardsley Architects + Engineers

This Statement of Special Inspections is submitted as a condition for permit issuance in accordance with the Special Inspection and Structural Testing requirements of the Building Code. It includes a schedule of Special Inspection services applicable to this Project as well as the name of the Special Inspector and the identity of other approved agencies to be retained for conducting these inspections and tests. This Statement of Special Inspections encompasses the following disciplines:

☒ Structural ☐ Mechanical/Electrical/Plumbing
☐ Architectural ☐ Other: _____

The Special Inspector shall keep records of all inspections and shall furnish inspection reports to the Building Official and Engineer. Discovered discrepancies will be brought to the immediate attention of Contractor for correction. If such discrepancies are not corrected, the discrepancies shall be brought to the attention of the Building Official and Engineer. The Special Inspection program does not relieve Contractor of their responsibilities.

Interim reports will be submitted to the Building Official and Engineer.

A Final Report of Special Inspections documenting completion of all required Special Inspections will be submitted at completion of the project.

Means and methods of construction, including site safety, are solely the responsibility of the Contractor.

Interim Report Frequency: ☒ To be determined ☐ Per attached schedule

Prepared by:

Joseph S. Kime, P.E.

(Type Name)

Signature 3/7/2025 Date



Seal

Owner's Authorization:

Signature Date

Building Official's Acceptance:

Signature Date

This Statement of Special Inspections/Quality Assurance Plan includes the following building systems:

- ☒ Soils and Foundations
- ☒ Cast-in-Place Concrete
- ☐ Precast Concrete
- ☐ Masonry
- ☒ Structural Steel
- ☐ Cold-Formed Steel Framing
- ☐ Spray Fire Resistant Material
- ☐ Wood Construction
- ☐ Exterior Insulation and Finish System
- ☐ Mechanical and Electrical Systems
- ☐ Architectural Systems
- ☐ Special Cases

Special Inspection Agencies	Firm	Address, Telephone, Email
1. Special Inspector	To Be Determined	
2. Inspector	To Be Determined	
3. Inspector		
4. Testing Agency	To Be Determined	
5. Testing Agency		
6. Other		

Note: The inspectors and testing agencies will be engaged by Owner or the Owner's Agent, and not by Contractor or Subcontractor whose work is to be inspected or tested.

Quality Assurance for Seismic Resistance	
Seismic Design Category	B
Quality Assurance Plan Required	☐ Yes ☒ No
Description of seismic force resisting system and designated seismic systems.	☒ Not required ☐ See description below

Quality Assurance for Wind Requirements	
Nominal Wind Speed (V_{asd})	66 mph
Wind Exposure Category	B
Quality Assurance Plan Required	☐ Yes ☒ No
Description of wind force resisting system and designated wind resisting components.	☒ Not required ☐ See description below

Statement of Responsibility	
Each Contractor responsible for the construction or fabrication of a system or component designated above must submit a Statement of Responsibility.	☐ Required ☒ Not required

Item and Description	Agency	Frequency		Scope	Referenced Standard
		C	P		
1. **Structural Fill Material** Perform classification and testing of compacted fill materials.			X	Test fill material in accordance with ASTM and the Contract Documents. Perform sieve tests (ASTM D422 and D1140) and modified Proctor tests (ASTM D1557) of each source of fill material.	BCNYS – 1705.6
2. **Excavations** Verify excavations below all shallow foundations and slabs-on-grade.			X	Verify excavations are extended to proper depth and have reached proper material. Inspect removal of unsuitable material and preparation of subgrade prior to placement of controlled fill.	BCNYS – 1705.6
3. **Controlled Structural Fill Placement** Verify use of proper materials, densities, and lift thicknesses during placement and compaction of compacted fill.			X	Prior to placement of controlled fill, observe subgrade and verify that site has been prepared properly.	BCNYS – 1705.6
		X		Inspect placement, lift thickness, and compaction of controlled fill. Test density of each lift of fill by nuclear methods (ASTM D2922). Verify extent and slope of fill placement.	
4. **Shallow Foundations** Verify materials below footings are adequate to achieve the design bearing capacity.			X	Inspect soils below footings for adequate bearing capacity and consistency with geotechnical report.	BCNYS – 1705.6

Item and Description	Agency	Frequency		Scope	Referenced Standard
		C	P		
1. Reinforcement Inspect reinforcing steel and verify placement.			X	Rebar inspection and field inspection of placement	ACI 318 Ch. 20, 25.2, 25.3, 26.6.1-26.6.3 IBC 1908.4
2. Inspection of reinforcing steel welding A. Verify weldability of reinforcing bars other then ASTM A706			X		AWS D1.4 ACI 318: 26.6.4
B. Inspect single pass fillet welds maximum 5/16", and			X		
C. Inspect all other welds		X			
3. Inspect Anchors Cast in Concrete			X		ACI 318: 17.8.2
4. Post-Installed Anchors			X		ACI 318: 17.8.2.4, ACI 318: 17.8.2
5. Use of Required Design Mix			X		ACI 318: Ch. 19, 26.4.3, 26.4.4; IBC 1904.1, 1904.2, 1908.2, 1908.3
6. Prior to concrete placement, fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of concrete.		X			ASTM C172, ASTM C31; ACI 318: 26.4, 26.12; IBC 1908.10
7. Concrete Placement		X		Inspect concrete and shotcrete placement for proper application techniques.	ACI 318: 26.5; IBC 1908.6, 1908.7, 1908.8
8. Curing			X	Verify maintenance of specified curing temperature and techniques.	ACI 318: 26.5.3-26.5.5 IBC: 1908.9
9. Formwork			X	Inspect formwork for shape, location and dimensions of the concrete member being formed.	ACI 318: 26.11.1.2(b)

Item and Description	Agency	Frequency		Scope	Referenced Standard
		C	P		
1. **Steel Frame Joint Details** Inspect steel frame joint details for compliance with approved construction documents.			X	Inspect bracing and stiffening details are compliant with approved construction documents. Verify member locations are per construction documents. Inspect the application of joint details at each	AISC 360 N5.8 IBC: 1705.2.1

SECTION 01 42 00

REFERENCES

PART 1 - GENERAL

1.1 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Director's Representative action on Contractor's submittals, applications, and requests, "approved" is limited to Director's Representative duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": A command or instruction by Director's Representative. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

H. "Provide": Furnish and install, complete and ready for the intended use.

I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

J. "Remove": Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

K. "Remove and Salvage": Carefully detach from existing construction, in a manner to prevent damage, and deliver to Director.

L. "Remove and Reinstall": Detach items from existing construction, prepare for reuse, and reinstall in the same location.

M. "Remove and Relocate": Detach items from existing construction, prepare for reuse, and reinstall in a new location as indicated.

N. "Existing to Remain": Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

O. "Replace": Remove existing and provide new as indicated.

1.2 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 RESPONSIBILITY

A. Each Prime Contractor is assigned specific responsibility for certain temporary services and facilities used by other Prime Contractors and other entities at the site.

B. The Contractor for General Construction Work is responsible for providing temporary services and facilities that are not specifically assigned otherwise by the Contract Documents.

1.2 TELEPHONE SERVICE

A. Provide, maintain and pay for cellular telephone, laptop computer, printer, scanner, and email service to field office at time of project mobilization.

1. This is the responsibility of each Prime Contractor

1.3 TEMPORARY SANITARY FACILITIES

A. This Work is assigned to the General Construction Contractor.

B. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.

C. Maintain daily in clean and sanitary condition.

D. Comply with the requirements of the Health Department and other public authorities having jurisdiction.

1.4 BARRIERS & FENCING

A. The General Contractor shall provide security chain link fence and gates to prevent unauthorized entry to construction areas, as directed by the Director's Representative. Security fencing shall allow for Director's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

B. Construction fencing shall consist of temporary 6' high galvanized steel chain link fence around building project site limits as shown on Drawings. Provide gates at locations approved by Director's Representative.

C. Provide barricades and protective walkways required by governing authorities for public rights-of-way and for public access to existing site.

D. Provide and maintain fence protection for plants designated to remain as indicated in the

Contract Documents. Replace damaged plants with approval from Director's Representative.

E. Furnish, install, and maintain for the duration of construction all required warning signs, steps, bridges, platforms, and other temporary construction necessary for the proper completion of the work in compliance with all pertinent safety and other regulations.

F. To the greatest extent practical, provide safe passage around the work area in order for park visitors and staff to access the Stony Brook beach and related walking trails. This may entail altering the location of the barriers and fencing from time to time. Trail closures requested by Contractor shall notify Director 48 hours prior.

G. Provide signage as required to direct personnel around the affected areas.

1.5 PROTECTION OF WORK AND EXISTING PROPERTY

A. Protect installed Work and existing property and vegetation during performance of the Work.

B. Maintain the building in a watertight condition during performance of the Work.

C. Provide temporary and removable protection for stored and installed products. Control activity in immediate work area to prevent damage.

D. Provide protective coverings at wall projections, jambs, sills, and soffit of openings.

E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, and movement of heavy objects by covering them with durable sheet materials.

F. Prohibit traffic or storage upon waterproofed and roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

G. Protect existing trees and plants during performance of the Work unless otherwise indicated. Protect trees and plants as indicated on the Drawings within the grading limit lines. Do not deposit excavated materials or store building materials, vehicles or equipment around or within drip line of trees or plants. Do not attach guy wires to trees. Replace damaged plants as directed by the Director's Representative at no additional cost to the Director. Provide replacement in kind and/or value if damaged.

H. Prohibit traffic from landscaped areas.

1.6 FIRE PREVENTION

A. Take precautions necessary to prevent fires.

B. Fuel for cutting and heating torches shall be acetylene or LP-gas only, and shall be contained in Underwriters Laboratory or Federal Department of Transportation approved containers.

C. Furnish and maintain a currently inspected 20 pound capacity multi-class A:B:C fire extinguisher in the immediate vicinity where welding tools or torches are in use.

D. Furnish and maintain a currently inspected fire extinguisher of the appropriate class and size whenever the temporary storage of materials changes that areas classification of fire load or life safety.

E. Volatile liquids are prohibited for use as cleaning agents within building.

F. Tarpaulins shall be flameproof and shall be securely anchored when attached to scaffolding or when used to enclose any portion of a building.

1.7 WATER CONTROLS

A. Provide and maintain pumping equipment necessary to keep the work areas free from water. Discharge water as directed by best practices or otherwise disperse as directed by Director's Representative. Uncontrolled runoff shall not be permitted to enter Stony Brook.

1.8 SECURITY

A. Coordinate with Director's security program.

1.9 VEHICULAR ACCESS AND PARKING

A. Coordinate access and haul routes with governing authorities and Director's Representative.

B. Provide and maintain access to fire hydrants, free of obstructions.

C. Provide means of removing mud from vehicle wheels before entering streets.

D. The Director will designate existing parking areas which may be used for construction parking.

E. Maintain construction parking areas free of debris and obstructions including snow. Verify and coordinate snow removal procedures with Park staff.

1.10 WASTE REMOVAL

A. Each Prime Contractor is responsible for removal of waste generated by the Work of their Contract.

B. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.

C. Provide containers with lids. Remove trash from site weekly or more often if debris presents a fire hazard or becomes excessive. Burning of waste material on-site is prohibited.

D. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the Director's Representative.

E. Clean up debris resulting from the work at the end of each day and leave work areas broom clean. Compactly pile debris where directed by Director or Director's Representative.

F. Following the installation of finish floor materials, clean, cover, and protect the floor as required, clean the floor if necessary while work is being performed in the space in which finish materials have been installed. "Clean," for the purpose of this subparagraph, will be interpreted as meaning free from all foreign material which, in the opinion of the Architect/Engineer or Director's Representative, may be injurious to the finish floor material. Damp mop prior to final acceptance.

G. Promptly remove all evidence of graffiti.

H. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

I. Burning of rubbish will not be permitted.

J. Disposal of volatile fluid wastes (such as mineral spirits, oil, or paint thinner) in storm or sanitary sewer systems or into streams or waterways is not permitted.

1.11 PROJECT IDENTIFICATION

A. This Work is assigned to the General Construction Contractor.

B. Provide project identification signs in accordance with Director's requirements.

C. Erect on site at location established by Director's Representative.

D. No other signs are allowed without Director permission except those required by law.

E. Project Informational Signs: Provide signs as indicated below. Unauthorized signs are not permitted.

1. Project Identification Signs: Provide 3 Project identification signs (NYSOPRHP will provide text and graphics in a compatible digital file as direct by the Contractor's sign fabricator – sign size will be 4'-0" x 8'-0" – sign shall be printed on vinyl with weather resistant ink – vinyl sign shall be mounted on 3/4" x 4'-0" x 8'-0" sign board as supported by two pressure treated 4"x 4"x10'-0" posts – placed 3'-0" into the ground with concrete footing/encasement.

1.12 FIELD OFFICES

A. Office: Weather tight, with lighting, electrical outlets, heating, cooling and ventilating equipment, and equipped with sturdy furniture.

B. Provide space for Project meetings, with table and chairs to accommodate 6 persons.

1.13 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Maintain all temporary facilities and controls as long as needed for the safe and proper completion of the work.

B. Remove temporary utilities, equipment, facilities, materials, prior to inspection.

C. Remove underground installation if any.

D. Clean and repair damage caused by installation or use of temporary work.

E. Restore existing facilities used during construction to original condition.

F. Restore new permanent facilities used during construction to specified condition as per the Director's Representative.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 51 00

TEMPORARY UTILITIES

PART 1 - GENERAL

1.2 GENERAL REQUIREMENTS

A. Each Prime Contractor is assigned specific responsibilities for certain temporary utilities used by other Prime Contractors and other entities at the site.

B. The Contractor for General Construction Work is responsible for providing temporary utilities that are not specially assigned otherwise by the Contract Documents.

C. No interruption of Director's utility services will be permitted unless approved in writing by Director. Schedule such interruptions at Director's convenience and to minimize frequency of occurrence.

D. Connections to public utility services shall be arranged for by Contractor providing service and performed to utility company requirements.

E. Refer to Sections in Section 2 for requirements in asbestos abatement areas. Contractor responsible for asbestos abatement provides all temporary utilities required within this area during abatement.

1.3 TEMPORARY ELECTRICITY

A. Temporary electric service provided by Electrical Contractor.

B. Cost of Electricity: By Director.

C. Connect to Director's existing power service with Contractor supplied cords and GFI's, coordinate with Director.

1. Do not disrupt Director's need for continuous service.
2. Exercise measures to conserve energy.
3. Electric Service at site is 120/208-Volt Three-Phase.

D. Provide temporary electric feeder from existing electrical service at location as directed by Director's Representative.

E. Complement existing power service capacity and characteristics as required. Power required above, Director's provided service is responsibility of each Prime Contractor at expense of each Prime Contractor.

F. Provide adequate distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting.

1. Provide 20 ampere duplex outlets, single phase circuits for power tools for every 2000 sq ft

of active work area.
2. Provide 20 ampere, single phase branch circuits for lighting.

G. Comply with the National Electrical Code.

H. Provide all temporary outlets with ground fault circuit interrupter protection.

I. Electric heaters will not be permitted.

1.4 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

A. Temporary lighting for building construction provided by Electrical Contractor

B. Provide and maintain lighting for construction operations during the normal working day to achieve a minimum lighting level requirements to be per OSHA specifications for brightness.

1.5 TEMPORARY HEATING

A. Each Prime Contractor shall provide temporary heat to maintain conditions required by their Work.

1. All costs of heat, including temporary equipment and fuel shall be paid for by the Prime Contractor requiring same.
2. Provide properly vented self-contained LP gas or fuel oil heaters with individual space thermostatic control. The use of electric space heaters, gasoline-burning space heaters, open burning type, or unsupervised salamander type heating units is prohibited.
3. Maintain temperature of not less than 50 degrees F, unless otherwise approved by Director's Representative.

1.6 TEMPORARY WATER SERVICE

A. Cost of Water Used: By Director.

B. Provide and maintain suitable quality water service for construction operations at time of project mobilization.

C. Connect to existing water source with Contractor supplied hoses and backflow preventers.

1. Exercise measures to conserve water.

D. Water used above Director provided services is responsibility of each Prime Contractor at expense of each Prime Contractor.

E. Plumbing Contractor shall provide temporary water distribution.

1. Extend branch piping with outlets located so water is available, at all points in the work area, using 150 foot hoses with threaded connections.
2. Each Contractor is responsible for providing hoses required for their work.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
4. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents.

    a. Substitutions for Cause: Changes proposed by a Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes or unavailability of required warranty terms. Contractor shall procure items in a timely manner so that items are available when required to meet the schedule. NYSOPRHP will not accept project extensions and delays due to equipment unavailability due to untimely procurement practices.
    b. Substitutions for Convenience: Changes proposed by a Contractor or Director that are not required in order to meet other Project requirements but may offer advantage to Contractor or Director.

B. Basis-of-Design Product Specification: A specification in which a specific manufacturer’s product is named and accompanied by the words “basis-of-design product” including make or model number or other designation. This designation is provided for the Contractor’s information. Significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics are also provided in the Contract Documents. The product has been named to inform the Contractor of the Product used in developing details and coordinating various elements of the design. Basis-of-Design products have properties which affect the way they work in a design. These properties are not always listed explicitly in the requirements. Examples of important properties that might not be listed include, exact dimensions, access points for maintenance, and attachment points. Other Products will be considered as equivalents subject to the requirements. Incorporation of

another product may require revision of details for installation or additional coordination, all of which is the responsibility of the Contractor and shall be at no additional cost to NYSOPRHP.

1.2 GENERAL SUBMITTALS

A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

D. Comply with requirements specified in Section 01 33 00 “Submittal Procedures”.

E. Where possible, submit actual product samples as opposed to written or graphic charts.

1.3 SUBSTITUTION REQUEST SUBMITTALS

A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Submit substitution request on Contractor’s letterhead.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

    a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
    b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Director and each Prime Contractor, that will be necessary to accommodate proposed substitution.
    c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable specification section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
    d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
    e. Certificates and qualification data, where applicable or requested.
    f. Research reports evidencing compliance with Building Code in effect for Project.

g. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time.
h. Cost information, including a proposal of change, if any, in the Contract Sum.
i. Contractor's certification that proposed substitution complies with requirements in the Contract Documents.
j. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. If necessary, Director’s Representative will request additional information or documentation for evaluation within 10 days of receipt of a request for substitution. Director’s Representative will notify Contractor of acceptance or rejection of proposed substitution within 10 days of receipt of request.

a. Forms of Acceptance: Change Order, Construction Change Directive, or Director’s Representative Supplemental Instructions for minor changes in the Work.
b. Use product specified if Director’s Representative does not issue a decision on use of a proposed substitution within time allocated.

1.4 QUALITY ASSURANCE

A. Compatibility of Options: If a Contractor is given option of selecting between two or more products for use on project, select product compatible with products previously selected.

B. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials.

C. Coordination of Substitutions: Modify or adjust affected work as necessary to integrate work of the approved substitutions, at no additional cost to NYSOPRHP.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions. Neither Park staff nor the Director’s Representative will accept deliveries on behalf of the Contactor.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.

4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger project site.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
5. Protect stored products from damage and liquids from freezing.

1.6 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Director.

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Director reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Director’s Representative will make selection.
5. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

1. Products:

a. Nonrestricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.

2. Manufacturers:

a. Nonrestricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.

3. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, provide the specified or indicated product. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration: Director's Representative will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Director's Representative may return requests without action, except to record noncompliance with these requirements:

1. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated. This may be done by highlighting or circling information on manufacturers, published product data, or by a certification of compliance from the manufacturers.
2. Evidence that proposed product provides specified warranty.
3. List of similar installations for completed projects with project names and addresses and names and addresses of architects and Owners, if requested.
4. Samples, if requested.

2.3 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately upon discovery of need for change, but not later than 10 days prior to time required for preparation and review of related submittals.

1. Conditions: Director's Representative will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Director's Representative will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
b. Substitution request is fully documented and properly submitted.
c. Requested substitution will not adversely affect Contractor's construction schedule.
d. Requested substitution has received necessary approvals of authorities having jurisdiction.
e. Requested substitution is compatible with other portions of the Work.
f. Requested substitution has been coordinated with other portions of the Work.
g. Requested substitution provides specified warranty.

B. Substitutions for Convenience: Director's Representative will consider requests for substitution if received within 15 days after the Notice of Award. Requests received after that time may be considered or rejected at discretion of Director's Representative.

1. Conditions: Director's Representative will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Director's Representative will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution offers Director a substantial advantage in cost, time, energy conservation, or other considerations.
b. Requested substitution does not require extensive revisions to the Contract Documents.
c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
d. Substitution request is fully documented and properly submitted.
e. Requested substitution will not adversely affect Contractor's construction schedule.
f. Requested substitution has received necessary approvals of authorities having jurisdiction.
g. Requested substitution is compatible with other portions of the Work.
h. Requested substitution has been coordinated with other portions of the Work.
i. Requested substitution provides specified warranty.

C. In all cases, provide contemporaneous proposal for a credit or additional cost for any substitutions, when warranted or requested.

PART 3 - EXECUTION

3.1 TRANSPORTATION AND HANDLING

A. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

B. Transport and handle products in accordance with manufacturer's instructions.

C. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

D. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

E. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

F. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.2 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

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 prevent condensation and degradation of products.

G. Prevent contact with material that may cause corrosion, discoloration, or staining.

H. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

I. Neatly arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

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EXECUTION

PART 1 - GENERAL

1.1 DEFINITIONS

A. Cutting and Coring: Removal of in-place construction necessary to permit installation or performance of other work. This includes both elements of existing construction which are being altered and elements of the work of this Project which are cut.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.2 INFORMATIONAL SUBMITTALS

A. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.

1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences.
2. Identify demolition firm and submit qualifications.
3. Include a summary of safety procedures.

B. Cutting and Patching: Submit written request in advance of cutting or alteration which affects:

1. Structural integrity of any element of Project.
2. Integrity of weather exposed or moisture resistant element.
3. Efficiency, maintenance, or safety of any operational element.
4. Visual qualities of sight exposed elements.
5. Work of Director or other Contractors.
6. Include in request:

a. Identification of Project.
b. Location and description of affected work.
c. Necessity for cutting or alteration.
d. Description of proposed work and products to be used.
e. Alternatives to cutting and patching.
f. Date and time work will be executed.

C. Project Record Documents: Accurately record actual locations of capped and active utilities.

1.3 QUALITY ASSURANCE

A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural Elements: When cutting and patching structural elements, notify Director's Representative of locations and details of cutting and await directions before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection
2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
3. Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Director's Representative's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

1.4 PROJECT CONDITIONS

A. Maintain excavations for foundation systems and utility work free of water. Provide, operate, and maintain pumping equipment.

B. Protect site and buildings from puddling or running water.

C. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

D. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere. This applies to both interior and exterior work.

E. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from trench excavation and backfill, from borrow and waste disposal areas. Prevent erosion and sedimentation.

F. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.

G. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.

1.5 COORDINATION

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. Notify affected utility companies and comply with their requirements.

C. Verify that utility requirements and characteristics of new 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.

D. Coordinate space requirements, supports, and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

F. Coordinate completion and clean-up of work.

G. After Director occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Director's activities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. New Materials: As specified in product sections; matching existing products and work for patching and extending work.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Director’s Representative for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning Work, investigate and verify the existence and location of underground utilities, and other construction affecting the Work.

B. Drawings showing existing construction and utilities are based on existing record documents only.

1. Verify that construction and utility arrangements are as shown.
2. Report discrepancies to Director’s Representative before disturbing existing installation.

C. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for mechanical, plumbing, and electrical systems to verify actual locations of connections before equipment and fixture installation.
2. Examine pavements, walls, floors, ceilings and roofs for suitable conditions where products and systems are to be installed.
3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

D. Examine and verify specific conditions described in individual specification sections.

E. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.

F. Verify that utility services are available, of the correct characteristics, and in the correct locations.

G. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

H. Written Report: Where a written report listing conditions detrimental to performance of the Work is required, include the following:

1. Description of the Work.
2. List of detrimental conditions, including substrates.
3. List of unacceptable installation tolerances.
4. Recommended corrections.

I. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to Director that is necessary to adjust, move, or relocate existing utility structures, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of each Prime Contractor, submit a request for information to Director's Representative.

E. Preinstallation Meeting: When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.

1. Required attendance of parties directly affecting, or affected by, Work or specification section.
2. Notify Director's Representative and other Contractors affected by Work 2 days in advance of meeting date.

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings. If discrepancies are discovered, notify Director's Representative promptly.

B. General: Engage a New York State Licensed Land Surveyor to lay out the Work using accepted surveying practices.

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project. Protect benchmarks and control points throughout the Project.
2. Establish limits on use of Project site.
3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
4. Inform installers of lines and levels to which they must comply.
5. Check the location, level and plumb, of every major element as the Work progresses.
6. Notify Director's Representative when deviations from required lines and levels exceed allowable tolerances.

C. Site Improvements: Locate and lay out site improvements, including but not limited to pavements, curbs, grading, fill and topsoil placement, utility work, and landscaping.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical Work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

3.4 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.

2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal conduits, and wiring in finished areas, unless otherwise indicated.
4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: The General Construction Contractor shall provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component provided by the trade contractors in place. The General Construction Contractor shall accurately locate and align with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Director’s Representative.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. 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.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.5 CUTTING AND PATCHING

A. The General Contractor is responsible for the cost of all cutting and patching for the Work. Each Prime Contractor (Plumbing, HVAC, and Electrical) unless specifically indicated otherwise, shall furnish Drawings or written information to the General Contractor covering the cutting, openings and patching required in new construction for the Work. If such information is not furnished at least 24 hours before start of the applicable part of the General Contractor's Work, all necessary cutting, patching, and refinishing will be included in the Prime Contractor's Contract at no additional cost to the Director.

B. Execute cutting and patching including excavation and fill to complete the work, to uncover work in order to install improperly sequenced work, to remove and replace defective or non-conforming work, to remove samples of installed work for testing when requested, to provide openings in the work for penetration of mechanical and electrical work, to execute patching to complement adjacent work, and to fit products together to integrate with other work.

C. Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

D. Existing Warranties: Remove, replace, patch and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as to not void existing warranties.

E. Temporary Support: Provide temporary support of work to be cut.

F. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of project that might be exposed during cutting and patching operations.

G. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas. All abandoned services/systems shall be noted as to location and condition on Contractor As-Built Drawings.

H. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. Prior to cutting, review proposed procedures with Director's Representative for approval of recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Division 31 Sections where required by cutting and patching operations. Minimize width of trenching, where

feasible, trenching should be performed utilizing ditch witch or similar equipment in order to maintain trench width as small as possible unless otherwise indicated.

5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

I. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.

    a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    b. Restore damaged pipe covering to its original condition.
    c. Where the existing surface is not indicated to be refinished, patch to match the surface finish that existing prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.
    d. Refinish existing surfaces as indicated.
    e. Where areas are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.

3. Floors and Walls: Where walls or partitions are altered to complete work, patch and repair floor and wall surfaces. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

    a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire wall surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
    b. When existing 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 Director’s Representative.
    c. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
    d. Where a change of plane of 1/4 inch or more occurs in existing work, submit recommendation for providing a smooth transition for Director’s Representative review and request instructions.

4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

3.6 PROGRESS CLEANING

A. General: Clean project site and work areas daily, including common areas and spaces where cutting and patching are performed. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

a. Use containers intended for holding waste materials of type to be stored.

B. Site: Maintain project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Division 01 Section "Construction Waste Management and Disposal."

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.7 STARTING AND ADJUSTING

A. Coordinate schedule for start-up of various equipment and systems.

B. Notify Director's Representative and Director seven days prior to start-up of each item.

C. Verify that each piece of equipment or system has been checked for proper operation, control sequence, and for conditions which may cause damage.

D. Execute start-up under supervision of Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.

E. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve system installation prior to start-up, and to supervise placing equipment or system in operation.

F. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

G. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.8 DEMONSTRATION AND INSTRUCTION

A. Demonstrate operation and maintenance of products to Director's personnel two weeks prior to date of final inspection.

B. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time.

C. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of Director personnel.

D. Utilize operation and maintenance manual as basis for instruction. Review contents of manual with Director's personnel in detail to explain all aspects of operation and maintenance.

3.9 PROTECTION OF INSTALLED CONSTRUCTION

A. Protect installed work from damage by construction operations.

B. Provide special protection where specified in individual specification sections.

C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

F. 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.

G. Prohibit traffic from landscaped areas.

H. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

I. Comply with manufacturer's written instructions for temperature and relative humidity.

3.10 FINAL CLEANING

A. Execute final cleaning prior to final project assessment.

B. Use cleaning materials that are non-hazardous.

C. 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.

D. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

E. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner or recycle; do not burn or bury, or dispose in water bodies.

3.11 CLOSEOUT PROCEDURES

A. Make submittals that are required in accordance with Division 01 Section “CLOSEOUT PROCEDURES”.

1. Provide copies to Director's Representative and Director.

B. Complete a preliminary inspection to determine items to be listed for completion or correction in Contractor's Notice of Substantial Completion.

C. Notify Director's Representative when work is considered ready for Substantial Completion.

D. 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 Director's Representative review.

E. Correct items of work listed in executed Certificates of Substantial Completion and comply with requirements for access to Director-occupied areas.

F. Notify Director's Representative when work is considered finally complete.

G. Complete items of work determined by Director's Representative final inspection.

3.12 MAINTENANCE SERVICE

A. Furnish maintenance services of components indicated in specification sections.

B. Furnish maintenance manuals and schedules for equipment indicated in specification sections.

C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

END OF SECTION

SECTION 01 74 19

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 DEFINITIONS

A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.

C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

D. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.

E. Non-hazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.

F. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.

G. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

H. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

I. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

J. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.

K. Toxic: Poisonous to humans either immediately or after a long period of exposure.

L. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.

M. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.2 PERFORMANCE REQUIREMENTS

A. Director requires that this project generate the least amount of trash and waste possible.

B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.

C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.

D. Required Recycling, Salvage, and Reuse: The following may not be disposed of in landfills or by incineration:

1. Aluminum and plastic beverage containers.
2. Packaging: Salvage or recycle 100 percent of the following uncontaminated packaging materials:

    a. Paper.
    b. Cardboard.
    c. Boxes.
    d. Plastic sheet and film.
    e. Polystyrene packaging.
    f. Wood crates.
    g. Plastic pails.

E. Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials to the fullest extent as possible for the Work.

1. Demolition Waste:

    a. Asphaltic paving.
    b. Concrete.
    c. Concrete reinforcing steel.
    d. Brick.
    e. Concrete masonry units (CMU).
    f. Wood studs.
    g. Wood joists.
    h. Gyspum board.
    i. Wood trim.
    j. Structural and miscellaneous steel.
    k. Rough hardware.
    l. Doors and frames.
    m. Windows.
    n. Glass.
    o. Plumbing fixtures.
    p. Piping, fittings and valves.
    q. Electrical conduit.

r. Copper wiring.
s. Lighting fixtures.

2. Construction Waste:

a. Masonry and CMU.
b. Lumber.
c. Masonry and CMU.
d. Wood sheet materials.
e. Wood trim.
f. Metals.
g. Roofing.
h. Insulation.
i. Gypsum board.
j. Roofing.
k. Insulation.
l. Piping.
m. Electrical conduit.
n. Copper Wiring
o. Electrical devices

F. Methods of trash/waste disposal that are not acceptable are:

1. Burning on the project site.
2. Burying on the project site.
3. Dumping or burying on other property, public or private.
4. Other illegal dumping or burying.
5. Incineration, either on- or off-site.
6. Dumping items in water bodies.

G. Regulatory Requirements: All Prime Contractors are responsible for knowing and complying with regulatory requirements, including but not limited to Federal, State and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.3 SUBMITTALS

A. Waste Management Plan: Within 10 calendar days after receipt of Notice to Proceed, or prior to any trash or waste removal, whichever occurs sooner, each Prime Contractor shall submit a Waste Management Plan to Director's Representative for Director's review and approval.

B. Waste Management Plan: Include the following information:

1. Analysis of the trash and waste projected to be generated during the entire project construction cycle, including types and quantities.
2. Landfill Options: The name, address, and telephone number of the landfill(s) where trash/waste will be disposed.

3. Landfill Alternatives: List all waste materials that will be diverted from landfills by reuse, salvage, or recycling.
4. Meetings: At regular job meetings describe methods to address waste prevention, reduction, recycling, salvage, reuse, and disposal.
5. Materials Handling Procedures: Describe the means by which materials to be diverted from landfills will be protected from contamination and prepared for acceptance by designated facilities; include separation procedures for recyclables, storage, and packaging.
6. Transportation: Identify the destination and means of transportation of materials to be recycled; i.e. whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

A. General: Implement approved Waste Management Plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

1. Comply with operation, termination, and removal requirements in Division 01 Section "Temporary Facilities and Controls".

B. Waste Management Coordinator: Each Prime Contractor shall designate a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan for their section of Work.

C. Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, Director, and Director's Representative.

D. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.

E. Meetings: Discuss trash/waste management goals and issues at project meetings.

F. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by contractor and installers.

1. As a minimum, provide:

a. Separate area for storage of materials to be reused on-site.
b. Separate enclosures for each category of recyclable.
c. Recycling bins at worker lunch area.

2. Provide containers as required.

3. Provide materials for barriers and enclosures that are nonhazardous, recyclable, or reusable to the maximum extent possible; reuse project construction waste materials if possible.
4. Locate enclosures out of the way of construction traffic.
5. Provide adequate space for pick-up and delivery and convenience to subcontractors.
6. If an enclosed area is not provided, clearly lay out and label a specific area on-site.
7. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.

G. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.

H. Reuse of Materials On-Site: Set aside, sort, and protect separated products including site materials such as topsoil, gravel, backfill, etc. in preparation for reuse.

I. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

3.2 RECYCLING CONSTRUCTION WASTE

A. Packaging:

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
2. Polystyrene Packaging: Separate and bag materials.
3. Pallets: As much as possible, require deliveries using pallets to remove pallets from project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Wood Materials:

1. Clean Cut-Offs of Lumber: Stack large clean pieces in container and store in dry location for processing off-site.

C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location for processing off-site.

3.3 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials.

C. Disposal: Remove waste materials from Director's property and legally dispose of them.

END OF SECTION

SECTION 01 77 00

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

B. Certified List of Incomplete Items: Final submittal at Final Completion.

C. Project Record Documents: Submit documents to Director's Representative.

D. Operation and Maintenance Data/Manuals:

1. For equipment, or component parts of equipment put into service during construction and operated by Director, submit completed documents within ten days after acceptance.
2. Submit 1 copy of completed documents 15 days prior to final inspection. This copy will be reviewed for compliance and returned after final inspection, with Director's Representative comments. Revise content of all document sets as required prior to final submission.
3. Submit two sets of revised final documents in final form within 10 days after final inspection.
4. Submit data bound in manuals as described in Part 3 of this Section.

E. Warranties:

1. For equipment or component parts of equipment put into service during construction with Director'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 the date of acceptance as the beginning of the warranty period.

F. Closeout Documents:

1. Contractor's Affidavit of Payment of Debts and Claims
2. Contractor's Affidavit of Release of Leans with:

    a. Consent of Surety to Final Payment
    b. Contractor's release or waiver of liens.
    c. Separate releases or waivers of liens for subcontractors, suppliers, and others with lien rights against property of Director, together with list of those parties.

1.2 SUBSTANTIAL COMPLETION PROCEDURES

A. NYSOPRHP will follow a three-step project close-out procedure, as follows:

1. Approximately two-weeks before project contract completion: Substantial Completion – project site walk-through, and generation of punch list.
2. Approximately one-week before project contract completion: Final Completion – All major punch list item shall be complete, some small items possibly still allowed to progress. All as-built drawings and O&M Manuals shall be received.
3. Day of project contract completion: Joint Inspection of Physical Completion – project shall be 100% complete and accepted; the project site shall be cleaned up; Contractors, equipment, and materials removed from the site. At this point, application for final payment may be made.
4. One day after contract completion: One-year warranty period begins; if work is not completed or accepted, liquidated damages begin.

B. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

C. Submittals Prior to Substantial Completion: Submit the following a minimum of 7 days prior to requesting inspection for determining date of Substantial Completion.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Director unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, and similar final record information.
3. Submit closeout submittals specified in individual Divisions 02 through 34 agreements, final certifications, and similar documents.
4. Submit maintenance material submittals specified in individual Divisions 02 through 34 Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Director's Representative. Label with manufacturer's name and model number where applicable.
5. Submit test/adjust/balance records.

D. Procedures Prior to Substantial Completion: Complete the following a minimum of 7 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Advise Director of pending insurance changeover requirements.
2. Complete startup and testing of systems and equipment.
3. Perform preventive maintenance on equipment used prior to Substantial Completion.
4. Instruct Director's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
5. Participate with Director in conducting inspection and walkthrough with local emergency responders.

6. Terminate and remove temporary facilities from project site, along with construction tools, and similar elements.
7. Complete final cleaning requirements, including touchup painting.
8. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

E. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 7 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Director's Representative will either proceed with inspection or notify each Prime Contractor of unfulfilled requirements. Director's Representative will prepare the Certificate of Substantial Completion after inspection or will notify each Prime Contractor of items, either on Contractor's list or additional items identified by Director's Representative that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.3 FINAL COMPLETION PROCEDURES

A. Substantial Completion:

1. Inspection: Submit a written request for inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for inspection and tests. On receipt of request, Director's Representative will either proceed with inspection or notify each Prime Contractor of unfulfilled requirements. Director's Representative will prepare a final Certificate for Payment after inspection or will notify Director's Representative of construction that must be completed or corrected before certificate will be issued.
2. Provide walk-through with Director's Representative, Construction Manager, and Architect/Engineer. Punch list will be generated.
3. Certified List of Incomplete Items: Submit certified copy of Director's Representative Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Director's Representative. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
4. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.

B. Final Completion:

1. Provide walk-through with Director's Representative, Construction Manager, and Architect/Engineer. Revised punch list will be generated.
2. Certified List of Incomplete Items: Submit certified copy of Director's Representative Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Director's Representative. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.

C. Joint Inspection of Physical Completion: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."

1.4 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Prime Contractor or other Prime Contractors that are outside the limits of construction.

1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor for each building.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.

1.5 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Director’s Representative for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated or when delay in submittal of warranties might limit Director’s rights under warranty.

B. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 PROJECT RECORD DOCUMENTS

A. Each Prime Contractor shall 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 Director.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

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 horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
2. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
3. Field changes of dimension and detail.
4. Details not on original Contract Drawings.

3.2 OPERATION AND MAINTENANCE DATA, GENERAL

A. For Each Product or System where called for in the technical specification sections: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.3 OPERATION AND MAINTENANCE DATA, FOR MATERIALS AND FINISHES

A. For Each Product, Applied Material, and Finish where called for in the technical specification sections:

1. Product data, with catalog number, size, composition, and color and texture designations.
2. Information for re-ordering custom manufactured products.

B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.

D. Additional information as specified in individual product specification sections.

E. Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

3.4 OPERATION AND MAINTENANCE DATA, FOR EQUIPMENT AND SYSTEMS

A. For Each Item of Equipment and Each System where called for in the technical specification sections:

1. Description of unit or system, and component parts.
2. Identify function, normal operating characteristics, and limiting conditions.
3. Include performance curves, with engineering data and tests.
4. Complete nomenclature and model number of replaceable parts.

B. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed or by label machine.

C. Include color coded wiring diagrams as installed.

D. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

E. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

F. Provide servicing and lubrication schedule, and list of lubricants required.

G. Include manufacturer's printed operation and maintenance instructions.

H. Include sequence of operation by controls manufacturer.

I. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

J. Provide control diagrams by controls manufacturer as installed.

K. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

L. Include test and balancing reports.

M. Additional Requirements: As specified in individual product specification sections.

3.5 OPERATION AND MAINTENANCE MANUALS

A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

B. Provide two hard copies of each, plus electronic copy.

C. Prepare data described above in the form of an instructional manual.

D. Binders: Commercial quality, 8-1/2 x 11 inch, three D-size ring binders with durable plastic covers; 2-inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.

E. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

F. Provide tabbed dividers for each separate product and system, with typed description of product and major component parts of equipment.

G. Text: Manufacturer's printed data, or typewritten data on 24-pound paper.

H. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

I. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.

J. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:

1. Part 1: Directory, listing names, addresses, and telephone numbers of Director, Director's Representative, 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 special 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. Test data.
    c. Certificates.

3.6 WARRANTIES

A. Obtain warranties, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work. Except for items put into use with Director's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.

B. Verify that documents are in proper form and contain full information as specified herein.

C. Co-execute submittals when required.

D. Retain warranties until time specified for submittal.

E. Include originals of each in operation and maintenance manuals, indexed separately on Table of Contents.

F. Manual: Bind in commercial quality 8-1/2 x 11 inch, three D-size ring binders with durable plastic covers.

G. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.

H. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.

I. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

J. Ten months following final contract completion date, execute a walk-through with the Director’s Representative. Purpose of the walk-through is to identify any items which appear to be failing or mis-operating and require replacement or repair.

3.7 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Remove tools, construction equipment, machinery, and surplus material from Project site.
d. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
e. Clean floors in occupied and unoccupied spaces.
f. Avoid dispersing harmful cleaning materials into lawn and landscape plantings. Damaged lawn or landscape plantings shall be replaced at no cost to NYSOPRHP by the Contractor causing such damage.
g. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer’s recommendations if visible soil or stains remain.
h. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
i. Remove labels that are not permanent.
j. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
k. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.

C. Construction Waste Disposal: Comply with waste disposal requirements in Division 01 Section "Construction Waste Management and Disposal."

3.8 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair of remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

1. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that already show evidence of repair or restoration.

    a. Do not paint over “UL” and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.

2. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.

END OF SECTION

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory manuals.

B. Related Requirements:
1. Section 013300 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.

1.3 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 CLOSEOUT SUBMITTALS

A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

1. Architect/Engineer will comment on whether content of operation and maintenance submittals is acceptable.
2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

B. Format: Submit operation and maintenance manuals in the following format:

1. Submit pdf by email to Director’s Representative. Enable reviewer comments on draft submittals.

C. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 10 days before commencing demonstration and training.

Architect will return copy with comments. Revised manual will be submitted with final payment application.

1.5 FORMAT OF OPERATION AND MAINTENANCE MANUALS

A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 017823

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for Project Record Documents, including the following:

1. Record Drawings.
2. Record specifications.
3. Record Product Data.
4. Miscellaneous record submittals.

B. Related Requirements:
1. Section 017300 "Execution" for final property survey.
2. Section 017700 "Closeout Procedures" for general closeout procedures.
3. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.3 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:
1. Number of Copies: Submit copies of Record Drawings as follows:

a. Initial Submittal:
1) Submit Record Digital Data Files.
2) Architect/Engineer will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.

b. Final Submittal:
1) Submit PDF electronic files of scanned Record Prints.

2. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Specification Section and Product Data as a component of manual.

B. Reports: Submit written report indicating items incorporated into Project Record Documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

1.4 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.

1. Preparation: Mark record prints to show the actual installation, where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Accurately record information in an acceptable drawing technique.
c. Record data as soon as possible after obtaining it.
d. Record and check the markup before enclosing concealed installations.
e. Cross-reference record prints to corresponding photographic documentation.

2. Content: Types of items requiring marking include, but are not limited to, the following:

a. Dimensional changes to Drawings.
b. Revisions to details shown on Drawings.
c. Depths of foundations.
d. Locations and depths of underground utilities.
e. Revisions to routing of piping and conduits.
f. Revisions to electrical circuitry.
g. Actual equipment locations.
h. Duct size and routing.
i. Locations of concealed internal utilities.
j. Changes made by Change Order or Field Order.
k. Changes made following Architect's/Engineer’s written orders.
l. Details not on the original Contract Drawings.
m. Field records for variable and concealed conditions.
n. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
4. Mark record prints with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect/Engineer and Director’s Representative. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:

1. Format: Same digital data software program, version, and operating system as for the original Contract Drawings and a PDF version.

2. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
3. Refer instances of uncertainty to Director's Representative for resolution.
4. Architect/Engineer will furnish Contractor with one set of digital data files of the Contract Drawings for use in recording information.
    a. Architect/Engineer will provide data file layer information. Record markups in separate layers.

C. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Format: Annotated PDF electronic file.
2. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
3. Identification: As follows:

    a. Project name.
    b. Date.
    c. Designation "PROJECT RECORD DRAWINGS."
    d. Name of Architect/Engineer.
    e. Name of Contractor.

1.5 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation, where installation varies from that indicated in Specifications, addenda, and Contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. For each principal product, submit Record Product Data in operation and maintenance manuals.
5. Note related Change Orders where applicable.

B. Format: Submit record specifications as PDF file.

1.6 RECORD PRODUCT DATA

A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and revisions to Project Record Documents as they occur; do not wait until end of Project.

B. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders where applicable.

C. Format: Submit Record Product Data as PDF electronic file.

1. Include Record Product Data directory organized by Specification Section number and title, electronically linked to each item of Record Product Data.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 017839

SECTION 01 81 13.01

ENVIRONMENTAL PRODUCT DECLARATION (EPD) REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes general requirements and procedures for compliance with requirements of Executive Order No. 22 to reduce the embodied carbon in all new construction or construction projects consisting of adaptive reuse or significant renovations costing over $1 million and using the minimum quantities of certain materials set forth below.

1. Bidders shall be required to submit Environmental Product Declarations (EPDs) when available, that include the amount of embodied carbon in given building materials, along with the quantities of these materials used in the construction project. See Article 2.1 Covered Construction Materials.

2. Specific requirements are also included in other Sections.

1.3 REFERENCE STANDARDS

A. General: Comply with the applicable provisions of the referenced standards except as modified by governing codes and the Contract Documents. Where a recommendation or suggestion occurs in the referenced standards, such recommendation or suggestion shall be considered mandatory. In the event of conflict of referenced standards and this specification or within the standards themselves, the more stringent standard or requirement shall govern.

1.4 ACTION SUBMITTALS

A. General: Submit additional submittals required by other Specification Sections.

B. Environmental Product Declaration (EPD) submittals are in addition to other submittals.

1. If submitted item is identical to that submitted to comply with other requirements, include an additional copy with other submittal as a record copy of compliance with indicated EPD requirements. Mark additional copy "EPD submittal."

2. Submit EPD submittals along with and at the same time as other associated submittals. Review of any specific submittal that must contain EPD information shall not be considered complete until the EPD aspects have been approved.
3. Submit the EPD Material Tracking Form with material quantities and delivery receipts with the Application for Payment in which these materials are being requisitioned.

C. EPD Documentation Submittals: If available, provide current EPDs and material quantities, that include the amount of embodied carbon in each product.

1. Acceptable EPDs are non-expired, Product-specific, Facility or Plant specific, or Supply Chain-specific Type III (Third-Party Reviewed), in adherence with ISO 14025 Environmental labels and declarations, ISO 14044 Environmental management – Life cycle assessment, and ISO 21930 Core rules for environmental product declarations of construction products and services.
2. In the EPD Material Tracking Form, provide the actual quantity/volume/weight of each Covered Construction Material incorporated into this project, whether or not an EPD exists for that particular material/product.
3. If an EPD cannot be provided, provide a statement of the contractor's good faith effort to obtain the EPD.

1.5 INFORMATIONAL SUBMITTALS

A. Project Materials Quantity Data: In the EPD Material Tracking Form, provide statement indicating total quantity of each Covered Construction Material used for Project.

B. EPD Action Plan: Provide preliminary submittals within 30 days of date established for the Notice to Proceed, indicating how the EPD reporting requirements will be met:

1. Provide list of Covered Construction Materials and estimated quantities of each, whether or not an EPD exists for that particular material/product.

C. EPD Progress Reports: Concurrent with each Application for Payment, Contractors shall provide an EPD Material Tracking Form and copies of delivery tickets for each Covered Construction Materials used in the Project to date, whether or not an EPD exists for that particular material/product.

PART 2 - PRODUCTS

2.1 COVERED CONSTRUCTION MATERIALS

Material	Minimum Quantity
Concrete mixes	50 cubic yards or more
Asphalt mixes	16,854 pounds (or 10 cubic yards) or more
Steel – Rebar	20,000 pounds or more
Steel – Hollow Structural Sections	5,000 pounds or more
Steel – Fabricated Steel Plate	5,000 pounds or more
Steel – Hot-Rolled Sections	5,000 pounds or more
Steel – Cold-Formed and Galvanized	5,000 pounds or more
Glass – Flat Glass	2,000 square feet or more
Glass – Processed Glass	2,000 square feet or more
Glass – Insulated Glazing Units	2,000 square feet or more

PART 3 - EXECUTION

3.1 ATTACHMENTS

A. Environmental Product Declarations (EPDs).
   1. The attached is an example of an EPD that includes the amount of embodied carbon in the product.

END OF SECTION

Hanson Aggregates, New York
Environmental Product Declaration
Mix 5007047 - Rochester

This cradle to gate Environmental Product Declaration (EPD) reports the impacts for one cubic yard of ready-mixed concrete, meeting the following product specifications:

ACI 211: Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.
ACI 318: Building Code Requirements for Structural Concrete.
ASTM C94 Standard Specification for Ready-Mixed Concrete.
CSI Masterformat Division 03-30-00: Cast-in-Place Concrete.
UNSPSC Code 30111500: Ready Mix

COMPANY

Hanson Aggregates, New York
5125 NY-28,
Middleville, NY 13406

PLANT

Rochester
1535 Scottsville Road Rochester, NY 14623

PROGRAM OPERATOR

ASTM International
100 Barr Harbor Drive
West Conshohocken, PA 19428

DATE OF ISSUE

9/28/2021

PERIOD OF VALIDITY

August 4th, 2026

Environmental Impacts

Declared Product:

5007047 - Rochester

Compressive Strength: 4000 psi at 28 days

Declared Unit:

1 yd3 of ready-mix concrete

		yd^3	m^3
Global Warming Potential	kg CO2e	234.67	306.95
Ozone Depletion	kg CFC11e	7.16E-06	9.36E-06
Acidification	kg SO2e	0.64	0.83
Eutrophication	kg Ne	0.27	0.35
SFP (Smog)	kg O3e	12.15	15.89
Abiotic depletion potential for fossil resources	MJ, NCV	473.16	618.89
Abiotic depletion potential for non-fossil mineral resources	kg Sbe	1.52E-04	1.99E-04

Product Components:

natural aggregate (ASTM C33), portland limestone cement (ASTM 595), batch water (ASTM C1602), admixture (ASTM C494), admixture (ASTM C260)

ISO 21930:2017 Sustainability in Building Construction-Environmental Declaration of Building Products: serves as the core PCR for Concrete; NSF International, February 2019 serves as a subcategory PCR

Sub-category PCR review was conducted by

Thomas P. Gloria, PhD. (t.gloria@industrial-ecology.com) • Industrial Ecology Consultants

Independent verification of the declaration and data, according to ISO 21930:2017 and ISO 14025:2006.: ☐ internal ☑ external

Third party verifier: Thomas P. Gloria, PhD. (t.gloria@industrial-ecology.com) • Industrial Ecology Consultants

For additional explanatory material:

Manufacture Representative: **Craig Green** (Craig.Green@LehighHanson.com)

LCA and EPD Developer: **Athena Sustainable Materials Institute**

Disclaimer: EPDS are comparable only if they comply with this document, use the same sub-category PCR where applicable, include all relevant information modules and are based on equivalent scenarios with respect to the context of construction works.

Cement accounts for as much as 95% of the impacts of the concrete mixes included in this EPD and thus manufacturer specific cement impacts could result in variation of as much as 47.5%

DECLARED UNIT

The declared unit is 1 cubic yard of ready mixed concrete product. Key product variables include:

- Compressive strength - Compressive strengths are represented in the various mix designs and include the number of days after pouring as a part of the reference value: e.g. 3,000 psi @ 28 days; 4,000 psi @ 56 days; 6,000 psi @ 90 days; etc.
- Water to cementitious materials ratio (w/cm) – Varies but generally lower for higher strength non-air entrained mix designs (above 5,000 psi (34.5 MPa)) in accordance with ACI 211.1 recommendations.
- SCM use – various mix designs call for Portland cement displacement by incorporating fly ash (FA) and/or slag cement (SL).
- Admixtures use – Admixtures used was specified for the different mixes that were modeled. These admixtures included an air-entraining admixture, water reducing and accelerating admixtures, and high range water reducer admixtures
- The ready mixed concrete products represented in this EPD are comprised of (in order of greatest mass per mix): natural and crushed aggregates, portland or portland limestone cement, slag cement, batch water, and admixtures.

SYSTEM BOUNDARY

A summary of life cycle stages included in the EPD is identified in the figure below. This EPD covers A1-A3 life cycle stages (Cradle-to-Gate). A summary of activities excluded from the EPD is as follows:

- Production, manufacture, and construction of manufacturing capital goods and infrastructure.
- Production and manufacture of production equipment, delivery vehicles, and laboratory equipment.
- Personnel-related activities (travel, furniture, and office supplies)
- Energy and water se related to company management and sales activities.

BUILDING LIFE CYCLE INFORMATION MODULES (X: Included in LCA; MND: Module Not Declared)

Production State			Construction Stage		Use Stage							End-Of-Life Stage			
Extraction Production	Transport to Facility	Manufacturing	Transport to Site	Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational	Operational	De-Construction	Transport to Disposal	Waste Processing	Disposal of Waste
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

CUT-OFF RULES

The cut-off criteria for all activity stage flows considered within the system boundary conform with ISO 21930: 2017 Section 7.1.8. Specifically, the cut-off criteria were applied as follows:

- All inputs and outputs for which data are available are included in the calculated effects and no collected core process data are excluded.
- A one percent cut-off is considered for renewable and non-renewable primary energy consumption and the total mass of inputs within a unit process. The sum of the total neglected flows does not exceed 5% of all energy consumption and mass of inputs.
- All flows known to contribute a significant impact or to uncertainty (e.g., portland cement and admixtures) are included.
- The cut-off rules are not applied to hazardous and toxic material flows – all of which are included in the life cycle inventory.
- Proxy data was used for admixtures used that did not align with any of the admixture categories published in the EFCA EPDs. In those cases, the Water Reducing Admixture data was selected as a conservative assumption as per the NSF PCR Appendix A.

ALLOCATION

The allocation of co-products or secondary flows cross the system boundary conforms with the ISO 21930: 2017 Section 7.2.4. Specifically, the allocation criteria were applied as follows:

- Allocation was not applied to any of the gate-to-gate production facilities. For facilities that manufacture additional products (i.e. aggregate), the LCI flows at the facility specific to the concrete production were reported.
- For Secondary Data sources, the NSF PCR default allocation selection (i.e. “Cut-off” or “Alloc Rec”) was applied.
- The product category rules for this EPD recognize fly ash, silica fume and slag as recovered materials and thus the environmental impacts allocated to these materials are limited to the treatment and transportation required to use as a concrete material input.
- A portion (30%) of the reported fleet energy use for truck mixing plants was allocated to the mixing facility.

CALCULATED RESULTS A1-A3

Core Mandatory Impact Indicator		**per yd^3**	**per m^3**
Global warming potential	kg CO2e	234.67	306.95
Depletion potential of the stratospheric ozone layer	kg CFC11e	7.16E-06	9.36E-06
Acidification potential of soil and water sources	kg SO2e	0.64	0.83
Eutrophication potential	kg Ne	0.27	0.35
Formation potential of tropospheric ozone	kg O3e	12.15	15.89
Abiotic depletion potential for fossil resources	MJ, NCV	473.16	618.89
Abiotic depletion potential for non-fossil mineral resources	kg Sbe	1.52E-04	1.99E-04
Fossil fuel depletion	MJ Surplus	55.66	72.80
Use of Primary Resources			
Renewable primary energy carrier used as energy	MJ, NCV	49.55	64.81
Renewable primary energy carrier used as material	MJ, NCV	0.06	0.08
Non-renewable primary energy carrier used as energy	MJ, NCV	581.45	760.53
Non-renewable primary energy carrier used as material	MJ, NCV	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy			
Secondary material	kg	26.21	34.28
Renewable secondary fuel	MJ, NCV	12.00	15.70
Non-renewable secondary fuel	MJ, NCV	115.86	151.54
Recovered energy	MJ, NCV	0.00	0.00
Mandatory Inventory Parameters			
Consumption of freshwater resources	m3	1.92	2.52
Calcination and carbonation emissions	kg CO2e	0.00	0.00
Indicators Describing Waste			
Hazardous waste disposed	kg	0.00	0.00
Non-hazardous waste disposed	kg	68.34	89.39
High-level radioactive waste, conditioned, to final repository	m3	8.76E-08	1.15E-07
Intermediate- and low-level radioactive waste, to final repository	m3	4.19E-07	5.48E-07
Components for re-use	kg	0.00	0.00
Materials for recycling	kg	0.12	0.15
Materials for energy recovery	kg	0.00	0.00
Recovered energy exported from the product system	MJ, NCV	0.43	0.56

DATA SOURCES

Portland Cement and Limestone Cement, ASTM C595, AASHTO M240, or CSA A3001	Portland Limestone Cement 1 - Lehigh Cement, Picton, Ontario (PCA Avg EPD)	2021	North America	Technology: very good, Time: very good, Geography: very good, Completeness: very good, Reliability: very good
Slag Cement, ASTM C989	Slag Cement Association EPD of North America Slag Cement (2021)	2021	North America	Technology: very good, Time: very good, Geography: very good, Completeness: very good, Reliability: very good
Fly Ash, ASTM C618	None, no incoming burden, only inbound transport is considered*	N/A	N/A	N/A
Silica Fume, ASTM C1240	None, no incoming burden, only inbound transport is considered*	N/A	N/A	N/A
Crushed Aggregates, coarse and fine, ASTM C33	ecoinvent 3.4: "Gravel, crushed {RoW}| production | Cut-off, U" (2018), modified with US average electricity	2001	World/US	Technology: very good, Time: poor, Geography: good, Completeness: very good, Reliability: very good
Natural Aggregates, coarse and fine, ASTM C33	ecoinvent 3.4: "Gravel, round {RoW}| gravel and sand quarry operation | Cut-off, U" (2018), modified with US average electricity	2001	World/US	Technology: very good, Time: poor, Geography: good, Completeness: very good, Reliability: very good
Manufactured Lightweight Aggre- gates, ASTM C330	ecoinvent 3.4: Expanded clay {RoW}| production | Cut-off, U (2018), modified with US average electricity	2000	World/US	Technology: good, Time: poor, Geography: good, Completeness: very good, Reliability: very good
Admixtures, ASTM C494	GCP Applied Technologies LCA for Concrete Admixtures (2020)	2020	North America	Technology: very good, Time: very good, Geography: fair, Completeness: very good, Reliability: very good
Steel Fibers	CRSI EPD for Fabricated Steel Reinforcement (2017)	2017	North America	Technology: very good, Time: very good, Geography: fair, Completeness: very good, Reliability: very good
Synthetic Fibers	USLCI 2014: Polypropylene resin, at plant/RNA	2014	North America	Technology: very good, Time: very good, Geography: fair, Completeness: very good, Reliability: very good
Batch and Wash Water, ASTM C1602	ecoinvent 3.4: Tap water {RoW}| market for | Cut-off, U (2018), modified with US average electricity	2011	World/US	Technology: very good, Time: good, Geography: good, Completeness: very good, Reliability: very good
Road Transport	USLCI 2014: Transport, combination truck, short-haul, diesel powered/tkm/RNA (2014)	2010	North America	Technology: very good, Time: fair, Geography: very good, Completeness: very good, Reliability: very good
Rail Transport	USLCI 2014: Transport, train, diesel powered /US U (2014)	2007	North America	Technology: very good, Time: fair, Geography: very good, Completeness: very good, Reliability: very good
Ocean Transport	USLCI 2014: Transport, ocean freighter, average fuel mix/US U (2014)	2007	North America	Technology: very good, Time: fair, Geography: very good, Completeness: very good, Reliability: very good
Electricity	ecoinvent 3.4: Electricity, low voltage {XX}| market for | Cut-off, U (2018)	2015	North America	Technology: very good, Time: very good, Geography: very good, Completeness: very good, Reliability: very good
Diesel	USLCI 2014: Diesel, combusted in industrial boiler / US U (2014)	2007	North America	Technology: very good, Time: fair, Geography: very good, Completeness: very good, Reliability: very good
Gasoline	USLCI 2014: Gasoline, combusted in equipment /US U (2014)	2007	North America	Technology: very good, Time: fair, Geography: very good, Completeness: very good, Reliability: very good
Liquefied Propane Gas	USLCI 2014: Liquefied petroleum gas, combusted in industrial boiler /US U (2014)	2007	North America	Technology: very good, Time: fair, Geography: very good, Completeness: very good, Reliability: very good
Hazardous Solid Waste	ecoinvent 3.4: Hazardous waste, for incineration {RoW}| treatment of hazardous waste, hazardous waste incineration | Alloc, Rec, U (2018), modified with US electricity	2011	World/US	Technology: very good, Time: good, Geography: good, Completeness: very good, Reliability: very good
Non-Hazardous Solid Waste	ecoinvent 3.4: Inert waste {RoW}| treatment of, sanitary landfill | Alloc Rec, U (2018), modified with US average electricity	2011	World/US	Technology: very good, Time: good, Geography: good, Completeness: very good, Reliability: very good

REFERENCES

American Concrete Institute (2009) ACI 211.1: Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete

American Concrete Institute (2009) ACI 211.2: Standard Practice for Selecting Proportions for Structural Lightweight Concrete

American Concrete Institute (2008) ACI 318: Building Code Requirements for Structural Concrete.

ASTM International (2018) ASTM C94: Standard Specification for Ready-Mixed Concrete.

ASTM International General Program Instructions (2020) v8.0

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CSA Group (2014) CSA A23.1-09/A23.2-14 - Concrete materials and methods of concrete construction / Test methods and standard practices for concrete.

EN 15804:2012 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products.

European Federation of Concrete Admixture Associations (2015). EFCA Environmental Declarations for Admixtures.

ISO 14040 Environmental Management - Life cycle assessment - Principles and framework

ISO 14044:2006/AMD 1:2017/ AMD 2:2020 Environmental Management - Life Cycle Assessment - Requirements and Guidelines

International Organization for Standardization (2017) ISO 21930:2017 Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products and services.

National Renewable Energy Laboratory (2019) U.S. Life Cycle Inventory Database http://www.nrel.gov/lci/

NSF International (2019) Product Category Rule for Concrete, Version 1

Wernet, G., Bauer, C., Steubing, B., Reinhard, J., Moreno-Ruiz, E., & Weidema, B. (2016) The ecoinvent database version 3 (part I): overview and methodology. The International Journal of Life Cycle Assessment, 21, 1218–1230.

SECTION 01 91 19

EXTERIOR ENCLOSURE COMMISSIONING

PART 1 - GENERAL (Not Used)

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 GENERAL TESTING REQUIREMENTS

A. Certify that insulation systems have been installed, according to the Contract Documents and approved Shop Drawings and submittals.

B. Construction Checklists: Prepare and submit detailed construction checklists for insulation.

1. Slab
2. Footing
3. Wall
4. Ceiling

END OF SECTION

SECTION 02 41 16

SELECTIVE SITE DEMOLITION

PART 1 - GENERAL

1.1 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged.

B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Director ready for reuse.

C. Remove and Relocate: Detach items from existing construction, prepare for reuse, and reinstall in a new location as indicated where indicated.

D. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall in the same location.

E. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

F. Replace: Remove existing and provide new as indicated.

1.2 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Director that may be uncovered during demolition remain the property of Director.

1. Carefully salvage in a manner to prevent damage and promptly return to Director.

1.3 INFORMATIONAL SUBMITTALS

A. Proposed Protection Measures: Submit informational report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.

B. Schedule of Site Demolition Activities: Indicate the following:

1. Detailed sequence of demolition work, with starting and ending dates for each activity.
2. Temporary interruption of utility services. Indicate how long utility services will be interrupted.

3. Coordination for shutoff, capping or re-routing of utility services.

C. Inventory: Submit a list of items to be removed and salvaged and deliver to Director prior to start of demolition.

D. Predemolition Photographs or Video: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by demolition operations. Submit before the Work begins.

E. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

C. Predemolition Conference: Conduct conference at Project site.

1. Inspect and discuss condition of construction to be demolished.
2. Review and finalize demolition work schedule and verify availability of demolition personnel, equipment, and facilities needed to make progress and avoid delays.
3. Review and finalize protection requirements.
4. Review procedures for noise control and dust control.
5. Review procedures for protection of adjacent buildings.

1.5 PROJECT CONDITIONS

A. Director will occupy portions of the facility and/or buildings immediately adjacent to demolition area. Conduct demolition so Director's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Director as far as practical.

C. Notify Director’s Representative of discrepancies between existing conditions and Drawings before proceeding with demolition work.

D. After substantial completion, the area adjacent to the demolition area will be occupied. Conduct demolition so operations of occupied buildings will not be disrupted.

1. Provide not less than 72 hours' notice of activities that will affect operations of adjacent occupied buildings.
2. Maintain access to existing walkways, exits, and other facilities used by occupants of adjacent buildings.

a. Do not close or obstruct walkways, exits, or other facilities used by occupants of adjacent buildings without written permission from authorities having jurisdiction.

E. On-site storage or sale of removed items or materials is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

1.6 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. Satisfactory Soils: Comply with requirements in Section 31 20 00 "Earth Moving."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting demolition operations.

B. Review Project Record Documents of existing construction provided by Director. Director does not guarantee that existing conditions are same as those indicated in Project Record Documents.

C. Survey existing conditions and correlate with requirements indicated to determine whether removing any element might result in structural deficiency.

D. Verify that hazardous materials have been remediated before proceeding with demolition operations.

3.2 PREPARATION

A. Existing Utilities: Locate, identify, disconnect, and seal or cap off indicated utilities as required.

1. Director will arrange to shut off indicated utilities when requested by Contractor.
2. If removal, relocation, or abandonment of utility services will affect adjacent occupied buildings, then provide temporary utilities that bypass buildings and structures to be demolished and that maintain continuity of service to other buildings and structures.

3. Cut off pipe or conduit a minimum of 24 inches below grade. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing according to requirements of authorities having jurisdiction.

B. Existing Utilities: See plumbing, mechanical, and electrical Sections for shutting off, disconnecting, removing, and sealing or capping utilities. Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing.

C. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent unexpected movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of demolition.

D. Salvaged Items: Comply with the following:

1. Clean salvaged items of dirt and demolition debris.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Director.
4. Transport items to storage area designated by Director.
5. Protect items from damage during transport and storage.

E. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

F. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.

3.3 PROTECTION

A. Existing Facilities: Protect adjacent walkways, loading docks, building entries, and other building facilities during demolition operations. Maintain exits from existing buildings.

B. Existing Utilities: Maintain utility services to remain and protect from damage during demolition operations.

1. Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by Director and authorities having jurisdiction.

2. Provide temporary services during interruptions to existing utilities, as acceptable to Director and authorities having jurisdiction.

    a. Provide at least 72 hours notice to occupants of affected buildings if shutdown of service is required during changeover.

C. Temporary Protection: Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction and as indicated. Comply with requirements in Section 01 50 00 "Temporary Facilities and Controls."

D. Remove temporary barriers and protections where hazards no longer exist. Where open excavations or other hazardous conditions remain, leave temporary barriers and protections in place.

3.4 DEMOLITION, GENERAL

A. General: Demolish portions of indicated site improvements completely. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Do not use cutting torches until work area is cleared of flammable materials. Maintain portable fire-suppression devices during flame-cutting operations.
2. Maintain fire watch during and for at least 24 hours after flame cutting operations.
3. Maintain adequate ventilation when using cutting torches.
4. Locate demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

B. Site Access and Temporary Controls: Conduct demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Director and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
2. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.

C. Explosives: Use of explosives is not permitted.

3.5 DEMOLITION BY MECHANICAL MEANS

A. Salvage: Items to be removed and salvaged are indicated on Drawings.

B. Existing Utilities: Demolish existing utilities and below-grade utility structures that are within 5 feet outside footprint indicated for new construction. Abandon utilities outside this area.

1. Fill abandoned utility structures with satisfactory soil materials according to backfill requirements in Section 31 20 00 "Earth Moving."

3.6 SITE RESTORATION

A. Below-Grade Areas: Rough grade below-grade areas ready for further excavation or new construction.

B. Building-Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes. Provide a smooth transition between adjacent existing grades and new grades.

3.7 REPAIRS

A. Promptly repair damage to adjacent buildings caused by demolition operations.

3.8 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project site and legally dispose of them in an EPA-approved landfill acceptable to authorities having jurisdiction. See Section 01 74 19 "Construction Waste Management and Disposal" for recycling and disposal of demolition waste.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Do not burn demolished materials.

3.9 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by building demolition operations. Return adjacent areas to condition existing before building demolition operations began.

1. Clean roadways of debris caused by debris transport.

END OF SECTION

SECTION 02 82 13

ASBESTOS ABATEMENT

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. This Section specifies removal and disposal of asbestos-containing materials (ACMs) as noted on the Drawings.

B. Type of Asbestos Abatement Project:

1. Large Asbestos Abatement Project: An asbestos project involving the removal, disturbance, repair or handling of more than 160 square feet of ACM or more than 260 linear feet in accordance with New York State Industrial Code Rule 56 (Code Rule 56).

C. The Contractor shall be aware of all conditions of the Project and is responsible for verifying quantities and locations of all Work to be performed. Failure to do so shall not relieve the Contractor of its obligation to furnish all labor and materials necessary to perform the Work.

1.2 INFORMATION AVAILABLE TO THE CONTRACTOR

A. Existing 8-inch transite water main is presumed to contain asbestos.

B. Contractor is responsible for obtaining any/all variances from Industrial Code Rule 56, which are desired or necessary to perform the work. All variances must be obtained in a timely manner so as not to disturb the schedule of work and may not change the Scope of Work as indicated by the project plans and Specifications.

1.3 PROJECT MONITORING (BY OTHERS)

A. The Director shall engage the services of a third-party project monitoring and air sampling firm and will possess all certifications required by governmental entities.

1. Air sampling will be performed in accordance with NYS Industrial Code Rule 56.
2. Final project monitor visual inspections will be performed in accordance with NYS Industrial Code Rule 56.

B. The Contractor is required to ensure cooperation of its personnel with the Consultant for the air sampling and project monitoring portions of the project.

1.4 SUBMITTALS

A. Submit the following items for review by the Director’s Representative, Architect/Engineer, and Air/Project Monitoring Firm, prior to commencing work involving asbestos materials:

1. An Asbestos Abatement Plan:

a. A detailed site-specific plan of the work procedures to be used in the removal and demolition of materials containing asbestos. This plan must be approved prior to the start of any asbestos work. The plan shall include:

1) Location of asbestos control areas.
2) Location of decontamination units.
3) Plan for coordination between other trades.
4) Procedures for fire and medical emergencies.

2. If a site-specific variance is sought, submit one copy of the New York State Department of Labor site specific variance decision.

3. Disposal

a. Submit one copy of the transporter's current waste transporter permit.
b. Submit written evidence that the selected disposal facility is approved to receive asbestos-containing waste and is permitted by the applicable State agency and EPA.

4. Certificates of Compliance

a. A valid and current copy of the Contractor's New York State Asbestos Handling License.
b. A valid and current New York State Supervisor Certificate of the Project Supervisor assigned to the job.

B. Upon completion of the job as a condition of its acceptance or upon request of the Director, submit the following:

1. Asbestos Handler (Worker) Certificate and medical clearance documentation for each worker employed on the project.
2. Job log book containing:

a. Day-to-day record of personnel entering the work area.
b. Any significant events occurring during the abatement project.
c. Results of personnel air monitoring.

3. Original waste shipment and disposal site receipts showing that the ACM has been properly disposed. Completed waste shipment and disposal site receipts must be provided to the Director within 35 days of the waste leaving the site.

1.5 QUALITY ASSURANCE

A. Codes and Standards

1. Comply with applicable codes and standards including, but not necessarily limited to, the following. Where multiple requirements are specified, adhere to the more stringent requirements.

a. Code of Federal Regulations (CFR)

1) 29 CFR 1910.20, “Access to Employee Exposure and Medical Records” (OHSA)
2) 29 CFR 1910.38, “Employee Emergency Plans and Fire Prevention Plans” (OSHA)
3) 29 CFR 1910.134, “Respiratory Protection” (OSHA)
4) 29 CFR 1910.145, “Specification for Accidental Prevention Signs and Tags” (OSHA)
5) 29 CFR 1910.1200, “Hazard Communication Standard” “(OSHA)
6) 29 CFR 1926.62, “Construction Standard for Lead”
7) 29 CFR 1926.95-105, “Construction Standard for Personal Protection”
8) 29 CFR 1926.1101, “Safety and Health Regulations for Construction” (OSHA)
9) 29 CFR 1926.150, “Fire Protection” (OSHA)
10) 40 CFR 61, Subpart A, “General Provisions” (EPA) (NESHAPS)
11) 40 CFR 61, Subpart M, “National Emission Standards for Hazardous Air Pollutants (NESHAPS) Asbestos Regulations” (EPA)
12) 49 CFR Part 173, Subpart J, “Asbestos Waste Management” (DOT)

b. American National Standard Institute (ANSI)

1) Z9.2-79, “Fundamentals Governing the Design and Operation of Local Exhaust Systems”
2) Z88.2-92, “Practices for Respiratory Protection”

c. Underwriters’ Laboratories, Incorporated (UL) Publication

1) 586-85, “High Efficiency, Particulate, Air Filter Units”

d. New York State Department of Labor

1) 12 NYCRR 56, Title 12, Part 56 of the New York State Official Compilation of Codes, Rules and Regulations
2) Guidance Document on Amended Industrial Code Rule 56

e. New York State Department of Environmental Conservation (DEC)

1) 6 NYCRR Part 360 – Solid Waste Management Facilities
2) 6 NYCRR Part 364 – Waste Transporter Permits
3) 6 NYCRR Part 370 – Hazardous Waste Management System
4) 6 NYCRR Part 371 – Identification and Listing of Hazardous Waste
5) 6 NYCRR Part 372 – Hazardous Waste Manifest System and Related Standards for Generators, Transporters, and Facilities
6) 6 NYCRR Part 373 – Hazardous Waste Management Facilities

B. Notices and Permits

1. Comply with the codes and standards listed in this specification.
2. Contractor is responsible for applying for any permits required to complete the work.
3. Emergency Procedures:

a. Consult with local Fire Department in the preparation of the Emergency Procedures Plan for fire and medical emergencies.

4. Post at the entrance to the abatement area the following documents:

a. Copy of the Site-Specific Work Plan.
b. Copy of Industrial Code Rule 56.
c. Copies of any site-specific variances granted for the project.

1.6 SUBCONTRACTING

A. After Contract Award, no subcontracting of asbestos abatement work from one Contractor to another will be permitted.

1.7 PRE-ABATEMENT CONFERENCE

A. Prior to start of preparatory work under this Contract, the Contractor shall attend a pre-abatement conference and walk-through attended by the Director Representative(s) and Air Sampling/Project Monitoring Firm.

B. Agenda for this conference may include but not necessarily be limited to:

1. Contractor's scope of work, work plan, and schedule.
2. Coordination with other trades.
3. Contractor's work procedures including:

a. Methods of job site preparation and decontamination chamber set-up, work procedures, and removal methods, methods of handling removed material and disposal procedures; clean-up procedures and equipment; signs and labels; fire exits and emergency procedures.

4. Contractor's plan for 24-hour job security both for prevention of theft and for barring entry of curious but unprotected personnel into work areas.
5. Temporary utilities.

C. In conjunction with the conference the Contractor shall accompany the Director's Representative(s) and the Air Sampling and Project Monitoring Firm on a preconstruction walk-through, documenting existing condition of finishes, reviewing overall work plan, location of fire exits, fire protection equipment, water supply and temporary electric tie-in.

1.8 DELIVERY AND STORAGE

A. Deliver all materials to the job site in original packages and containers bearing manufacturer's name and label.

B. Store all materials at the job site in a suitable and designated area. Store materials subject to deterioration or damage away from wet or damp surfaces and under cover. Protect materials from unintended contamination.

C. Remove damaged or deteriorated materials and equipment from the job site. Materials and equipment contaminated with asbestos that cannot be cleaned shall be disposed of as asbestos debris as herein specified.

1.9 JOB CONDITIONS

A. Contractor is responsible for keeping the work area in a clean and safe condition. Contractor shall ensure that uncertified personnel or unauthorized visitors do not enter the abatement work area at any time.

1.10 TEMPORARY UTILITIES

A. Electric

1. Obtain electrical power from the facility's existing power distribution system.
2. Provide temporary 120-208 volt, single phase, three wire, 20 amp electric service with ground fault circuit interrupters (GFCI) for all electric requirements within the asbestos work area containing 5-20 amp, 208 volt negative air machines and lighting.
3. Provide a back-up emergency generator for the duration of the Abatement Project to be used should failure of the normal power source occur.
4. Provide temporary wiring and "weatherproof" receptacles insufficient quantity and location to serve all HEPA vacuum equipment and tools.
5. All temporary devices and wiring used in the work area shall be capable of decontamination procedures including HEPA vacuuming and wet-wiping.

B. Water

1. Provide temporary valved hot and cold water in sufficient quantity to complete the work.
2. Hot and cold water service shall be provided to decontamination chamber's shower.
3. Provide 3/4" cold water hose connection at decontamination equipment room.
4. The Contractor is to provide hot water to meet all regulation requirements.

1.11 ELECTRICAL CODES, STANDARDS, AND NOTIFICATIONS

A. Provide all products and perform all electrical installation and removal work in accordance with applicable requirements of:

1. National Electrical Code (NEC)
2. New York State Uniform Fire Prevention and Building Code.
3. NFPA 101, "Life Safety Code".

B. All electrical devices, materials, and packaged equipment shall meet the requirements of a recognized testing agency, such as the Underwriters' Laboratories, Incorporated, and shall bear its label.

C. If requested by the Director's Representative, where equipment other than that specified is proposed for use under this Contract, submit a list of installations within New York State where the proposed equipment has operated satisfactorily for a period of at least five years.

D. Notify and obtain permission from the Director 48 hours in advance of interrupting any utilities.

1.12 FIRE PROTECTION AND EMERGENCY EGRESS

A. Establish a system for alerting workers of fire or other hazards that require escape routes, evacuation of the work area, and development of an assigned meeting place.

B. Establish emergency and fire exits from the work area containment.

C. Provide a person onsite who is trained in First Aid and in the treatment of heat stress and hypothermia.

D. Provide chemical fire extinguishers on site for emergencies.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

A. Perform asbestos related work in accordance with the codes and standards listed in Quality Assurance.

B. Comply with all applicable OSHA worker protections requirements.
   1. Contractor is responsible for personal air sampling of all asbestos abatement personnel employed on the project as required by OSHA 29 CFR Part 1926.1101.

C. Contractor is responsible for all project notifications to building occupants, NYSDOL, and /or U.S. EPA. All notifications shall be conducted in a timely manner meeting all State and Federal requirements.

D. Should the area beyond the asbestos work area(s) become contaminated with asbestos-containing dust or debris as a consequence of the work, immediately institute emergency procedures. All costs incurred in decontaminating such non-work areas and the contents thereof shall be borne by the Contractor, at no additional cost to the Director.

E. Medical approval and certificates of training shall be on file prior to admittance of any individual to the asbestos control work area. Individuals approved for entry into the work area shall be listed in the logbook and sign in prior to entry.

F. If any suspect asbestos-containing materials not already sampled/characterized are encountered during demolition/renovation activities, discuss with the Director's Representative whether the material should be:

   1. Sampled by an appropriately-certified asbestos professional and submitted to a certified laboratory for asbestos analysis, or
   2. Assumed to be asbestos-containing, and abated by a licensed asbestos abatement contractor.

3.2 REMOVAL OF ASBESTOS-CONTAINING MATERIALS

A. Asbestos-containing materials shall be removed in accordance with the Contract Documents and the approved Asbestos Work Plan.

B. Sufficiently wet asbestos materials with a low pressure, airless fine spray of surfactant to ensure full penetration prior to material removal. Re-wet material that does not display evidence of saturation.

C. Perform cutting, drilling, abrading, or any penetration or disturbance of asbestos containing material in a manner to minimize the dispersal of asbestos fibers into the air. Use equipment and methods specifically designed to limit generation of airborne asbestos particles. All power operated tools used shall be provided with manufacturer HEPA equipped filtered local exhaust ventilation, as required by regulation.

D. All removed material shall be placed into 6 mil plastic disposal bags or other suitable container upon detachment from the substrate. Cleanup of accumulations of loose debris or waste shall be performed whenever there is enough accumulation to fill a single bag or container and minimally at the end of each work shift.

E. Large components shall be wrapped in two layers of 6 mil fire retardant plastic sheeting. Sharp components likely to tear plastic sheeting shall be placed in fiber drums or boxes and then wrapped with sheeting.

F. The use of metal shovels, metal dust pans, etc. are not permitted inside the work area.

3.3 WORK AREA DECONTAMINATION, CLEANING, AND CLEARANCE PROCEDURES

A. Following completion of gross abatement and after all accumulations of asbestos waste materials have been containerized, conduct cleaning and clearance procedures following all applicable regulations.

1. All bagged asbestos waste and unnecessary equipment shall be decontaminated and removed from the Work Area.
2. All surfaces in the Work Area shall be HEPA vacuumed and then wet cleaned.

B. Following completion of cleaning activities coordinate with the Air Sampling and Project Monitoring Firm to conduct work area clearance following all applicable regulations.

1. The Project Monitor shall conduct a visual inspection of the Work Area for cleanliness and completion of abatement.

C. As a result of any failed visual inspections, the Contractor will reclean the affected areas at no additional expense to the Director.

3.4 DISPOSAL OF ASBESTOS-CONTAINING MATERIAL

A. Remove all waste generated as part of the asbestos project from the project site within ten calendar days after the completion of the project or within one day of the waste disposal container/trailer becomes full, whichever occurs first.

B. Transport and dispose of all the asbestos-containing waste, related debris, and wastewater to the approved disposal site.

C. All generated waste removed from the site must be documented, accounted for and disposed of in accordance with the codes and standards listed in Quality Assurance.

3.5 RESTORATION OF UTILITIES

A. After final clearance, remove locks and restore power. All temporary power shall be disconnected, power lockouts removed and power restored. Remove all temporary plumbing.

3.6 RESTORATION OF FINISHES

A. Remove temporary decontamination facilities and restore area designated for these facilities to its original condition or better.

END OF SECTION

SECTION 03 10 00

CONCRETE FORMING AND ACCESSORIES

PART 1 - GENERAL

1.1 DEFINITIONS

A. Form-Facing Material: Temporary structure or mold for the support of concrete while the concrete is setting and gaining sufficient strength to be self-supporting.

B. Formwork: The total system of support of freshly placed concrete, including the mold or sheathing that contacts the concrete, as well as supporting members, hardware, and necessary bracing.

1.2 DELIVERY, STORAGE, AND HANDLING

A. Form Liners: Store form liners under cover to protect from sunlight.

B. Insulating Concrete Forms: Store forms off ground and under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

C. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Concrete Formwork: Design, engineer, erect, shore, brace, and maintain formwork, shores, and reshores in accordance with ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads, so that resulting concrete conforms to the required shapes, lines, and dimensions.

1. Design wood panel forms in accordance with APA's "Concrete Forming Design/Construction Guide."
2. Design formwork to limit deflection of form-facing material to 1/240 of center-to-center spacing of supports.
    a. For architectural concrete specified in Section 03 33 00 "Architectural Concrete," limit deflection of form-facing material, studs, and walers to 0.0025 times their respective clear spans (L/400).

2.2 FORM-FACING MATERIALS

A. As-Cast Surface Form-Facing Material:

1. Provide continuous, true, and smooth concrete surfaces.
2. Furnish in largest practicable sizes to minimize number of joints.

3. Acceptable Materials: As required to comply with Surface Finish designations specified in Section 03 30 00 "Cast-In-Place Concrete, and as follows:
   a. Plywood, metal, or other approved panel materials.

B. Concealed Surface Form-Facing Material: Lumber, plywood, metal, plastic, or another approved material.

1. Provide lumber dressed on at least two edges and one side for tight fit.

2.3 WATERSTOPS

A. Self-Expanding Butyl Strip Waterstops: Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch.

1. Sika USA; Basis of Design manufacturer
2. JPS Specialties
3. Approved equal

2.4 RELATED MATERIALS

A. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.

B. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
2. Form release agent for form liners shall be acceptable to form liner manufacturer.

C. Form Ties: Factory-fabricated, removable or snap-off, glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
2. Furnish ties that, when removed, leave holes no larger than 1 inch in diameter in concrete surface.

PART 3 - EXECUTION

3.1 INSTALLATION OF FORMWORK

A. Comply with ACI 301.

B. Construct formwork, so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117 and to comply with the Surface Finish designations specified in Section 03 30 00 "Cast-In-Place Concrete" for as-cast finishes .

C. Limit concrete surface irregularities as follows:

1. Surface Finish-1.0: ACI 117 Class D, 1 inch.
2. Surface Finish-2.0: ACI 117 Class B, 1/4 inch.
3. Surface Finish-3.0: ACI 117 Class A, 1/8 inch.

D. Construct forms tight enough to prevent loss of concrete mortar.

1. Minimize joints.
2. Exposed Concrete: Symmetrically align joints in forms.

E. Construct removable forms for easy removal without hammering or prying against concrete surfaces.

1. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces.
2. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
3. Install keyways, reglets, recesses, and other accessories, for easy removal.

F. Do not use rust-stained, steel, form-facing material.

G. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces.

1. Provide and secure units to support screed strips.
2. Use strike-off templates or compacting-type screeds.

H. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible.

1. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar.
2. Locate temporary openings in forms at inconspicuous locations.

I. Chamfer exterior corners and edges of permanently exposed concrete.

J. At construction joints, overlap forms onto previously placed concrete not less than 12 inches.

K. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work.

1. Determine sizes and locations from trades providing such items.
2. Obtain written approval of Director’s Representative prior to forming openings not indicated on Drawings.

L. Construction and Movement Joints:

1. Construct joints true to line with faces perpendicular to surface plane of concrete.
2. Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Director’s Representative.

3. Place joints perpendicular to main reinforcement.
4. Locate joints for beams, slabs, joists, and girders in the middle third of spans.
   a. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
6. Space vertical joints in walls as indicated on Drawings.
   a. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.

M. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection.

1. Locate ports and openings in bottom of vertical forms, in inconspicuous location, to allow flushing water to drain.
2. Close temporary ports and openings with tight-fitting panels, flush with inside face of form, and neatly fitted, so joints will not be apparent in exposed concrete surfaces.

N. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

O. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

P. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 INSTALLATION OF EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete.

1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.
3. Clean embedded items immediately prior to concrete placement.

3.3 INSTALLATION OF WATERSTOPS

A. Flexible Waterstops: Install in construction joints and at other joints indicated to form a continuous diaphragm.

1. Install in longest lengths practicable.
2. Locate waterstops in center of joint unless otherwise indicated on Drawings.
3. Allow clearance between waterstop and reinforcing steel of not less than 2 times the largest concrete aggregate size specified in Section 03 30 00 "Cast-In-Place Concrete."
4. Secure waterstops in correct position at 12 inches on center.
5. Field fabricate joints in accordance with manufacturer's instructions using heat welding.

a. Miter corners, intersections, and directional changes in waterstops.
b. Align center bulbs.

6. Clean waterstops immediately prior to placement of concrete.
7. Support and protect exposed waterstops during progress of the Work.

B. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated on Drawings, according to manufacturer's written instructions, by adhesive bonding, mechanically fastening, and firmly pressing into place.

1. Install in longest lengths practicable.
2. Locate waterstops in center of joint unless otherwise indicated on Drawings.
3. Protect exposed waterstops during progress of the Work.

3.4 REMOVING AND REUSING FORMS

A. Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations, and curing and protection operations need to be maintained.

1. Leave formwork for beam soffits, joists, slabs, and other structural elements that support weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

B. Clean and repair surfaces of forms to be reused in the Work.

1. Split, frayed, delaminated, or otherwise damaged form-facing material are unacceptable for exposed surfaces.
2. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints.

1. Align and secure joints to avoid offsets.
2. Do not use patched forms for exposed concrete surfaces unless approved by Director’s Representative.

3.5 SHORING AND RESHORING INSTALLATION

A. Comply with ACI 318 and ACI 301 for design, installation, and removal of shoring and reshoring.

1. Do not remove shoring or reshoring until measurement of slab tolerances is complete.

B. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

END OF SECTION

SECTION 03 20 00

CONCRETE REINFORCING

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For the following:

1. Mechanical splice couplers.

B. Shop Drawings: Comply with ACI SP-066:

1. Include placing drawings that detail fabrication, bending, and placement for all concrete reinforcement.
2. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, location of splices, lengths of lap splices, details of mechanical splice couplers, details of welding splices, tie spacing, hoop spacing, and supports for concrete reinforcement.

C. Construction Joint Layout: Indicate proposed construction joints required to build the structure.

1. Location of construction joints is subject to approval of Architect.

D. Environmental Product Declarations: Provide current Environmental Product Declarations (EPDs), that include the amount of embodied carbon in concrete reinforcing.

1. Acceptable EPDs are non-expired, Product-specific, Facility or Plant-specific, or Supply Chain-specific Type III (Third-Party Reviewed), in adherence with ISO 14025 Environmental labels and declarations, ISO 14044 Environmental management – Life cycle assessment, and ISO 21930 Core rules for environmental product declarations of construction products and services.
2. Provide the EPD Material Tracking Form containing the total anticipated quantity/volume/weight (matching the units used in the EPDs) of each product being incorporated into the project.
    a. With each application for payment, provide an updated EPD Material Tracking Form and copies of delivery tickets for each product incorporated into the project for the period covered by the payment application.

1.2 INFORMATIONAL SUBMITTALS

A. Welding certificates.

1. Reinforcement To Be Welded: Welding procedure specification in accordance with AWS D1.4/D1.4M.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

1. Store reinforcement to avoid contact with earth.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A615/A615M, Grade 60, deformed.

B. Headed-Steel Reinforcing Bars: ASTM A970/A970M.

C. Plain-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, plain, fabricated from as-drawn steel wire into flat sheets.

D. Deformed-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, flat sheet.

2.2 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A615/A615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.

B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place.

1. Manufacture bar supports from steel wire, plastic, or precast concrete in accordance with CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
   a. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.

C. Mechanical Splice Couplers: ACI 318 Type 1 Type 2, same material of reinforcing bar being spliced; tension-compression type dowel-bar type mechanical-lap type.

D. Steel Tie Wire: ASTM A1064/A1064M, annealed steel, not less than 0.0508 inch in diameter.

2.3 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

PART 3 - EXECUTION

3.1 PREPARATION

A. Protection of In-Place Conditions:

1. Do not cut or puncture vapor retarder.
2. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

3.2 INSTALLATION OF STEEL REINFORCEMENT

A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.

B. Accurately position, support, and secure reinforcement against displacement.

1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.
2. Do not tack weld crossing reinforcing bars.

C. Preserve clearance between bars of not less than 1 inch, not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.

D. Provide concrete coverage in accordance with ACI 318.

E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

F. Splices: Lap splices as indicated on Drawings.

1. Bars indicated to be continuous, and all vertical bars to be lapped not less than 36 bar diameters at splices, or 24 inches, whichever is greater.
2. Stagger splices in accordance with ACI 318.
3. Mechanical Splice Couplers: Install in accordance with manufacturer's instructions.
4. Weld reinforcing bars in accordance with AWS D1.4/D 1.4M, where indicated on Drawings.

G. Install welded-wire reinforcement in longest practicable lengths.

1. Support welded-wire reinforcement in accordance with CRSI "Manual of Standard Practice."
   a. For reinforcement less than W4.0 or D4.0, continuous support spacing to not exceed 12 inches.
2. Lap edges and ends of adjoining sheets at least one wire spacing plus 2 inches for plain wire and 8 inches for deformed wire.
3. Offset laps of adjoining sheet widths to prevent continuous laps in either direction.
4. Lace overlaps with wire.

3.3 JOINTS

A. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Place joints perpendicular to main reinforcement.

2. Continue reinforcement across construction joints unless otherwise indicated.
3. Do not continue reinforcement through sides of strip placements of floors and slabs.

B. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length, to prevent concrete bonding to one side of joint.

3.4 INSTALLATION TOLERANCES

A. Comply with ACI 117.

3.5 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a special inspector to perform field tests and inspections and prepare test reports.

B. Inspections:

1. Refer to drawings.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.

B. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

1.2 ACTION SUBMITTALS

A. Product Data: For each of the following.

1. Portland cement.
2. Fly ash.
3. Slag cement.
4. Blended hydraulic cement.
5. Silica fume.
6. Aggregates.
7. Admixtures:
   a. Include limitations of use, including restrictions on cementitious materials, supplementary cementitious materials, air entrainment, aggregates, temperature at time of concrete placement, relative humidity at time of concrete placement, curing conditions, and use of other admixtures.
8. Vapor retarders.
9. Floor and slab treatments.
10. Liquid floor treatments.
11. Curing materials.
12. Joint fillers.
13. Repair materials.

B. Design Mixtures: For each concrete mixture, include the following:

1. Mixture identification.
2. Minimum 28-day compressive strength.
3. Maximum w/cm.
4. Slump limit.
5. Air content.
6. Nominal maximum aggregate size.
7. Indicate amounts of mixing water to be withheld for later addition at Project site if permitted.

C. Product Declarations: Provide current Environmental Product Declarations (EPDs), that include the amount of embodied carbon in cast-In-place concrete.

1. Acceptable EPDs are non-expired, Product-specific, Facility or Plant-specific, or Supply Chain-specific Type III (Third-Party Reviewed), in adherence with ISO 14025 Environmental labels and declarations, ISO 14044 Environmental management – Life cycle assessment, and ISO 21930 Core rules for environmental product declarations of construction products and services.
2. Provide the EPD Material Tracking Form containing the total anticipated quantity/volume/weight (matching the units used in the EPDs) of each product being incorporated into the project.
    a. With each application for payment, provide an updated EPD Material Tracking Form and copies of delivery tickets for each product incorporated into the project for the period covered by the payment application.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For the following:

1. Installer: Include copies of applicable ACI certificates.

B. Preconstruction Test Reports: For each mix design.

C. Field quality-control reports.

D. Minutes of preinstallation conference.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs Project personnel qualified as an ACI-certified Flatwork Technician and Finisher and a supervisor who is a certified ACI Flatwork Concrete Finisher/Technician or an ACI Concrete Flatwork Technician.

1. Post-Installed Concrete Anchors Installers: ACI-certified Adhesive Anchor Installer.

B. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.

1. Manufacturer certified in accordance with NRMCA's "Certification of Ready Mixed Concrete Production Facilities." or NYSDOT approved.

1.5 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on each concrete mixture.

1. Include the following information in each test report:
    a. Admixture dosage rates.

b. Slump.
c. Air content.
d. Seven-day compressive strength.
e. 28-day compressive strength.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with ASTM C94/C94M and ACI 301.

1.7 FIELD CONDITIONS

A. Cold-Weather Placement: Comply with ACI 301 and ACI 306.1 and as follows.

1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
2. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
3. Do not use frozen materials or materials containing ice or snow.
4. Do not place concrete in contact with surfaces less than 35 deg F, other than reinforcing steel.
5. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1, and as follows:

1. Maintain concrete temperature at time of discharge to not exceed 95 deg F.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with ACI 301 unless modified by requirements in the Contract Documents.

2.2 CONCRETE MATERIALS

A. Maximum carbon content of concrete shall be in accordance with NY State Buy Clean Concrete Guidelines, including but not limited to the following limits:

1. Compressive strength 0-2500 psi: 275 kg CO_2 per CY
2. Compressive strength 2501-3000 psi: 302 kg CO_2 per CY
3. Compressive strength 3001-4000 psi: 360 kg CO_2 per CY
4. Compressive strength 4001-5000 psi: 434 kg CO_2 per CY

A. Source Limitations:

1. Obtain all concrete mixtures from a single ready-mixed concrete manufacturer for entire Project.
2. Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant.
3. Obtain aggregate from single source.
4. Obtain each type of admixture from single source from single manufacturer.
5. Concrete mixes must comply with the Global Warming Potential (GWP) limits set by the NYS Buy Clean Concrete Law for low embodied carbon concrete, as provided in the table below:

Specified compressive strength (f'c in PSI)	Maximum GWP Limits for Low Embodied Carbon Concrete (kilograms of carbon dioxide equivalent per cubic yard - CO_2e kg/y^3)
0 – 2,500	275
2,501 – 3,000	302
3,001 – 4,000	360
4,001 – 5,000	434
5,001 – 6,000	458
6,001 – 8,000	541

B. Cementitious Materials:

1. Portland Cement: ASTM C150/C150M, Type I/II , .
2. Fly Ash: ASTM C618, Class C or F.
3. Slag Cement: ASTM C989/C989M, Grade 100 or 120.
4. Blended Hydraulic Cement: ASTM C595/C595M, Type IS, portland blast-furnace slag cement.
5. Silica Fume: ASTM C1240 amorphous silica.

C. Normal-Weight Aggregates: ASTM C33/C33M,Class 4S coarse aggregate or better, graded. Provide aggregates from a single source.

1. Alkali-Silica Reaction: Comply with one of the following:
   a. Expansion Result of Aggregate: Not more than 0.04 percent at one-year when tested in accordance with ASTM C1293.
   b. Expansion Results of Aggregate and Cementitious Materials in Combination: Not more than 0.10 percent at an age of 16 days when tested in accordance with ASTM C1567.
   c. Alkali Content in Concrete: Not more than 4 lb./cu. yd. for moderately reactive aggregate or 3 lb./cu. yd. for highly reactive aggregate, when tested in accordance with ASTM C1293 and categorized in accordance with ASTM C1778, based on alkali content being calculated in accordance with ACI 301.
   d. NYSDOT Approved Source: Approved for use in concrete and not indicated to have “ASR Potential”.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

D. Air-Entraining Admixture: ASTM C260/C260M.

E. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride .

1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
2. Retarding Admixture: ASTM C494/C494M, Type B.
3. Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
5. High-Range, Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II.
7. Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C494/C494M, Type C.
    a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
        1) Euclid Chemical Company (The); an RPM company.
        2) Master Builders Solutions.
        3) Sika Corporation.

F. Water and Water Used to Make Ice: ASTM C94/C94M, potable

2.3 VAPOR RETARDERS

A. Sheet Vapor Retarder, Class A: ASTM E1745, Class A ; not less than 10 mils thick. Include manufacturer's recommended adhesive or pressure-sensitive tape.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. ISI Building Products.
    b. Poly-America, L.P.
    c. Stego Industries, LLC.
    d. W. R. Meadows, Inc.

2.4 LIQUID FLOOR TREATMENTS

A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. Dayton Superior Corporation.
    b. Kaufman Products, Inc.
    c. W. R. Meadows, Inc.
    d. Ashford Formula

2.5 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Kaufman Products, Inc.
   b. W. R. Meadows, Inc.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

C. Moisture-Retaining Cover: ASTM C171, polyethylene film burlap-polyethylene sheet.

1. Color:
   a. Ambient Temperature Below 50 deg F: Black.
   b. Ambient Temperature between 50 deg F and 85 deg F: Any color.
   c. Ambient Temperature Above 85 deg F: White.

D. Water: Potable or complying with ASTM C1602/C1602M.

E. Clear, Waterborne, Membrane-Forming, Dissipating Curing Compound: ASTM C309, Type 1, Class B.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Dayton Superior.
   b. Kaufman Products, Inc.
   c. W.R. Meadows, Inc.

F. Clear, Waterborne, Membrane-Forming, Curing and Sealing Compound: ASTM C1315, Type 1, Class A.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Dayton Superior Corporation.
   b. Kaufman Products, Inc.
   c. W. R. Meadows, Inc.

2.6 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber or ASTM D1752, cork or self-expanding cork.

B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 in accordance with ASTM D2240.

C. Bonding Agent: ASTM C1059/C1059M, Type II, nonredispersible, acrylic emulsion or styrene butadiene.

D. Epoxy Bonding Adhesive: ASTM C881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade and class to suit requirements, and as follows:

1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

E. Floor Slab Protective Covering: Eight-feet- wide cellulose fabric.

2.7 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand, as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than 5000 psi at 28 days when tested in accordance with ASTM C109/C109M.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.

1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5000 psi at 28 days when tested in accordance with ASTM C109/C109M.

2.8 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with ACI 301.

1. Use a qualified testing agency for preparing and reporting proposed mixture designs, based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

1. Fly Ash or Other Pozzolans: 25 percent by mass.
2. Slag Cement: 40 percent by mass.
3. Silica Fume: 10 percent by mass.
4. Total of Fly Ash or Other Pozzolans, Slag Cement, and Silica Fume: 50 percent by mass, with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceeding 10 percent by mass.
5. Total of Fly Ash or Other Pozzolans and Silica Fume: 35 percent by mass with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceeding 10 percent by mass.

C. Admixtures: Use admixtures in accordance with manufacturer's written instructions.

1. Use water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete, concrete for parking structure slabs, and concrete with a w/cm below 0.50.
4. Use air-entraining admixture in exterior concrete only

2.9 CONCRETE MIXTURES

A. Normal-weight concrete used for footings, foundation walls, and piers.

1. Exposure Class: ACI 318 (ACI 318M) F1 S0 W0 C1.
2. Minimum Compressive Strength: 4000 psi at 28 days.
3. Maximum w/cm: 0.45.
4. Slump Limit: 4 inches, plus or minus 1 inch .
5. Air Content:
   a. Exposure Class F1: 4.5 percent, plus or minus 1.5 percent at point of delivery for concrete containing 1-inch nominal maximum aggregate size.
6. Limit water-soluble, chloride-ion content in hardened concrete to 0.30 percent by weight of cement.

B. Normal-weight concrete used for interior slab-on-ground.

1. Exposure Class: ACI 318 (ACI 318M) F1 S0 W0 C1.
2. Minimum Compressive Strength: 4000 psi at 28 days.
3. Maximum w/cm: 0.45.
4. Slump Limit: 4 inches, plus or minus 1 inch .
5. Air Content:
   a. Do not use an air-entraining admixture or allow total air content to exceed 3 percent for concrete used in trowel-finished floors.
6. Limit water-soluble, chloride-ion content in hardened concrete to 0.30 percent by weight of cement.

C. Normal-weight concrete used for exterior slabs-on-ground.

1. Exposure Class: ACI 318 (ACI 318M) F3 S0 W0 C2.
2. Minimum Compressive Strength: 5000 psi at 28 days.
3. Maximum w/cm: 0.40 .
4. Minimum Cementitious Materials Content: 610 lb/cu. yd..
5. Slump Limit: 4 inches , plus or minus 1 inch .
6. Air Content:
   a. 6 percent, plus or minus 1.5 percent at point of delivery for concrete containing 1-inch (25-mm) nominal maximum aggregate size.
7. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

2.10 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94/C94M and ASTM C1116/C1116M, and furnish batch ticket information.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:

1. Before placing concrete, verify that installation of concrete forms, accessories, and reinforcement, and embedded items is complete and that required inspections have been performed.
2. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Pre-Installation Conference:

1. Before scheduling concrete delivery, notify Director’s Representative at least five (5) days in advance to facilitate coordination of a pre-installation conference.

B. Provide reasonable auxiliary services to accommodate field testing and inspections, acceptable to testing agency, including the following:

1. Daily access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Secure space for storage, initial curing, and field curing of test samples, including source of water and continuous electrical power at Project site during site curing period for test samples.
4. Security and protection for test samples and for testing and inspection equipment at Project site.

3.3 INSTALLATION OF EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining Work that is attached to or supported by cast-in-place concrete.

1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of ANSI/AISC 303.

3.4 INSTALLATION OF VAPOR RETARDER

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder in accordance with ASTM E1643 and manufacturer's written instructions.

1. Install vapor retarder with longest dimension parallel with direction of concrete pour.
2. Face laps away from exposed direction of concrete pour.
3. Lap vapor retarder over footings and grade beams not less than 6 inches, sealing vapor retarder to concrete.
4. Lap joints 6 inches and seal with manufacturer's recommended tape.
5. Terminate vapor retarder at the top of floor slabs, grade beams, and pile caps, sealing entire perimeter to floor slabs, grade beams, foundation walls, or pile caps.
6. Seal penetrations in accordance with vapor retarder manufacturer's instructions.
7. Protect vapor retarder during placement of reinforcement and concrete.
    a. Repair damaged areas by patching with vapor retarder material, overlapping damages area by 6 inches on all sides, and sealing to vapor retarder.

3.5 JOINTS

A. Construct joints true to line, with faces perpendicular to surface plane of concrete.

B. Construction Joints: Coordinate with floor slab pattern and concrete placement sequence.

1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Director’s Representative.
2. Place joints perpendicular to main reinforcement.
    a. Continue reinforcement across construction joints unless otherwise indicated.
    b. Do not continue reinforcement through sides of strip placements of floors and slabs.
3. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
4. Locate joints for beams, slabs, joists, and girders at third points of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
6. Space vertical joints in walls as indicated on Drawings no more than 30 feet . Unless otherwise indicated on Drawings, locate vertical joints beside piers integral with walls, near corners, and in concealed locations where possible.

7. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
8. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Control Joints in Slabs-on-Ground: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Grooved Joints: Form control joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of control joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
2. Sawed Joints: Form control joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random cracks.

D. Isolation Joints in Slabs-on-Ground: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated on Drawings.
2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface, where joint sealants, specified in Section 07 92 00 "Joint Sealants," are indicated.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E. Doweled Joints:

1. Install dowel bars and support assemblies at joints where indicated on Drawings.
2. Lubricate or asphalt coat one-half of dowel bar length to prevent concrete bonding to one side of joint.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and vapor retarder is complete and that required inspections are completed.

1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.
2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.

B. Notify Director’s Representative and testing and inspection agencies 24 hours prior to commencement of concrete placement.

C. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Director's Representative in writing, but not to exceed the amount indicated on the concrete delivery ticket.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.

1. If a section cannot be placed continuously, provide construction joints as indicated.
2. Deposit concrete to avoid segregation.
3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
4. Consolidate placed concrete with mechanical vibrating equipment in accordance with ACI 301.
    a. Do not use vibrators to transport concrete inside forms.
    b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer.
    c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
    d. At each insertion, limit duration of vibration to time necessary to consolidate concrete, and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Do not place concrete floors and slabs in a checkerboard sequence.
2. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
3. Maintain reinforcement in position on chairs during concrete placement.
4. Screed slab surfaces with a straightedge and strike off to correct elevations.
5. Level concrete, cut high areas, and fill low areas.
6. Slope surfaces uniformly to drains where required.
7. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface.
8. Do not further disturb slab surfaces before starting finishing operations.

3.7 FINISHING FORMED SURFACES

A. As-Cast Surface Finishes:

1. ACI 301 Surface Finish SF-1.0: As-cast concrete texture imparted by form-facing material.
    a. Patch voids larger than 1-1/2 inches wide or 1/2 inch deep.
    b. Remove projections larger than 1 inch.

c. Tie holes do not require patching.
d. Surface Tolerance: ACI 117 Class D.
e. Apply to concrete surfaces not exposed to public view and backfilled with soil.

2. ACI 301 Surface Finish SF-3.0:
   a. Patch voids larger than 3/4 inch wide or 1/2 inch deep.
   b. Remove projections larger than 1/8 inch.
   c. Patch tie holes.
   d. Surface Tolerance: ACI 117 Class A.
   e. Locations: Apply to concrete surfaces exposed to public view, to receive a rubbed finish, or to be covered with a coating or covering material applied directly to concrete.

3.8 FINISHING FLOORS AND SLABS

A. Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Scratch Finish:

1. While still plastic, texture concrete surface that has been screeded and bull-floated or darbied.
2. Use stiff brushes, brooms, or rakes to produce a profile depth of 1/4 inch in one direction.
3. Apply scratch finish to surfaces to receive concrete floor toppings to receive mortar setting beds for bonded cementitious floor finishes .

C. Float Finish:

1. When bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operation of specific float apparatus, consolidate concrete surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats.
2. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture and complies with ACI 117 tolerances for conventional concrete.
3. Apply float finish to surfaces to receive trowel finish .

D. Trowel Finish:

1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.
2. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance.
3. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
4. Do not add water to concrete surface.
5. Do not apply hard-troweled finish to concrete, which has a total air content greater than 3 percent.

6. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system .
7. Finish surfaces to the following tolerances, in accordance with ASTM E1155, for a randomly trafficked floor surface:
    a. Slabs on Ground:
        1) Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.- long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inchand also no more than 1/16 inch in 2 feet.

E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces to parking garage floors and surfaces indicated on Drawings. While concrete is still plastic, slightly scarify surface with a fine broom perpendicular to main traffic route.

1. Coordinate required final finish with Director's Representative before application.
2. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and locations indicated on Drawings.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.
2. Coordinate required final finish with Director's Representative before application.

3.9 INSTALLATION OF MISCELLANEOUS CONCRETE ITEMS

A. Filling In:

1. Fill in holes and openings left in concrete structures after Work of other trades is in place unless otherwise indicated.
2. Mix, place, and cure concrete, as specified, to blend with in-place construction.
3. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations:

1. Coordinate sizes and locations of concrete bases with actual equipment provided.
2. Construct concrete bases 4 inches high unless otherwise indicated on Drawings, and extend base not less than 6 inches in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated on Drawings, or unless required for seismic anchor support.
3. Minimum Compressive Strength: 4000 psi at 28 days.

4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete substrate.
6. Prior to pouring concrete, place and secure anchorage devices.
    a. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
    b. Cast anchor-bolt insert into bases.
    c. Install anchor bolts to elevations required for proper attachment to supported equipment.

3.10 CONCRETE CURING

A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

1. Comply with ACI 301 and ACI 306.1 for cold weather protection during curing.
2. Comply with ACI 301 and ACI 305.1 for hot-weather protection during curing.
3. Maintain moisture loss no more than 0.2 lb/sq. ft. x h before and during finishing operations.

B. Curing Formed Surfaces: Comply with ACI 308.1 as follows:

1. Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces.
2. If forms remain during curing period, moist cure after loosening forms.
3. If removing forms before end of curing period, continue curing for remainder of curing period, as follows:
    a. Continuous Fogging: Maintain standing water on concrete surface until final setting of concrete.
    b. Continuous Sprinkling: Maintain concrete surface continuously wet.
    c. Absorptive Cover: Pre-dampen absorptive material before application; apply additional water to absorptive material to maintain concrete surface continuously wet.
    d. Water-Retention Sheeting Materials: Cover exposed concrete surfaces with sheeting material, taping, or lapping seams.
    e. Membrane-Forming Curing Compound: Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
        1) Recoat areas subject to heavy rainfall within three hours after initial application.
        2) Maintain continuity of coating and repair damage during curing period.

C. Curing Unformed Surfaces: Comply with ACI 308.1 as follows:

1. Begin curing immediately after finishing concrete.
2. Interior Concrete Floors:

a. Floors to Receive Floor Coverings Specified in Other Sections: Contractor has option of the following:
   1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
      a) Lap edges and ends of absorptive cover not less than 12-inches.
      b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
   2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive.
      a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
      b) Cure for not less than seven days.
   3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
      a) Water.
      b) Continuous water-fog spray.

b. Floors to Receive Penetrating Liquid Floor Treatments: Contractor has option of the following:
   1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
      a) Lap edges and ends of absorptive cover not less than 12 inches.
      b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
   2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive.
      a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
      b) Cure for not less than seven days.
   3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
      a) Water.
      b) Continuous water-fog spray.

c. Floors to Receive Urethane Flooring:
   1) As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
   2) Rewet absorptive cover, and cover immediately with polyethylene moisture-retaining cover with edges lapped 6 inches and sealed in place.

3) Secure polyethylene moisture-retaining cover in place to prohibit air from circulating under polyethylene moisture-retaining cover.
4) Leave absorptive cover and polyethylene moisture-retaining cover in place for duration of curing period, but not less than 28 days.

d. Floors to Receive Curing and Sealing Compound:
1) Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller in accordance with manufacturer's written instructions.
2) Recoat areas subjected to heavy rainfall within three hours after initial application.
3) Repeat process 24 hours later, and apply a second coat. Maintain continuity of coating, and repair damage during curing period.

3.11 TOLERANCES

A. Conform to ACI 117.

3.12 APPLICATION OF LIQUID FLOOR TREATMENTS

A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment in accordance with manufacturer's written instructions.

1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
2. Do not apply to concrete that is less than 28 days' old.
3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing.
4. Rinse with water; remove excess material until surface is dry.
5. Apply a second coat in a similar manner if surface is rough or porous.

B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller in accordance with manufacturer's written instructions.

3.13 JOINT FILLING

A. Prepare, clean, and install joint filler in accordance with manufacturer's written instructions.

1. Defer joint filling until concrete has aged at least one month(s).
2. Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.

C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints.

D. Overfill joint, and trim joint filler flush with top of joint after hardening.

3.14 CONCRETE SURFACE REPAIRS

A. Defective Concrete:

1. Repair and patch defective areas when approved by Director's Representative.
2. Remove and replace concrete that cannot be repaired and patched to Director's Representative's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete.
   a. Limit cut depth to 3/4 inch.
   b. Make edges of cuts perpendicular to concrete surface.
   c. Clean, dampen with water, and brush-coat holes and voids with bonding agent.
   d. Fill and compact with patching mortar before bonding agent has dried.
   e. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement, so that, when dry, patching mortar matches surrounding color.
   a. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching.
   b. Compact mortar in place and strike off slightly higher than surrounding surface.
3. Repair defects on concealed formed surfaces that will affect concrete's durability and structural performance as determined by Director's Representative.

D. Repairing Unformed Surfaces:

1. Test unformed surfaces, such as floors and slabs, for finish, and verify surface tolerances specified for each surface.
   a. Correct low and high areas.
   b. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
2. Repair finished surfaces containing surface defects, including spalls, popouts, honeycombs, rock pockets, crazing, and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
3. After concrete has cured at least 14 days, correct high areas by grinding.
4. Correct localized low areas during, or immediately after, completing surface-finishing operations by cutting out low areas and replacing with patching mortar.
   a. Finish repaired areas to blend into adjacent concrete.

5. Correct other low areas scheduled to receive floor coverings with a repair underlayment.
    a. Prepare, mix, and apply repair underlayment and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
    b. Feather edges to match adjacent floor elevations.
6. Correct other low areas scheduled to remain exposed with repair topping.
    a. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations.
    b. Prepare, mix, and apply repair topping and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
7. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete.
    a. Remove defective areas with clean, square cuts, and expose steel reinforcement with at least a 3/4-inch clearance all around.
    b. Dampen concrete surfaces in contact with patching concrete and apply bonding agent.
    c. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate.
    d. Place, compact, and finish to blend with adjacent finished concrete.
    e. Cure in same manner as adjacent concrete.
8. Repair random cracks and single holes 1 inch or less in diameter with patching mortar.
    a. Groove top of cracks and cut out holes to sound concrete, and clean off dust, dirt, and loose particles.
    b. Dampen cleaned concrete surfaces and apply bonding agent.
    c. Place patching mortar before bonding agent has dried.
    d. Compact patching mortar and finish to match adjacent concrete.
    e. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Director’s Representative's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Director’s Representative’s approval.

3.15 FIELD QUALITY CONTROL

A. Special Inspections: Director’s Representative will engage a special inspector to perform field tests and inspections and prepare testing and inspection reports.

B. Testing Agency: Director’s Representative will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

1. Testing agency shall be responsible for providing curing container for composite samples on Site and verifying that field-cured composite samples are cured in accordance with ASTM C31/C31M.

2. Testing agency shall immediately report to Director's Representative, Contractor, and concrete manufacturer any failure of Work to comply with Contract Documents.
3. Testing agency shall report results of tests and inspections, in writing, to Director's Representative, Contractor, and concrete manufacturer within 48 hours of inspections and tests.
    a. Test reports shall include reporting requirements of ASTM C31/C31M, ASTM C39/C39M, and ACI 301, including the following as applicable to each test and inspection:
        1) Project name.
        2) Name of testing agency.
        3) Names and certification numbers of field and laboratory technicians performing inspections and testing.
        4) Name of concrete manufacturer.
        5) Date and time of inspection, sampling, and field testing.
        6) Date and time of concrete placement.
        7) Location in Work of concrete represented by samples.
        8) Date and time sample was obtained.
        9) Truck and batch ticket numbers.
        10) Design compressive strength at 28 days.
        11) Concrete mixture designation, proportions, and materials.
        12) Field test results.
        13) Information on storage and curing of samples before testing, including curing method and maximum and minimum temperatures during initial curing period.
        14) Type of fracture and compressive break strengths at seven days and 28 days.

C. Batch Tickets: For each load delivered, submit three copies of batch delivery ticket to testing agency, indicating quantity, mix identification, admixtures, design strength, aggregate size, design air content, design slump at time of batching, and amount of water that can be added at Project site.

D. Inspections:

1. Headed bolts and studs.
2. Verification of use of required design mixture.
3. Concrete placement, including conveying and depositing.
4. Curing procedures and maintenance of curing temperature.
5. Verification of concrete strength before removal of shores and forms from beams and slabs.
6. Batch Plant Inspections: On a random basis, as determined by Director's Representative.

E. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172/C 172M shall be performed in accordance with the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.

a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C143/C143M:
   a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
   b. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C231/C231M pressure method, for normal-weight concrete; .
   a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C1064/C1064M:
   a. One test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C31/C31M:
   a. Cast and laboratory cure two sets of four 6-inch by 12-inch or 4-inch by 8-inch cylinder specimens for each composite sample.
   b. Cast, initial cure, and field cure one sets of four standard cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C39/C39M.
   a. Test one set of four laboratory-cured specimens at seven days and one set of two specimens at 28 days.
   b. Test one set of four field-cured specimens at seven days and one set of two specimens at 28 days.
   c. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
7. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
8. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength, and no compressive-strength test value falls below specified compressive strength by more than 500 psi if specified compressive strength is 5000 psi, or no compressive strength test value is less than 10 percent of specified compressive strength if specified compressive strength is greater than 5000 psi.
9. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Director’s Representative but will not be used as sole basis for approval or rejection of concrete.
10. Additional Tests:
    a. Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Director’s Representative.
    b. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42/C42M or by other methods as directed by Director’s Representative.
       1) Acceptance criteria for concrete strength shall be in accordance with ACI 301 section 1.6.6.3.

11. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
12. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

F. Measure floor and slab flatness and levelness in accordance with ASTM E1155 within 72 hours of completion of floor finishing and promptly report test results to Director’s Representative.

3.16 PROTECTION

A. Protect concrete surfaces as follows:

1. Protect from petroleum stains.
2. Diaper hydraulic equipment used over concrete surfaces.
3. Prohibit vehicles from interior concrete slabs.
4. Prohibit use of pipe-cutting machinery over concrete surfaces.
5. Prohibit placement of steel items on concrete surfaces.
6. Prohibit use of acids or acidic detergents over concrete surfaces.
7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

END OF SECTION

SECTION 04 22 00

CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 DEFINITIONS

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

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

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For the following:

1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
2. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315. Show elevations of reinforced walls.

C. Product Declarations: Provide current Environmental Product Declarations (EPDs), that include the amount of embodied carbon in reinforcing steel.

1. Acceptable EPDs are non-expired, Product-specific, Facility or Plant-specific, or Supply Chain-specific Type III (Third-Party Reviewed), in adherence with ISO 14025 Environmental labels and declarations, ISO 14044 Environmental management – Life cycle assessment, and ISO 21930 Core rules for environmental product declarations of construction products and services.
2. Provide the EPD Material Tracking Form containing the total anticipated quantity/volume/weight (matching the units used in the EPDs) of each product being incorporated into the project.
    a. With each application for payment, provide an updated EPD Material Tracking Form and copies of delivery tickets for each product incorporated into the project for the period covered by the payment application.

1.3 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each type and size of the following:

1. Masonry units.
2. Integral water repellant used in CMUs.
3. Cementitious materials. Include name of manufacturer, brand name, and type.
4. Mortar admixtures.
5. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
6. Grout mixes. Include description of type and proportions of ingredients.

7. Reinforcing bars.
8. Joint reinforcement.
9. Anchors, ties, and metal accessories.

B. 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.

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

1.5 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.

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

2.1 MANUFACTURERS

A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.

B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

2.2 PERFORMANCE REQUIREMENTS

A. Provide structural unit masonry that develops indicated net-area compressive strengths at 28 days.

1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to TMS 602/ACI 530.1/ASCE 6.

2.3 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 and will be within 20 feet vertically and horizontally of a walking surface.

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.

2.4 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 bullnose units for outside corners unless otherwise indicated.

B. Integral Water Repellent: Provide units made with integral water repellent where indicated.

1. Integral Water Repellent: Liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested according to ASTM E514/E514M as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive, with test period extended to 24 hours, shall show no visible water or leaks on the back of test specimen.
   a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      1) ACM Chemistries.
      2) Euclid Chemical Company (The); an RPM company.
      3) GCP Applied Technologies Inc.
      4) Master Builders Solutions.
      5) Moxie International.

C. CMUs: ASTM C90, Type 1.

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of as indicated on Drawings.
2. Density Classification: Normal weight.
3. Size (Width): Manufactured to dimensions 3/8 inch less-than-nominal dimensions.
4. Exposed Faces: Provide color and texture matching the range represented by Director’s Representative sample.

2.5 MASONRY LINTELS

A. General: Provide one of the following:

B. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs matching adjacent CMUs in color, texture, and density classification, with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.6 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C150/C150M, 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 C114.

B. Hydrated Lime: ASTM C207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

D. Masonry Cement: ASTM C91/C91M.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Cemex S.A.B. de C.V.
   b. Holcim (US) Inc.
   c. Lafarge North America Inc.
   d. Lehigh Hanson; HeidelbergCement Group.

E. Mortar Cement: ASTM C1329/C1329M.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
   a. Lafarge North America Inc.

F. Water: Potable.

2.7 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A615/A615M or ASTM A996/A996M, 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.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Heckmann Building Products, Inc.
   b. Hohmann & Barnard, Inc.
   c. Wire-Bond.

C. Masonry-Joint Reinforcement, General: Ladder type complying with ASTM A951/A951M.

1. Interior Walls: Mill- galvanized carbon steel.
2. Exterior Walls: Hot-dip galvanized carbon steel.
3. Wire Size for Side Rods: 0.187-inch diameter.
4. Wire Size for Cross Rods: 0.187-inch diameter.
5. Spacing of Cross Rods: Not more than 16 inches o.c.
6. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

2.8 TIES AND ANCHORS

A. General: Ties and anchors shall extend at least 1-1/2 inches into masonry 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. Mill-Galvanized, Carbon-Steel Wire: ASTM A82/A82M, with ASTM A641/A641M, Class 1 coating.

2. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A82/A82M, with ASTM A153/A153M, Class B-2 coating.
3. Galvanized-Steel Sheet: ASTM A653/A653M, Commercial Steel, G60 zinc coating.
4. Steel Sheet, Galvanized after Fabrication: ASTM A1008/A1008M, Commercial Steel, with ASTM A153/A153M, Class B coating.
5. Steel Plates, Shapes, and Bars: ASTM A36/A36M.

C. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

1. Connector Section: Dovetail tabs for inserting into dovetail slots in concrete and attached to tie section; formed from 0.105-inch- thick steel sheet, galvanized after fabrication.

D. Partition Top Anchors: 0.105-inch- thick metal plate with a 3/8-inch- diameter metal rod 6 inches long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.

E. Rigid Anchors: Fabricate from steel bars 1-1/2 inches wide by 1/4 inch thick by 24 inches long, with ends turned up 2 inches or with cross pins unless otherwise indicated.

1. Corrosion Protection: Hot-dip galvanized to comply with ASTMA 153/A153M.

2.9 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.

B. Mortar for Unit Masonry: Comply with ASTM C270, Specification. Provide the following types of mortar for applications stated unless another type is indicated.

1. For reinforced masonry, use Type SorType N.

C. Grout for Unit Masonry: Comply with ASTM C476.

1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
2. Proportion grout in accordance with ASTM C476, paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi.
3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C143/C143M.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of 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 would impair mortar bond.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping.

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

3.2 INSTALLATION, GENERAL

A. Build chases and recesses to accommodate items specified in this and other Sections.

B. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.

C. 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.

3.3 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.

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.

3.4 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 bond pattern indicated on Drawings; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.

C. 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.

D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

E. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

F. 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.

G. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

H. 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 43 "Joint Firestopping."

3.5 MORTAR BEDDING AND JOINTING

A. Lay hollow 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.

B. Lay solid CMUs 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. Set cast-stone trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.

1. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
2. Wet joint surfaces thoroughly before applying mortar.
3. Rake out mortar joints for pointing with sealant.

D. Rake out mortar joints at pre-faced CMUs to a uniform depth of 1/4 inch and point with epoxy mortar to comply with epoxy-mortar manufacturer's written instructions.

E. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

F. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

G. Cut joints flush where indicated to receive waterproofing unless otherwise indicated.

3.6 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 in addition to continuous reinforcement.

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.

3.7 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

A. 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.

3.8 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.

3.9 LINTELS

A. Provide masonry lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are shown without structural steel or other supporting lintels.

B. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.

3.10 REINFORCED UNIT MASONRY

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 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.

3.11 FIELD QUALITY CONTROL

A. Testing and Inspecting: Director’s Representative 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. Inspections: Special inspections according to Level B in TMS 402/ACI 530/ASCE 5.

1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
3. Place grout only after inspectors have verified proportions of site-prepared grout.

C. Testing Prior to Construction: One set of tests.

D. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.

E. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C140 for compressive strength.

F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C780.

G. Mortar Test (Property Specification): For each mix provided, according to ASTM C780. Test mortar for mortar air content and compressive strength.

H. Grout Test (Compressive Strength): For each mix provided, according to ASTM C1019.

I. Prism Test: For each type of construction provided, according to ASTM C1314 at 7 days and at 28 days.

3.12 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 Director’s Representative 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.

3.13 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 Director's Representative property.

END OF SECTION

SECTION 05 40 00

COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For the following:

1. Cold-formed steel framing materials.
2. Wall framing.
3. Vertical deflection clips.
4. Single deflection track.
5. Roof rafter framing.
6. Clips and connectors.
7. Sill sealer gasket.

B. Shop Drawings:

1. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.

C. Product Declarations: Provide current Environmental Product Declarations (EPDs), that include the amount of embodied carbon in cold-formed metal framing products.

1. Acceptable EPDs are non-expired, Product-specific, Facility or Plant-specific, or Supply Chain-specific Type III (Third-Party Reviewed), in adherence with ISO 14025 Environmental labels and declarations, ISO 14044 Environmental management – Life cycle assessment, and ISO 21930 Core rules for environmental product declarations of construction products and services.
2. Provide the EPD Material Tracking Form containing the total anticipated quantity/volume/weight (matching the units used in the EPDs) of each product being incorporated into the project.
    a. With each application for payment, provide an updated EPD Material Tracking Form and copies of delivery tickets for each product incorporated into the project for the period covered by the payment application.

1.2 QUALITY ASSURANCE

A. Comply with AISI S230 "Standard for Cold-Formed Steel Framing - Prescriptive Method for One and Two Family Dwellings."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ClarkDietrich.
2. Marino\WARE.
3. Steel Network, Inc. (The).

2.2 LOAD-BEARING WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: As indicated.
2. Flange Width: As indicated.
3. Section Properties: As indicated.

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, and as follows:

1. Minimum Base-Metal Thickness: As indicated.
2. Flange Width: As indicated.

C. Steel Box or Back-to-Back Headers: Manufacturer's standard C-shapes used to form header beams, of web depths indicated, unpunched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0428 inch.
2. Flange Width: As indicated.
3. Section Properties: As indicated.

2.3 INTERIOR NON-LOAD-BEARING WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0428 inch.
2. Flange Width: As Indicated.
3. Section Properties: As Indicated.

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: Matching steel studs.
2. Flange Width: 1-1/4 inches, unless noted otherwise.

C. Vertical Deflection Clips: Manufacturer's standard head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. AllSteel & Gypsum Products, Inc.
   b. ClarkDietrich.
   c. Marino\WARE.
   d. Steel Network, Inc. (The).

D. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:

1. Minimum Base-Metal Thickness: 0.0428 inch.

E. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

2.4 ROOF RAFTER FRAMING

A. Steel Roof Rafters: Manufacturer's standard C-shaped steel sections, of web depths indicated, unpunched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: As Indicated.
2. Flange Width: As Indicated.
3. Section Properties: As Indicated.

2.5 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories from ASTM A1003/A1003M, Structural Grade, Type H, metallic coated steel sheet, of same grade and coating designation used for framing members.

B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:

1. Supplementary framing.
2. Bracing, bridging, and solid blocking.
3. Web stiffeners.
4. Anchor clips.
5. End clips.
6. Foundation clips.
7. Gusset plates.
8. Stud kickers and knee braces.
9. Joist hangers and end closures.
10. Hole-reinforcing plates.

11. Backer plates.

2.6 ANCHORS, CLIPS, AND FASTENERS

A. Steel Shapes and Clips: ASTM A36/A36M, zinc coated by hot-dip process according to ASTM A123/A123M.

B. Anchor Bolts: ASTM F1554, Grade 36 , threaded carbon-steel hex-headed bolts, carbon-steel nuts, and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A153/A153M, Class C .

C. Power-Actuated Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

D. Mechanical Fasteners: ASTM C1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.

1. Head Type: Low-profile head beneath sheathing; manufacturer's standard elsewhere.

E. Welding Electrodes: Comply with AWS standards.

2.7 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: ASTM A780/A780M MIL-P-21035B or SSPC-Paint 20.

B. Cement Grout: Portland cement, ASTM C150/C150M, Type I; and clean, natural sand, ASTM C404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

C. Nonmetallic, Nonshrink Grout: Factory-packaged, nonmetallic, noncorrosive, nonstaining grout, complying with ASTM C1107/C1107M, and with a fluid consistency and 30-minute working time.

D. Shims: Load-bearing, high-density, multimonomer, nonleaching plastic; or cold-formed steel of same grade and metallic coating as framing members supported by shims.

E. Sill Sealer Gasket: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to match width of bottom track or rim track members as required.

F. Sill Sealer Gasket/Termite Barrier: Minimum 68-mil nominal thickness, self-adhering sheet consisting of 64 mils of rubberized asphalt laminated on one side to a 4-mil- thick, polyethylene-film reinforcement, and with release liner on adhesive side ; formulated for application with primer or surface conditioner that complies with VOC limits of authorities having jurisdiction.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Polyguard Products, Inc.

2. Physical Properties:
   a. Peel Adhesion: 17.0 lb/in of width when tested in accordance with ASTM D412.
   b. Low-Temperature Flexibility: Pass at minus 25 deg FASTM D146/D146M.
   c. Water Vapor Permeance: 0.05 perm maximum when tested in accordance with ASTM E96/E96M, Method B.
   d. Resistance to Termite Penetration: Comply with ICC-ES AC380.

2.8 FABRICATION

A. Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.

1. Fabricate framing assemblies using jigs or templates.
2. Cut framing members by sawing or shearing; do not torch cut.
3. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
   a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
   b. Locate mechanical fasteners and install according to Shop Drawings, with screws penetrating joined members by no fewer than three exposed screw threads.

B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies by means that prevent damage or permanent distortion.

C. Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable variation of 1/8 inch in 10 feet and as follows:

1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
2. Squareness: Fabricate each cold-formed steel framing assembly to a maximum out-of-square tolerance of 1/8 inch.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, conditions, and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

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

3.2 PREPARATION

A. Install sill sealer gasket at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

B. Install sill sealer gasket/termite barrier in accordance with manufacturer's written instructions at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

3.3 INSTALLATION, GENERAL

A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.

B. Install cold-formed steel framing according to AISI S200, AISI S202, and manufacturer's written instructions unless more stringent requirements are indicated.

C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.

1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch.

D. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.

1. Cut framing members by sawing or shearing; do not torch cut.
2. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
   a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
   b. Locate mechanical fasteners, install according to Shop Drawings, and comply with requirements for spacing, edge distances, and screw penetration.

E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.

F. Install temporary bracing and supports to secure framing and support loads equal to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

G. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.

H. Install insulation, specified in Section 07 21 00 "Thermal Insulation," in framing-assembly members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.

I. Fasten hole-reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.

3.4 INSTALLATION OF INTERIOR NONLOADBEARING WALL FRAMING

A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure.

B. Fasten both flanges of studs to top and bottom track unless otherwise indicated. Space studs as follows:

1. Stud Spacing: As indicated on Drawings .

C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.

D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.

1. Install single deep-leg deflection tracks and anchor to building structure.
2. Install double deep-leg deflection tracks and anchor outer track to building structure.
3. Connect vertical deflection clips to studs and anchor to building structure.
4. Connect drift clips to cold-formed steel metal framing and anchor to building structure.

E. Install horizontal bridging in wall studs, spaced vertically in rows indicated but not more than 48 inches apart. Fasten at each stud intersection.

1. Channel Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
2. Bar Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.

F. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 12 inches of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.

G. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.5 INSTALLATION TOLERANCES

A. Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:

1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.6 REPAIR

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A780/A780M and manufacturer's written instructions.

3.7 FIELD QUALITY CONTROL

A. Testing: Director’s Representative will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Field and shop welds will be subject to testing and inspecting.

C. Testing agency will report test results promptly and in writing to Contractor and Director’s Representative.

D. Cold-formed steel framing will be considered defective if it does not pass tests and inspections.

E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.8 PROTECTION

A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 06 10 53

MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 DEFINITIONS

A. Boards or Strips: Lumber of less than 2 inches nominal size in least dimension.

B. Dimension Lumber: Lumber of 2 inches nominal or greater size but less than 5 inches nominal size in least dimension.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D5664.
4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.

2. Dress lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content of Lumber: 15 percent for 2-inch nominal thickness or less, 19 percent for more than 2-inch nominal thickness unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
2. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat items indicated on Drawings, and the following:

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated materials are indicated, materials shall comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.

1. Treatment shall not promote corrosion of metal fasteners.
2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D2898. Use for exterior locations and where indicated.
3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D3201 at 92 percent relative humidity. Use where exterior type is not indicated.

C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.

D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.

E. Application: Treat items indicated on Drawings, and the following:

1. Plywood backing panels.

2.4 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.
3. Grounds.

B. Dimension Lumber Items: Construction or No. 2 grade lumber of the following species:

1. Spruce-pine-fir; NLGA.

C. Concealed Boards: 15 percent maximum moisture content of the following species and grades:

1. Spruce-pine-fir (south) or spruce-pine-fir, Construction or No. 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.

D. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

E. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

F. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.5 PLYWOOD BACKING PANELS

A. Equipment Backing Panels: Plywood, DOC PS 1, Exposure 1, C-D Plugged , fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.

2.6 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M .

B. Screws for Fastening to Metal Framing: length as recommended by screw manufacturer for material being fastened.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry accurately to other construction. Locate nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

C. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.

D. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

E. Do not splice structural members between supports unless otherwise indicated.

F. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.

G. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

H. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

1. Use inorganic boron for items that are continuously protected from liquid water.
2. Use copper naphthenate for items not continuously protected from liquid water.

I. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

3.2 INSTALLATION OF WOOD BLOCKING AND NAILER

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

3.3 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

B. Protect miscellaneous rough carpentry from weather. If, despite protection, miscellaneous rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION

SECTION 06 64 00

PLASTIC PANELING

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.2 QUALITY ASSURANCE

A. Testing Agency: Acceptable to authorities having jurisdiction .

1.3 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install plastic paneling until spaces are enclosed and weathertight and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain plastic paneling and trim accessories from single manufacturer.

2.2 FACTORY-LAMINATED PLASTIC SHEET PANELING

A. Factory-Laminated Glass-Fiber-Reinforced Plastic (FRP) Paneling: Gelcoat-finished, glass-fiber-reinforced plastic panels complying with ASTM D 5319, laminated to plywood .

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. Arcoplast.
    b. Citadel Architectural Products, Inc.
    c. Crane Composites, Inc.
    d. Glasteel.
    e. Newcourt, Inc.
    f. Nudo. (Basis of Design manufacturer)
2. Surface-Burning Characteristics: As follows when tested by a qualified testing agency according to ASTM E 84. Identify products with appropriate markings of applicable testing agency.
    a. Flame-Spread Index: 25 or less.
    b. Smoke-Developed Index: 450 or less.
3. Glass-Fiber-Reinforced Plastic Panel Nominal Thickness: Not less than 0.03 inch .
4. Surface Finish: Smooth .
5. Color: White .

6. Plywood: DOC PS 1, Exterior B-C, 1/2 inch thick.

2.3 ACCESSORIES

A. Trim Accessories: Manufacturer's standard two-piece, snap-on vinyl extrusions designed to retain and cover edges of panels. Provide division bars, inside corners, outside corners, and caps as needed to conceal edges.

1. Color: Match panels .

B. Exposed Fasteners: Nylon drive rivets recommended by panel manufacturer.

C. Concealed Mounting Splines: Continuous, H-shaped aluminum extrusions designed to fit into grooves routed in edges of factory-laminated panels and to be fastened to substrate.

D. Adhesive: As recommended by plastic paneling manufacturer.

1. Verify adhesives have a VOC content of 50 g/L or less.
2. Verify adhesive complies with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

E. Sealant: Mildew-resistant, single-component, neutral-curing silicone sealant recommended by plastic paneling manufacturer and complying with requirements in Section 07 92 00 "Joint Sealants."

1. Verify sealant has a VOC content of 250 g/L or less.
2. Verify sealant complies with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

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

3.2 PREPARATION

A. Clean substrates of substances that could impair adhesive bond, including oil, grease, dirt, and dust.

B. Condition panels by unpacking and placing in installation space before installation according to manufacturer's written recommendations.

C. Lay out paneling before installing. Locate panel joints to provide equal panels at ends of walls not less than half the width of full panels .

1. Mark plumb lines on substrate at panel joint locations for accurate installation.
2. Locate panel joints to allow clearance at panel edges according to manufacturer's written instructions.

3.3 INSTALLATION

A. Install plastic paneling according to manufacturer's written instructions.

B. Install panels with fasteners. Layout fastener locations and mark on face of panels so that fasteners are accurately aligned.

1. Drill oversized fastener holes in panels and center fasteners in holes.
2. Apply sealant to fastener holes before installing fasteners.

C. Install factory-laminated panels using concealed mounting splines in panel joints.

D. Install trim accessories with adhesive and nails or staples . Do not fasten through panels.

E. Fill grooves in trim accessories with sealant before installing panels, and bed inside corner trim in a bead of sealant.

F. Maintain uniform space between panels and wall fixtures. Fill space with sealant.

G. Remove excess sealant and smears as paneling is installed. Clean with solvent recommended by sealant manufacturer and then wipe with clean dry cloths until no residue remains.

END OF SECTION

SECTION 07 21 00

THERMAL INSULATION

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For the following:

1. Extruded polystyrene foam-plastic board insulation.
2. Glass-fiber blanket insulation.

1.2 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

B. Protect foam-plastic board insulation as follows:

1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site until just before installation time.
3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 - PRODUCTS

2.1 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD INSULATION

A. Extruded Polystyrene Board Insulation, Type IV: ASTM C578, Type IV, 25-psi minimum compressive strength; unfaced.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. DiversiFoam Products.
   b. DuPont de Nemours, Inc.
   c. Owens Corning.
   d. The Dow Chemical Company.
   e. Basis of design at foundations: T CLEAR Corporation: WALLGUARD
2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
3. Smoke-Developed Index: Not more than 450 when tested in accordance with ASTM E84.
4. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
5. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

2.2 GLASS-FIBER BLANKET INSULATION

A. Glass-Fiber Blanket Insulation, Unfaced: ASTM C665, Type I; passing ASTM E136 for combustion characteristics.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Certainteed; SAINT-GOBAIN.
   b. Johns Manville; a Berkshire Hathaway company.
   c. Knauf Insulation.
   d. Owens Corning.
2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
3. Smoke-Developed Index: Not more than 50 when tested in accordance with ASTM E84.

2.3 INSULATION FASTENERS

A. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- thick galvanized-steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches square or in diameter.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. AGM Industries, Inc.
   b. Gemco.

2.4 ACCESSORIES

A. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Install insulation with manufacturer's R-value label exposed after insulation is installed.

D. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

E. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.3 INSTALLATION OF SLAB INSULATION

A. On vertical slab edge and foundation surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.

1. If not otherwise indicated, extend insulation a minimum of 24 inches below exterior grade line.

B. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

1. If not otherwise indicated, extend insulation a minimum of 24 inches in from exterior walls.

3.4 INSTALLATION OF FOUNDATION WALL INSULATION

A. Butt panels together for tight fit.

B. Anchor Installation: Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors as follows:

1. Fasten insulation anchors to concrete substrates with insulation anchor adhesive according to anchor manufacturer's written instructions.
2. Space anchors according to insulation manufacturer's written instructions for insulation type, thickness, and application.
3. After adhesive has dried, install board insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation.
4. Where insulation will not be covered by other building materials, apply capped washers to tips of spindles.

C. Adhesive Installation: Install with adhesive or press into tacky waterproofing or dampproofing according to manufacturer's written instructions.

3.5 INSTALLATION OF CAVITY-WALL INSULATION

A. Foam-Plastic Board Insulation: Install pads of adhesive spaced approximately 24 inches o.c. both ways on inside face and as recommended by manufacturer.

1. Fit courses of insulation between wall ties and other obstructions, with edges butted tightly in both directions, and with faces flush.
2. Press units firmly against inside substrates.

3.6 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:

1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
4. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.

B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:

1. Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft.

3.7 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes.

B. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION

SECTION 07 84 13

PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.2 PROJECT CONDITIONS

A. Environmental Limitations: Do not install penetration firestopping system when ambient or substrate temperatures are outside limits permitted by penetration firestopping system manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.

B. Install and cure penetration firestopping materials per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.3 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems can be installed according to specified firestopping system design.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping systems.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics:

1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
2. Test per testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements:
    a. Penetration firestopping systems shall bear classification marking of a qualified testing agency.
        1) UL in its "Fire Resistance Directory."
        2) Intertek Group in its "Directory of Listed Building Products."
        3) FM Approval in its "Approval Guide."

2.2 PENETRATION FIRESTOPPING SYSTEMS

A. Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. 3M Fire Protection Products.
   b. Hilti, Inc.
   c. NUCO Inc.
   d. Specified Technologies, Inc.
   e. Tremco Incorporated.
   f. Approved equal

B. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.

1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.

C. Manufactured Piping Penetration Firestopping System: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Balco; a CSW Industrials Company.
   b. ProVent Systems.
   c. Approved equal
2. F-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated.
3. T-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
4. W-Rating: Provide penetration firestopping systems showing no evidence of water leakage when tested according to UL 1479.
5. Sleeve: Molded-PVC plastic, of length to match slab thickness and with integral nailing flange on one end for installation in cast-in-place concrete slabs.

D. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.

1. Permanent forming/damming/backing materials.
2. Substrate primers.
3. Collars.

4. Steel sleeves.

2.3 FILL MATERIALS

A. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.

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

3.2 PREPARATION

A. Surface Cleaning: Before installing penetration firestopping systems, clean out openings immediately to comply with manufacturer's written instructions and with the following requirements:

1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping materials.
2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.
3. Remove laitance and form-release agents from concrete.

B. Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

A. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.

B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings.

1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.

C. Install fill materials by proven techniques to produce the following results:

1. Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.
2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches high and with minimum 0.375-inch strokes.

1. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 feet from end of wall and at intervals not exceeding 30 feet.

3.5 CLEANING AND PROTECTION

A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping system manufacturers and that do not damage materials in which openings occur.

B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping material and install new materials to produce systems complying with specified requirements.

END OF SECTION

SECTION 07 92 00

JOINT SEALANTS

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data:

1. Joint-sealants.
2. Joint sealant backing materials.

B. Samples for Initial Selection: Manufacturer's standard color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

1.2 CLOSEOUT SUBMITTALS

A. Warranty Documentation:

1. Manufacturers' special warranties.
2. Installer's special warranties.

1.3 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain joint sealants from single manufacturer for each sealant type.

2.2 JOINT SEALANTS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. VOC Content: Verify sealants and sealant primers comply with the following:

1. Verify sealant complies with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
2. Architectural sealants have a VOC content of 250 g/L or less.
3. Sealants and sealant primers for porous substrates have a VOC content of 775 g/L or less.
4. Sealants and sealant primers for nonporous substrates have a VOC content of 250 g/L or less.

C. Colors of Exposed Joint Sealants: As selected by Director's Representative.

2.3 NONSTAINING SILICONE JOINT SEALANTS

A. Nonstaining Joint Sealants: No staining of substrates when tested in accordance with ASTM C1248.

B. Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 50, Use NT.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Pecora Corporation.
   b. Sika Corporation Joint Sealants.
   c. The Dow Chemical Company.
   d. Tremco Incorporated.

2.4 URETHANE JOINT SEALANTS

A. Urethane, S, NS, 25, T, NT: Single-component, nonsag, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type S, Grade NS, Class 25, Uses T and NT.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. LymTal International, Inc.
   b. Master Builders Solutions.
   c. Approved equal

2.5 IMMERSIBLE JOINT SEALANTS

A. Urethane, Immersible, S, P, 50, T, NT, I: Immersible, single-component, pourable, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type S, Grade P, Class 50, Uses T, NT, and I.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Tremco Incorporated.
b. Sika Corporation Joint Sealants
c. Approved equal

2.6 MILDEW-RESISTANT JOINT SEALANTS

A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.

B. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 25, Use NT.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Pecora Corporation.
   b. The Dow Chemical Company.
   c. Tremco Incorporated.

2.7 JOINT-SEALANT BACKING

A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Adfast.
   b. Alcot Plastics Ltd.
   c. Construction Foam Products; a division of Nomaco, Inc.
   d. Master Builders Solutions.

B. Cylindrical Sealant Backings: ASTM C1330, Type C (closed-cell material with a surface skin) Type O (open-cell material) Type B (bicellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.8 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.

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

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
    a. Concrete.
    b. Masonry.
3. Remove laitance and form-release agents from concrete.
4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
    a. Metal.
    b. Glass.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact

or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile in accordance with Figure 8A in ASTM C1193 unless otherwise indicated.

3.4 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION

SECTION 08 11 13

HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings in accordance with NAAMM-HMMA 803 or ANSI/SDI A250.8.

1.2 COORDINATION

A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

B. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, core descriptions, and finishes.

B. Shop Drawings: Include the following:

1. Elevations of each door type.
2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
7. Details of anchorages, joints, field splices, and connections.
8. Details of accessories.
9. Details of moldings, removable stops, and glazing.

C. Product Schedule: For hollow-metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow-metal doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

1. Provide additional protection to prevent damage to factory-finished units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow-metal doors and frames vertically under cover at Project site with head up. Place on minimum 4-inch- high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Ceco Door; AADG, Inc.; ASSA ABLOY.
2. Curries, AADG, Inc.; ASSA ABLOY Group.
3. MPI Group, LLC (The).
4. Republic Doors and Frames; a Allegion brand.
5. Steelcraft; Allegion plc.

2.2 EXTERIOR STANDARD STEEL DOORS AND FRAMES

A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Extra-Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 3; ANSI/SDI A250.4, Level A. At locations indicated in the Door and Frame Schedule .

1. Doors:
   a. Type: As indicated in the Door and Frame Schedule.
   b. Thickness: 1-3/4 inches.
   c. Edge Bevel: Provide manufacturer's standard beveled or square edges.
   d. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets. Seal joints against water penetration.
   e. Bottom Edges: Close bottom edges of doors with end closures or channels of same material as face sheets. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape.
   f. Core: Manufacturer's standard or as required for fire-rating .
2. Frames:
   a. Construction:
      1) Existing Construction: Frames scheduled for replacement in existing construction can be knocked down type
      2) New Construction: Frames scheduled for use in new construction shall be face welded
3. Exposed Finish: Prime, field-painted finish.

2.3 FRAME ANCHORS

A. Jamb Anchors:

1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches of frame height above 7 feet.
3. Postinstalled Expansion Anchor: Minimum 3/8-inch- diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.

B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.

C. Material: ASTM A879/A879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A1008/A1008M or ASTM A1011/A1011M; hot-dip galvanized in accordance with ASTM A153/A153M, Class B.

2.4 MATERIALS

A. Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

C. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

D. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B.

E. Inserts, Bolts, and Fasteners: Hot-dip galvanized in accordance with ASTM A153/A153M.

F. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.

G. Mineral-Fiber Insulation: ASTM C665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E136 for combustion characteristics.

H. Glazing: Comply with requirements in Section 08 80 00 "Glazing."

2.5 FABRICATION

A. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.

1. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
2. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
   a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
   b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

B. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping in accordance with ANSI/SDI A250.6, the Door Hardware Schedule, and templates.

1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.

2.6 STEEL FINISHES

A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.1 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.

B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.2 INSTALLATION

A. Install hollow-metal doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.

B. Hollow-Metal Frames: Comply with ANSI/SDI A250.11 .

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.
    a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
    b. Install frames with removable stops located on secure side of opening.
2. Fire-Rated Openings: Install frames in accordance with NFPA 80.
3. Floor Anchors: Secure with postinstalled expansion anchors.
4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout or mortar.
5. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors.
6. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:
    a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
    c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
    d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

C. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.

1. Non-Fire-Rated Steel Doors: Comply with ANSI/SDI A250.8.

D. Glazing: Comply with installation requirements in Section 08 80 00 "Glazing" and with hollow-metal manufacturer's written instructions.

3.3 REPAIR

A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

B. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION

SECTION 08 16 13

FIBERGLASS DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fiberglass doors.

B. Fiberglass door frames.

1.2 REFERENCE STANDARDS

A. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.

B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2011.

C. ASTM D570 - Standard Test Method for Water Absorption of Plastics; 1998 (Reapproved 2010).

D. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position; 2018.

E. ASTM D638 - Standard Test Method for Tensile Properties of Plastics; 2014.

F. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials; 2016.

G. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

H. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).

I. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.

J. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2016).

K. ASTM E2112 - Standard Practice for Installation of Exterior Windows, Doors and Skylights; 2007 (Reapproved 2016).

L. ICC (IBC) - International Building Code; 2018.

M. ITS (DIR) - Directory of Listed Products; current edition.

N. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2019.

O. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

P. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

Q. NFRC 100 - Procedure for Determining Fenestration Products U-Factors.

R. NFRC 400 - Procedure for Determining Fenestration Products Air Leakage.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Obtain hardware templates from hardware manufacturer prior to starting fabrication.

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's standard details, installation instructions, hardware and anchor recommendations.

B. Shop Drawings: Indicate layout and profiles; include assembly methods.

1. Indicate product components, including hardware reinforcement locations and preparations, accessories, finish colors, patterns, and textures.
2. Indicate wall conditions, door and frame elevations, sections, materials, gages, finishes, location of door hardware by dimension, and details of openings; use same reference numbers indicated on drawings to identify details and openings.

C. Selection Samples: Submit two complete sets of color chips, illustrating manufacturer's available finishes, colors, and textures.

D. Manufacturer's Qualification Statement.

E. Installer's Qualification Statement.

F. Warranty: Submit manufacturer warranty and ensure that forms have been completed in the Authority's name and registered with manufacturer; include detailed terms of warranty.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with not less than three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

B. Deliver pre-assembled doors and frames with braces, spreaders, and packaging as required to prevent damage.

C. Store materials in original packaging, under cover, protected from exposure to harmful weather conditions and from direct contact with water.

1. Store at temperature and humidity conditions recommended by manufacturer.
2. Do not use non-vented plastic or canvas shelters.
3. Immediately remove wet wrappers.

D. Store in position recommended by manufacturer, elevated minimum 4 inch above grade, with minimum 1/4-inch space between doors.

1.7 FIELD CONDITIONS

A. Do not install doors until structure is enclosed.

B. Maintain temperature and humidity at manufacturer's recommended levels during and after installation of doors.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Pultruded Fiberglass Reinforced Plastic (FRP) Doors:

1. Special-Lite, Inc; AF 100 Pultruded Smooth Door; www.special-lite.com.
2. Approved Equal.

2.2 DOOR AND FRAME ASSEMBLIES

A. Door and Frame Assemblies: Factory-fabricated, prepared and machined for hardware.

1. Physical Endurance: Swinging door cycle test to ANSI/SDI A250.4, Level A (1,000,000 cycles) minimum; tested with hardware and fasteners intended for use on project.
2. Screw-Holding Capacity: Tested to 890 lbs, minimum.
3. Surface Burning Characteristics: Flame spread index (FSI) of 0 to 25, Class A, and smoke developed index (SDI) of 450 or less, when tested in accordance with ASTM E84.
4. Flammability: Self-extinguishing when tested in accordance with ASTM D635.
5. Sizes: As indicated on drawings.
6. Clearance Between Door and Frame: 1/8 inch, maximum.
7. Clearance Between Bottom of Door and Finished Floor: 3/4 inch, maximum; not less than 1/4-inch clearance to threshold.

8. Provide frame anchors that allow for variation in rough opening size; field cutting of doors or frames to fit is not permitted.

2.3 COMPONENTS

A. Doors: Fiberglass construction with reinforced core.

1. Thickness: 1-3/4-inch, nominal.
2. Core Material: Manufacturer's standard insulated core material for application indicated.
3. Construction:

    a. Pultruded as single monolithic fiberglass reinforced plastic (FRP) panel.
    b. Molded in one piece including through color gel coating on each side; manufacturer's standard subframe, core and faces fused during curing; hardware reinforcements.
    c. Fiberglass faces laminated to core with an applied gel coating, or molded in one piece including gel coating on each side.

4. Face Sheet Texture: Smooth grain.
5. Subframe and Reinforcements: Manufacturer's standard materials.
6. Waterproof Integrity: Provide factory fabricated edges, cut-outs, and hardware preparations of fiberglass reinforced plastic (FRP); provide cut-outs with joints sealed independently of glazing, louver inserts, or trim.
7. Hardware Preparations: Factory reinforce, machine, and prepare for door hardware including field installed items; provide solid blocking for each item; field cutting, drilling or tapping is not permitted; obtain manufacturer's hardware templates for preparation as necessary.

B. Door Frames: Provide type in compliance with performance requirements specified for doors.

1. Type: Factory assembled with chemically welded joints.
2. Profiles: As indicated on drawings.
3. Door Stop: 5/8-inch wide, by 1-7/8-inch deep.
4. Non-Fire-Rated:

    a. Fiberglass reinforced plastic (FRP) with gel-coating matching doors.

5. Corner Joints: Mitered with concealed corner blocks or angles of same material as frame; fiberglass and aluminum joined with screws; steel and stainless steel spot welded; sealed watertight with silicone sealant; field assemble knock-down type frames as required.
6. Hardware Cut-outs: Provide continuous backing or mortar guards of same material as frame, with watertight seal.
7. Frame Anchors: Stainless steel, Type 304; provide three anchors in each jamb for heights up to 84 inches with one additional anchor for each additional 24 inches in height.
8. Reinforcing: Provide manufacturer's standard reinforcing at hinge, strike, and closer locations.
9. Kerf frame to receive weatherstripping.

2.4 PERFORMANCE REQUIREMENTS

A. Provide door assemblies that have been designed and fabricated in compliance with specified performance requirements.

B. Fiberglass Skin.

1. Surface Burning, ASTM-E84; Flame Spread ≤ 25; Smoke Developed ≤ 450
2. Tensile Strength, ASTM-D638; 12,300 psi
3. Percentage Fiberglass: 50%

C. Water Leakage: No uncontrolled leakage on interior face when tested in accordance with ASTM E331 at differential pressure of 7.5 psf.

D. Air Leakage: Maximum of 0.1 cu ft/min/sq. ft. at 6.27 psf differential pressure, when tested in accordance with ASTM E283.

E. Structural Performance: Withstand positive and negative wind loads equal to 1.5 times design wind loads specified by local code without damage or permanent set, when tested in accordance with ASTM E330/E330M, using 10 second duration of maximum load.

F. Thermal Transmittance, Exterior Doors: AAMA 1503, U-value of 0.35, maximum, measured on exterior door in size required for this project.

G. Fiberglass Reinforced Plastic (FRP) Face Sheet Properties:

1. Tensile Strength at Break: ASTM D638, 13,250 psi, minimum.
2. Water Absorption: ASTM D570, 0.16 percent, maximum, after 24 hours at 74 degrees F.
3. Flexural Strength: ASTM D790, 27,000 psi, minimum.

2.5 FINISHES

A. Gel Coating: Ultraviolet (UV) stabilized polyester finish.

1. Thickness: Minimum 15 mils wet thickness, plus/minus 3 mils.
2. Color: As selected by Director’s Representative from manufacturer's standard line of colors.

B. Abuse resistant engineered surface with protective coating and through-molded color.

1. Panel Texture: Smooth grain.
2. Color: As selected by Director’s Representative from manufacturer's full line of colors.

2.6 ACCESSORIES

A. Stops for Glazing: Fiberglass, unless otherwise indicated or required by fire rating; provided by door manufacturer to fit factory made openings, with color and texture to match door; fasteners shall maintain waterproof integrity.

1. Exterior Doors: Provide non-removable stops on exterior side with continuous compression gasket weatherseal.
2. Glazed Openings: Provide removable stops on interior side.
3. Opening Sizes and Shapes: As indicated on drawings.

B. Glazing:

1. Fully tempered float glass, 1/4-inch thick, insulated, clear at exterior doors. Design Basis: PPG Solarban 60; www.vitroglazings.com or equal.

C. Door Hardware: As specified in Section 08 71 00.

1. Weatherstripping
2. Thresholds: Fiberglass, with skid resistant surface, extends full width of door opening, 1/2-inch high by 6-inch wide; same color as frame.
3. See Specification Section 08 71 00 for additional hardware requirements.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify actual dimensions of openings by field measurements before door fabrication; show recorded measurements on shop drawings.

B. Do not begin installation until substrates have been properly prepared.

3.2 PREPARATION

A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

B. Clean and prepare substrate in accordance with manufacturer's directions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions; do not penetrate frames with anchors.

B. Install exterior doors in accordance with ASTM E2112.

C. Set units plumb, level, and true-to-line, without warping or racking doors, and with specified clearances; anchor in place.

D. Set thresholds in continuous bed of sealant.

E. In masonry walls, install frames prior to laying masonry; anchor frames into masonry mortar joints; fill jambs with grout as walls are laid up.

F. In stud walls, install frames prior to building walls; anchor frames to studs using concealed anchors.

G. Separate aluminum and other metal surfaces from sources of corrosion of electrolytic action at points of contact with other materials.

H. Repair or replace damaged installed products.

3.4 ADJUSTING

A. Lubricate, test, and adjust doors to operate easily, free from warp, twist or distortion, and to fit watertight for entire perimeter.

B. Adjust hardware for smooth and quiet operation.

C. Adjust doors to fit snugly and close without sticking or binding.

3.5 CLEANING

A. Clean installed products in accordance with manufacturer's instructions prior to Director's Representative acceptance.

3.6 PROTECTION

A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

SECTION 08 36 13

SECTIONAL DOORS

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For each type and size of sectional door and accessory.

1. Include construction details, material descriptions, dimensions of individual components, profile door sections, and finishes.
2. For power-operated doors, include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.

B. Shop Drawings: For each installation and for components not dimensioned or detailed in manufacturer's product data.

1. Include plans, elevations, sections, and mounting details.
2. Include details of equipment assemblies. Indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
4. Include diagrams for power, signal, and control wiring.

1.2 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of sectional doors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Structural failures including, but not limited to, excessive deflection.
   b. Failure of components or operators before reaching required number of operation cycles.
   c. Faulty operation of hardware.
   d. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use; rust through.
   e. Delamination of exterior or interior facing materials.
2. Warranty Period: Two years minimum from date of Substantial Completion.

B. Finish Warranty: Manufacturer agrees to repair or replace components that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS, GENERAL

A. Source Limitations: Obtain sectional doors from single source from single manufacturer.

1. Obtain operators and controls from sectional door manufacturer.

2.2 SECTIONAL-DOOR ASSEMBLY

A. Steel Sectional Door: Provide sectional door formed with hinged sections and fabricated so that finished door assembly is rigid and aligned with tight hairline joints; free of warp, twist, and deformation; and complies with requirements in DASMA 102.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Overhead Door Corporation.
      1) Basis of design at conditioned spaces: Thermacore® Sectional Steel Door – 596 (with windows)
      2) Basis of design at non-conditioned spaces: Sectional Steel Door – 416 (with windows)
   b. Raynor Garage Doors.
      1) At conditioned spaces: S-20, insulated with steel back covers (with windows)
      2) Basis of design at non-conditioned spaces: S-20, non-insulated (with windows)
   c. Wayne Dalton; a division of Overhead Door Corporation.
   d. Approved equal

B. Operation Cycles: Door components and operators capable of operating for not less than 50,000 operation cycles. One operation cycle is complete when door is opened from closed position to the open position and returned to closed position.

C. Air Infiltration: Maximum rate of 0.4 cfm/sq. ft. when tested in accordance with ASTM E283 or DASMA 105.

D. U-Value (at conditioned spaces): 0.1 Btu/sq. ft. x h x deg F .

E. Steel Door Sections: ASTM A653/A653M, zinc-coated (galvanized), cold-rolled, commercial steel sheet with G60 zinc coating.

1. Door-Section Thickness: 2 inches .
2. Section Faces:
   a. Thermal-Break Construction: Provide sections with continuous thermal-break construction separating the exterior and interior faces of door.
   b. Exterior Face: Fabricated from single sheets, not more than 24 inches high; with horizontal meeting edges rolled to continuous, interlocking, keyed, rabbeted, shiplap, or tongue-in-groove, weather- and pinch-resistant seals and reinforcing flange return.

1) Surface: Manufacturer's standard, flat .

c. Interior Face: Enclose insulation completely within steel exterior facing and interior facing material, with no exposed insulation. Provide the following interior-facing material:

1) Zinc-Coated (Galvanized) Steel Sheet: With minimum nominal coated thickness of dimension recommended in writing by manufacturer to comply with performance requirements .

3. End Stiles: Enclose open ends of sections with channel end stiles formed from galvanized-steel sheet not less than 0.064-inch nominal coated thickness and welded to door section.
4. Intermediate Stiles: Provide intermediate stiles formed from not less than 0.064-inch-thick galvanized-steel sheet, cut to door section profile, and welded in place. Space stiles not more than 48 inches apart.
5. Section Reinforcing: Horizontal and diagonal reinforcement as required to stiffen door and for wind loading. Provide galvanized-steel bars, struts, trusses, or strip steel, formed to depth and bolted or welded in place. Ensure that reinforcement does not obstruct vision lites.
   a. Bottom Section: Reinforce section with a continuous channel or angle conforming to bottom-section profile and allowing installation of astragal (weatherseal).
   b. Hardware Locations: Provide reinforcement for hardware attachment.
6. Thermal Insulation: Insulate interior of steel sections with door manufacturer's standard CFC-free insulation of type indicated below:
   a. Foamed-in-Place Insulation: Polyurethane, foamed in place to completely fill interior of section and pressure bonded to face sheets to prevent delamination under wind load.
   b. Fire-Resistance Characteristics: Maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, in accordance with ASTM E84.

F. Track: Manufacturer's standard, galvanized-steel, standard-liftand high-lift track system. Provide complete system including brackets, bracing, and reinforcement to ensure rigid support of ball-bearing roller guides.

1. Standard lift locations: Equipment Storage Building
2. High lift locations: Heavy Equipment Building
3. Material: Galvanized steel, ASTM A653/A653M, minimum G60 zinc coating.
4. Size: As recommended in writing by manufacturer for door size, weight, track configuration and door clearances indicated on Drawings .
5. Track Reinforcement and Supports: Provide galvanized-steel members to support track without sag, sway, and vibration during opening and closing of doors. Slot vertical sections of track spaced 2 inches apart for door-drop safety device.
   a. Vertical Track: Incline vertical track to ensure weathertight closure at jambs. Provide continuous angle or continuous reverse angle as required to attach to track and wall.
   b. Horizontal Track: Provide continuous reinforcing angle from curve in track to end of track, attached to track and supported at points by laterally braced attachments to overhead structural members.

G. Weatherseals: Replaceable, adjustable, continuous, compressible weather-stripping gaskets of flexible vinyl, rubber, or neoprene fitted to bottom top and jambs of door.

H. Windows: Manufacturer's standard window units of shape and size and in locations indicated on Drawings. Set glazing in vinyl, rubber, or neoprene glazing channel. Provide removable stops of same material as door-section frames. Provide the following glazing:

1. Insulating Glass Units: Manufacturer's standard.

I. Hardware: Heavy-duty, corrosion-resistant hardware, with hot-dip galvanized, stainless steel, or other corrosion-resistant fasteners, to suit door type.

J. Electric Door Operator: Electric door operator assembly of size and capacity recommended by door manufacturer for door and operation cycles specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, control stations, control devices, integral gearing for locking door, and accessories required for proper operation.

1. Comply with NFPA 70.
2. Control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6; with NFPA 70, Class 2 control circuit, maximum 24 V ac or dc.
3. Safety: Listed in accordance with UL 325 by a qualified testing agency for commercial or industrial use; moving parts of operator enclosed or guarded if exposed and mounted at 8 ft. or lower.
4. Usage Classification: Heavy duty, 25 or more cycles per hour and more than 90 cycles per day.
5. Operator Type: Manufacturer's standard for door requirements.
6. Motor: Reversible-type with controller (disconnect switch) for interior, clean, and dry motor exposure. Use adjustable motor-mounting bases for belt-driven operators.
    a. At Truck Wash Bay: Reversible-type for exterior, dusty, wet, or humid motor exposure. Use adjustable motor-mounting bases for belt-driven operators.
    b. Motor Size: 1/2 hp.
    c. Electrical Characteristics:
        1) Phase: Single phase.
        2) Volts: 115 V.
7. Limit Switches: Equip motorized door with adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.
8. Obstruction Detection: Automatic external entrapment protection consisting of automatic safety sensor capable of protecting full width of door opening. Activation of device immediately stops and reverses downward door travel.
    a. Monitored Entrapment Protection: Photoelectric sensor designed to interface with door-operator control circuit to detect damage to or disconnection of sensor and complying with requirements in UL 325.
    b. Unmonitored Entrapment Protection: Retro-reflective photo sensor.
9. Control Station: Surface mounted, three-position (open, close, and stop) control.
    a. Operation: Push button.

b. Interior-Mounted Unit: Full-guarded, surface-mounted, heavy-duty type, with general-purpose NEMA ICS 6, Type 1 standard-duty, weatherproof-type, NEMA ICS 6, Type 4 enclosure.
c. Exterior-Mounted Unit: Full-guarded, surface-mounted, standard-duty, weatherproof type, NEMA ICS 6, Type 4 enclosure, key operated.

10. Emergency Manual Operation: Push-up Chain type designed so required force for door operation does not exceed 25 lbf.
11. Emergency Operation Disconnect Device: Hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.
12. Motor Removal: Design operator so motor can be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.

K. Metal Finish: Comply with NAAMM/NOMMA's "Metal Finishes Manual for Architectural and Metal Products (AMP 500-06)" for recommendations for applying and designating finishes.

1. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.
a. Color and Gloss: As selected by Director's Representative.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.

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

3.2 INSTALLATION

A. Install sectional doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; in accordance with manufacturer's written instructions.

B. Tracks:

1. Fasten vertical track assembly to opening jambs and framing with fasteners spaced not more than 24 inches apart.
2. Hang horizontal track assembly from structural overhead framing with angles or channel hangers attached to framing by welding or bolting, or both. Provide sway bracing, diagonal bracing, and reinforcement as required for rigid installation of track and door-operating equipment.

C. Accessibility: Install sectional doors, switches, and controls along accessible routes in compliance with regulatory requirements for accessibility.

D. Power-Operated Doors: Install in accordance with UL 325.

3.3 ADJUSTING

A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.

B. Lubricate bearings and sliding parts as recommended by manufacturer.

C. Adjust doors and seals to provide weather-resistant fit around entire perimeter.

D. Touchup Painting Galvanized Material: Immediately after welding galvanized materials, clean welds and abraded galvanized surfaces and repair galvanizing to comply with ASTM A780/A780M.

END OF SECTION

SECTION 08 51 13

ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, glazing and fabrication methods, dimensions of individual components and profiles, hardware, and finishes for aluminum windows.

B. Shop Drawings: For aluminum windows.

1. Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.

1.2 INFORMATIONAL SUBMITTALS

A. Sample Warranties: For manufacturer's warranties.

1.3 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace aluminum windows that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Failure to meet performance requirements.
   b. Structural failures including excessive deflection, water leakage, condensation, and air infiltration.
   c. Faulty operation of movable sash and hardware.
   d. Deterioration of materials and finishes beyond normal weathering.
   e. Failure of insulating glass.
2. Warranty Period:
   a. Window: 10 years from date of Substantial Completion.
   b. Glazing Units: 10 years from date of Substantial Completion.
   c. Aluminum Finish: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain aluminum windows from single source from single manufacturer.

2.2 WINDOW PERFORMANCE REQUIREMENTS

A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.

1. Window Certification: AAMA certified with label attached to each window.

B. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:

1. Minimum Performance Class: CW .
2. Minimum Performance Grade: 30 .

C. Thermal Transmittance: NFRC 100 maximum whole-window U-factor of 0.32 Btu/sq. ft. x h x deg F .

D. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of 0.40 .

2.3 ALUMINUM WINDOWS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. EFCO Corporation.
2. Kawneer Company, Inc.; Arconic Corporation.
3. TRACO.
4. Wausau Window and Wall Systems; Apogee Wausau Group, Inc.

B. Types: Provide the following types in locations indicated on Drawings:

1. Fixed.

C. Frames and Sashes: Aluminum extrusions complying with AAMA/WDMA/CSA 101/I.S.2/A440.

1. Thermally Improved Construction: Fabricate frames, sashes, and muntins with an integral, concealed, low-conductance thermal barrier located between exterior materials and window members exposed on interior side in a manner that eliminates direct metal-to-metal contact.

D. Insulating-Glass Units: ASTM E2190.

1. Glass: ASTM C1036, Type 1, Class 1, q3.
   a. Tint: Clear .
   b. Kind: Fully tempered where indicated on Drawings .
2. Lites: Two .
3. Filling: Fill space between glass lites with argon.
4. Low-E Coating: Sputtered on second surface .

E. Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.

F. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.

1. Exposed Fasteners: Do not use exposed fasteners to greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

2.4 ACCESSORIES

A. Subsills: Thermally broken , extruded-aluminum subsills in configurations indicated on Drawings.

B. Panning Trim: Extruded-aluminum profiles in sizes and configurations indicated on Drawings.

2.5 FABRICATION

A. Fabricate aluminum windows in sizes indicated. Include a complete system for assembling components and anchoring windows.

B. Glaze aluminum windows in the factory.

C. Weather strip each operable sash to provide weathertight installation.

D. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.

E. Mullions: Provide mullions and cover plates, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections. Provide mullions and cover plates capable of withstanding design wind loads of window units.

F. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation.

2.6 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. 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.

2.7 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. Class I, Color Anodic Finish: AA-M12C22A42/A44 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker) complying with AAMA 611.

1. Color: As selected by Director's Representative.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Verify rough opening dimensions, levelness of sill plate, and operational clearances.

C. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure weathertight window installation.

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

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E2112.

B. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.

C. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.

D. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

3.3 ADJUSTING, CLEANING, AND PROTECTION

A. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.

B. Clean exposed surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.

1. Keep protective films and coverings in place until final cleaning.

C. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

D. Protect window surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written instructions.

END OF SECTION

SECTION 08 71 00

DOOR HARDWARE

PART 1 - GENERAL

1.1 COORDINATION

A. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

B. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.

C. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

D. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.

B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.

C. Deliver keys and permanent cores to Owner by registered mail or overnight package service.

1.4 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Structural failures including excessive deflection, cracking, or breakage.

b. Faulty operation of doors and door hardware.
c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.

2. Warranty Period: Three years from date of Substantial Completion unless otherwise indicated below:
   a. Exit Devices: Two years from date of Substantial Completion.
   b. Manual Closers: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain each type of door hardware from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Rated Door Assemblies: Where fire-rated doors are indicated, provide door hardware complying with NFPA 80 that is listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.

B. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that complies with requirements of assemblies tested in accordance with UL 1784 and installed in compliance with NFPA 105.

   1. Air Leakage Rate: Maximum air leakage of 0.3 cfm/sq. ft. at the tested pressure differential of 0.3-inch wg of water.

C. Means of Egress Doors: Latches do not require more than 15 lbf to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.

D. Accessibility Requirements: For door hardware on doors in an accessible route, comply with ICC A117.1 .

   1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.
   2. Comply with the following maximum opening-force requirements:
      a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf applied perpendicular to door.
      b. Sliding or Folding Doors: 5 lbf applied parallel to door at latch.
      c. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
   3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch high.
   4. Adjust door closer sweep periods so that, from an open position of 90 degrees, the door will take at least 5 seconds to move to a position of 12 degrees from the latch.
   5. Adjust spring hinges so that, from an open position of 70 degrees, the door will take at least 1.5 seconds to move to the closed position.

2.3 HINGES

A. Hinges: BHMA A156.1.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Allegion plc.
   b. Bommer Industries, Inc.
   c. McKinney Products Company; ASSA ABLOY Accessories and Door Controls Group, Inc.; ASSA ABLOY.
   d. STANLEY; dormakaba USA, Inc.

2.4 MECHANICAL LOCKS AND LATCHES

A. Lock Functions: As indicated in door hardware schedule.

B. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:

1. Bored Locks: Minimum 1/2-inch latchbolt throw.
2. Mortise Locks: Minimum 3/4-inch latchbolt throw.
3. Deadbolts: Minimum 1-inch bolt throw.

C. Lock Backset: 2-3/4 inches unless otherwise indicated.

D. Lock Trim:

E. Description: As indicated on Drawings.

1. Levers: Cast.
2. Escutcheons (Roses): Cast.
3. Dummy Trim: Match lever lock trim and escutcheons.

F. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.

1. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
2. Aluminum-Frame Strike Box: Manufacturer's special strike box fabricated for aluminum framing.

G. Bored Locks: BHMA A156.2; Grade 1; Series 4000.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Allegion plc.
   b. BEST Access Solutions, Inc.; dormakaba USA Inc.
   c. Corbin Russwin, Inc.; an ASSA ABLOY Group company.
   d. Hager Companies.

e. SARGENT Manufacturing Company; ASSA ABLOY.
f. STANLEY; dormakaba USA, Inc.
g. Yale Security Inc; ASSA ABLOY.

H. Mortise Locks: BHMA A156.13; Operational Grade 1; stamped steel case with steel or brass parts; Series 1000.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Allegion plc.
b. BEST Access Solutions, Inc.; dormakaba USA Inc.
c. Corbin Russwin, Inc.; an ASSA ABLOY Group company.
d. Hager Companies.
e. SARGENT Manufacturing Company; ASSA ABLOY.
f. STANLEY; dormakaba USA, Inc.
g. Yale Security Inc; ASSA ABLOY.

2.5 EXIT DEVICES AND AUXILIARY ITEMS

A. Exit Devices and Auxiliary Items: BHMA A156.3.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Allegion plc.
b. Corbin Russwin, Inc.; an ASSA ABLOY Group company.
c. Hager Companies.
d. Precision Hardware, Inc.; dormakaba Group.

2.6 LOCK CYLINDERS

A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Allegion plc.
b. BEST Access Solutions, Inc.; dormakaba USA Inc.
c. Corbin Russwin, Inc.; an ASSA ABLOY Group company.
d. Hager Companies.
e. STANLEY; dormakaba USA, Inc.

2.7 KEYING

A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, appendix. Provide one extra key blank for each lock.

1. Grand Master Key System: Change keys, a master key, and a grand master key operate cylinders.
a. Provide three cylinder change keys and five each of master and grand master keys.

2. Keyed Alike: Key all cylinders to same change key.

B. Keys: Nickel silver .

1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:
   a. Notation: "DO NOT DUPLICATE."

2.8 SURFACE CLOSERS

A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written instructions for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Allegion plc.
   b. Corbin Russwin, Inc.; an ASSA ABLOY Group company.
   c. Hager Companies.
   d. Norton Door Controls; ASSA ABLOY.
   e. STANLEY; dormakaba USA, Inc.

2.9 DOOR GASKETING

A. Door Gasketing: BHMA A156.22; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Hager Companies.
   b. National Guard Products, Inc.
   c. Pemko Manufacturing Company Inc.; ASSA ABLOY Accessories and Door Controls Group, Inc.; ASSA ABLOY.
   d. Zero International; Allegion plc.

B. Maximum Air Leakage: When tested in accordance with ASTM E283 with tested pressure differential of 0.3-inch wg, as follows:

1. Smoke-Rated Gasketing: 0.3 cfm/sq. ft. of door opening.
2. Gasketing on Single Doors: 0.3 cfm/sq. ft. of door opening.

2.10 THRESHOLDS

A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Hager Companies.
b. National Guard Products, Inc.
c. Pemko Manufacturing Company Inc.; ASSA ABLOY Accessories and Door Controls Group, Inc.; ASSA ABLOY.
d. Zero International; Allegion plc.

2.11 AUXILIARY DOOR HARDWARE

A. Auxiliary Hardware: BHMA A156.16.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Allegion plc.
   b. Hager Companies.
   c. Rockwood Manufacturing Company; ASSA ABLOY Accessories and Door Controls Group, Inc.; ASSA ABLOY.
   d. Trimco.

2.12 FABRICATION

A. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.

B. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware unless otherwise indicated.

1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
2. Fire-Rated Applications:
   a. Wood or Machine Screws: For the following:
      1) Hinges mortised to doors or frames.
      2) Strike plates to frames.
      3) Closers to doors and frames.
   b. Steel Through Bolts: For the following unless door blocking is provided:
      1) Surface hinges to doors.
      2) Closers to doors and frames.
      3) Surface-mounted exit devices.
3. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
4. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.13 FINISHES

A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance of the Work.

B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

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

3.2 PREPARATION

A. Steel Doors and Frames: For surface-applied door hardware, drill and tap doors and frames in accordance with ANSI/SDI A250.6.

3.3 INSTALLATION

A. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.

1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
2. Custom Steel Doors and Frames: HMMA 831.

B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.

1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

C. Hinges: Install types and in quantities indicated in door hardware schedule, but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.

D. Lock Cylinders: Install construction cores to secure building and areas during construction period.

1. Replace construction cores with permanent cores as directed by Owner.
2. Furnish permanent cores to Owner for installation.

E. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 07 92 00 "Joint Sealants."

F. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

1. Do not notch perimeter gasketing to install other surface-applied hardware.

G. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.4 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 08 80 00

GLAZING

PART 1 - GENERAL

1.1 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters in accordance with ASTM C1036.

C. IBC: International Building Code.

D. Interspace: Space between lites of an insulating-glass unit.

1.2 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances to achieve proper safety margins for glazing retention under each design load case, load case combination, and service condition.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials in accordance with manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F.

1.6 WARRANTY

A. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Glass: Obtain glass from single source from single manufacturer.

B. Source Limitations for Glazing Accessories: For each product and installation method, obtain from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

2.3 GLASS PRODUCTS, GENERAL

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."

B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction or manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the IGCC.

D. Thickness: Where glass thickness is indicated, it is a minimum.

2.4 GLASS PRODUCTS

A. Fully Tempered Float Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

2.5 INSULATING GLASS

A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified in accordance with ASTM E2190.

1. Sealing System: Dual seal, with manufacturer's standard primary and secondary sealants.
2. Perimeter Spacer: Manufacturer's standard spacer material and construction .
    a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
        1) Saint-Gobain Glass Corp.
        2) Technoform Glass Insulation North America.
        3) Thermix; a brand of Ensinger USA.
3. Desiccant: Molecular sieve or silica gel, or a blend of both.

2.6 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C1281 and AAMA 800 for products indicated below:

1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.

2.7 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, recommended in writing by manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks:

1. EPDM with Shore A durometer hardness of 85, plus or minus 5.
2. Type recommended in writing by sealant or glass manufacturer.

D. Spacers:

1. Neoprene blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
2. Type recommended in writing by sealant or glass manufacturer.

E. Edge Blocks:

1. EPDM with Shore A durometer hardness per manufacturer's written instructions.
2. Type recommended in writing by sealant or glass manufacturer.

2.8 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
   a. Temperature Change: 120 deg F , ambient; 180 deg F , material surfaces .

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep systems.
3. Minimum required face and edge clearances.
4. Effective sealing between joints of glass-framing members.

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

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.

C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

F. Provide spacers for glass lites where length plus width is larger than 50 inches.

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
2. Provide 1/8-inch- minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and in accordance with requirements in referenced glazing publications.

H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

J. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended in writing by gasket manufacturer.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until right before each glazing unit is installed.

F. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

G. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended in writing by gasket manufacturer.

D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended in writing by gasket manufacturer.

E. Install gaskets so they protrude past face of glazing stops.

3.6 CLEANING AND PROTECTION

A. Immediately after installation, remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.

1. If, despite such protection, contaminating substances do contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.

C. Remove and replace glass that is damaged during construction period.

D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION

SECTION 08 91 19

FIXED LOUVERS

PART 1 - GENERAL

1.1 DEFINITIONS

A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.

B. Horizontal Louver: Louver with horizontal blades (i.e., the axis of the blades are horizontal).

C. Vertical Louver: Louver with vertical blades (i.e., the axis of the blades are vertical).

D. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to channels in jambs and mullions, which carry it to bottom of unit and away from opening.

E. Wind-Driven-Rain-Resistant Louver: Louver that provides specified wind-driven-rain performance, as determined by testing according to AMCA 500-L.

F. Windborne-Debris-Impact-Resistant Louver: Louver that provides specified windborne-debris-impact resistance, as determined by testing according to AMCA 540.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.

B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.

1. Show weep paths, gaskets, flashings, sealants, and other means of preventing water intrusion.
2. Show mullion profiles and locations.

1.3 FIELD CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain fixed louvers from single source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

2.2 PERFORMANCE REQUIREMENTS

A. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

2.3 FIXED EXTRUDED-ALUMINUM LOUVERS

A. Horizontal, Drainable-Blade, Windborne-Debris-Impact-Resistant Louver:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Airolite Company, LLC (The).
   b. Greenheck Fan Corporation.
2. Louver Depth: 4 inches.
3. Frame and Blade Nominal Thickness: Not less than 0.080 inch
4. Mullion Type: Exposed.
5. AMCA Seal: Mark units with AMCA Certified Ratings Seal.
6. AMCA Rating: AMCA 540.

2.4 LOUVER SCREENS

A. General: Provide screen at each exterior louver.

1. Screen Location for Fixed Louvers: Interior face.
2. Screening Type: Insect screening.

B. Secure screen frames to louver frames with stainless-steel machine screws, spaced a maximum of 6 inches from each corner and at 12 inches o.c.

C. Louver Screen Frames: Fabricate with mitered corners to louver sizes indicated.

1. Metal: Same type and form of metal as indicated for louver to which screens are attached.
2. Finish: Same finish as louver frames to which louver screens are attached.
3. Type: Rewirable frames with a driven spline or insert.

D. Louver Screening for Aluminum Louvers:

1. Insect Screening: Aluminum, 18-by-16 mesh, 0.012-inch wire.

2.5 MATERIALS

A. Aluminum Extrusions: ASTM B 221, Alloy 6063-T5, T-52, or T6.

B. Aluminum Sheet: ASTM B 209, Alloy 3003 or 5005, with temper as required for forming, or as otherwise recommended by metal producer for required finish.

C. Galvanized-Steel Sheet: ASTM A 653/A 653M, G60 zinc coating, mill phosphatized.

D. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, No. 4 finish, with grain running parallel to length of blades and frame members.

E. Fasteners: Use types and sizes to suit unit installation conditions.

1. Use tamper-resistant screws for exposed fasteners unless otherwise indicated.
2. For fastening aluminum, use aluminum or 300 series stainless-steel fasteners.
3. For fastening galvanized steel, use hot-dip-galvanized-steel or 300 series stainless-steel fasteners.
4. For fastening stainless steel, use 300 series stainless-steel fasteners.
5. For color-finished louvers, use fasteners with heads that match color of louvers.

F. Postinstalled Fasteners for Concrete and Masonry: Torque-controlled expansion anchors, fabricated from stainless-steel components, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing according to ASTM E 488/E 488M conducted by a qualified testing agency.

G. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

2.6 FABRICATION

A. Factory assemble louvers to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

B. Maintain equal louver blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.

C. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.

D. Include supports, anchorages, and accessories required for complete assembly.

E. Provide vertical mullions of type and at spacings indicated, but not more than is recommended by manufacturer, or 72 inches o.c., whichever is less.

1. Exposed Mullions: Where indicated, provide units with exposed mullions of same width and depth as louver frame. Where length of louver exceeds fabrication and handling limitations, provide interlocking split mullions designed to permit expansion and contraction.

F. Provide subsills made of same material as louvers or extended sills for recessed louvers.

G. Join frame members to each other and to fixed louver blades with fillet welds concealed from view unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.7 ALUMINUM FINISHES

A. Finish louvers after assembly.

B. High-Performance Organic Finish: -coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Color and Gloss: As selected by Director's Representative.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

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

3.2 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 INSTALLATION

A. Locate and place louvers level, plumb, and at indicated alignment with adjacent work.

B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.

C. Form closely fitted joints with exposed connections accurately located and secured.

D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.

E. Protect unpainted galvanized- and nonferrous-metal surfaces that are in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint or by separating surfaces with waterproof gaskets or nonmetallic flashing.

F. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Section 07 92 00 "Joint Sealants" for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING

A. Clean exposed louver surfaces that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate during construction period.

B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.

C. Restore louvers damaged during installation and construction, so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.

1. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION

SECTION 09 29 00

GYPSUM BOARD

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For the following:

1. Gypsum board, Type X.
2. Gypsum ceiling board.
3. Mold-resistant gypsum board.
4. Glass-mat gypsum sheathing board.
5. Interior trim.
6. Joint treatment materials.

1.2 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.3 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

A. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

A. Gypsum Board, Type X: ASTM C1396/C1396M.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. American Gypsum.
   b. Certainteed; SAINT-GOBAIN.
   c. Georgia-Pacific Gypsum LLC.
   d. USG Corporation.
2. Thickness: 5/8 inch.
3. Long Edges: Tapered .

B. Gypsum Ceiling Board: ASTM C1396/C1396M.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. American Gypsum.
   b. Certainteed; SAINT-GOBAIN.
   c. Continental Building Products Inc.
   d. Georgia-Pacific Gypsum LLC.
2. Thickness: 1/2 inch.
3. Long Edges: Tapered.

C. Mold-Resistant Gypsum Board: ASTM C1396/C1396M. With moisture- and mold-resistant core and paper surfaces.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. American Gypsum.
   b. Certainteed; SAINT-GOBAIN.
   c. Georgia-Pacific Gypsum LLC.
   d. USG Corporation.
2. Core: 5/8 inch , Type X.
3. Long Edges: Tapered.
4. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

2.4 TRIM ACCESSORIES

A. Interior Trim: ASTM C1047.

1. Material: Paper-faced galvanized-steel sheet.
2. Shapes:
    a. Cornerbead.

2.5 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C475/C475M.

B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Exterior Gypsum Soffit Board: Paper.
3. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
4. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints , rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
    a. Use setting-type compound for installing paper-faced metal trim accessories.
3. Fill Coat: For second coat, use drying-type, all-purpose compound.
4. Finish Coat: For third coat, use drying-type, all-purpose compound.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

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

3.2 INSTALLATION AND FINISHING OF PANELS, GENERAL

A. Comply with ASTM C840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
2. Fit gypsum panels around ducts, pipes, and conduits.
3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch- wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

I. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members or provide control joints to counteract wood shrinkage.

J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 INSTALLATION OF INTERIOR GYPSUM BOARD

A. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
2. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
    a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
3. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

B. Multilayer Application:

1. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
2. On Z-shaped furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
3. Fastening Methods: Fasten base layers and face layers separately to supports with screws .

3.4 INSTALLATION OF EXTERIOR GYPSUM PANELS FOR CEILINGS AND SOFFITS

A. Apply panels perpendicular to supports, with end joints staggered and located over supports.

1. Install with 1/4-inch open space where panels abut other construction or structural penetrations.
2. Fasten with corrosion-resistant screws.

3.5 INSTALLATION OF TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners unless otherwise indicated.

3.6 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

SECTION 09 65 13

RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.2 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials , from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

1.4 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F , in spaces to receive resilient products during the following periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F .

C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Verify products comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.2 THERMOSET-RUBBER BASE

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Flexco.
2. Johnsonite; a Tarkett company.
3. Roppe Corporation.

B. Product Standard: ASTM F 1861, Type TS (rubber, vulcanized thermoset), Group I (solid, homogeneous).

1. Style and Location:
   a. Style B, Cove

C. Thickness: 0.125 inch.

D. Height: 4 inches.

E. Lengths: Coils in manufacturer's standard length.

F. Outside Corners: Job formed or preformed.

G. Inside Corners: Job formed or preformed.

H. Colors: As selected by Director's Representative.

2.3 INSTALLATION MATERIALS

A. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

1. Verify adhesives have a VOC content of 50 Insert value> g/L or less and 60 g/L or less for rubber stair treads.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

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

1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates for Resilient Stair Accessories: Prepare horizontal surfaces according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
4. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft. , and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.

C. Do not install resilient products until materials are the same temperature as space where they are to be installed.

1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.

D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 RESILIENT BASE INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

G. Preformed Corners: Install preformed corners before installing straight pieces.

H. Job-Formed Corners:

1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
   a. Form without producing discoloration (whitening) at bends.
2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
   a. Miter or cope corners to minimize open joints.

3.4 RESILIENT ACCESSORY INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient accessories.

B. Resilient Stair Accessories:

1. Tightly adhere to substrates throughout length of each piece.
2. For treads installed as separate, equal-length units, install to produce a flush joint between units.

C. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.

B. Perform the following operations immediately after completing resilient-product installation:

1. Remove adhesive and other blemishes from surfaces.
2. Sweep and vacuum horizontal surfaces thoroughly.
3. Damp-mop horizontal surfaces to remove marks and soil.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION

SECTION 09 91 23

INTERIOR PAINTING

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

1. Include preparation requirements and application instructions.
2. Indicate VOC content.

1.2 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. Paint Products: 5 percent, but not less than 1 gal. of each material and color applied.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.4 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures of less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Benjamin Moore & Co.
2. PPG Paints; PPG Industries, Inc.
3. Rust-Oleum Corporation; a subsidiary of RPM International, Inc.
4. Sherwin-Williams Company (The).

5. Vista Paint Corporation.

B. Source Limitations: Obtain each paint product from single source from single manufacturer.

2.2 PAINT PRODUCTS, GENERAL

A. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

B. VOC Content: For field applications that are inside the weatherproofing system, verify paints and coatings comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:

1. Flat Paints and Coatings: 50 g/L.
2. Nonflat Paints and Coatings: 50 g/L.
3. Dry-Fog Coatings: 150 g/L.
4. Primers, Sealers, and Undercoaters: 100 g/L.
5. Shellacs, Pigmented: 550 g/L.
6. Shellacs, Clear: 730 g/L.
7. Pretreatment Wash Primers: 420 g/L.
8. Zinc-Rich Industrial Maintenance Primers: 100 g/L.
9. Rust-Preventive Coatings: 100 g/L.

C. Low-Emitting Materials: For field applications that are inside the weatherproofing system, verify 90 percent of paints and coatings comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

D. Colors: As selected by Director's Representative.

2.3 PRIMERS

A. Interior/Exterior Latex Block Filler: Water-based, high-solids, emulsion coating formulated to bridge and fill porous surfaces of exterior concrete masonry units in preparation for specified subsequent coatings.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Behr Paint Company; Behr Process Corporation.
   b. Benjamin Moore & Co.
   c. PPG Paints; PPG Industries, Inc.
   d. Rust-Oleum Corporation; a subsidiary of RPM International, Inc.
   e. Sherwin-Williams Company (The).
   f. Vista Paint Corporation.

B. Interior, Institutional Low-Odor/VOC Primer Sealer: Water-based primer sealer with low-odor characteristics and a VOC of less than 10 grams per liter for use on new interior plaster, concrete, and gypsum wallboard surfaces that are subsequently to be painted with latex finish coats.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Behr Paint Company; Behr Process Corporation.
   b. Benjamin Moore & Co.
   c. PPG Paints; PPG Industries, Inc.
   d. Rust-Oleum Corporation; a subsidiary of RPM International, Inc.
   e. Sherwin-Williams Company (The).
   f. Vista Paint Corporation.

2.4 WATER-BASED FINISH COATS

A. Interior, Latex, High-Performance Architectural Coating, Satin: High-performance architectural latex coating providing a significantly higher level of performance than conventional latex paints in the areas of scrub resistance, burnish resistance, and ease of stain removal.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Behr Paint Company; Behr Process Corporation.
   b. Benjamin Moore & Co.
   c. PPG Paints; PPG Industries, Inc.
   d. Sherwin-Williams Company (The).

2.5 FLOOR SEALERS AND PAINTS

A. Water-Based Concrete Floor Sealer: Clear, water-based, acrylic-copolymer-emulsion sealer formulated for oil, gasoline, alkali, and water resistance and for use on concrete traffic surfaces.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Behr Paint Company; Behr Process Corporation.
   b. H&C Decorative Concrete Products; a brand of Sherwin-Williams Co.
   c. Hempel (USA), Inc.
   d. PPG Paints; PPG Industries, Inc.
   e. Rust-Oleum Corporation; a subsidiary of RPM International, Inc.
   f. Sherwin-Williams Company (The).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.
2. Fiber-Cement Board: 12 percent.
3. Masonry (Clay and CMUs): 12 percent.
4. Wood: 15 percent.
5. Gypsum Board: 12 percent.
6. Plaster: 12 percent.

C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

D. Plaster Substrates: Verify that plaster is fully cured.

E. Spray-Textured Ceiling Substrates: Verify that surfaces are dry.

F. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

G. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.

F. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer .

G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

H. Aluminum Substrates: Remove loose surface oxidation.

I. Wood Substrates:

1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
2. Sand surfaces that will be exposed to view, and dust off.
3. Prime edges, ends, faces, undersides, and backsides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

J. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.3 INSTALLATION

A. Apply paints according to manufacturer's written instructions.

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Fire-Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed in equipment rooms:
   a. Plywood backing panels.

3.4 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

1. Do not clean equipment with free-draining water and prevent solvents, thinners, cleaners, and other contaminants from entering into waterways, sanitary and storm drain systems, and ground.
2. Dispose of contaminants in accordance with requirements of authorities having jurisdiction.
3. Allow empty paint cans to dry before disposal.
4. Collect waste paint by type and deliver to recycling or collection facility.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Director's Representative, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

END OF SECTION

SECTION 09 96 00

HIGH-PERFORMANCE COATINGS

PART 1 - GENERAL

1.1 DEFINITIONS

A. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
2. Indicate VOC content.

1.3 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials , from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Coatings: 5 percent, but not less than 1 gal. of each material and color applied.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.5 FIELD CONDITIONS

A. Apply coatings only when temperature of surfaces to be coated and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply coatings when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

C. Do not apply exterior coatings in snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Behr Paint Company; Behr Process Corporation.
2. Benjamin Moore & Co.
3. PPG Paints; PPG Industries, Inc.
4. Rust-Oleum Corporation; a subsidiary of RPM International, Inc.
5. Sherwin-Williams Company (The).
6. Tnemec Company, Inc.

2.2 HIGH-PERFORMANCE COATINGS, GENERAL

A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."

B. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
3. Products shall be of same manufacturer for each coat in a coating system.

C. Low-Emitting Materials: For field applications that are inside the weatherproofing system, verify 90 percent of paints and coatings comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

D. Colors: As selected by Directo's Representative .

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.
2. Fiber-Cement Board: 12 percent.
3. Masonry (Clay and CMUs): 12 percent.
4. Wood: 15 percent.

C. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

D. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and coating systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of coatings, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce coating systems indicated.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.

1. Clean surfaces with pressurized water. Use pressure range of 1500 to 4000 psi at 6 to 12 inches.

E. Masonry Substrates: Remove efflorescence and chalk. Do not coat surfaces if moisture content, alkalinity of surfaces, or alkalinity of mortar joints exceeds that permitted in manufacturer's written instructions.

1. Clean surfaces with pressurized water. Use pressure range of 100 to 600 psi at 6 to 12 inches.

F. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer .

G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied coatings.

H. Wood Substrates:

1. Scrape and clean knots. Before applying primer, apply coat of knot sealer that is recommended in writing by topcoat manufacturer for coating system indicated.
2. Sand surfaces that will be exposed to view and dust off.
3. Prime edges, ends, faces, undersides, and backsides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with filler that is recommended in writing by topcoat manufacturer for coating system indicated. Sand smooth when dried.

3.3 APPLICATION

A. Apply high-performance coatings according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."

1. Use applicators and techniques suited for coating and substrate indicated.
2. Coat surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, coat surfaces behind permanently fixed equipment or furniture with prime coat only.
3. Coat backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
4. Do not apply coatings over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of the same material are to be applied. Tint undercoats to match color of finish coat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color, and appearance.

D. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and color breaks.

3.4 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from coating operation. Correct damage to work of other trades by cleaning, repairing, replacing, and recoating, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

END OF SECTION

SECTION 10 14 23.16

ROOM-IDENTIFICATION PANEL SIGNAGE

PART 1 - GENERAL

1.1 DEFINITIONS

A. Accessible: In accordance with the accessibility standard.

1.2 COORDINATION

A. Furnish templates for placement of sign-anchorage devices embedded in permanent construction by other installers.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For room-identification signs.

1. Include fabrication and installation details and attachments to other work.
2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
3. Show message list, typestyles, graphic elements, including raised characters and Braille, and layout for each sign at least half size .

1.4 FIELD CONDITIONS

A. Field Measurements: Verify locations of anchorage devices and electrical service embedded in permanent construction by other installers by field measurements before fabrication, and indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 ROOM-IDENTIFICATION SIGNS

A. Room-Identification Sign : Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. ACE Sign Systems, Inc.
   b. ASE, Inc.
   c. ASI Sign Systems, Inc.
   d. Best Sign Systems, Inc.
   e. inpro Corporation.
   f. Mohawk Sign Systems.

g. Signature Signs, Inc.

2. Laminated-Sheet Sign: Sandblasted polymer face sheet with raised graphics laminated to phenolic backing sheet to produce composite sheet.
   a. Composite-Sheet Thickness: Manufacturer's standard for size of sign.
   b. Color(s): As selected by Director's Representative.
3. Sign-Panel Perimeter: Finish edges smooth.
   a. Edge Condition: Bullnosed .
   b. Corner Condition in Elevation: Rounded to radius indicated.
4. Mounting: Manufacturer's standard method for substrates indicated with two-face tape.
5. Text and Typeface: Accessible raised characters and Braille Times Roman. Finish raised characters to contrast with background color, and finish Braille to match background color.

2.2 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.

B. Two-Face Tape: Manufacturer's standard high-bond, foam-core tape, 0.045 inch thick, with adhesive on both sides.

2.3 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. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
4. 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.

2.4 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.

1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
2. Install signs so they do not protrude or obstruct according to the accessibility standard.
3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.

B. Accessibility: Install signs in locations on walls as indicated on Drawings.

C. Mounting Methods:

1. Concealed Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.
   a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place sign in position and push until flush to surface, embedding studs in holes. Temporarily support sign in position until adhesive fully sets.
   b. Thin or Hollow Surfaces: Place sign in position and flush to surface, install washers and nuts on studs projecting through opposite side of surface, and tighten.
2. Through Fasteners: Drill holes in substrate using predrilled holes in sign as template. Countersink holes in sign if required. Place sign in position and flush to surface. Install through fasteners and tighten.
3. Two-Face Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges. Place sign in position, and push to engage tape adhesive.

3.2 ADJUSTING AND CLEANING

A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.

B. Remove temporary protective coverings and strippable films as signs are installed.

C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION

SECTION 10 28 00

TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
3. Include electrical characteristics.

1.3 WARRANTY

A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, visible silver spoilage defects.
2. Warranty Period: 10 years from date of Substantial Completion.

B. Manufacturer's Special Warranty for Hand Dryers: Manufacturer agrees to repair or replace hand dryers that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Two years 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.

2.2 PUBLIC-USE WASHROOM ACCESSORIES

A. Source Limitations: Obtain public-use washroom accessories from single source from single manufacturer.

B. Toilet Tissue (Roll) Dispenser:

1. See drawings

C. Waste Receptacle:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. American Specialties, Inc. (ASI).
   b. Bobrick Washroom Equipment, Inc.
   c. Bradley Corporation.
2. Mounting: Freestanding.
3. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).

D. Soap Dispenser:

1. See drawings

E. Grab Bar:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. American Specialties, Inc. (ASI).
   b. Bobrick Washroom Equipment, Inc.
   c. Bradley Corporation.
2. Mounting: Flanges with concealed fasteners.
3. Material: Stainless steel, 0.05 inch thick.
   a. Finish: Smooth, ASTM A480/A480M No. 4 finish (satin).
4. Outside Diameter: 1-1/4 inches.
5. Configuration and Length: As indicated on Drawings.

F. Mirror Unit:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. American Specialties, Inc. (ASI).
   b. Bobrick Washroom Equipment, Inc.
   c. Bradley Corporation.
2. Frame: Stainless steel, fixed tilt.
   a. Corners: Manufacturer's standard.
3. Size: As indicated on Drawings.

G. Hook:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. American Specialties, Inc. (ASI).
   b. Bobrick Washroom Equipment, Inc.
   c. Bradley Corporation.
2. Description: Double-prong unit.
3. Mounting: Exposed.
4. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).

2.3 HAND DRYERS

A. Source Limitations: Obtain hand dryers from single source from single manufacturer.

B. High-Speed Air Dryer:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. American Specialties, Inc. (ASI).
   b. Bobrick Washroom Equipment, Inc.
   c. Bradley Corporation.
   d. Excel Dryer Inc.
   e. Saniflow Corporation; Mediclinics S.A.
   f. World Dryer Corporation.
2. Description: High-speed, unheated-air hand dryer for rapid hand drying.
3. Mounting: Surface mounted.
   a. Protrusion Limit: Installed unit protrudes maximum 4 inches from wall surface.
4. Operation: Infrared-sensor activated with timed power cut-off switch.
   a. Average Dry Time: 12 seconds.
   b. Automatic Shut Off: At 60 seconds.
5. Maximum Sound Level: 69 dB.
6. Cover Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).
7. Electrical Requirements: 115V, 0.8–1.9 AMP, 50/60 Hz, 202–213 Watts

2.4 UNDERLAVATORY GUARDS

A. Underlavatory Guard :

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Buckaroos, Inc.
   b. Plumberex Specialty Products, Inc.
   c. Truebro; IPS Corporation.
2. Description: Insulating pipe covering for supply and drain piping assemblies that prevents direct contact with and burns from piping; allow service access without removing coverings.
3. Material and Finish: Antimicrobial, molded plastic, white.

2.5 CUSTODIAL ACCESSORIES

A. Source Limitations: Obtain custodial accessories from single source from single manufacturer.

B. Custodial Mop and Broom Holder:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. American Specialties, Inc. (ASI).
   b. Bobrick Washroom Equipment, Inc.
   c. Bradley Corporation.
2. Description: Unit with shelf, hooks, holders, and rod suspended beneath shelf.
3. Length: 36 inches.
4. Hooks: Four.
5. Mop/Broom Holders: Three, spring-loaded, rubber hat, cam type.
6. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).
   a. Shelf: Not less than nominal 0.05-inch- thick stainless steel.
   b. Rod: Approximately 1/4-inch- diameter stainless steel.

2.6 MATERIALS

A. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304, 0.031-inch- minimum nominal thickness unless otherwise indicated.

B. Steel Sheet: ASTM A1008/A1008M, Designation CS (cold rolled, commercial steel), 0.036-inch-minimum nominal thickness.

C. Galvanized-Steel Sheet: ASTM A653/A653M, with G60 hot-dip zinc coating.

D. Galvanized-Steel Mounting Devices: ASTM A153/A153M, hot-dip galvanized after fabrication.

E. Fasteners: Screws, bolts, and other devices of same material as accessory unit, unless otherwise recommended by manufacturer or specified in this Section, and tamper and theft resistant where exposed, and of stainless or galvanized steel where concealed.

F. Chrome Plating: ASTM B456, Service Condition Number SC 2 (moderate service).

G. Mirrors: ASTM C1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

2.7 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of two keys to Director’s Representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

1. Remove temporary labels and protective coatings.

B. Grab Bars: Install to comply with specified structural-performance requirements.

C. Shower Seats: Install to comply with specified structural-performance requirements.

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Clean and polish exposed surfaces according to manufacturer's written instructions.

END OF SECTION

SECTION 10 44 16

FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For each type of product. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.

1.2 COORDINATION

A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

1.3 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Failure of hydrostatic test according to NFPA 10 when testing interval required by NFPA 10 is within the warranty period.
   b. Faulty operation of valves or release levers.
2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

1. Provide fire extinguishers approved, listed, and labeled by FM Global.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

A. Fire Extinguishers: Type, size, and capacity for each and mounting bracket indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Babcock-Davis.
   b. Kidde; Carrier Global Corporation.
   c. Larsen's Manufacturing Company.
   d. Nystrom, Inc.

2. Source Limitations: Obtain fire extinguishers, fire-protection cabinets, and accessories, from single source from single manufacturer.
3. Valves: Manufacturer's standard.
4. Handles and Levers: Manufacturer's standard.
5. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B, and bar coding for documenting fire-extinguisher location, inspections, maintenance, and recharging.

B. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 4-A:60-B:C, 10-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

2.3 MOUNTING BRACKETS

A. Mounting Brackets: Manufacturer's standard steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red baked-enamel finish.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Babcock-Davis.
   b. Kidde; Carrier Global Corporation.
   c. Larsen's Manufacturing Company.
   d. Nystrom, Inc.
2. Source Limitations: Obtain mounting brackets and fire extinguishers from single source from single manufacturer.

B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.

1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.
   a. Orientation: Vertical.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fire extinguishers for proper charging and tagging.

1. Remove and replace damaged, defective, or undercharged fire extinguishers.

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

3.2 INSTALLATION

A. General: Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.

1. Mounting Brackets: Top of fire extinguisher to be at 42 inches above finished floor.

B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION

SECTION 13 34 19

METAL BUILDING SYSTEMS

PART 1 - GENERAL

1.1 DEFINITIONS

A. Terminology Standard: See MBMA's "Metal Building Systems Manual" for definitions of terms for metal building system construction not otherwise defined in this Section or in standards referenced by this Section.

1.2 COORDINATION

A. Coordinate sizes and locations of concrete foundations and casting of anchor-rod inserts into foundation walls and footings. Anchor rod installation, concrete, reinforcement, and formwork requirements are specified in Section 03 30 00 "Cast-in-Place Concrete."

B. Coordinate metal panel assemblies with rain drainage work, flashing, trim, and construction of supports and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to metal building systems including, but not limited to, the following:
    a. Condition of foundations and other preparatory work performed by other trades.
    b. Structural load limitations.
    c. Construction schedule. Verify availability of materials and erector's personnel, equipment, and facilities needed to make progress and avoid delays.
    d. Required tests, inspections, and certifications.
    e. Unfavorable weather and forecasted weather conditions and impact on construction schedule.
2. Review methods and procedures related to metal roof panel assemblies including, but not limited to, the following:
    a. Compliance with requirements for purlin and rafter conditions, including flatness and attachment to structural members.
    b. Structural limitations of purlins and rafters during and after roofing.
    c. Flashings, special roof details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect metal roof panels.
    d. Temporary protection requirements for metal roof panel assembly during and after installation.
    e. Roof observation and repair after metal roof panel installation.
3. Review methods and procedures related to metal wall panel assemblies including, but not limited to, the following:

a. Compliance with requirements for support conditions, including alignment between and attachment to structural members.
b. Structural limitations of girts and columns during and after wall panel installation.
c. Flashings, special siding details, wall penetrations, openings, and condition of other construction that will affect metal wall panels.
d. Temporary protection requirements for metal wall panel assembly during and after installation.
e. Wall observation and repair after metal wall panel installation.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of metal building system component.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
   a. Metal roof panels.
   b. Metal wall panels.
   c. Metal soffit panels.
   d. Thermal insulation and vapor-retarder facings.

B. Shop Drawings: Indicate components by others. Include full building plan, elevations, sections, details and the following:

1. Anchor-Rod Plans: Submit anchor-rod plans and templates before foundation work begins. Include location, diameter, and minimum required projection of anchor rods required to attach metal building to foundation. Indicate column reactions at each location.
2. Structural-Framing Drawings: Show complete fabrication of primary and secondary framing; include provisions for openings. Indicate welds and bolted connections, distinguishing between shop and field applications. Include transverse cross-sections.
3. Accessory Drawings: Include details of the following items, at a scale of not less than 1-1/2 inches per 12 inches:
   a. Flashing and trim.
   b. Gutters.
   c. Downspouts.

C. Delegated-Design Submittal: For metal building systems.

1. Include analysis data indicating compliance with performance requirements and design data signed and stamped by the qualified New York State Professional Engineer responsible for their preparation.

D. Product Declarations: Provide current Environmental Product Declarations (EPDs), that include the amount of embodied carbon in hollow structural sections, fabricated steel plate, hot-rolled sections and cold-formed and galvanized materials.

1. Acceptable EPDs are non-expired, Product-specific, Facility or Plant-specific, or Supply Chain-specific Type III (Third-Party Reviewed), in adherence with ISO 14025

Environmental labels and declarations, ISO 14044 Environmental management – Life cycle assessment, and ISO 21930 Core rules for environmental product declarations of construction products and services.

2. Provide the EPD Material Tracking Form containing the total anticipated quantity/volume/weight (matching the units used in the EPDs) of each product being incorporated into the project.
    a. With each application for payment, provide an updated EPD Material Tracking Form and copies of delivery tickets for each product incorporated into the project for the period covered by the payment application.

1.5 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Letter of Design Certification: Signed and sealed by a qualified professional engineer. Include the following:

1. Name and location of Project.
2. Order number.
3. Name of manufacturer.
4. Name of Contractor.
5. Building dimensions including width, length, height, and roof slope.
6. Indicate compliance with AISC standards for hot-rolled steel and AISI standards for cold-rolled steel, including edition dates of each standard.
7. Governing building code and year of edition.
8. Design Loads: Include dead load, roof live load, collateral loads, roof snow load, deflection, wind loads/speeds and exposure, seismic design category or effective peak velocity-related acceleration/peak acceleration, and auxiliary loads (cranes).
    a. Include loading for potential future open canopy indicated on Drawings.
9. Load Combinations: Indicate that loads were applied acting simultaneously with concentrated loads, according to governing building code.
10. Building-Use Category: Indicate category of building use and its effect on load importance factors.

C. Material Test Reports: For each of the following products:

1. Structural steel physical properties.
2. Bolts, nuts, and washers including mechanical properties and chemical analysis.
3. Tension-control, high-strength, bolt-nut-washer assemblies.
4. Shop primers.
5. Non-shrink grout.

D. Sample Warranties: For special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For metal panel finishes to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer.

1. Accreditation: Manufacturer's facility accredited according to the International Accreditation Service's AC472, "Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems."
2. Engineering Responsibility: Preparation of comprehensive engineering analysis and Shop Drawings by a professional engineer who is legally qualified to practice in jurisdiction where Project is located.

B. Erector Qualifications: An experienced erector who specializes in erecting and installing work similar in material, design, and extent to that indicated for this Project and who is acceptable to manufacturer.

C. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.3, "Structural Welding Code - Sheet Steel."

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, sheets, panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.

B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Protect foam-plastic insulation as follows:

1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver foam-plastic insulation materials to Project site before installation time.
3. Complete installation and concealment of foam-plastic materials as rapidly as possible in each area of construction.

1.9 FIELD CONDITIONS

A. Weather Limitations: Proceed with panel installation only when weather conditions permit metal panels to be installed according to manufacturers' written instructions and warranty requirements.

1.10 WARRANTY

A. Special Warranty on Metal Panel Finishes: Manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
   a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
   b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
   c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Finish Warranty Period: 20 years from date of Substantial Completion.

B. Special Weathertightness Warranty for Face-fastened Metal Roof Panels: Manufacturer agrees to repair or replace face-fastened metal roof panel assemblies that leak or otherwise fail to remain weathertight within specified warranty period.

1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ACI Building Systems, Inc.
2. Alliance Steel, Inc.
3. Butler Manufacturing Company; a division of BlueScope Buildings North America, Inc.
4. Ceco Building Systems; part of the Cornerstone Building Brands.
5. Chief Buildings; Chief Industries, Inc.
6. Mesco Building Solutions, part of the Cornerstone Building Brands family.
7. Metallic Building Systems, part of the Cornerstone Building Brands.
8. Nucor Building Systems; a Nucor company.
9. Steel Systems; a division of NCI Building Systems, Inc.
10. Vulcan Steel Structures, Inc.

B. Source Limitations: Obtain metal building system components, including primary and secondary framing and metal panel assemblies, from single source from single manufacturer.

2.2 SYSTEM DESCRIPTION

A. Provide a complete, integrated set of mutually dependent components and assemblies that form a metal building system capable of withstanding structural and other loads, thermally induced movement, and exposure to weather without failure or infiltration of water into building interior.

B. Primary-Frame Type:

1. Rigid Clear Span: Solid-member, structural-framing system without interior columns.

C. End-Wall Framing: Manufacturer's standard, for buildings not required to be expandable, consisting of primary frame, capable of supporting one-half of a bay design load, and end-wall columns.

D. Secondary-Frame Type: Manufacturer's standard purlins and joists and exterior-framed (bypass) girts.

E. Eave Height: Manufacturer's standard height, as indicated by nominal height on Drawings.

F. Bay Spacing: As indicated on Drawings.

G. Roof Slope: As indicated on Drawings.

H. Roof System: Manufacturer's standard face-fastened metal roofing panels.

1. Provide batt insulation and vapor-retarder facing where indicated on drawings

I. Exterior Wall System: Manufacturer's standard exposed-fastener, flush-profile, metal wall panels.

1. No liner panels.

2.3 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified New York State licensed professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design metal building system.

B. Structural Performance: Metal building systems shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated according to procedures in MBMA's "Metal Building Systems Manual."

1. Design Loads: As indicated on Drawings.
2. Deflection and Drift Limits: Design metal building system assemblies to withstand serviceability design loads without exceeding deflections and drift limits recommended in AISC Steel Design Guide No. 3 "Serviceability Design Considerations for Steel Buildings."
3. Deflection and Drift Limits: No greater than the following:
    a. Purlins and Rafters: Vertical deflection of 1/180 of the span.
    b. Girts: Horizontal deflection of 1/180 of the span.
    c. Metal Roof Panels: Vertical deflection of 1/180 of the span.
    d. Metal Wall Panels: Horizontal deflection of 1/180 of the span.
    e. Design secondary-framing system to accommodate deflection of primary framing and construction tolerances, and to maintain clearances at openings.
    f. Lateral Drift: Maximum of 1/240 of the building height.

C. Seismic Performance: Metal building system shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change: 120 deg F , ambient; 180 deg F , material surfaces .

E. Fire Propagation Characteristics: Exterior wall assemblies containing foam plastics pass NFPA 285 fire test.

F. Structural Performance for Metal Roof and Wall Panels: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:

1. Wind Loads: As indicated on Drawings.

G. Air Infiltration for Metal Roof Panels: Air leakage of not more than 0.06 cfm/sq. ft. when tested according to ASTM E 1680 or ASTM E 283 at the following test-pressure difference:

1. Test-Pressure Difference: 6.24 lbf/sq. ft.

H. Air Infiltration for Metal Wall Panels: Air leakage of not more than 0.06 cfm/sq. ft. when tested according to ASTM E 283 at the following test-pressure difference:

1. Test-Pressure Difference: 6.24 lbf/sq. ft.

I. Water Penetration for Metal Roof Panels: No water penetration when tested according to ASTM E 1646 or ASTM E 331 at the following test-pressure difference:

1. Test-Pressure Difference: 6.24 lbf/sq. ft.

J. Water Penetration for Metal Wall Panels: No water penetration when tested according to ASTM E 331 at the following test-pressure difference:

1. Test-Pressure Difference: 6.24 lbf/sq. ft.

K. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for wind-uplift-resistance class indicated.

1. Uplift Rating: UL 90.

L. FM Global Listing: Provide metal roof panels and component materials that comply with requirements in FM Global 4471 as part of a panel roofing system and that are listed in FM Global's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Global markings.

1. Fire/Windstorm Classification: Minimum Class NC-C-90; more restrictive classifications are acceptable.
2. Hail Resistance: MH .

2.4 STRUCTURAL-STEEL FRAMING

A. Structural Steel: Comply with AISC 360, "Specification for Structural Steel Buildings."

B. Bolted Connections: Comply with RCSC's "Specification for Structural Joints Using High-Strength Bolts."

C. Cold-Formed Steel: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" for design requirements and allowable stresses.

D. Primary Framing: Manufacturer's standard primary-framing system, designed to withstand required loads and specified requirements. Primary framing includes transverse and lean-to frames; rafters, rake, and canopy beams; sidewall, intermediate, end-wall, and corner columns; and wind bracing.

1. General: Provide frames with attachment plates, bearing plates, and splice members. Factory drill for field-bolted assembly. Provide frame span and spacing indicated.
    a. Slight variations in span and spacing may be acceptable if necessary to comply with manufacturer's standard, as approved by Director’s Representative.
2. Rigid Clear-Span Frames: I-shaped frame sections fabricated from shop-welded, built-up steel plates or structural-steel shapes. Interior columns are not permitted.
3. Frame Configuration: As indicated on Drawings.
4. Exterior Column: Tapered.
5. Rafter: Tapered.

E. End-Wall Framing: Manufacturer's standard primary end-wall framing fabricated for field-bolted assembly to comply with the following:

1. End-Wall and Corner Columns: I-shaped sections fabricated from structural-steel shapes; shop-welded, built-up steel plates; or C-shaped, cold-formed, structural-steel sheet.
2. End-Wall Rafters: C-shaped, cold-formed, structural-steel sheet; or I-shaped sections fabricated from shop-welded, built-up steel plates or structural-steel shapes.

F. Secondary Framing: Manufacturer's standard secondary framing, including purlins, girts, eave struts, flange bracing, base members, gable angles, clips, headers, jambs, and other miscellaneous structural members. Unless otherwise indicated, fabricate framing from either cold-formed, structural-steel sheet or roll-formed, metallic-coated steel sheet, prepainted with coil coating, to comply with the following:

1. Purlins: C- or Z-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes; minimum 2-1/2-inch- wide flanges.
    a. Depth: As indicated on Drawings .
2. Girts: C- or Z-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes. Form ends of Z-sections with stiffening lips angled 40 to 50 degrees from flange, with minimum 2-1/2-inch- wide flanges.
    a. Depth: As indicated on Drawings .

3. Eave Struts: Unequal-flange, C-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes; to provide adequate backup for metal panels.
4. Flange Bracing: Minimum 2-by-2-by-1/8-inch structural-steel angles or 1-inch- diameter, cold-formed structural tubing to stiffen primary-frame flanges.
5. Sag Bracing: Minimum 1-by-1-by-1/8-inch structural-steel angles.
6. Base or Sill Angles: Manufacturer's standard base angle, minimum 3-by-2-inch , fabricated from zinc-coated (galvanized) steel sheet.
7. Purlin and Girt Clips: Manufacturer's standard clips fabricated from steel sheet. Provide galvanized clips where clips are connected to galvanized framing members.
8. Framing for Openings: Channel shapes; fabricated from cold-formed, structural-steel sheet or structural-steel shapes. Frame head and jamb of door openings and head, jamb, and sill of other openings.
9. Miscellaneous Structural Members: Manufacturer's standard sections fabricated from cold-formed, structural-steel sheet; built-up steel plates; or zinc-coated (galvanized) steel sheet; designed to withstand required loads.

G. Bracing: Provide adjustable wind bracing as follows:

1. Rigid Portal Frames: Fabricated from shop-welded, built-up steel plates or structural-steel shapes to match primary framing; of size required to withstand design loads.
2. Rods: ASTM A36; ASTM A572, Grade 50; or ASTM A529, Grade 50; minimum 1/2-inch diameter steel; threaded full length or threaded a minimum of 6 inches at each end.
3. Cable: ASTM A475, minimum 1/4-inch diameter, extra-high-strength grade, Class B, zinc-coated, seven-strand steel; with threaded end anchors.

H. Anchor Rods: Headed anchor rods as indicated in Anchor Rod Plan for attachment of metal building to foundation.

I. Materials:

1. W-Shapes: ASTM A 992/A 992M; ASTM A 572/A 572M, Grade 50 or 55; or ASTM A 529/A 529M, Grade 50 or 55.
2. Channels, Angles, M-Shapes, and S-Shapes: ASTM A 36/A 36M; ASTM A 572/A 572M, Grade 50 or 55 ; or ASTM A 529/A 529M, Grade 50 or 55 .
3. Plate and Bar: ASTM A 36/A 36M; ASTM A 572/A 572M, Grade 50 or 55; or ASTM A 529/A 529M, Grade 50 or 55.
4. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.
5. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B or C, structural tubing.
6. Structural-Steel Sheet: Hot-rolled, ASTM A 1011/A 1011M, Structural Steel (SS), Grades 30 through 55, or High-Strength Low-Alloy Steel (HSLAS) or High-Strength Low-Alloy Steel with Improved Formability (HSLAS-F), Grades 45 through 70; or cold-rolled, ASTM A 1008/A 1008M, Structural Steel (SS), Grades 25 through 80, or HSLAS, Grades 45 through 70.
7. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, SS, Grades 33 through 80 , or HSLAS or HSLAS-F, Grades 50 through 80 ; with G60 coating designation; mill phosphatized.
8. Metallic-Coated Steel Sheet Prepainted with Coil Coating: Steel sheet, metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.

a. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, SS, Grades 33 through 80 , or HSLAS or HSLAS-F, Grades 50 through 80 ; with G90 coating designation.
b. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, SS, Grade 50 or 80; with Class AZ50 coating.

9. Non-High-Strength Bolts, Nuts, and Washers: ASTM A 307, Grade A, carbon-steel, hex-head bolts; ASTM A 563 carbon-steel hex nuts; and ASTM F 844 plain (flat) steel washers.
   a. Finish: Plain Hot-dip zinc coating, ASTM F 2329, Class C.
10. High-Strength Bolts, Nuts, and Washers: ASTM F 3125/F 3125M,Grade A325, Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F 436/F 436M, Type 1, hardened carbon-steel washers.
    a. Finish: Plain Hot-dip zinc coating, ASTM F 2329, Class C.
11. High-Strength Bolts, Nuts, and Washers: ASTM F 3125/F 3125M, Grade A490, Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F 436/F 436M, Type 1, hardened carbon-steel washers; all with plain finish.
12. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 3125/F 3125M, Grade F1852, Type 1, head assemblies consisting of steel structural bolts with splined ends; ASTM A 563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F 436/F 436M, Type 1 hardened carbon-steel washers.
    a. Finish: Plain Mechanically deposited zinc coating, ASTM B 695, Class 50 Mechanically deposited zinc coating, ASTM B 695, Class 50, baked-epoxy coated.
13. Unheaded Anchor Rods: ASTM F 1554, Grade 36.
    a. Configuration: Straight.
    b. Nuts: ASTM A 563 heavy-hex carbon steel.
    c. Plate Washers: ASTM A 36/A 36M carbon steel.
    d. Washers: ASTM F 436 hardened carbon steel.
    e. Finish: Plain Hot-dip zinc coating, ASTM F 2329, Class C.
14. Headed Anchor Rods: ASTM F 1554, Grade 36.
    a. Configuration: Straight.
    b. Nuts: ASTM A 563 heavy-hex carbon steel.
    c. Plate Washers: ASTM A 36/A 36M carbon steel.
    d. Washers: ASTM F 436 hardened carbon steel.
    e. Finish: Plain Hot-dip zinc coating, ASTM F 2329, Class C.
15. Threaded Rods: ASTM A 193/A 193M ASTM A 572/A 572M, Grade 50 ASTM A 36/A 36M ASTM A 307, Grade A.
    a. Nuts: ASTM A 563 heavy-hex carbon steel.
    b. Washers: ASTM F 436 hardened ASTM A 36/A 36M carbon steel.
    c. Finish: Plain Hot-dip zinc coating, ASTM F 2329, Class C.

J. Finish: Factory primed. Apply specified primer immediately after cleaning and pretreating.

1. Clean and prepare in accordance with SSPC-SP2.
2. Coat with manufacturer's standard primer. Apply primer to primary and secondary framing to a minimum dry film thickness of 1 mil.
   a. Prime secondary framing formed from uncoated steel sheet to a minimum dry film thickness of 0.5 mil on each side.

3. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

2.5 METAL ROOF AND WALL PANELS

A. Exposed-Fastener, Tapered-Rib, Metal Wall and Roof Panels : Formed with raised, trapezoidal major ribs and flat pan between major ribs; designed to be installed by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners in side laps.

1. Material: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 26 gauge nominal (minimum) uncoated steel thickness. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
   a. Exterior Finish: Two-coat fluoropolymer.
   b. Color: As selected by Director's Representative.
2. Major-Rib Spacing: 12 inches o.c.
3. Panel Coverage: 36 inches.
4. Panel Height: 0.75 inch.

B. Finishes:

1. Exposed Coil-Coated Finish:
   a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

2.6 THERMAL INSULATION

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Bay Insulation Systems; a division of Bay Industries.

B. Faced Metal Building Insulation: ASTM C 991, Type II, glass-fiber-blanket insulation; 0.5-lb/cu. ft. density; 2-inch- wide, continuous, vapor-tight edge tabs; with a flame-spread index of 25 or less.

C. Unfaced Metal Building Insulation: ASTM C 991, Type I, or NAIMA 202, glass-fiber-blanket insulation; 0.5-lb/cu. ft. density; 2-inch- wide, continuous, vapor-tight edge tabs; with a flame-spread index of 25 or less.

D. Mineral-Fiber-Blanket Insulation: ASTM C 665, type indicated below; consisting of fibers manufactured from glass, slag wool, or rock wool.

1. Unfaced: Type I (blankets without membrane covering), passing ASTM E 136 for combustion characteristics.

E. Vapor-Retarder Facing: ASTM C 1136, with permeance not greater than 0.02 perm when tested according to ASTM E 96/E 96M, Desiccant Method.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Lamtec Corporation.
2. Composition: White metallized-polypropylene film facing, fiberglass scrim reinforcement, and kraft-paper backing.
3. Composition: Aluminum foil facing, elastomeric barrier coating, fiberglass scrim reinforcement, and kraft-paper backing.
4. Composition: White film facing, fiberglass scrim reinforcement, and metallized-polyester film backing.
5. Composition: White polypropylene film facing and fiberglass-polyester-blend fabric backing.

F. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

2.7 ACCESSORIES

A. General: Provide accessories as standard with metal building system manufacturer and as specified. Fabricate and finish accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes. Comply with indicated profiles and with dimensional and structural requirements.

1. Form exposed sheet metal accessories that are without excessive oil-canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.

B. Roof Panel Accessories: Provide components required for a complete metal roof panel assembly including copings, fasciae, corner units, ridge closures, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal roof panels unless otherwise indicated.

1. Closures: Provide closures at eaves and ridges, fabricated of same material as metal roof panels.
2. Clips: Manufacturer's standard, formed from stainless-steel sheet, designed to withstand negative-load requirements.
3. Cleats: Manufacturer's standard, mechanically seamed cleats formed from stainless-steel sheet or nylon-coated aluminum sheet.
4. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
5. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- thick, flexible closure strips; cut or premolded to match metal roof panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

6. Snow guards
7. Ridge Vents

C. Wall Panel Accessories: Provide components required for a complete metal wall panel assembly including copings, fasciae, mullions, sills, corner units, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal wall panels unless otherwise indicated.

1. Closures: Provide closures at eaves and rakes, fabricated of same material as metal wall panels.
2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- thick, flexible closure strips; cut or premolded to match metal wall panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

D. Flashing and Trim: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.018-inch nominal uncoated steel thickness, prepainted with coil coating; finished to match adjacent metal panels.

1. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers.
2. Opening Trim: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.030-inch nominal uncoated steel thickness, prepainted with coil coating. Trim head and jamb of door openings, and head, jamb, and sill of other openings.

E. Gutters: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.018-inch nominal uncoated steel thickness, prepainted with coil coating; finished to match roof fascia and rake trim. Match profile of gable trim, complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum 96-inch- long sections, sized according to SMACNA's "Architectural Sheet Metal Manual."

1. Gutter Supports: Fabricated from same material and finish as gutters.
2. Strainers: Bronze, copper, or aluminum wire ball type at outlets.

F. Downspouts: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.018-inch nominal uncoated steel thickness, prepainted with coil coating; finished to match metal wall panels. Fabricate in minimum 10-foot- long sections, complete with formed elbows and offsets.

1. Mounting Straps: Fabricated from same material and finish as gutters.

G. Pipe Flashing: Premolded, EPDM pipe collar with flexible aluminum ring bonded to base.

H. Materials:

1. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide fasteners with heads matching color of materials being fastened by means of plastic caps or factory-applied coating.
    a. Fasteners for Metal Roof Panels: Self-drilling or self-tapping, zinc-plated, hex-head carbon-steel screws, with a stainless-steel cap or zinc-aluminum-alloy head and EPDM sealing washer.
    b. Fasteners for Metal Wall Panels: Self-drilling or self-tapping, zinc-plated, hex-head carbon-steel screws , with EPDM sealing washers bearing on weather side of metal panels.
    c. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws with hex washer head.
    d. Blind Fasteners: High-strength aluminum or stainless-steel rivets.
2. Corrosion-Resistant Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
3. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.
4. Metal Panel Sealants:
    a. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene-compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape of manufacturer's standard size.
    b. Joint Sealant: ASTM C 920; one part elastomeric polyurethane or polysulfide; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended by metal building system manufacturer.

2.8 FABRICATION

A. General: Design components and field connections required for erection to permit easy assembly.

1. Mark each piece and part of the assembly to correspond with previously prepared erection drawings, diagrams, and instruction manuals.
2. Fabricate structural framing to produce clean, smooth cuts and bends. Punch holes of proper size, shape, and location. Members shall be free of cracks, tears, and ruptures.

B. Tolerances: Comply with MBMA's "Metal Building Systems Manual" for fabrication and erection tolerances.

C. Primary Framing: Shop fabricate framing components to indicated size and section, with baseplates, bearing plates, stiffeners, and other items required for erection welded into place. Cut, form, punch, drill, and weld framing for bolted field assembly.

1. Make shop connections by welding or by using high-strength bolts.
2. Join flanges to webs of built-up members by a continuous, submerged arc-welding process.

3. Brace compression flange of primary framing with steel angles or cold-formed structural tubing between frame web and purlin web or girt web, so flange compressive strength is within allowable limits for any combination of loadings.
4. Weld clips to frames for attaching secondary framing if applicable, or punch for bolts.
5. Shop Priming: Prepare surfaces for shop priming according to SSPC-SP 2. Shop prime primary framing with specified primer after fabrication.

D. Secondary Framing: Shop fabricate framing components to indicated size and section by roll forming or break forming, with baseplates, bearing plates, stiffeners, and other plates required for erection welded into place. Cut, form, punch, drill, and weld secondary framing for bolted field connections to primary framing.

1. Make shop connections by welding or by using non-high-strength bolts.
2. Shop Priming: Prepare uncoated surfaces for shop priming according to SSPC-SP 2. Shop prime uncoated secondary framing with specified primer after fabrication.

E. Metal Panels: Fabricate and finish metal panels at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements. Comply with indicated profiles and with dimensional and structural requirements.

1. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of metal panel.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with erector present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Before erection proceeds, survey elevations and locations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments to receive structural framing, with erector present, for compliance with requirements and metal building system manufacturer's tolerances.

1. Engage land surveyor to perform surveying.

C. Proceed with erection only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition.

B. Provide temporary shores, guys, braces, and other supports during erection to keep structural framing secure, plumb, and in alignment against temporary construction loads and loads equal

in intensity to design loads. Remove temporary supports when permanent structural framing, connections, and bracing are in place unless otherwise indicated.

3.3 ERECTION OF STRUCTURAL FRAMING

A. Erect metal building system according to manufacturer's written instructions and drawings.

B. Do not field cut, drill, or alter structural members without written approval from metal building system manufacturer's professional engineer.

C. Set structural framing accurately in locations and to elevations indicated, according to AISC specifications referenced in this Section. Maintain structural stability of frame during erection.

D. Base and Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.

1. Set plates for structural members on wedges, shims, or setting nuts as required.
2. Tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
3. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

E. Align and adjust structural framing before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with framing. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure.
2. Make allowances for difference between temperature at time of erection and mean temperature when structure will be completed and in service.

F. Primary Framing and End Walls: Erect framing level, plumb, rigid, secure, and true to line. Level baseplates to a true even plane with full bearing to supporting structures, set with double-nutted anchor bolts. Use grout to obtain uniform bearing and to maintain a level base-line elevation. Moist-cure grout for not less than seven days after placement.

1. Make field connections using high-strength bolts installed according to RCSC's "Specification for Structural Joints Using High-Strength Bolts" for bolt type and joint type specified.
   a. Joint Type: Snug tightened or pretensioned as required by manufacturer.

G. Secondary Framing: Erect framing level, plumb, rigid, secure, and true to line. Field bolt secondary framing to clips attached to primary framing.

1. Provide rake or gable purlins with tight-fitting closure channels and fasciae.
2. Locate and space wall girts to suit openings such as doors and windows.
3. Provide supplemental framing at entire perimeter of openings, including doors, windows, louvers, ventilators, and other penetrations of roof and walls.

H. Bracing: Install bracing in roof and sidewalls where indicated on erection drawings.

1. Tighten rod and cable bracing to avoid sag.
2. Locate interior end-bay bracing only where indicated.

I. Framing for Openings: Provide shapes of proper design and size to reinforce openings and to carry loads and vibrations imposed, including equipment furnished under mechanical and electrical work. Securely attach to structural framing.

J. Erection Tolerances: Maintain erection tolerances of structural framing within AISC 303.

3.4 METAL PANEL INSTALLATION, GENERAL

A. Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.

C. Examination: Examine primary and secondary framing to verify that structural-panel support members and anchorages have been installed within alignment tolerances required by manufacturer.

1. Examine roughing-in for components and systems penetrating metal panels, to verify actual locations of penetrations relative to seams before metal panel installation.

D. General: Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Field cut metal panels as required for doors, windows, and other openings. Cut openings as small as possible, neatly to size required, and without damage to adjacent metal panel finishes.
   a. Field cutting of metal panels by torch is not permitted unless approved in writing by manufacturer.
2. Install metal panels perpendicular to structural supports unless otherwise indicated.
3. Flash and seal metal panels with weather closures at perimeter of openings and similar elements. Fasten with self-tapping screws.
4. Locate and space fastenings in uniform vertical and horizontal alignment.
5. Locate metal panel splices over structural supports with end laps in alignment.
6. Lap metal flashing over metal panels to allow moisture to run over and off the material.

E. Lap-Seam Metal Panels: Install screw fasteners using power tools with controlled torque adjusted to compress EPDM washers tightly without damage to washers, screw threads, or metal panels. Install screws in predrilled holes.

1. Arrange and nest side-lap joints so prevailing winds blow over, not into, lapped joints. Lap ribbed or fluted sheets one full rib corrugation. Apply metal panels and associated items for neat and weathertight enclosure. Avoid "panel creep" or application not true to line.

F. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with corrosion-resistant coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal roof panel manufacturer.

G. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal panel assemblies. Provide types of gaskets, fillers, and sealants indicated; or, if not indicated, provide types recommended by metal panel manufacturer.

1. Seal metal panel end laps with double beads of tape or sealant the full width of panel. Seal side joints where recommended by metal panel manufacturer.
2. Prepare joints and apply sealants to comply with requirements in Section 07 92 00 "Joint Sealants."

3.5 METAL ROOF PANEL INSTALLATION

A. General: Provide metal roof panels of full length from eave to ridge unless otherwise indicated or restricted by shipping limitations.

1. Install ridge caps as metal roof panel work proceeds.
2. Flash and seal metal roof panels with weather closures at eaves and rakes. Fasten with self-tapping screws.

B. Lap-Seam Metal Roof Panels: Fasten metal roof panels to supports with exposed fasteners at each lapped joint, at location and spacing recommended by manufacturer.

1. Provide metal-backed sealing washers under heads of exposed fasteners bearing on weather side of metal roof panels.
2. Provide sealant tape at lapped joints of metal roof panels and between panels and protruding equipment, vents, and accessories.
3. Apply a continuous ribbon of sealant tape to weather-side surface of fastenings on end laps and on side laps of nesting-type metal panels, on side laps of ribbed or fluted metal panels, and elsewhere as needed to make metal panels weatherproof to driving rains.
4. At metal panel splices, nest panels with minimum 6-inch end lap, sealed with butyl-rubber sealant and fastened together by interlocking clamping plates.

C. Metal Fascia Panels: Align bottom of metal panels and fasten with blind rivets, bolts, or self-drilling or self-tapping screws. Flash and seal metal panels with weather closures where fasciae meet soffits, along lower panel edges, and at perimeter of all openings.

D. Metal Roof Panel Installation Tolerances: Shim and align metal roof panels within installed tolerance of 1/4 inch in 20 feet on slope and location lines and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.6 METAL WALL PANEL INSTALLATION

A. General: Install metal wall panels in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to girts, extending full height of building, unless otherwise indicated. Anchor metal wall panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Unless otherwise indicated, begin metal panel installation at corners with center of rib lined up with line of framing.
2. Shim or otherwise plumb substrates receiving metal wall panels.
3. When two rows of metal panels are required, lap panels 4 inches minimum.
4. When building height requires two rows of metal panels at gable ends, align lap of gable panels over metal wall panels at eave height.
5. Rigidly fasten base end of metal wall panels and allow eave end free movement for thermal expansion and contraction. Predrill panels.
6. Flash and seal metal wall panels with weather closures at eaves and rakes, and at perimeter of all openings. Fasten with self-tapping screws.
7. Install screw fasteners in predrilled holes.
8. Install flashing and trim as metal wall panel work proceeds.
9. Apply elastomeric sealant continuously between metal base channel (sill angle) and concrete, and elsewhere as indicated on Drawings; if not indicated, as necessary for waterproofing.
10. Align bottom of metal wall panels and fasten with blind rivets, bolts, or self-drilling or self-tapping screws.
11. Provide weatherproof escutcheons for pipe and conduit penetrating exterior walls.

B. Metal Wall Panels: Install metal wall panels on exterior side of girts. Attach metal wall panels to supports with fasteners as recommended by manufacturer.

C. Insulated Metal Wall Panels: Install insulated metal wall panels on exterior side of girts. Attach panels to supports at each panel joint using concealed clip and fasteners at maximum 42 inches o.c., spaced not more than manufacturer's recommendation. Fully engage tongue and groove of adjacent insulated metal wall panels.

1. Install clips to supports with self-tapping fasteners.
2. Apply continuous ribbon of sealant to panel joint on concealed side of insulated metal wall panels as vapor seal; apply sealant to panel joint on exposed side of panels as weather seal.

D. Installation Tolerances: Shim and align metal wall panels within installed tolerance of 1/4 inch in 20 feet , noncumulative; level, plumb, and on location lines; and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.7 METAL SOFFIT PANEL INSTALLATION

A. Provide metal soffit panels the full width of soffits. Install panels perpendicular to support framing.

B. Flash and seal metal soffit panels with weather closures where panels meet walls and at perimeter of all openings.

3.8 THERMAL INSULATION INSTALLATION

A. General: Install insulation concurrently with metal panel installation, in thickness indicated to cover entire surface, according to manufacturer's written instructions.

1. Set vapor-retarder-faced units with vapor retarder toward warm side of construction unless otherwise indicated. Do not obstruct ventilation spaces except for firestopping.
2. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to the surrounding construction to ensure airtight installation.
3. Install factory-laminated, vapor-retarder-faced blankets straight and true in one-piece lengths, with both sets of facing tabs sealed, to provide a complete vapor retarder.
4. Install blankets straight and true in one-piece lengths. Install vapor retarder over insulation, with both sets of facing tabs sealed, to provide a complete vapor retarder.

B. Blanket Roof Insulation: Comply with the following installation method:

1. Between-Purlin Installation: Extend insulation and vapor retarder between purlins. Carry vapor-retarder-facing tabs up and over purlin, overlapping adjoining facing of next insulation course and maintaining continuity of retarder. Hold in place with bands and crossbands below insulation.

C. Blanket Wall Insulation: Extend insulation and vapor retarder over and perpendicular to top flange of secondary framing. Hold in place by metal wall panels fastened to secondary framing.

1. Retainer Strips: Install retainer strips at each longitudinal insulation joint, straight and taut, nesting with secondary framing to hold insulation in place.
2. Sound-Absorption Insulation: Where sound-absorption requirement is indicated for metal liner panels, cover insulation with polyethylene film and provide inserts of wire mesh to form acoustical spacer grid.

3.9 ACCESSORY INSTALLATION

A. General: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal roof panel assembly, including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
2. Install components for a complete metal wall panel assembly, including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
3. Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with corrosion-resistant coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by manufacturer.

B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

1. Install exposed flashing and trim that is without excessive oil-canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

C. Gutters: Join sections with riveted-and-soldered or lapped-and-sealed joints. Attach gutters to eave with gutter hangers spaced as required for gutter size, but not more than 36 inches o.c. using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.

D. Downspouts: Join sections with 1-1/2-inch telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch away from walls; locate fasteners at top and bottom and at approximately 60 inches o.c. in between.

1. Provide elbows at base of downspouts to direct water away from building.
2. Tie downspouts to underground drainage system indicated.

E. Circular Roof Ventilators: Set ventilators complete with necessary hardware, anchors, dampers, weather guards, rain caps, and equipment supports. Mount ventilators on flat level base. Install preformed filler strips at base to seal ventilator to metal roof panels.

F. Continuous Roof Ventilators: Set ventilators complete with necessary hardware, anchors, dampers, weather guards, rain caps, and equipment supports. Join sections with splice plates and end-cap skirt assemblies where required to achieve indicated length. Install preformed filler strips at base to seal ventilator to metal roof panels.

G. Louvers: Locate and place louver units level, plumb, and at indicated alignment with adjacent work.

1. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.
2. Provide perimeter reveals and openings of uniform width for sealants and joint fillers.
3. Protect galvanized- and nonferrous-metal surfaces from corrosion or galvanic action by applying a heavy coating of corrosion-resistant paint on surfaces that will be in contact with concrete, masonry, or dissimilar metals.

4. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Section 07 92 00 "Joint Sealants" for sealants applied during louver installation.

H. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to panel as recommended by manufacturer.

3.10 FIELD QUALITY CONTROL

A. Special Inspections: Director's Representative will engage a qualified special inspector to perform field quality control special inspections and to submit reports.

B. Product will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

D. Manufacturers representative shall observe the installation of the roof at coordinated points during construction, and provide a Report which documents and confirms that the roof has been installed in accordance with manufacturers requirements.

3.11 ADJUSTING

A. Doors: After completing installation, test and adjust doors to operate easily, free of warp, twist, or distortion.

B. Door Hardware: Adjust and check each operating item of door hardware and each door to ensure proper operation and function of every unit. Replace units that cannot be adjusted to operate as intended.

C. Windows: Adjust operating sashes and ventilators, screens, hardware, and accessories for a tight fit at contact points and at weather stripping to ensure smooth operation and weathertight closure. Lubricate hardware and moving parts.

3.12 CLEANING AND PROTECTION

A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780/A 780M and manufacturer's written instructions.

B. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

C. Touchup Painting: After erection, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted structural framing , bearing plates, and accessories.

1. Clean and prepare surfaces by SSPC-SP 2, "Hand Tool Cleaning," or by SSPC-SP 3, "Power Tool Cleaning."
2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.

D. Touchup Painting: Cleaning and touchup painting are specified in Section 09 91 13 "Exterior Painting" and Section 09 91 23 "Interior Painting."

E. Metal Panels: Remove temporary protective coverings and strippable films, if any, as metal panels are installed. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

1. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

F. Doors and Frames: Immediately after installation, sand rusted or damaged areas of prime coat until smooth and apply touchup of compatible air-drying primer.

1. Immediately before final inspection, remove protective wrappings from doors and frames.

G. Windows: Clean metal surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances. Clean factory-glazed glass immediately after installing windows.

H. Louvers: Clean exposed surfaces that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate until final cleaning.

1. Restore louvers damaged during installation and construction period so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Director’s Representative, remove damaged units and replace with new units.
   a. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION

SECTION 22 05 17

SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 SLEEVES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Advance Products & Systems, Inc.
2. CALPICO, Inc.
3. GPT; an EnPro Industries company.

B. Cast-Iron Pipe Sleeves: Cast or fabricated of cast or ductile iron and equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop collar.

C. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, or galvanized, with plain ends and integral welded waterstop collar.

2.2 SLEEVE-SEAL SYSTEMS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Advance Products & Systems, Inc.
2. CALPICO, Inc.
3. GPT; an EnPro Industries company.
4. Metraflex Company (The).
5. Proco Products, Inc.

B. Description:

1. Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.
2. Designed to form a hydrostatic seal of 20 psig minimum.
3. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
4. Pressure Plates: Composite plastic.
5. Connecting Bolts and Nuts: Stainless steel, Type 316 of length required to secure pressure plates to sealing elements.

2.3 GROUT

A. Description: Nonshrink, for interior and exterior sealing openings in non-fire-rated walls or floors.

B. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

C. Design Mix: 5000-psi, 28-day compressive strength.

D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION

A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.

B. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch annular clear space between piping and concrete slabs and walls.

1. Sleeves are not required for core-drilled holes.

C. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.

1. Cut sleeves to length for mounting flush with both surfaces.
   a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level.
2. Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system.

D. Install sleeves for pipes passing through interior partitions.

1. Cut sleeves to length for mounting flush with both surfaces.
2. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
3. Seal annular space between sleeve and piping or piping insulation; use joint sealants appropriate for size, depth, and location of joint.

E. Fire-Resistance-Rated Penetrations, Horizontal Assembly Penetrations, and Smoke Barrier Penetrations: Maintain indicated fire or smoke rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with fire- and smoke-stop materials. Comply with requirements for firestopping and fill materials specified in Section 07 84 13 "Penetration Firestopping."

3.2 SLEEVE-SEAL-SYSTEM INSTALLATION

A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building.

B. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

3.3 SLEEVE AND SLEEVE-SEAL SCHEDULE

A. Use sleeves and sleeve seals for the following piping-penetration applications:

1. Exterior Concrete Walls above Grade:
    a. Piping Smaller Than NPS 6: Steel pipe sleeves.
2. Exterior Concrete Walls below Grade:
    a. Piping Smaller Than NPS 6: Steel pipe sleeves with sleeve-seal system.
        1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
3. Concrete Slabs-on-Grade:
    a. Piping Smaller Than NPS 6: Steel pipe sleeves with sleeve-seal system.
        1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
4. Interior Partitions:
    a. Piping Smaller Than NPS 6: Steel pipe sleeves .

END OF SECTION

SECTION 22 05 18

ESCUTCHEONS FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 DEFINITIONS

A. Existing Piping to Remain: Existing piping that is not to be removed and that is not otherwise indicated to be removed and salvaged, or removed and reinstalled.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. BrassCraft Manufacturing Co.; a Masco company.
2. Dearborn Brass.
3. Jones Stephens Corp.
4. Keeney Manufacturing Company (The).
5. Mid-America Fittings, LLC; A Midland Industries Company.
6. ProFlo; a Ferguson Enterprises, Inc. brand.

2.2 ESCUTCHEONS

A. One-Piece, Steel Type: With polished, chrome-plated finish and setscrew fastener.

B. One-Piece, Stainless-Steel Type: With polished stainless-steel finish.

C. One-Piece, Cast-Brass Type: With polished, chrome-plated finish and setscrew fastener.

D. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished, chrome-plated finish and spring-clip fasteners.

E. One-Piece, Stamped-Steel Type: With polished, chrome-plated finish and spring-clip fasteners.

F. Split-Plate, Stamped-Steel Type: With polished, chrome-plated finish; concealed hinge; and spring-clip fasteners.

2.3 FLOOR PLATES

A. Split Floor Plates: Cast brass with concealed hinge.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.

B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of insulated piping and with OD that completely covers opening.

1. Escutcheons for New Piping:
    a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep pattern.
    b. Chrome-Plated Piping: One-piece cast brass with polished, chrome-plated finish.
    c. Insulated Piping: One-piece steel with finish.
    d. Insulated Piping: One-piece cast brass with finish.
    e. Insulated Piping: One-piece stamped steel or split-plate, stamped steel with concealed hinge with polished, chrome-plated finish.
    f. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece steel with finish.
    g. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece cast brass with polished, chrome-plated finish.
    h. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece stamped steel with polished, chrome-plated finish.
    i. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece steel with finish.
    j. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece cast brass with polished, chrome-plated finish.
    k. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece stamped steel with polished, chrome-plated finish.

C. Install floor plates for piping penetrations of equipment-room floors.

D. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.

1. New Piping: One-piece, floor plate.

END OF SECTION

SECTION 22 05 19

METERS AND GAUGES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 LIQUID-IN-GLASS THERMOMETERS

A. Metal-Case, Industrial-Style, Liquid-in-Glass Thermometers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Trerice, H. O. Co.
   b. Weiss Instruments, Inc.
   c. Weksler Glass Thermometer Corp.
   d. Winters Instruments - U.S.
2. Standard: ASME B40.200.
3. Case: Cast aluminum; 9-inch nominal size unless otherwise indicated.
4. Case Form: Adjustable angle unless otherwise indicated.
5. Tube: Glass with magnifying lens and blue organic liquid.
6. Tube Background: Nonreflective aluminum with permanently etched scale markings graduated in deg F and deg C.
7. Window: Glass.
8. Stem: Zamac Alloy and of length to suit installation.
   a. Design for Thermowell Installation: Bare stem.
9. Connector: 1-1/4 inches, with ASME B1.1 screw threads.
10. Accuracy: Plus or minus 1 percent of scale range or one scale division, to a maximum of 1.5 percent of scale range.

2.2 THERMOWELLS

A. Thermowells:

1. Standard: ASME B40.200.
2. Description: Pressure-tight, socket-type fitting made for insertion into piping tee fitting.
3. Material for Use with Copper Tubing: CNR or CUNI.
4. Type: Stepped shank unless straight or tapered shank is indicated.
5. External Threads: NPS 1/2, NPS 3/4, or NPS 1, ASME B1.20.1 pipe threads.
6. Internal Threads: 1/2, 3/4, and 1 inch, with ASME B1.1 screw threads.
7. Bore: Diameter required to match thermometer bulb or stem.
8. Insertion Length: Length required to match thermometer bulb or stem.
9. Lagging Extension: Include on thermowells for insulated piping and tubing.

10. Bushings: For converting size of thermowell's internal screw thread to size of thermometer connection.

B. Heat-Transfer Medium: Mixture of graphite and glycerin.

2.3 PRESSURE GAUGES

A. Direct-Mounted, Metal-Case, Dial-Type Pressure Gauges:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Ashcroft Inc.
   b. Trerice, H. O. Co.
   c. WATTS; A Watts Water Technologies Company.
   d. Weiss Instruments, Inc.
   e. Weksler Glass Thermometer Corp.
   f. Winters Instruments - U.S.
2. Standard: ASME B40.100.
3. Case: Sealed type(s); cast aluminum or drawn steel ; 4-1/2-inch nominal diameter.
4. Pressure-Element Assembly: Bourdon tube unless otherwise indicated.
5. Pressure Connection: Brass, with NPS 1/4 , ASME B1.20.1 pipe threads and bottom-outlet type unless back-outlet type is indicated.
6. Movement: Mechanical, with link to pressure element and connection to pointer.
7. Dial: Nonreflective aluminum with permanently etched scale markings graduated in psi and kPa.
8. Pointer: Dark-colored metal.
9. Window: Glass .
10. Ring: Stainless steel.
11. Accuracy: Grade B, plus or minus 2 percent of middle half of scale range.

2.4 GAUGE ATTACHMENTS

A. Snubbers: ASME B40.100, brass; with NPS 1/4 , ASME B1.20.1 pipe threads and porous-metal-type surge-dampening device. Include extension for use on insulated piping.

B. Valves: Brass ball , with NPS 1/4 , ASME B1.20.1 pipe threads.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install thermowells with socket extending to center of pipe and in vertical position in piping tees.

B. Install thermowells of sizes required to match thermometer connectors. Include bushings if required to match sizes.

C. Install thermowells with extension on insulated piping.

D. Fill thermowells with heat-transfer medium.

E. Install direct-mounted thermometers in thermowells and adjust vertical and tilted positions.

F. Install remote-mounted thermometer bulbs in thermowells and install cases on panels; connect cases with tubing and support tubing to prevent kinks. Use minimum tubing length.

G. Install direct-mounted pressure gauges in piping tees with pressure gauge located on pipe at the most readable position.

H. Install remote-mounted pressure gauges on panel.

I. Install valve and snubber in piping for each pressure gauge for fluids.

J. Install test plugs in piping tees.

K. Install thermometers in the following locations:

1. Inlet and outlet of each water heater.
2. Inlet and outlet of each domestic hot-water storage tank.

L. Install pressure gauges in the following locations:

1. Building water service entrance into building.
2. Inlet and outlet of each pressure-reducing valve.
3. Suction and discharge of each domestic water pump.

3.2 CONNECTIONS

A. Install meters and gauges adjacent to machines and equipment to allow service and maintenance of meters, gauges, machines, and equipment.

3.3 ADJUSTING

A. Adjust faces of meters and gauges to proper angle for best visibility.

END OF SECTION

SECTION 22 05 23.12

BALL VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 DEFINITIONS

A. CWP: Cold working pressure.

B. RPTFE: Reinforced polytetrafluoroethylene.

C. WOG: Water, oil, gas.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of valve.

1.3 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 soldered 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. Standards:

1. Domestic water valves intended to convey or dispense water for human consumption must comply with the SDWA, requirements of authorities having jurisdiction, and NSF 61 and NSF 372, or must be certified to be in compliance with NSF 61 and NSF 372

(by an ANSI-accredited third-party certification body) that the weighted average lead content at wetted surfaces is less than or equal to 0.25 percent.

B. 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
8. ASME B31.9 for building services piping valves.

C. Provide bronze valves made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.

D. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.

E. Valve Sizes: Same as upstream piping unless otherwise indicated.

F. Valve Actuator Type:

1. Hand Lever: For quarter-turn valves smaller than NPS 4 .

G. Valves in Insulated Piping:

1. Provide 2-inch 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.

2.3 BRASS BALL VALVES

A. Brass Ball Valves, Two Piece with Full Port and Brass Trim, Threaded or Soldered Ends:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. A.Y. McDonald Mfg. Co.
   b. American Valve, Inc.
   c. Apollo Valves; a part of Aalberts Integrated Piping Systems.
   d. FNW; Ferguson Enterprises, Inc.
   e. Hammond Valve.
   f. Jenkins Valves; a Crane Co. brand.
   g. Jomar Valve.
   h. Marwin Valve; Richards Industries.
   i. Milwaukee Valve Company.

j. Red-White Valve Corp.
k. Stockham; a Crane Co. brand.
l. Viega LLC.
m. WATTS; A Watts Water Technologies Company.

2. Standard: MSS SP-110; MSS SP-145.
3. CWP Rating: 600 psig.
4. Body Design: Two piece.
5. Body Material: Forged brass.
6. Ends: Threaded or soldered.
7. Seats: PTFE.
8. Stem: Brass.
9. Ball: Chrome-plated brass.
10. Port: Full.

B. Brass Ball Valves, Three Piece with Full Port and Brass Trim, Threaded or Soldered Ends:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Jomar Valve.
   b. Marwin Valve; Richards Industries.
   c. WATTS; A Watts Water Technologies Company.
2. Standard: MSS SP-110; MSS SP-145.
3. CWP Rating: 600 psig.
4. Body Design: Three piece.
5. Body Material: Forged brass.
6. Ends: Threaded or soldered.
7. Seats: PTFE.
8. Stem: Brass.
9. Ball: Chrome-plated brass.
10. Port: Full.

2.4 BRONZE BALL VALVES

A. Bronze Ball Valves, Two Piece with Full Port, and Bronze or Brass Trim, Threaded or Soldered Ends:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Apollo Valves; a part of Aalberts Integrated Piping Systems.
   b. Center Line; a Crane Co. brand.
   c. Hammond Valve.
   d. Jenkins Valves; a Crane Co. brand.
   e. Milwaukee Valve Company.
   f. NIBCO INC.
   g. Red-White Valve Corp.
   h. Stockham; a Crane Co. brand.
   i. Viega LLC.
   j. WATTS; A Watts Water Technologies Company.

k. Zurn Industries, LLC.
2. Standard: MSS SP-110; MSS SP-145.
3. CWP Rating: 600 psig.
4. Body Design: Two piece.
5. Body Material: Bronze.
6. Ends: Threaded or soldered.
7. Seats: PTFE.
8. Stem: Bronze or brass.
9. Ball: Chrome-plated brass.
10. 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 to piping adjacent to valves such that no force is imposed upon valves.

C. Locate valves for easy access.

D. For valves in horizontal piping, install valves 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 22 05 53 "Identification for Plumbing 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 CWP ratings are unavailable, provide the same types of valves with higher CWP ratings.

B. Select valves with the following end connections:

1. For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option or press-end option is indicated in valve schedules below.

3.5 DOMESTIC HOT- AND COLD-WATER VALVE SCHEDULE

A. Pipe NPS 2 and Smaller:

1. Brass ball valves, two piece with full port, and brass trim. Provide with threaded solder -joint ends.
2. Bronze ball valves, two piece with full port, and bronze or brass trim. Provide with threaded solder -joint ends.
3. Brass ball valves, three piece with full port, and brass trim.
4. Bronze ball valves, three piece with full port, and bronze or brass trim.
5. Bronze ball valves, two piece with regular port, and bronze trim.

END OF SECTION

SECTION 22 05 23.14

CHECK VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 DEFINITIONS

A. CWP: Cold working pressure.

B. EPDM: Ethylene propylene-diene terpolymer.

C. NBR: Nitrile butadiene rubber (also known as Buna-N).

1.2 ACTION SUBMITTALS

A. Product Data: For each type of valve.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Prepare valves for shipping as follows:

1. Protect internal parts against rust and corrosion.
2. Protect threads, flange faces, grooves, press connections, and weld ends.
3. Set check valves in either closed or open position.

B. Use the following precautions during storage:

1. Maintain valve end protection.
2. Store valves indoors and maintain at higher-than-ambient-dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.

C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use stems or other components as lifting or rigging points unless specifically indicated for this purpose in manufacturer's instructions.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Standards:

1. Domestic water piping check valves intended to convey or dispense water for human consumption are to comply with the U.S. Safe Drinking Water Act (SDWA), requirements of authorities having jurisdiction, and NSF 61/NSF 372, or to be certified in compliance with NSF 61/NSF 372 by an American National Standards Institute (ANSI)-accredited third-party certification body that the weighted average lead content at wetted surfaces is less than or equal to 0.25 percent.

B. 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 for metric standard piping.
4. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
5. ASME B16.18 for cast-copper solder joint.
6. ASME B16.22 for wrought copper solder joint.
7. ASME B16.51 for press joint.
8. ASME B31.9 for building services piping valves.

C. AWWA Compliance: Comply with AWWA C606 for groove-end connections.

D. Provide bronze valves made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are unacceptable.

E. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.

F. Valve Sizes: Same as upstream piping unless otherwise indicated.

G. Valve Bypass and Drain Connections: MSS SP-45.

2.2 BRONZE SWING CHECK VALVES

A. Bronze, Swing Check Valves with Bronze Disc, Class 125:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Apollo Valves; a part of Aalberts Integrated Piping Systems.
   b. Crane Fluid Systems; Crane Co.
   c. Jenkins Valves; a Crane Co. brand.
   d. Jomar Valve.
   e. Keckley Company.
   f. Milwaukee Valve Company.
   g. NIBCO INC.
   h. Red-White Valve Corp.
   i. Stockham; a Crane Co. brand.
   j. Val-Matic Valve & Manufacturing Corp.
   k. Victaulic Company.
2. Description:
   a. Standard: MSS SP-80, Type 3.
   b. CWP Rating: 200 psig.
   c. Body Design: Horizontal flow.
   d. Body Material: ASTM B62, bronze.
   e. Ends: Threaded or soldered. See valve schedule articles.
   f. Disc: Bronze.

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. Examine press fittings to verify they have been properly press.

F. Do not attempt to repair defective valves; replace with new valves.

3.2 INSTALLATION OF VALVES

A. Install valves with unions or flanges at each piece of equipment arranged to allow 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 and where not blocked by equipment, other piping, or building components.

D. Install valves so that stems are horizontal or slope upward from centerline of pipe.

E. Install valves in position that does not project into aisles or block access to other equipment.

F. Install valves in position to allow full stem and manual operator movement.

G. Verify that joints of each valve have been properly installed and sealed to assure there is no leakage or damage.

H. Check Valves: Install check valves for proper direction of flow.

1. Swing Check Valves: In horizontal position with hinge pin level.
2. Check Valves: In horizontal or vertical position, between flanges.

I. Install valve tags. Comply with requirements in Section 22 05 53 "Identification for Plumbing Piping and Equipment" for valve tags and schedules.

J. Adhere to manufacturer's 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 if persistent leaking occurs.

3.4 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

A. If valve applications are not indicated, use the following:

1. Pump-Discharge Check Valves:
   a. NPS 2 and Smaller: Bronze, swing check valves with bronze disc.

B. If valves with specified CWP ratings are unavailable, the same types of valves with higher CWP ratings may be substituted.

C. End Connections:

1. For Copper Tubing, NPS 2 and Smaller: Threaded, soldered connections.

3.5 DOMESTIC HOT- AND COLD-WATER VALVE SCHEDULE

A. Pipe NPS 2 and Smaller:

1. Bronze, swing check valves with bronze disc, Class 125 , with soldered or threaded end connections.

END OF SECTION

SECTION 22 05 29

HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show fabrication and installation details and include calculations for the following:

1. Trapeze pipe hangers.
2. Metal framing systems.
3. Pipe stands.
4. Equipment supports.

1.2 QUALITY ASSURANCE

A. Structural-Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M.

B. Pipe Welding Qualifications: Qualify procedures and operators according to 2015 ASME Boiler and Pressure Vessel Code, Section IX.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design trapeze pipe hangers and equipment supports.

B. Structural Performance: Hangers and supports for plumbing 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 .

B. Copper Pipe and Tube Hangers:

1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
2. Hanger Rods: Continuous-thread rod, nuts, and washer made of copper-coated 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. MFMA Manufacturer Metal Framing Systems:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. ABB, Electrification Business.
   b. Cooper B-line; brand of Eaton, Electrical Sector.
   c. Flex-Strut Inc.
   d. G-Strut.
   e. Gregory GSTRUT.
   f. Haydon Corporation.
   g. Rocket Rack; Robroy Industries.
   h. Unistrut; Atkore International.
   i. Wesanco, Inc.
2. Description: Shop- or field-fabricated pipe-support assembly, made of steel channels, accessories, fittings, and other components for supporting multiple parallel pipes.
3. Standard: Comply with MFMA-4, factory-fabricated components for field assembly.
4. Channels: Continuous slotted carbon-steel channel with inturned lips.
5. Channel Width: Selected for applicable load criteria.
6. Channel Nuts: Formed or stamped nuts or other devices designed to fit into channel slot and, when tightened, prevent slipping along channel.
7. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel .
8. Metallic Coating: Electroplated zinc .

2.5 THERMAL HANGER-SHIELD INSERTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Buckaroos, Inc.
2. CADDY; brand of nVent Electrical plc.

3. Carpenter & Paterson, Inc.
4. National Pipe Hanger Corporation.
5. Pipe Shields Inc.
6. Piping Technology & Products, Inc.
7. Rilco Manufacturing Co., Inc.
8. Value Engineered Products, Inc.

B. Insulation-Insert Material for Cold Piping: ASTM C 552, Type II cellular glass with 100-psig or ASTM C 591, Type VI, Grade 1 polyisocyanurate with 125-psig minimum compressive strength and vapor barrier.

C. Insulation-Insert Material for Hot Piping: Water-repellent-treated, ASTM C 533, Type I calcium silicate with 100-psig ASTM C 552, Type II cellular glass with 100-psig or ASTM C 591, Type VI, Grade 1 polyisocyanurate with 125-psig minimum compressive strength.

D. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.

E. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.

F. Insert Length: Extend 2 inches 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.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Hilti, Inc.
   b. ITW Ramset/Red Head; Illinois Tool Works, Inc.
   c. MKT Fastening, LLC.
   d. Simpson Strong-Tie Co., Inc.

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. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Cooper B-line; brand of Eaton, Electrical Sector.
   b. Empire Industries, Inc.
   c. Hilti, Inc.
   d. ITW Ramset/Red Head; Illinois Tool Works, Inc.
   e. MKT Fastening, LLC.
2. Indoor Applications: Zinc-coated steel.
3. Outdoor Applications: Stainless steel.

2.7 PIPE-POSITIONING SYSTEMS

A. Description: IAPMO PS 42 positioning system composed of metal brackets, clips, and straps for positioning piping in pipe spaces; for plumbing fixtures in commercial applications.

2.8 EQUIPMENT SUPPORTS

A. Description: Welded, shop- or field-fabricated equipment support made from structural-carbon-steel shapes.

2.9 MATERIALS

A. Aluminum: ASTM B 221.

B. Carbon Steel: ASTM A 1011/A 1011M.

C. Structural Steel: ASTM A 36/A 36M carbon-steel plates, shapes, and bars; black and galvanized.

D. Stainless Steel: ASTM A 240/A 240M.

E. Grout: ASTM C 1107/C 1107M, 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, 28-day compressive strength.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with requirements in Section 07 84 13 "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 .

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 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 A 36/A 36M carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.

C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping, and support together on field-assembled metal framing systems.

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 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. Pipe-Positioning-System Installation: Install support devices to make rigid supply and waste piping connections to each plumbing fixture.

G. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.

H. Equipment Support Installation: Fabricate from welded-structural-steel shapes.

I. 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.

J. Install lateral bracing with pipe hangers and supports to prevent swaying.

K. 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 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms, and install reinforcing bars through openings at top of inserts.

L. Load Distribution: Install hangers and supports, so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

M. 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.

N. 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 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 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: 12 inches long and 0.048 inch thick.
   b. NPS 4: 12 inches long and 0.06 inch thick.
   c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.
   d. NPS 8 to NPS 14: 24 inches long and 0.075 inch thick.
   e. NPS 16 to NPS 24: 24 inches long and 0.105 inch thick.
5. Pipes NPS 8 and Larger: Include wood or reinforced calcium-silicate-insulation inserts of length at least as long as protective shield.
6. Thermal Hanger Shields: Install with insulation of 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 .

3.6 PAINTING

A. Touchup: Clean field welds and abraded, shop-painted areas. Paint exposed areas immediately after erecting hangers and supports. Use same materials as those 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.

B. Touchup: Cleaning and touchup painting of field welds, bolted connections, and abraded, shop-painted areas on miscellaneous metal are specified in Section 09 91 23 "Interior Painting."

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas, and apply galvanizing-repair paint to comply with ASTM A 780/A 780M.

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 finishes.

D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

E. Use carbon-steel pipe hangers and supports metal trapeze pipe hangers and metal framing systems and attachments for general service applications.

F. Use copper-plated pipe hangers and copper attachments for copper piping and tubing.

G. Use padded hangers for piping that is subject to scratching.

H. Use thermal hanger-shield inserts for insulated piping and tubing.

I. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
2. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36, requiring clamp flexibility and up to 4 inches of insulation.
3. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of noninsulated, stationary pipes NPS 3/4 to NPS 8.
4. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
5. Extension Hinged or Two-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 3.
6. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30.
7. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
8. Pipe Saddle Supports (MSS Type 36): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate.
9. Pipe Stanchion Saddles (MSS Type 37): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate, and with U-bolt to retain pipe.
10. Adjustable Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes NPS 2-1/2 to NPS 36 if vertical adjustment is required, with steel-pipe base stanchion support and cast-iron floor flange.

J. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.

K. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
2. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.

L. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction, to attach to top flange of structural shape.
2. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
3. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
4. C-Clamps (MSS Type 23): For structural shapes.

5. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
6. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
7. 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.
8. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
9. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
10. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.

M. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
3. Thermal Hanger-Shield Inserts: For supporting insulated pipe.

N. Comply with MSS SP-58 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.

O. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.

P. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

Q. Use pipe-positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

END OF SECTION

SECTION 22 05 53

IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples: For color, letter style, and graphic representation required for each identification material and device.

C. Equipment-Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.

D. Valve-numbering scheme.

E. Valve Schedules: For each piping system. Include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

A. Plastic Labels for Equipment:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Brady Corporation.
   b. Carlton Industries, LP.
   c. Champion America.
   d. Craftmark Pipe Markers.
   e. emedco.
   f. Kolbi Pipe Marker Co.
   g. LEM Products Inc.
   h. Marking Services Inc.
   i. Pipemarker.com; Brimar Industries, Inc.
   j. Seton Identification Products; a Brady Corporation company.
2. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16 inch thick, with predrilled holes for attachment hardware.
3. Letter and Background Color: As indicated for specific application under Part 3.
4. Maximum Temperature: Able to withstand temperatures of up to 160 deg F.
5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances of up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

7. Fasteners: Stainless steel rivets or self-tapping screws.
8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), and the Specification Section number and title where equipment is specified.

2.2 WARNING SIGNS AND LABELS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Brady Corporation.
2. Carlton Industries, LP.
3. Champion America.
4. Craftmark Pipe Markers.
5. emedco.
6. LEM Products Inc.
7. Marking Services Inc.
8. National Marker Company.
9. Pipemarker.com; Brimar Industries, Inc.
10. Seton Identification Products; a Brady Corporation company.
11. Stranco, Inc.

B. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, with predrilled holes for attachment hardware.

C. Letter and Background Color: As indicated for specific application under Part 3.

D. Maximum Temperature: Able to withstand temperatures of up to 160 deg F.

E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.

F. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances of up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

G. Fasteners: Stainless steel rivets or self-tapping screws.

H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

I. Label Content: Include caution and warning information plus emergency notification instructions.

2.3 PIPE LABELS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Actioncraft Products, Inc.; a division of Industrial Test Equipment Co., Inc.
2. Brady Corporation.
3. Carlton Industries, LP.
4. Champion America.
5. Craftmark Pipe Markers.
6. emedco.
7. Kolbi Pipe Marker Co.
8. LEM Products Inc.
9. Marking Services Inc.
10. Pipemarker.com; Brimar Industries, Inc.
11. Seton Identification Products; a Brady Corporation company.

B. General Requirements for Manufactured Pipe Labels: Preprinted, color coded, with lettering indicating service and showing flow direction in accordance with ASME A13.1.

C. Letter and Background Color: As indicated for specific application under Part 3.

D. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.

E. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.

F. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings. Also include:

1. Pipe size.
2. Flow-Direction Arrows: Include flow-direction arrows on main distribution piping. Arrows may be either integral with label or applied separately.
3. Lettering Size: Size letters in accordance with ASME A13.1 for piping.

2.4 VALVE TAGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Actioncraft Products, Inc.; a division of Industrial Test Equipment Co., Inc.
2. Brady Corporation.
3. Carlton Industries, LP.
4. Champion America.
5. Craftmark Pipe Markers.
6. emedco.
7. Kolbi Pipe Marker Co.
8. LEM Products Inc.
9. Marking Services Inc.

10. Pipemarker.com; Brimar Industries, Inc.
11. Seton Identification Products; a Brady Corporation company.

B. Description: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.

1. Tag Material: Brass, 0.04-inch minimum thickness, with predrilled or stamped holes for attachment hardware.
2. Fasteners: Brass S-hook.

C. Letter and Background Color: As indicated for specific application under Part 3.

D. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.

1. Include valve-tag schedule in operation and maintenance data.

2.5 WARNING TAGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Brady Corporation.
2. Champion America.
3. Craftmark Pipe Markers.
4. emedco.
5. Kolbi Pipe Marker Co.
6. LEM Products Inc.
7. Marking Services Inc.
8. Pipemarker.com; Brimar Industries, Inc.
9. Seton Identification Products; a Brady Corporation company.

B. Description: Preprinted accident-prevention tags of plasticized card stock.

1. Size: Approximately 4 by 7 inches.
2. Fasteners: Brass grommet and wire.
3. Nomenclature: Large-size primary caption, such as "DANGER," "CAUTION," or "DO NOT OPERATE."
4. Letter and Background Color: As indicated for specific application under Part 3.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean piping and equipment surfaces of incompatible primers, paints, and encapsulants, as well as dirt, oil, grease, release agents, and other substances that could impair bond of identification devices.

3.2 INSTALLATION, GENERAL REQUIREMENTS

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Coordinate installation of identifying devices with locations of access panels and doors.

C. Install identifying devices before installing acoustical ceilings and similar concealment.

D. Locate identifying devices so that they are readily visible from the point of normal approach.

3.3 INSTALLATION OF EQUIPMENT LABELS, WARNING SIGNS, AND LABELS

A. Permanently fasten labels on each item of plumbing equipment.

B. Sign and Label Colors.

1. White letters on an ANSI Z535.1 safety-green background.

C. Locate equipment labels where accessible and visible.

3.4 INSTALLATION OF PIPE LABELS

A. Install pipe labels showing service and flow direction with permanent adhesive on pipes.

B. Pipe-Label Locations: Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:

1. Within 3 ft. of each valve and control device.
2. At access doors, manholes, and similar access points that permit view of concealed piping.
3. Within 3 ft. of equipment items and other points of origination and termination.
4. Spaced at maximum intervals of 25 ft. along each run. Reduce intervals to 10 ft. in areas of congested piping and equipment.

C. Do not apply plastic pipe labels or plastic tapes directly to bare pipes conveying fluids at temperatures of 125 deg F or higher. Where these pipes are to remain uninsulated, use a short section of insulation or use stenciled labels.

D. Flow-Direction Flow Arrows: Use arrows, in compliance with ASME A13.1, to indicate direction of flow in pipes, including pipes where flow is allowed in both directions.

E. Pipe-Label Color Schedule:

1. Domestic Cold-Water Piping: White letters on an ANSI Z535.1 safety-green background.
2. Domestic Hot-Water Piping: White letters on an ANSI Z535.1 safety-green background
3. Domestic Hot-Water Return Piping White letters on an ANSI Z535.1 safety-green background.

4. Sanitary Waste Piping: White letters on a black background.

3.5 INSTALLATION OF VALVE TAGS

A. Install tags on valves and control devices in piping systems, except check valves, valves within factory-fabricated equipment units, shutoff valves, faucets, convenience and lawn-watering hose connections, and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule in the operating and maintenance manual.

B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in "Valve-Tag Size and Shape" Subparagraph below:

1. Valve-Tag Size and Shape:
   a. Domestic Cold Water: 1-1/2 inches, round.
   b. Domestic Hot Water: 1-1/2 inches, round.
   c. Domestic Hot-Water Return: 1-1/2 inches, round.
2. Valve-Tag Colors:
   a. For each piping system, use the same lettering and background coloring system on valve tags as used in the piping system labels and background.

3.6 INSTALLATION OF WARNING TAGS

A. Warning Tag Color: Black letters on an ANSI Z535.1 safety-yellow background.

B. Attach warning tags, with proper message, to equipment.

END OF SECTION

SECTION 22 07 19

PLUMBING PIPING INSULATION

PART 1 - GENERAL

1.1 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).

1.2 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 the manufacturer, fabricator, type, description, and size , as well as ASTM standard designation and maximum use temperature.

1.3 COORDINATION

A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 22 05 29 "Hangers and Supports for Plumbing 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.

C. Coordinate installation and testing of heat tracing.

1.4 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: 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. Products that come into 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. Flexible Elastomeric: Closed-cell or expanded-rubber materials; suitable for maximum use temperature between minus 70 deg F and 220 deg F. Comply with ASTM C534/C534M, Type I for tubular materials.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. Aeroflex USA.
    b. Armacell LLC.
    c. K-Flex USA.

G. Glass-Fiber, Preformed Pipe: Glass fibers bonded with a thermosetting resin; suitable for maximum use temperature up to 850 deg F in accordance with ASTM C411. Comply with ASTM C547.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. Johns Manville; a Berkshire Hathaway company.
    b. Knauf Insulation.
    c. Manson Insulation Inc.
    d. Owens Corning.
2. Preformed Pipe Insulation: Type I, Grade A with factory-applied ASJ-SSL .
3. Fabricated shapes in accordance with ASTM C450 and ASTM C585.
4. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

2.3 INSULATING CEMENTS

A. Glass-Fiber and Mineral Wool Insulating Cement: Comply with ASTM C195.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
    a. Ramco Insulation, Inc.

B. Glass-Fiber and Mineral Wool Hydraulic-Setting Insulating and Finishing Cement: Comply with ASTM C449.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
   a. Ramco Insulation, Inc.

2.4 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. Flexible Elastomeric and Polyolefin Adhesive: Solvent-based adhesive.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Aeroflex USA.
   b. Armacell LLC.
   c. Foster Brand; H. B. Fuller.
   d. K-Flex USA.
2. Adhesive: As recommended by flexible elastomeric and polyolefin manufacturer and with a VOC content of 80 g/L or less.
3. Verify adhesive complies with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
4. Flame-spread index is 25 or less and smoke-developed index is 50 or less as tested in accordance with ASTM E84.
5. Wet Flash Point: Below 0 deg F.
6. Service Temperature Range: 40 to 200 deg F.
7. Color: Black .

C. Glass-Fiber and Mineral Wool Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Childers Brand; H. B. Fuller Construction Products.
   b. Foster Brand; H. B. Fuller.
   c. Mon-Eco Industries, Inc.
2. Adhesive: As recommended by mineral fiber manufacturer and with a VOC content of 80 g/L or less.
3. Verify adhesive complies with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

D. ASJ Adhesive and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A, for bonding insulation jacket lap seams and joints.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Childers Brand; H. B. Fuller Construction Products.
   b. Foster Brand; H. B. Fuller.
   c. Mon-Eco Industries, Inc.
2. Verify adhesives and sealants comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

E. PVC Jacket Adhesive: Compatible with PVC jacket.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Johns Manville; a Berkshire Hathaway company.
   b. P.I.C. Plastics, Inc.
   c. Proto Corporation.
   d. Speedline Corporation.
   e. The Dow Chemical Company.

2.5 MASTICS AND COATINGS

A. Materials are compatible with insulation materials, jackets, and substrates.

B. Vapor-Retarder Mastic, Water Based: Suitable for indoor use on below-ambient services.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Childers Brand; H. B. Fuller Construction Products.
   b. Foster Brand; H. B. Fuller.
   c. Knauf Insulation.
   d. Mon-Eco Industries, Inc.
   e. Vimasco Corporation.
2. Water-Vapor Permeance: Comply with ASTM E96/E96M or ASTM F1249.
3. Service Temperature Range: 0 to plus 180 deg F .
4. Comply with MIL-PRF-19565C, Type II, for permeance requirements , with supplier listing on DOD QPD - Qualified Products Database.
5. Color: White .

C. Breather Mastic: Water based; suitable for indoor and outdoor use on above-ambient services.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Childers Brand; H. B. Fuller Construction Products.
   b. Foster Brand; H. B. Fuller.
   c. Knauf Insulation.
   d. Mon-Eco Industries, Inc.
   e. Vimasco Corporation.

2. Water-Vapor Permeance: ASTM E96/E96M, greater than 1.0 perm at manufacturer's recommended dry film thickness.
3. Service Temperature Range: 0 to plus 180 deg F .
4. Color: White .

2.6 LAGGING ADHESIVES

A. Adhesives comply with MIL-A-3316C, Class I, Grade A, and are compatible with insulation materials, jackets, and substrates.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Childers Brand; H. B. Fuller Construction Products.
   b. Foster Brand; H. B. Fuller.
   c. Vimasco Corporation.
2. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over pipe insulation.
3. Service Temperature Range: 0 to plus 180 deg F.
4. Color: White.

2.7 SEALANTS

A. Materials are as recommended by the insulation manufacturer and are compatible with insulation materials, jackets, and substrates.

B. Joint Sealants:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Childers Brand; H. B. Fuller Construction Products.
   b. Foster Brand; H. B. Fuller.
   c. Mon-Eco Industries, Inc.
   d. Owens Corning.
2. Permanently flexible, elastomeric sealant.
3. Service Temperature Range: Minus 58 to plus 176 deg F .
4. Color: White or gray.
5. Verify sealant has a VOC content of 420 g/L or less.
6. Verify sealant complies with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

C. ASJ Flashing Sealants and PVC Jacket Flashing Sealants:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Childers Brand; H. B. Fuller Construction Products.
   b. Foster Brand; H. B. Fuller.

2. Fire- and water-resistant, flexible, elastomeric sealant.
3. Service Temperature Range: Minus 40 to plus 250 deg F.
4. Color: White.

2.8 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. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C1136, Type I.
2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C1136, Type I.
3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C1136, Type II.
4. ASJ+: 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.
5. PSK Jacket: Aluminum foil fiberglass reinforced scrim with polyethylene backing, complying with ASTM C1136, Type II.

2.9 FIELD-APPLIED JACKETS

A. Field-applied jackets comply with ASTM C1136, Type I, unless otherwise indicated.

B. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Airex Manufacturing Inc.
   b. Johns Manville; a Berkshire Hathaway company.
   c. P.I.C. Plastics, Inc.
   d. Proto Corporation.
   e. Speedline Corporation.
2. Adhesive: As recommended by jacket material manufacturer.
3. Color: White .
4. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.
   a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.

C. Metal Jacket:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Johns Manville; a Berkshire Hathaway company.

b. RPR Products, Inc.

2.10 TAPES

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C1136.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. 3M Industrial Adhesives and Tapes Division.
   b. Avery Dennison Corporation, Specialty Tapes Division.
   c. Ideal Tape Co., Inc., an American Biltrite Company.
   d. Knauf Insulation.
2. Width: 3 inches .
3. Thickness: 11.5 mils .
4. Adhesion: 90 ounces force/inch in width.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch in width.
7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

B. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for indoor and outdoor applications.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. 3M Industrial Adhesives and Tapes Division.
   b. Ideal Tape Co., Inc., an American Biltrite Company.
2. Width: 2 inches .
3. Thickness: 6 mils .
4. Adhesion: 64 ounces force/inch in width.
5. Elongation: 500 percent.
6. Tensile Strength: 18 lbf/inch in width.

2.11 SECUREMENTS

A. Bands:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Johns Manville; a Berkshire Hathaway company.
   b. RPR Products, Inc.
2. Stainless Steel: ASTM A240/A240M, Type 304 ; 0.015 inch thick, 1/2 inch wide with wing seal or closed seal.
3. 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.

B. Staples: Outward-clinching insulation staples, nominal 3/4-inch- wide, stainless steel or Monel.

2.12 PROTECTIVE SHIELDING GUARDS

A. Protective Shielding Pipe Covers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Buckaroos, Inc.
   b. McGuire Manufacturing.
   c. MVG Molded Products.
   d. Plumberex Specialty Products, Inc.
   e. Truebro; IPS Corporation.
   f. Zurn Industries, LLC.
2. Description: Manufactured plastic wraps for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with Americans with Disabilities Act (ADA) requirements.

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. Clean and prepare surfaces to be insulated. Before insulating, apply a corrosion coating to insulated surfaces as follows:

1. Stainless Steel: Coat 300 series stainless steel with an epoxy primer 5 mils thick and an epoxy finish 5 mils thick if operating in a temperature range of between 140 and 300 deg F. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
2. Carbon Steel: Coat carbon steel operating at a service temperature of between 32 and 300 deg F with an epoxy coating. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.

C. Coordinate insulation installation with the tradesman installing heat tracing. Comply with requirements for heat tracing that apply to insulation.

D. 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 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 4 inches o.c.
   a. For below-ambient services, apply vapor-barrier mastic over staples.
4. Cover joints and seams with tape, in accordance with 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 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.
4. Cleanouts.

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 preformed fitting insulation 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 preformed fitting 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 preformed fitting 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 preformed fitting insulation of same material, density, and thickness as 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. 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 fabric-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 at locations indicated. 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 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Insulation Installation on Pipe Flanges:

1. Install pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as that of pipe insulation.
4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install sections of pipe insulation and miter if required in accordance with manufacturer's written instructions.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install prefabricated valve covers manufactured of same material as that of pipe insulation when available.
2. When prefabricated valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.
4. Secure insulation to valves and specialties, and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.6 INSTALLATION OF GLASS-FIBER

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands, and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.

3. For insulation with jackets on above-ambient surfaces, secure laps with outward-clinched staples at 6 inches o.c.
4. For insulation with jackets on below-ambient surfaces, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive, as recommended by insulation material manufacturer, and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install prefabricated pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with glass-fiber or mineral-wool blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install prefabricated sections of same material as that of straight segments of pipe insulation when available.
2. When prefabricated insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install prefabricated sections of same material as that of straight segments of pipe insulation when available.
2. When prefabricated sections are not available, install fabricated sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

3.7 INSTALLATION OF FIELD-APPLIED JACKETS

A. Where glass-cloth jackets are indicated, install directly over bare insulation or insulation with factory-applied jackets.

1. Draw jacket smooth and tight to surface with 2-inch overlap at seams and joints.
2. Embed glass cloth between two 0.062-inch- thick coats of lagging adhesive.
3. Completely encapsulate insulation with coating, leaving no exposed insulation.

B. 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.

C. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints. Seal with manufacturer's recommended adhesive.

1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

D. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless steel bands 12 inches o.c. and at end joints.

3.8 FINISHES

A. Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Section 09 91 13 "Exterior Painting" and Section 09 91 23 "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. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.

C. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.

D. Do not field paint aluminum or stainless steel jackets.

3.9 PIPING INSULATION SCHEDULE, GENERAL

A. 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.

B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:

1. Drainage piping located in crawl spaces.
2. Underground piping.
3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.10 INDOOR PIPING INSULATION SCHEDULE

A. Domestic Cold Water:

1. NPS 2 and Smaller: Insulation is one of the following:
   a. Flexible Elastomeric: 1 inch thick.
   b. Glass-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.

B. Domestic Hot and Recirculated Hot Water:

1. NPS 1-1/4 and Smaller: Insulation is one of the following:
   a. Flexible Elastomeric: 1 inch thick.
   b. Glass-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.

3.11 INDOOR, FIELD-APPLIED JACKET SCHEDULE

A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.

B. If more than one material is listed, selection from materials listed is Contractor's option.

C. Piping, Exposed:

1. PVC : 20 mils thick.

END OF SECTION

SECTION 22 11 13

FACILITY WATER DISTRIBUTION PIPING

PART 1 - GENERAL

1.1 DEFINITIONS

A. PE: Polyethylene plastic.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Field quality-control test reports: Including, but not limited to, chlorination and disinfection testing.

1.3 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Comply with Regional and New York State standards for potable-water-service piping, materials, installation, testing, and disinfection.

B. Piping materials shall bear label, stamp, or other markings of specified testing agency.

C. Comply with ASTM F 645 for selection, design, and installation of thermoplastic water piping.

D. NSF Compliance:

1. Comply with NSF 14 for plastic potable-water-service piping.
2. Comply with NSF 61 for materials for water-service piping and specialties for domestic water.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Preparation for Transport: Prepare valves according to the following:

1. Ensure that valves are dry and internally protected against rust and corrosion.
2. Protect valves against damage to threaded ends and flange faces.
3. Set valves in best position for handling. Set valves closed to prevent rattling.

B. During Storage: Use precautions for valves according to the following:

1. Do not remove end protectors unless necessary for inspection; then reinstall for storage.
2. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.

C. Handling: Use sling to handle valves if size requires handling by crane or lift. Rig valves to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

D. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.

E. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.

F. Protect flanges, fittings, and specialties from moisture and dirt.

G. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.5 PROJECT CONDITIONS

A. Interruption of Existing Water-Distribution Service: Do not interrupt service to facilities occupied by Director or others unless permitted under the following conditions and then only after arranging to provide temporary water-distribution service according to requirements indicated:

1. Notify Director's Representative no fewer than five days in advance of proposed interruption of service.
2. Do not proceed with interruption of water-distribution service without Director's Representative's written permission.

1.6 COORDINATION

A. Coordinate connection of existing water supply to new water distribution system with Director's Representative.

PART 2 - PRODUCTS

2.1 PE PIPE AND FITTINGS

A. PE 4710 Resin, AWWA/ASTM Pipe:

1. AWWA C906, ASTM F714, ASTM D3035 or 2-inch diameter pipe, iron pipe size (IPS), DR9 (250 PSI) or DR11 (200 PSI), black with blue stripes.

a. Molded PE Fittings: PE 4710 resin, socket-or butt-fusion type meeting ASTM D2683 or D3261, respectively.

2. AWWA C906, ASTM F714, ASTM D3035 for 8-inch diameter pipe, ductile iron pipe size (DIPS), DR11 (200 PSI), black with blue stripes

    a. Molded PE Fittings: PE 4710 resin, socket-or-butt-fusion type meeting ASTM D2683 or D3261, respectively.

2.2 JOINING MATERIALS

A. Plastic Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.

2.3 PIPING SPECIALTIES

A. Transition Fittings: Manufactured fitting or coupling same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.

B. Tubular-Sleeve Pipe Couplings:

1. Manufacturers: Subject to compliance with the requirements. Description: Metal, bolted, sleeve-type, reducing or transition coupling, with center sleeve, gaskets, end rings, and bolt fasteners and with ends of same sizes as piping to be joined.

    a. Standard: AWWA C219.
    b. Center-Sleeve Material: Stainless steel.
    c. Gasket Material: Natural or synthetic rubber.
    d. Pressure Rating: 200 psig minimum.
    e. Metal Component Finish: Corrosion-resistant coating or material.

2.4 GATE VALVES

A. AWWA, Ductile-Iron Gate Valves:

1. Nonrising-Stem, Resilient-Seated Gate Valves:

    a. Description: Ductile-iron body and bonnet; with ductile-iron gate, resilient seats, bronze stem, and stem nut.

        1) Standard: AWWA C509.
        2) Minimum Pressure Rating**:** 250 psig.
        3) End Connections: Mechanical joint.
        4) Interior and Outside Coating: Complying with AWWA C550.
        5) Certified Lead-Free.
        6) 2" square wrench nut unless indicated otherwise.

    b. Manufacturers: Model A-2362 by Mueller Co., LLC, or approved equal.

2.5 GATE VALVE ACCESSORIES AND SPECIALTIES

A. Valve Boxes: Comply with AWWA M44 for cast-iron valve boxes. Include top section, adjustable extension of length required for depth of burial of valve, plug with lettering "WATER," and bottom section with base that fits over valve and with a barrel approximately 5 inches in diameter.

1. Operating Wrenches: Steel, tee-handle with one pointed end, stem of length to operate deepest buried valve, and socket matching valve operating nut.
2. Valve Box Cover: Top of covers shall be factory or field-painted blue.

2.6 CORROSION-PROTECTION PIPING ENCASEMENT

A. Encasements for Underground Metal Valves:
1. Standards: ASTM A 674 or AWWA C105.
2. Form: Sheet or tube.
3. Material: LLDPE Film of 0.008-inch minimum thickness, or high-density, cross laminated PE film of 0.004-inch minimum thickness.
4. Color: Black.
5. Install per manufacturer's written instructions.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Refer to Division 31 Section "Earth Moving" for excavating, trenching, and backfilling.

3.2 PIPING APPLICATIONS

A. General: Use pipe, fittings, and joining methods for piping systems according to the following applications.

B. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used, unless otherwise indicated.

C. Do not use unions for underground piping.

D. Underground NPS 2 to NPS 8 water-service piping shall be the following:

1. PE, ASTM Pipe: Molded PE fittings and heat-fusion joints.

3.3 VALVE APPLICATIONS

A. General Application: Use mechanical-joint-end valves underground installation.

B. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:

1. Underground Valve: AWWA ductile-iron, nonrising-stem, resilient-seated gate valves with valve box.

3.4 PIPING INSTALLATION

A. Make connections to existing pipes utilizing tees and/or couplings.

B. Install PE pipe according to ASTM D 2774, ASTM F 645, and AWWA C901/C906.

C. Bury piping with depth of cover as indicated on the Contract Drawings.

D. Extend water-service piping and connect to water-supply source and existing building-water-piping systems 5-feet +/- outside face of building wall in locations indicated.

E. Install underground piping with restrained joints at horizontal and vertical changes in direction.

3.5 JOINT CONSTRUCTION

A. Make pipe joints according to the following:

1. PE Piping Joints: Make joints in accordance with the manufacturer's written instructions.

3.6 ANCHORAGE INSTALLATION

A. Anchorage, General: Install water-distribution piping with restrained joints. Anchorages and restrained-joint types that may be used include the following:

1. Locking mechanical joints.
2. Heat-fused joints.

B. Apply full coat of asphalt or other acceptable corrosion-resistant material to surfaces of installed ferrous anchorage devices.

3.7 VALVE INSTALLATION

A. AWWA Gate Valves: Comply with AWWA C600 and AWWA M44. Install each underground valve with stem pointing up and with valve box.

3.8 CONNECTIONS

A. Connect water-distribution piping to existing piping to remain as indicated. Make connections to existing pipes utilizing tees and/or couplings recommended by the piping manufacturer for connection to dissimilar pipe.

3.9 FIELD QUALITY CONTROL

A. Piping Tests: Conduct piping tests before joints are covered. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.

B. Hydrostatic Tests: Test at not less than one-and-one-half times working pressure for two hours:

1. Increase pressure in 50-psig increments and inspect each joint between increments. Hold at test pressure for 1 hour; decrease to 0 psig. Slowly increase again to test pressure and hold for 1 more hour. Maximum allowable leakage is 2 quarts per hour per 100 joints. Remake leaking joints with new materials and repeat test until leakage is within allowed limits.

C. Prepare reports of testing activities.

D. Tests shall be performed in accordance with all applicable AWWA standards and authorities having jurisdiction.

3.10 IDENTIFICATION

A. Install continuous underground detectable warning tape during backfilling of trench for underground water-distribution piping. Locate below finished grade, directly over piping. Underground warning tapes are specified in Division 31 Section "Earth Moving."

B. Permanently attach equipment nameplate or marker indicating plastic water service piping on main electrical meter panel.

3.11 CLEANING

A. Clean and disinfect water-distribution piping as follows:

1. Purge new water-distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.
2. Use purging and disinfecting procedure prescribed by Health Department or, if method is not prescribed by authorities having jurisdiction, use procedure described in AWWA C651 or do as follows:
    a. Fill system or part of system with water/chlorine solution containing at least 50 ppm of chlorine; isolate and allow to stand for 24 hours.
    b. Drain system or part of system of previous solution and refill with water/chlorine solution containing at least 200 ppm of chlorine; isolate and allow to stand for 3 hours.
    c. After standing time, flush system with clean, potable water until no chlorine remains in water coming from system.
    d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedure if biological examination shows evidence of contamination.

B. Prepare reports of purging and disinfecting activities.

END OF SECTION

SECTION 22 11 16

DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data:

1. Pipe and tube.
2. Fittings.
3. Joining materials.
4. Transition fittings.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Potable-water piping and components shall comply with NSF 14, NSF 61, and NSF 372. Include marking "NSF-pw" on piping.

2.2 COPPER TUBE AND FITTINGS

A. Drawn-Temper Copper Tube: ASTM B88, Type L.

B. Annealed-Temper Copper Tube: ASTM B88, Type L.

C. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, pressure fittings.

D. Wrought Copper Unions: ASME B16.22.

E. Copper Tube, Pressure-Seal-Joint Fittings:

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Apollo Valves; a part of Aalberts Integrated Piping Systems.
   b. Conex Banninger - USA.
   c. Copper Press Brand; Merit Brass Company.
   d. NIBCO INC.
   e. Viega LLC.
2. Fittings: Cast-brass, cast-bronze, or wrought-copper with EPDM O-ring seal in each end.
3. Minimum 200-psig working-pressure rating at 250 deg F.

2.3 PIPING JOINING MATERIALS

A. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.

B. Solder Filler Metals: ASTM B32, lead-free alloys.

C. Flux: ASTM B813, water flushable.

2.4 TRANSITION FITTINGS

A. General Requirements:

1. Same size as pipes to be joined.
2. Pressure rating at least equal to pipes to be joined.
3. End connections compatible with pipes to be joined.

B. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.

C. Fitting Option: Extruded-tee connections and brazed joints may be used on aboveground copper tubing.

D. Under-building-slab, domestic water, building-service piping, NPS 3 and smaller , shall be the following:

1. Annealed-temper copper tube, ASTM B88, Type L ; wrought-copper, solder-joint fittings; and brazed copper pressure-seal fittings; and pressure-sealed joints.

E. Under-building-slab, domestic water piping, NPS 2 and smaller , shall be the following:

1. annealed-temper copper tube, ASTM B88, Type L; wrought-copper, solder-joint fittings; and brazed joints.

F. Aboveground domestic water piping, NPS 2 and smaller , shall be the following:

1. Drawn-temper copper tube, ASTM B88, Type L ; wrought-copper, solder-joint fittings; and soldered joints.
2. Drawn-temper copper tube, ASTM B88, Type L ; copper pressure-seal-joint fittings; and pressure-sealed joints.

3.2 EARTHWORK

A. Comply with requirements in Section 31 20 00 "Earth Moving" for excavating, trenching, and backfilling.

3.3 INSTALLATION OF PIPING

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. 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 copper tubing under building slab according to CDA's "Copper Tube Handbook."

C. Install underground copper tube in PE encasement according to ASTM A674 or AWWA C105/A21.5.

D. Install valves according to the following:

1. Section 22 05 23.12 "Ball Valves for Plumbing Piping."
2. Section 22 05 23.14 "Check Valves for Plumbing Piping."

E. Install water-pressure-reducing valves downstream from shutoff valves. Comply with requirements for pressure-reducing valves in Section 22 11 19 "Domestic Water Piping Specialties."

F. Install domestic water piping level with 0.25 percent slope downward toward drain and plumb.

G. Rough-in domestic water piping for water-meter installation according to utility company's requirements.

H. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.

I. 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.

J. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.

K. Install piping to permit valve servicing.

L. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system pressure rating used in applications below unless otherwise indicated.

M. Install piping free of sags and bends.

N. Install fittings for changes in direction and branch connections.

O. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.

P. Install pressure gauges on suction and discharge piping for each plumbing pump . Comply with requirements for pressure gauges in Section 22 05 19 "Meters and Gages for Plumbing Piping."

Q. Install thermostats in hot-water circulation piping. Comply with requirements for thermostats in Section 22 11 23 "Domestic Water Pumps."

R. Install thermometers on inlet and outlet piping from each water heater. Comply with requirements for thermometers in Section 22 05 19 "Meters and Gages for Plumbing Piping."

S. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 22 05 17 "Sleeves and Sleeve Seals for Plumbing Piping."

T. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 22 05 17 "Sleeves and Sleeve Seals for Plumbing Piping."

U. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 22 05 18 "Escutcheons for Plumbing Piping."

3.4 JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.

C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.

D. Brazed Joints for Copper Tubing: Comply with CDA's "Copper Tube Handbook," "Brazed Joints" chapter.

E. Soldered Joints for Copper Tubing: Apply ASTM B813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B828 or CDA's "Copper Tube Handbook."

F. Pressure-Sealed Joints for Copper Tubing: Join copper tube and pressure-seal fittings with tools and procedure recommended by pressure-seal-fitting manufacturer. Leave insertion marks on pipe after assembly.

G. Joint Construction for Grooved-End Copper Tubing: Make joints according to AWWA C606. Roll groove ends of tubes. Lubricate and install gasket over ends of tubes or tube and fitting. Install coupling housing sections over gasket with keys seated in tubing grooves. Install and tighten housing bolts.

H. Joints for Dissimilar-Material Piping: Make joints using adapters compatible with materials of both piping systems.

3.5 INSTALLATION OF TRANSITION FITTINGS

A. Install transition couplings at joints of dissimilar piping.

B. Transition Fittings in Underground Domestic Water Piping:

1. Fittings for NPS 1-1/2 and Smaller: Fitting-type coupling.
2. Fittings for NPS 2 and Larger: Sleeve-type coupling.

C. Transition Fittings in Aboveground Domestic Water Piping NPS 2 and Smaller: Plastic-to-metal transition fittings .

3.6 INSTALLATION OF HANGERS AND SUPPORTS

A. Comply with requirements for hangers, supports, and anchor devices in Section 22 05 29 "Hangers and Supports for Plumbing Piping and Equipment."

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 of each fitting.

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.

3.7 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. When installing piping adjacent to equipment and machines, allow space for service and maintenance.

C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.

D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:

1. Domestic Water Booster Pumps: Cold-water suction and discharge piping.
2. Water Heaters: Cold-water inlet and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.
3. Plumbing Fixtures: Cold- and hot-water-supply piping in sizes indicated, but not smaller than that required by plumbing code.

4. Equipment: Cold- and hot-water-supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 and larger.

3.8 IDENTIFICATION

A. Identify system components. Comply with requirements for identification materials and installation in Section 22 05 53 "Identification for Plumbing Piping and Equipment."

3.9 ADJUSTING

A. Perform the following adjustments before operation:

1. Close drain valves, hydrants, and hose bibbs.
2. Open shutoff valves to fully open position.
3. Open throttling valves to proper setting.
4. Adjust balancing valves in hot-water-circulation return piping to provide adequate flow.
   a. Manually adjust ball-type balancing valves in hot-water-circulation return piping to provide hot-water flow in each branch.
   b. Adjust calibrated balancing valves to flows indicated.
5. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
6. Remove and clean strainer screens. Close drain valves and replace drain plugs.
7. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
8. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.10 PIPING PRESSURE TESTS

A. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.

B. Test for leaks and defects in the new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.

C. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.

D. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.

E. Repair leaks and defects with new materials and retest piping or portion thereof until satisfactory results are obtained.

F. Prepare reports for test and for corrective action required.

G. Domestic water piping will be considered defective if it does not pass tests and inspections.

H. Prepare test and inspection reports.

3.11 PPIPING DISINFECTION/CLEANING

A. Clean and disinfect potable domestic water piping as follows:

1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:

    a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
    b. Fill and isolate system according to either of the following:

        1) Fill system or part of thereof with water/chlorine solution with at least 50 ppm chlorine. Isolate with valves and allow to stand 24 hours.
        2) Fill system or part thereof with water/chlorine solution with at least 200 ppm chlorine. Isolate and allow to stand for three hours.

    c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
    d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.

3. Prepare and submit reports of purging and disinfecting activities.
4. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

END OF SECTION

SECTION 22 11 19

DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.2 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For domestic water piping specialties to include in emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PIPING SPECIALTIES

A. Domestic water piping specialties intended to convey or dispense water for human consumption are to comply with the SDWA, requirements of authorities having jurisdiction, and NSF 61 and NSF 372, or to be certified in compliance with NSF 61 and NSF 372 by an American National Standards Institute (ANSI)-accredited third-party certification body that the weighted average lead content at wetted surfaces is less than or equal to 0.25 percent.

2.2 VACUUM BREAKERS

A. Hose-Connection Vacuum Breakers :

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Apollo Valves; a part of Aalberts Integrated Piping Systems.
   b. Cash Acme Plumbing Products; an RWC brand.
   c. Champion-Arrowhead.
   d. MIFAB, Inc.
   e. WATTS; A Watts Water Technologies Company.
   f. Woodford Manufacturing Company.
   g. Zurn Industries, LLC.
2. Standard: ASSE 1011.
3. Body: Bronze, nonremovable, with manual drain.
4. Outlet Connection: Garden-hose threaded complying with ASME B1.20.7.
5. Finish: Chrome or nickel plated .

2.3 BACKFLOW PREVENTERS

A. Reduced-Pressure-Principle Backflow Preventers :

1. Manufacturers: Subject to compliance with requirements, provide products indicated on drawings or by one of the following:
    a. Ames Fire & Waterworks; A Watts Water Technologies Company.
    b. Apollo Valves; a part of Aalberts Integrated Piping Systems.
    c. Caleffi North America.
    d. FEBCO; A WATTS Brand.
    e. WATTS; A Watts Water Technologies Company.
    f. Zurn Industries, LLC.
2. Standard: ASSE 1013.
3. Operation: Continuous-pressure applications.
4. End Connections: Threaded for NPS 2 and smaller; for NPS 2-1/2 and larger.
5. Configuration: Designed for flow.
6. Accessories:
    a. Valves NPS 2 and Smaller: Ball type with threaded ends on inlet and outlet.
    b. Air-Gap Fitting: ASME A112.1.2, matching backflow-preventer connection.

2.4 BALANCING VALVES

A. Copper-Alloy Calibrated Balancing Valves :

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. Bell & Gossett; a Xylem brand.
    b. IMI Hydronic Engineering Inc.
    c. Nexus Valve, Inc.; Aalberts Hydronic Flow Control.
    d. NIBCO INC.
    e. WATTS; A Watts Water Technologies Company.
2. Type: Ball or Y-pattern globe valve with two readout ports and memory-setting indicator.
3. Body: Brass or bronze.
4. Size: Same as connected piping, but not larger than NPS 2.
5. Accessories: Meter hoses, fittings, valves, differential pressure meter, and carrying case.

2.5 TEMPERATURE-ACTUATED, WATER MIXING VALVES

A. Water-Temperature Limiting Devices (Refer to Schedule on Drawings)

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. Acorn Engineering Company; a Division of Morris Group International.
    b. Apollo Valves; a part of Aalberts Integrated Piping Systems.
    c. Cash Acme Plumbing Products; an RWC brand.
    d. POWERS; A WATTS Brand.
    e. Symmons Industries, Inc.
    f. Taco Comfort Solutions.
    g. WATTS; A Watts Water Technologies Company.
    h. Zurn Industries, LLC.
2. Standard: ASSE 1070.

3. Pressure Rating: 125 psig.
4. Type: Thermostatically controlled, water mixing valve.
5. Material: Bronze body with corrosion-resistant interior components.
6. Connections: Threaded [**union**] inlets and outlet.
7. Accessories: Check stops on hot- and cold-water supplies, and adjustable, temperature-control handle.
8. Tempered-Water Setting: Refer to Schedule.
9. Valve Finish: Rough bronze.

B. Primary, Thermostatic, Water Mixing Valves :

1. Refer to schedule on drawings
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Acorn Engineering Company; a Division of Morris Group International.
   b. Apollo Valves; a part of Aalberts Integrated Piping Systems.
   c. Caleffi North America.
   d. Cash Acme Plumbing Products; an RWC brand.
   e. Lawler Manufacturing Company, Inc.
   f. POWERS; A WATTS Brand.
   g. Symmons Industries, Inc.
   h. WATTS; A Watts Water Technologies Company.
   i. Zurn Industries, LLC.
3. Standard: ASSE 1017.
4. Pressure Rating: 125 psig minimum unless otherwise indicated.
5. Type: Exposed-mounted , thermostatically controlled, water mixing valve.
6. Material: Bronze body with corrosion-resistant interior components.
7. Connections: Threaded union inlets and outlet.
8. Accessories: Manual temperature control, check stops on hot- and cold-water supplies, and adjustable, temperature-control handle.
9. Tempered-Water Setting: 110 deg F .
10. Tempered-Water Design Flow Rate: Refer to Schedule.
11. Selected Valve Flow Rate: Refer to Schedule.
12. Valve Finish: Rough bronze.
13. Piping Finish: Copper.

2.6 STRAINERS FOR DOMESTIC WATER PIPING

A. Y-Pattern Strainers :

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Keckley Company.
   b. Titan Flow Control, Inc.
   c. WATTS.
   d. Zurn Industries, LLC.
2. Pressure Rating: 125 psig minimum unless otherwise indicated.

3. Body: Bronze for NPS 2 and smaller;
4. End Connections: Threaded for NPS 2 and smaller.
5. Screen: Stainless steel with round perforations unless otherwise indicated.
6. Perforation Size:
   a. Strainers NPS 2 and Smaller: 0.020 inch No. 20 Mesh .
7. Drain: Pipe plug .

2.7 HOSE BIBBS

A. Hose Bibbs HB-1 :

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Jay R. Smith Mfg Co; a division of Morris Group International.
   b. MIFAB, Inc.
   c. Prier Products, Inc.
   d. WATTS.
   e. Woodford Manufacturing Company.
   f. Zurn Industries, LLC.
2. Standard: ASME A112.18.1 for sediment faucets.
3. Body Material: Bronze.
4. Seat: Bronze, replaceable.
5. Supply Connections: NPS 1/2 or NPS 3/4 threaded or solder-joint inlet.
6. Outlet Connection: Garden-hose thread complying with ASME B1.20.7.
7. Pressure Rating: 125 psig.
8. Vacuum Breaker: Integral nonremovable, drainable, hose-connection vacuum breaker complying with ASSE 1011.
9. Finish for Equipment Rooms: Rough bronze, or chrome or nickel plated.
10. Finish for Service Areas: Rough bronze .
11. Finish for Finished Rooms: Chrome or nickel plated.
12. Operation for Equipment Rooms: Wheel handle or operating key.
13. Operation for Service Areas: Operating key.
14. Operation for Finished Rooms: Operating key.
15. Include operating key with each operating-key hose bibb.
16. Include integral wall flange with each chrome- or nickel-plated hose bibb.

2.8 WALL HYDRANTS

A. Non-freeze Wall Hydrants AFWH :

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Jay R. Smith Mfg Co; a division of Morris Group International.
   b. Josam Company.
   c. MIFAB, Inc.
   d. Prier Products, Inc.

e. WATTS.
f. Woodford Manufacturing Company.
g. Zurn Industries, LLC.

2. Standard: ASME A112.21.3M for concealed -outlet, self-draining wall hydrants.
3. Pressure Rating: 125 psig.
4. Operation: Loose key.
5. Casing and Operating Rod: Of length required to match wall thickness. Include wall clamp.
6. Inlet: NPS 3/4 or NPS 1.
7. Outlet, Concealed: With integral vacuum breaker and garden-hose thread complying with ASME B1.20.7.
8. Box: Deep, flush mounted with cover.
9. Box and Cover Finish: Polished nickel bronze .
10. Outlet, Exposed: With integral vacuum breaker and garden-hose thread complying with ASME B1.20.7.
11. Nozzle and Wall-Plate Finish: Polished nickel bronze .
12. Operating Keys(s): Two with each wall hydrant.

2.9 DRAIN VALVES

A. Ball-Valve-Type, Hose-End Drain Valves :

1. Standard: MSS SP-110 for standard-port, two-piece ball valves.
2. Pressure Rating: 400-psig minimum CWP.
3. Size: NPS 3/4.
4. Body: Copper alloy.
5. Ball: Chrome-plated brass.
6. Seats and Seals: Replaceable.
7. Handle: Vinyl-covered steel.
8. Inlet: Threaded or solder joint.
9. Outlet: Threaded, short nipple with garden-hose thread complying with ASME B1.20.7 and cap with brass chain.

2.10 WATER-HAMMER ARRESTERS

A. Water-Hammer Arresters :

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. AMTROL, Inc.
   b. Jay R. Smith Mfg Co; a division of Morris Group International.
   c. Josam Company.
   d. MIFAB, Inc.
   e. Precision Plumbing Products.
   f. Sioux Chief Manufacturing Company, Inc.
   g. WATTS.
   h. Zurn Industries, LLC.

2. Standard: ASSE 1010 or PDI-WH 201.
3. Type: Metal bellows or Piston .
4. Size: ASSE 1010, Sizes AA and A through F, or PDI-WH 201, Sizes A through F.

PART 3 - EXECUTION

3.1 INSTALLATION OF PIPING SPECIALTIES

A. Backflow Preventers: Install in each water supply to mechanical equipment and systems and to other equipment and water systems that may be sources of contamination. Comply with authorities having jurisdiction.

1. Locate backflow preventers in same room as connected equipment or system.
2. Do not install bypass piping around backflow preventers.

B. Balancing Valves: Install in locations where they can easily be adjusted. Set at indicated design flow rates.

C. Temperature-Actuated, Water Mixing Valves: Install with check stops or shutoff valves on inlets and with shutoff valve on outlet.

1. Install cabinet-type units recessed in or surface mounted on wall as specified.

D. Y-Pattern Strainers: For water, install on supply side of each pump.

E. Water-Hammer Arresters: Install in water piping in accordance with PDI-WH 201.

3.2 PIPING CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. When installing piping specialties adjacent to equipment and machines, allow space for service and maintenance.

3.3 IDENTIFICATION

A. Plastic Labels for Equipment: Install engraved plastic-laminate equipment nameplate or sign on or near each of the following:

1. Temperature-actuated, water mixing valves.

B. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Section 22 05 53 "Identification for Plumbing Piping and Equipment."

3.4 ADJUSTING

A. Set field-adjustable flow set points of balancing valves.

B. Set field-adjustable temperature set points of temperature-actuated, water mixing valves.

END OF SECTION

SECTION 22 11 23.21

INLINE, DOMESTIC-WATER PUMPS

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For each type of product. Include construction materials, rated capacities, certified performance curves with operating points plotted on curves, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1.2 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For inline, domestic-water pumps to include in operation and maintenance manuals.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Retain shipping flange protective covers and protective coatings during storage.

B. Protect bearings and couplings against damage.

C. Comply with pump manufacturer's written instructions for handling.

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. UL Compliance: UL 778 for motor-operated water pumps.

C. Drinking Water System Components - Health Effects and Drinking Water System Components - Lead Content Compliance: NSF 61 and NSF 372.

2.2 IN-LINE, SEALLESS CENTRIFUGAL PUMPS

A. Description: Factory-assembled and -tested, in-line, close-coupled, canned-motor, sealless, overhung-impeller centrifugal pumps.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Flo Fab Inc.
2. Grundfos Pumps Corporation.
3. Taco Comfort Solutions.
4. WILO USA LLC - WILO Canada Inc.

C. Capacities and Characteristics: Refer to schedule on drawings

D. Pump Construction:

1. Pump and Motor Assembly: Hermetically sealed, replaceable-cartridge type with motor and impeller on common shaft and designed for installation with pump and motor shaft horizontal.
2. Minimum Working Pressure: 125 psig .
3. Maximum Continuous Operating Temperature: 220 deg F .
4. Casing: BronzeorStainless steel, with threaded or companion-flange connections.
5. Impeller: composite .
6. Motor: Single speed.

2.3 MOTORS

A. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Section 22 05 13 "Common Motor Requirements for Plumbing Equipment."

1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.

2.4 CONTROLS

A. Thermostats: Electric; adjustable for control of hot-water circulation pump.

1. Type: Water-immersion temperature sensor, for installation in piping.
2. Range: 65 to 200 deg F .
3. Enclosure: NEMA 250, Type 4X .
4. Operation of Pump: On or off.
5. Transformer: Provide if required.
6. Power Requirement: 120 V ac .
7. Settings: Start pump at 105 deg F and stop pump at 110deg F .

B. Timers: Electric, for control of hot-water circulation pump.

1. Type: Programmable, seven-day clock with manual override on-off switch.
2. Enclosure: NEMA 250, Type 1 , suitable for wall mounting.
3. Operation of Pump: On or off.
4. Transformer: Provide if required.
5. Power Requirement: 120 V ac .
6. Programmable Sequence of Operation: Up to two on-off cycles each day for seven days .

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in for domestic-water-piping system to verify actual locations of piping connections before pump installation.

3.2 PUMP INSTALLATION

A. Comply with HI 1.4.

B. Mount pumps in orientation complying with manufacturer's written instructions.

C. Install pressure switches in water-supply piping.

D. Install thermostats in hot-water return piping.

E. Install timers on wall of mechanical room.

F. Install time-delay relays in piping between water heaters and hot-water storage tanks.

3.3 PIPING CONNECTIONS

A. Comply with requirements for piping specified in Section 22 11 16 "Domestic Water Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

B. Where installing piping adjacent to inline, domestic-water pumps, allow space for service and maintenance.

C. Connect domestic-water piping to pumps. Install suction and discharge piping equal to or greater than size of pump nozzles.

D. Install shutoff valve on suction side of each pump, and check, shutoff, and throttling valves on discharge side of each pump. Install valves same size as connected piping. Comply with requirements for strainers specified in Section 22 11 19 "Domestic Water Piping Specialties." Comply with requirements for valves specified in the following:

1. Section 22 05 23.12 "Ball Valves for Plumbing Piping."
2. Section 22 05 23.14 "Check Valves for Plumbing Piping."
3. Install pressure gauge and snubber at suction of each pump and pressure gauge and snubber at discharge of each pump. Install at integral pressure-gauge tappings where provided or install pressure-gauge connectors in suction and discharge piping around pumps. Comply with requirements for pressure gauges and snubbers specified in Section 22 05 19 "Meters and Gages for Plumbing Piping."

3.4 CONTROL CONNECTIONS

A. Install control and electrical power wiring to field-mounted control devices.

B. Connect control wiring between temperature controllers and devices.

C. Interlock pump between water heater and hot-water storage tank with water heater burner and time-delay relay.

3.5 IDENTIFICATION

A. Identify system components. Comply with requirements for identification specified in Section 22 05 53 "Identification for Plumbing Piping and Equipment" for identification of pumps.

3.6 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions.
2. Check piping connections for tightness.
3. Clean strainers on suction piping.
4. Set thermostats, timers, for automatic starting and stopping operation of pumps.
5. Perform the following startup checks for each pump before starting:
    a. Verify bearing lubrication.
    b. Verify that pump is free to rotate by hand and that pump for handling hot liquid is free to rotate with pump hot and cold. If pump is bound or drags, do not operate until cause of trouble is determined and corrected.
    c. Verify that pump is rotating in the correct direction.
6. Prime pump by opening suction valves and closing drains, and prepare pump for operation.
7. Start motor.
8. Open discharge valve slowly.
9. Adjust temperature settings on thermostats.
10. Adjust timer settings.

3.7 ADJUSTING

A. Adjust inline, domestic-water pumps to function smoothly, and lubricate as recommended by manufacturer.

B. Adjust initial temperature set points.

C. Set field-adjustable switches and circuit-breaker trip ranges as indicated.

END OF SECTION

SECTION 22 13 13

FACILITY SANITARY SEWERS

PART 1 - GENERAL

1.1 DEFINITIONS

A. FRP: Fiberglass-reinforced plastic.

1.2 ACTION SUBMITTALS

A. Product Data: For the following:

1. Pipe and fittings.
2. Non-pressure and pressure couplings
3. Cleanouts.

B. Shop Drawings: For manholes. Include plans, elevations, sections, details, and frames and covers.

1.3 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of pipe and fitting.

B. Field quality-control reports.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Do not store plastic pipe, and fittings in direct sunlight.

B. Protect pipe, pipe fittings, and seals from dirt and damage.

C. Handle manholes according to manufacturer's written rigging instructions.

1.5 FIELD CONDITIONS

A. Interruption of Existing Sanitary Sewerage Service: Do not interrupt service to facilities occupied by NYSOPRHP or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:

1. Notify Director's Representative no fewer than two days in advance of proposed interruption of service.
2. Do not proceed with interruption of service without Director's Representative's written permission.

PART 2 - PRODUCTS

2.1 PVC PIPE AND FITTINGS

A. PVC Type PSM Sewer Piping:

1. Pipe: ASTM D 3034, SDR 35 , PVC Type PSM sewer pipe with bell-and-spigot ends for gasketed joints.
2. Fittings: ASTM D 3034, PVC with bell ends.
3. Gaskets: ASTM F 477, elastomeric seals.

2.2 NONPRESSURE-TYPE TRANSITION COUPLINGS

A. Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling; for joining underground nonpressure piping. Include ends of same sizes as piping to be joined and include corrosion-resistant-metal tension band and tightening mechanism on each end.

B. Sleeve Materials:

1. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
2. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.

C. Unshielded, Flexible Couplings:

1. Description: Elastomeric sleeve with stainless-steel shear ring and corrosion-resistant-metal tension band and tightening mechanism on each end.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Dallas Specialty & Mfg. Co.
   b. Fernco Inc.
   c. Logan Clay Pipe.
   d. Mission Rubber Company, LLC; a division of MCP Industries.
   e. NDS Inc.
   f. Plastic Oddities.

2.3 CLEANOUTS

A. PVC Cleanouts:

1. Description: PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.
2. Cleanout Box Frame and Lid: Subject to compliance with the requirements, provide East Jordan Works Model #00156602 cast iron cleanout frame and cover assembly with countersink stainless steel bolts, or approved equal.

2.4 MANHOLES

A. Standard Precast Concrete Manholes:

1. Description: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
2. Diameter: 48 inches minimum unless otherwise indicated.
3. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent flotation.
4. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section; with separate base slab or base section with integral floor.
5. Riser Sections: 4-inch minimum thickness, of length to provide depth indicated.
6. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated; with top of cone of size that matches grade rings.
7. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
8. Resilient Pipe Connectors: ASTM C 923, cast or fitted into manhole walls, for each pipe connection.
9. Steps: Individual FRP steps or FRP ladder ; wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of manhole to finished grade is less than 60 inches .
10. Grade Rings: Reinforced-concrete rings, 6- to 9-inch total thickness, with diameter matching manhole frame and cover, and with height as required to adjust manhole frame and cover to indicated elevation and slope.

B. Manhole Frames and Covers:

1. Description: Ferrous; 24-inch ID by 7- to 9-inch riser, with 4-inch- minimum-width flange and 26-inch- diameter cover. Include indented top design with lettering cast into cover, using wording equivalent to "SANITARY SEWER."
2. Material: ASTM A 48/A 48M, Class 35 gray iron unless otherwise indicated.

2.5 CONCRETE

A. General: Cast-in-place concrete complying with ACI 318, ACI 350, and the following:

1. Cement: ASTM C 150/C 150M, Type II.
2. Fine Aggregate: ASTM C 33/C 33M, sand.
3. Coarse Aggregate: ASTM C 33/C 33M, crushed gravel.
4. Water: Potable.

B. Portland Cement Design Mix: 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio.

1. Reinforcing Fabric: ASTM A 1064/A 1064M, steel, welded wire fabric, plain.
2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 deformed steel.

C. Manhole Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio. Include channels and benches in manholes.

1. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.
   a. Invert Slope: 2 percent through manhole.
2. Benches: Concrete, sloped to drain into channel.
   a. Slope: 8 percent.

D. Ballast and Pipe Supports: Portland cement design mix, 3000 psi minimum, with 0.58 maximum water/cementitious materials ratio.

1. Reinforcing Fabric: ASTM A1064/A 1064M, steel, welded wire fabric, plain.
2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 deformed steel.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavating, trenching, and backfilling are specified in Section 31 20 00 "Earth Moving."

3.2 PIPING INSTALLATION

A. General Locations and Arrangements: Drawing plans and details to indicate general location and arrangement of underground sanitary sewer piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.

B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for using lubricants, cements, and other installation requirements.

C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.

D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

E. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling.

F. Install gravity-flow, nonpressure, drainage piping according to the following:

1. Install piping pitched down in direction of flow, at minimum slope as indicated on the Contract Drawings
2. Install piping with 36-inch minimum cover.
3. Install PVC gravity sewer piping according to ASTM D 2321 and ASTM F 1668.

G. Clear interior of piping and manholes of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed. Place plug in end of incomplete piping at end of day and when work stops.

3.3 PIPE JOINT CONSTRUCTION

A. Join gravity-flow, nonpressure, drainage piping according to the following:

1. Join PVC gravity sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-seal joints or ASTM D 3034 for elastomeric-gasket joints.
2. Join dissimilar pipe materials with nonpressure-type, flexible couplings.

B. Pipe couplings, expansion joints, and deflection fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

1. Use nonpressure flexible couplings where required to join gravity-flow, nonpressure sewer piping unless otherwise indicated.
   a. Unshielded flexiblecouplings for pipes of same or slightly different OD.
   b. Unshielded, increaser/reducer-pattern, flexiblecouplings for pipes with different OD.

3.4 MANHOLE INSTALLATION

A. General: Install manholes complete with appurtenances and accessories indicated.

B. Install precast concrete manhole sections with sealants according to ASTM C 891.

C. Form continuous concrete channels and benches between inlets and outlet.

D. Set tops of frames and covers flush with finished surface of manholes that occur in pavements. Set tops 3 inches above finished surface elsewhere unless otherwise indicated.

3.5 CONCRETE PLACEMENT

A. Place cast-in-place concrete according to ACI 318.

3.6 CLEANOUT INSTALLATION

A. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Install piping so cleanouts open in direction of flow in sewer pipe.

B. Set cleanout frames and covers in earth in cast-in-place-concrete block, 18 by 18 by 12 inches deep. Set with tops 1 inch above surrounding grade.

C. Set cleanout frames and covers in concrete pavement and roads with tops flush with pavement surface.

3.7 CONNECTIONS

A. Connect nonpressure, gravity-flow drainage piping to building's sanitary building drains specified in Section 22 13 16 "Sanitary Waste and Vent Piping."

B. Make connections to existing piping and underground manholes.

1. Use commercially manufactured mechanical link seals for watertight connections where shown.
2. Protect existing piping and manholes to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

3.8 IDENTIFICATION

A. Comply with requirements in Section 31 20 00 "Earth Moving" for underground utility identification devices. Arrange for installation of green warning tapes directly over piping and at outside edges of underground manholes.

1. Use warning tape or detectable warning tape over ferrous piping.
2. Use detectable warning tape over nonferrous piping and over edges of underground manholes.

3.9 FIELD QUALITY CONTROL

A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.

1. Submit separate report for each system inspection.
2. Defects requiring correction include the following:
    a. Alignment: Less than full diameter of inside of pipe is visible between structures.
    b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
    c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
    d. Infiltration: Water leakage into piping.
    e. Exfiltration: Water leakage from or around piping.
3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
4. Reinspect and repeat procedure until results are satisfactory.

B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.

1. Do not enclose, cover, or put into service before inspection and approval.
2. Test completed piping systems according to requirements of authorities having jurisdiction.
3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.

4. Submit separate report for each test.
5. Air Tests: Test sanitary sewerage according to requirements of authorities having jurisdiction, UNI-B-6, and the following:
   a. Test plastic gravity sewer piping according to ASTM F 1417.
   b. Test concrete gravity sewer piping according toASTM C 1628.
6. Force Main: Perform hydrostatic test after thrust blocks, supports, and anchors have hardened. Test at pressure not less than 1-1/2 times the maximum system operating pressure, but not less than 150 psig .
   a. PVC Piping: Test according to AWWA M23, "Testing and Maintenance" Chapter.
7. Manholes: Perform hydraulic test according to ASTM C 969.

C. Leaks and loss in test pressure constitute defects that must be repaired.

D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

3.10 CLEANING

A. Clean dirt and superfluous material from interior of piping. Flush with potable water.

END OF SECTION

SECTION 22 13 16

SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Product Data: For adhesives, indicating VOC content.
2. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.

C. Shop Drawings: For hubless, single-stack drainage system. Include plans, elevations, sections, and details.

1.2 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Plans and elevations, or Building Information Model (BIM) drawn to scale, showing items described in this Section and coordinated with all building trades.

B. Seismic Qualification Certificates: For waste and vent piping, 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. Detailed description of piping anchorage devices on which the certification is based and their installation requirements.

C. Field quality-control reports.

1.3 FIELD CONDITIONS

A. Interruption of Existing Sanitary Waste Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service in accordance with requirements indicated:

1. Notify Architect Owner no fewer than two days in advance of proposed interruption of sanitary waste service.
2. Do not proceed with interruption of sanitary waste service without Architect's Owner's written permission.

1.4 WARRANTY

A. Listed manufacturers to provide labeling and warranty of their respective products.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Components and installation are capable of withstanding the following minimum working pressure unless otherwise indicated:

1. Soil, Waste, and Vent Piping: 10 ft. head of water .

2.2 PIPING MATERIALS

A. Piping materials to bear label, stamp, or other markings of specified testing agency.

B. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.3 HUB-AND-SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AB & I Foundry; a part of the McWane family of companies.
2. Charlotte Pipe and Foundry Company.
3. Tyler Pipe; a part of McWane family of companies.

B. Pipe and Fittings:

1. Marked with CISPI collective trademark.
2. ASTM A74, service cast iron.

C. Gaskets: ASTM C564, rubber.

D. Caulking Materials: ASTM B29, pure lead and oakum or hemp fiber.

2.4 HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AB & I Foundry; a part of the McWane family of companies.
2. Charlotte Pipe and Foundry Company.
3. Tyler Pipe; a part of McWane family of companies.

B. Pipe and Fittings:

1. Marked with CISPI collective trademark.
2. ASTM A888 or CISPI 301.

C. CISPI, Hubless-Piping Couplings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. ANACO-Husky.
   b. Charlotte Pipe and Foundry Company.
   c. Dallas Specialty & Mfg. Co.
   d. Fernco Inc.
   e. Ideal Tridon Group.
   f. Matco-Norca.
   g. MIFAB, Inc.
   h. Mission Rubber Company, LLC; a division of MCP Industries.
   i. NewAge Casting.
   j. Tyler Pipe; a subsidiary of McWane Inc.
2. Standards: ASTM C1277 and CISPI 310.
3. Description: Stainless steel corrugated shield with stainless steel bands and tightening devices; and ASTM C564, rubber sleeve with integral, center pipe stop.

D. Heavy-Duty, Hubless-Piping Couplings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. AB & I Foundry; a part of the McWane family of companies.
   b. ANACO-Husky.
   c. Charlotte Pipe and Foundry Company.
   d. Clamp-All Corp.
   e. Dallas Specialty & Mfg. Co.
   f. Ideal Tridon Group.
   g. MIFAB, Inc.
   h. Mission Rubber Company, LLC; a division of MCP Industries.
   i. Tyler Pipe; a subsidiary of McWane Inc.
2. Standards: ASTM C1277 and ASTM C1540. .
3. Description: Stainless steel shield with stainless steel bands and tightening devices; and ASTM C564, rubber sleeve with integral, center pipe stop.

2.5 COPPER TUBE AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cambridge-Lee Industries, LLC.
2. Cerro Flow Products, LLC.
3. Wieland Copper Products, LLC.

B. Copper Type DWV Tube: ASTM B306, drainage tube, drawn temper.

C. Copper Drainage Fittings: ASME B16.23, cast copper or ASME B16.29, wrought copper, solder-joint fittings.

D. Solder: ASTM B32, lead free with ASTM B813, water-flushable flux.

2.6 SPECIALTY PIPE FITTINGS

A. Transition Couplings:

1. General Requirements: Fitting or device for joining piping with small differences in ODs or of different materials. Include end connections of same size as and compatible with pipes to be joined.
2. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.
3. Shielded, Nonpressure Transition Couplings:
    a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
        1) Cascade Waterworks Mfg. Co.
        2) Mission Rubber Company, LLC; a division of MCP Industries.
    b. Standard: ASTM C1460.
    c. Description: Elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.
    d. End Connections: Same size as and compatible with pipes to be joined.

PART 3 - EXECUTION

3.1 EARTH MOVING

A. Comply with requirements for excavating, trenching, and backfilling specified in Section 31 20 00 "Earth Moving."

3.2 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems.

1. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations.
2. 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. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends.

1. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical.
2. Use long-turn, double Y-branch, and 1/8-bend fittings if two fixtures are installed back to back or side by side with common drain pipe.
    a. Straight tees, elbows, and crosses may be used on vent lines.
3. Do not change direction of flow more than 90 degrees.
4. Use proper size of standard increasers and reducers if pipes of different sizes are connected.
    a. Reducing size of waste piping in direction of flow is prohibited.

J. Lay buried building waste piping beginning at low point of each system.

1. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream.
2. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
3. Maintain swab in piping and pull past each joint as completed.

K. Install soil and waste and vent piping at the following minimum slopes unless otherwise indicated:

1. Building Sanitary Waste: Two percent downward in direction of flow for piping NPS 3 and smaller; 1 percent downward in direction of flow for piping NPS 4 and larger.
2. Horizontal Sanitary Waste Piping: Two percent downward in direction of flow.
3. Vent Piping: One percent down toward vertical fixture vent or toward vent stack.

L. Install cast-iron soil piping in accordance with CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."

1. Install encasement on underground piping in accordance with ASTM A674 or AWWA C105/A 21.5.

M. Install aboveground copper tubing in accordance with CDA's "Copper Tube Handbook."

N. Install engineered soil and waste and vent piping systems as follows:

1. Combination Waste and Vent: Comply with standards of authorities having jurisdiction.

O. Plumbing Specialties:

1. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers in sanitary waste gravity-flow piping.

a. Install cleanout fitting with closure plug inside the building in sanitary drainage force-main piping.
b. Comply with requirements for cleanouts specified in Section 22 13 19 "Sanitary Waste Piping Specialties."

2. Install drains in sanitary waste gravity-flow piping.
   a. Comply with requirements for drains specified in Section 22 13 19 "Sanitary Waste Piping Specialties."

P. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

Q. Install sleeves for piping penetrations of walls, ceilings, and floors.

1. Comply with requirements for sleeves specified in Section 22 05 17 "Sleeves and Sleeve Seals for Plumbing Piping."

R. Install sleeve seals for piping penetrations of concrete walls and slabs.

1. Comply with requirements for sleeve seals specified in Section 22 05 17 "Sleeves and Sleeve Seals for Plumbing Piping."

S. Install escutcheons for piping penetrations of walls, ceilings, and floors.

1. Comply with requirements for escutcheons specified in Section 22 05 18 "Escutcheons for Plumbing Piping."

3.3 JOINT CONSTRUCTION

A. Hub-and-Spigot, Cast-Iron Soil Piping Gasketed Joints: Join in accordance with CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.

B. Hub-and-Spigot, Cast-Iron Soil Piping Caulked Joints: Join in accordance with CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for lead-and-oakum caulked joints.

C. Hubless, Cast-Iron Soil Piping Coupled Joints:

1. Join hubless, cast-iron soil piping in accordance with CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-piping coupling joints.

D. Threaded Joints: Thread pipe with tapered pipe threads in accordance with ASME B1.20.1.

1. Cut threads full and clean using sharp dies.
2. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
   a. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
   b. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
   c. Do not use pipe sections that have cracked or open welds.

E. Join copper tube and fittings with soldered joints in accordance with ASTM B828. Use ASTM B813, water-flushable, lead-free flux and ASTM B32, lead-free-alloy solder.

F. Joint Restraints and Sway Bracing:

1. Provide joint restraints and sway bracing for storm drainage piping joints to comply with the following conditions:
   a. Provide axial restraint for pipe and fittings 4 inches and larger, upstream and downstream of all changes in direction, branches, and changes in diameter greater than two pipe sizes.
   b. Provide rigid sway bracing for pipe and fittings 4 inches and larger, upstream and downstream of all changes in direction and branch openings.

3.4 SPECIALTY PIPE FITTING INSTALLATION

A. Transition Couplings:

1. Install transition couplings at joints of piping with small differences in ODs.
2. In Waste Drainage Piping: Shielded, nonpressure transition couplings.

3.5 VALVE INSTALLATION

A. General valve installation requirements for general-duty valve installation are specified in the following Sections:

1. Section 22 05 23.12 "Ball Valves for Plumbing Piping."
2. Section 22 05 23.14 "Check Valves for Plumbing Piping."

3.6 INSTALLATION OF HANGERS AND SUPPORTS

A. Comply with requirements for pipe hanger and support devices and installation specified in Section 22 05 29 "Hangers and Supports for Plumbing Piping and Equipment" .

1. Install carbon-steel pipe hangers for horizontal piping in noncorrosive environments.
2. Install carbon-steel pipe support clamps for vertical piping in noncorrosive environments.
3. Vertical Piping: MSS Type 8 or Type 42 clamps.
4. Install individual, straight, horizontal piping runs:
   a. 100 Ft. and Less: MSS Type 1, adjustable, steel clevis hangers.

B. Install hangers for and copper soil piping, 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 and tubing within 12 inches of each fitting , valve, and coupling.

D. Support vertical runs of cast-iron and copper soil piping to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

3.7 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.

C. Connect waste and vent piping to the following:

1. Plumbing Fixtures: Connect waste piping in sizes indicated, but not smaller than required by plumbing code.
2. Plumbing Specialties: Connect waste and vent piping in sizes indicated, but not smaller than required by plumbing code.
3. Install test tees (wall cleanouts) in conductors near floor and floor cleanouts with cover flush with floor.
4. Comply with requirements for cleanouts and drains specified in Section 22 13 19 "Sanitary Waste Piping Specialties."
5. Equipment: Connect waste piping as indicated.
    a. Provide shutoff valve if indicated and union for each connection.

D. Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.

3.8 IDENTIFICATION

A. Identify exposed sanitary waste and vent piping.

B. Comply with requirements for identification specified in Section 22 05 53 "Identification for Plumbing Piping and Equipment."

3.9 FIELD QUALITY CONTROL

A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.

1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.

C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

D. Test sanitary waste and vent piping in accordance with procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired.
    a. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
2. Leave uncovered and unconcealed new, altered, extended, or replaced waste and vent piping until it has been tested and approved.
    a. Expose work that was covered or concealed before it was tested.
3. Roughing-in Plumbing Test Procedure: Test waste and vent piping except outside leaders on completion of roughing-in.
    a. Close openings in piping system and fill with water to point of overflow, but not less than 10 ft. head of water.
    b. From 15 minutes before inspection starts to completion of inspection, water level must not drop.
    c. Inspect joints for leaks.
4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight.
    a. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1 inch wg.
    b. Use U-tube or manometer inserted in trap of water closet to measure this pressure.
    c. Air pressure must remain constant without introducing additional air throughout period of inspection.
    d. Inspect plumbing fixture connections for gas and water leaks.
5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
6. Prepare reports for tests and required corrective action.

3.10 CLEANING AND PROTECTION

A. Clean interior of piping. Remove dirt and debris as work progresses.

B. Protect sanitary waste and vent piping during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.

C. Place plugs in ends of uncompleted piping at end of day and when work stops.

D. Repair damage to adjacent materials caused by waste and vent piping installation.

3.11 PIPING SCHEDULE

A. Aboveground, soil and waste piping NPS 4 and smaller are to be any of the following:

1. Service cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. Hubless, cast-iron soil pipe and fittings ; CISPI heavy-duty hubless-piping couplings; and coupled joints.
3. Copper Type DWV tube, copper drainage fittings, and soldered joints.
4. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.

B. Aboveground, vent piping is to be any of the following:

1. Service cast iron, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. Hubless, cast-iron soil pipe and fittings; CISPI heavy-duty hubless-piping couplings; and coupled joints.
3. Copper Type DWV tube, copper drainage fittings, and soldered joints.
4. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.

C. Underground, soil, waste, and vent piping are to be the following:

1. Service cast-iron soil piping; gaskets; and gasketed joints.

END OF SECTION

SECTION 22 13 19

SANITARY WASTE PIPING SPECIALTIES

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.2 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For sanitary waste piping specialties to include in emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTIONS

A. Sanitary waste piping specialties shall bear label, stamp, or other markings of specified testing agency.

B. Comply with NSF 14 for plastic sanitary waste piping specialty components.

2.2 CLEANOUTS

A. Cast-Iron Exposed Cleanouts CO :

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Jay R. Smith Mfg Co; a division of Morris Group International.
   b. Josam Company.
   c. WATTS; A Watts Water Technologies Company.
   d. Zurn Industries, LLC.
2. Standard: ASME A112.36.2M.
3. Size: Same as connected drainage piping
4. Body Material: Hub-and-spigot, cast-iron soil pipe T-branch Hubless, cast-iron soil pipe test tee as required to match connected piping.
5. Closure: Countersunk or raised-head , brass plug.
6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.

B. Cast-Iron Exposed Floor Cleanouts FPCO :

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Jay R. Smith Mfg Co; a division of Morris Group International.
   b. Josam Company.
   c. Sioux Chief Manufacturing Company, Inc.

d. WATTS; A Watts Water Technologies Company.
e. Zurn Industries, LLC.

2. Standard: ASME A112.36.2M for adjustable housing cleanout.
3. Size: Same as connected branch.
4. Type: Adjustable housing .
5. Body or Ferrule: Cast iron.
6. Clamping Device: Not required .
7. Outlet Connection: Inside calk .
8. Closure: Brass plug with tapered threads .
9. Adjustable Housing Material: Cast iron with threads .
10. Frame and Cover Material and Finish: Nickel-bronze, copper alloy .
11. Frame and Cover Shape: Round .
12. Top-Loading Classification: Medium Duty.
13. Riser: ASTM A74, Service Class, cast-iron drainage pipe fitting and riser to cleanout.

C. Cast-Iron Wall Cleanouts WPCO :

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Jay R. Smith Mfg Co; a division of Morris Group International.
   b. Josam Company.
   c. WATTS; A Watts Water Technologies Company.
   d. Zurn Industries, LLC.
2. Standard: ASME A112.36.2M. Include wall access.
3. Size: Same as connected drainage piping.
4. Body: Hubless, cast-iron soil pipe test tee as required to match connected piping.
5. Closure Plug:
   a. Brass .
   b. Countersunk head.
   c. Drilled and threaded for cover attachment screw.
   d. Size: Same as or not more than one size smaller than cleanout size.
6. Wall Access, Cover Plate: Round, flat, chrome-plated brass or stainless steel cover plate with screw.
7. Wall Access, Frame and Cover: Round , nickel-bronze, copper-alloy, or stainless steel wall-installation frame and cover.

2.3 MISCELLANEOUS SANITARY DRAINAGE PIPING SPECIALTIES

A. Deep-Seal Traps :

1. Description: Cast-iron or bronze casting, with inlet and outlet matching connected piping and cleanout trap-seal primer valve connection.
2. Size: Same as connected waste piping.
   a. NPS 2: 4-inch- minimum water seal.
   b. NPS 2-1/2 and Larger: 5-inch- minimum water seal.

B. Floor-Drain, Inline Trap Seal :

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Green Drain, Inc.
   b. Jay R. Smith Mfg Co; a division of Morris Group International.
   c. Josam Company.
   d. MIFAB, Inc.
   e. RectorSeal Plumbing; A CSW Industrials Company.
2. Description: Inline floor drain trap seal, forming a physical barrier to slow trap evaporation while not impeding flow from drain.
3. Material: Polymer.
4. Standard: Tested and certified in accordance with ASSE 1072.
5. Listing: ICC-ES listed.
6. Size: Same as floor drain outlet or strainer throat.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:

1. Size same as drainage piping up to NPS 4. Use NPS 4 for larger drainage piping unless larger cleanout is indicated.
2. Locate at each change in direction of piping greater than 45 degrees.
3. Locate at minimum intervals of 50 feet for piping NPS 4 and smaller and 100 feet for larger piping.
4. Locate at base of each vertical soil and waste stack.

B. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.

C. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.

D. Install deep-seal traps on floor drains and other waste outlets, if indicated.

E. Install wood-blocking reinforcement for wall-mounting-type specialties.

F. Install traps on plumbing specialty drain outlets. Omit traps on indirect wastes unless trap is indicated.

3.2 PIPING CONNECTIONS

A. Comply with requirements in Section 22 13 16 "Sanitary Waste and Vent Piping" for piping installation requirements. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to equipment, to allow service and maintenance.

3.3 LABELING AND IDENTIFYING

A. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit.

1. Nameplates and signs are specified in Section 22 05 53 "Identification for Plumbing Piping and Equipment."

3.4 PROTECTION

A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.

B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION

SECTION 22 13 19.13

SANITARY DRAINS

PART 1 - GENERAL

1.1 DEFINITIONS

A. HDPE: High-density polyethylene.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 DRAIN ASSEMBLIES

A. Sanitary drains shall bear label, stamp, or other markings of specified testing agency.

B. Comply with NSF 14 for plastic sanitary piping specialty components.

2.2 FLOOR DRAINS

A. Cast-Iron Floor Drains: Refer to Schedule:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Jay R. Smith Mfg. Co; a division of Morris Group International.
   b. Josam Company.
   c. Sioux Chief Manufacturing Company, Inc.
   d. Wade; a subsidiary of McWane Inc.
   e. WATTS; A Watts Water Technologies Company.
   f. Zurn Industries, LLC.
2. Standard: ASME A112.6.3.
3. Pattern: Floor drain.
4. Body Material: Gray iron.
5. Seepage Flange: Required.
6. Anchor Flange: Required.
7. Clamping Device: Required.
8. Outlet: Bottom.
9. Sediment Bucket: Refer to schedule.
10. Top or Strainer Material: Refer to schedule.
11. Top Shape: Round.
12. Top Loading Classification: Medium Duty.
13. Funnel: Not required.
14. Trap Material: Cast iron.
15. Trap Pattern: Deep-seal P-trap.

2.3 TRENCH DRAINS: Refer to Schedule

A. Trench Drains:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Jay R. Smith Mfg Co; a division of Morris Group International.
   b. Josam Company.
   c. MIFAB, Inc.
   d. Sioux Chief Manufacturing Company, Inc.
   e. Wade; a subsidiary of McWane Inc.
   f. WATTS; A Watts Water Technologies Company.
   g. Zurn Industries, LLC.
2. Standard: ASME A112.6.3 for trench drains.
3. Material: Ductile or gray iron.
4. Flange: Anchor.
5. Clamping Device: Not required.
6. Outlet: Bottom.
7. Grate Material: Ductile iron.
8. Top Loading Classification: Extra Heavy Duty <Delete if not applicable>.
9. Trap Material: Not required.
10. Trap Pattern: Not required.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated.

1. Position floor drains for easy access and maintenance.
2. Set floor drains below elevation of surrounding finished floor to allow floor drainage.
3. Set with grates depressed according to the following drainage area radii:
   a. Radius, 30 Inches or Less: Equivalent to 1 percent slope, but not less than 1/4-inch total depression.
   b. Radius, 30 to 60 Inches: Equivalent to 1 percent slope.
   c. Radius, 60 Inches or Larger: Equivalent to 1 percent slope, but not greater than 1-inch total depression.
4. Install floor-drain flashing collar or flange, so no leakage occurs between drain and adjoining flooring.
   a. Maintain integrity of waterproof membranes where penetrated.
5. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.

B. Install trench drains at low points of surface areas to be drained.

1. Set grates of drains flush with finished surface, unless otherwise indicated.

3.2 CONNECTIONS

A. Comply with requirements in Section 22 13 16 "Sanitary Waste and Vent Piping" for piping installation requirements. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Comply with requirements in Section 22 13 19 "Sanitary Waste Piping Specialties" for miscellaneous sanitary drainage piping specialties.

C. Comply with requirements in Section 22 13 23 "Sanitary Waste Interceptors" for sand interceptors interceptors.

D. Install piping adjacent to equipment to allow service and maintenance.

3.3 LABELING AND IDENTIFYING

A. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Section 22 05 53 "Identification for Plumbing Piping and Equipment."

3.4 PROTECTION

A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.

B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION

SECTION 22 13 23

SANITARY WASTE INTERCEPTORS

PART 1 - GENERAL

1.1 DEFINITIONS

A. FRP: Fiberglass-reinforced plastic.

B. PP: Polypropylene.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of metal interceptor. Include materials of fabrication, dimensions, rated capacities, retention capacities, operating characteristics, size and location of each pipe connection, furnished specialties, and accessories.

B. Shop Drawings: For each type and size of precast-concrete interceptor indicated.

1. Include materials of construction, dimensions, rated capacities, retention capacities, location and size of each pipe connection, furnished specialties, and accessories.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For sanitary waste interceptors to include in emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS

2.1 OIL INTERCEPTORS

A. Cast-Iron or Steel Oil Interceptors: Factory fabricated; with removable sediment bucket or strainer, baffles, vents, and flow-control fitting on inlet.

1. Manufacturers: Subject to compliance with requirements, provide products indicated in schedule on drawings or by one of the following:
   a. Rockford Sanitary Systems, Inc.
   b. WATTS; A Watts Water Technologies Company.
   c. Zurn Industries, LLC.
2. Inlet, Outlet, Vent, and Waste-Oil-Outlet Piping Connections: Hub, hubless, or threaded unless otherwise indicated.
3. Extension: Steel shroud, full size of interceptor, extending from top of interceptor to grade.
4. Cover: Steel, with steel reinforcement to provide H20, heavy traffic load rating.
5. Capacities and Characteristics: Refer to Schedule on Drawings
   a. Mounting: Exterior below grade with cover flushed with finished surface.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavating, trenching, and backfilling are specified in Section 31 20 00 "Earth Moving."

3.2 INSTALLATION

A. Equipment Mounting:

1. Install on compacted base.

B. Set interceptors level and plumb.

C. Set metal interceptors level and plumb.

D. Set tops of metal interceptor covers flush with finished surface in pavements.

E. Install oil interceptors, including trapping and venting according to authorities having jurisdiction and with clear space for servicing.

3.3 PIPING CONNECTIONS

A. Piping installation requirements are specified in Section 22 13 16 "Sanitary Waste and Vent Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

B. Make piping connections between interceptors and piping systems.

3.4 IDENTIFICATION

A. Identification materials and installation are specified in Section 31 20 00 "Earth Moving."

1. Arrange for installation of green warning tapes directly over piping and at outside edges of underground interceptors.
2. Use warning tapes or detectable warning tape over ferrous piping.

B. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign on or near each of the following:

1. Oil interceptors.

3.5 PROTECTION

A. Protect sanitary waste interceptors from damage during construction period.

B. Repair damage to adjacent materials caused by sanitary waste interceptor installation.

END OF SECTION

SECTION 22 33 00

ELECTRIC, DOMESTIC-WATER HEATERS

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1.2 INFORMATIONAL SUBMITTALS

A. Retain "Seismic Qualification Data" Paragraph below if required by seismic criteria applicable to Project. Coordinate with Section 22 05 48 "Vibration and Seismic Controls for Plumbing Piping and Equipment." See ASCE/SEI 7 for certification requirements for equipment and components.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For electric, domestic-water heaters to include emergency, operation, and maintenance manuals.

1.4 COORDINATION

A. Coordinate sizes and locations of concrete bases with actual equipment provided.

1.5 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of electric, domestic-water heaters that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Structural failures including storage tank and supports.
   b. Faulty operation of controls.
   c. Deterioration of metals, metal finishes, and other materials beyond normal use.
2. Warranty Periods: From date of Substantial Completion.
   a. Commercial, Light-Duty, Storage, Electric, Domestic-Water Heaters:
      1) Storage Tank: Three years.
      2) Controls and Other Components: Two years.
   b. Expansion Tanks: Five years.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and use.

B. ASHRAE/IES Compliance: Applicable requirements in ASHRAE/IES 90.1.

C. NSF Compliance: Fabricate and label equipment components that will be in contact with potable water to comply with NSF 61 and NSF 372.

2.2 COMMERCIAL, ELECTRIC, DOMESTIC-WATER HEATERS

A. Commercial, Light-Duty, Storage, Electric, Domestic-Water Heaters:

1. Manufacturers: Subject to compliance with requirements, provide products indicated in schedule on drawings or by one of the following:
    a. A. O. Smith Corporation.
    b. American Water Heaters.
    c. Electric Heater Company (The).
    d. Heat Transfer Products, Inc.
    e. Lochinvar, LLC.
    f. Rheem Manufacturing Company.
    g. Ruud Water Heaters; a Rheem brand.
    h. State Industries.
2. Source Limitations: Obtain domestic-water heaters from single source from single manufacturer.
3. Standard: UL 174.
4. Storage-Tank Construction: Steel, vertical arrangement.
    a. Tappings: ASME B1.20.1 pipe thread.
    b. Pressure Rating: 150 psig.
    c. Interior Finish: Comply with NSF 61 and NSF 372 barrier materials for potable-water tank linings, including extending lining material into tappings.
5. Factory-Installed, Storage-Tank Appurtenances:
    a. Anode Rod: Replaceable magnesium.
    b. Dip Tube: Required unless cold-water inlet is near bottom of tank.
    c. Drain Valve: Corrosion-resistant metal with hose-end connection.
    d. Insulation: Comply with ASHRAE/IES 90.1.
    e. Jacket: Steel with enameled finish or high-impact composite material.
    f. Heat-Trap Fittings: Inlet type in cold-water inlet and outlet type in hot-water outlet.
    g. Heating Elements: Electric, screw-in immersion type.
    h. Temperature Control: Adjustable thermostat.
    i. Safety Control: High-temperature-limit cutoff device or system.
    j. Relief Valve: ASME rated and stamped for combination temperature-and-pressure relief valves. Include relieving capacity at least as great as heat input,

and include pressure setting less than working-pressure rating of domestic-water heater. Select relief valve with sensing element that extends into storage tank.

6. Special Requirements: NSF 5 construction with legs for off-floor installation.

2.3 DOMESTIC-WATER HEATER ACCESSORIES

A. Domestic-Water Expansion Tanks:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. A. O. Smith Corporation.
   b. AMTROL, Inc.
   c. Flexcon Industries.
   d. Honeywell International Inc.
   e. Pentair Aurora; Pentair Pump Group.
   f. State Industries.
   g. Taco Comfort Solutions.
2. Source Limitations: Obtain domestic-water expansion tanks from single source from single manufacturer.
3. Description: Steel pressure-rated tank constructed with welded joints and factory-installed, butyl-rubber diaphragm. Include air precharge to minimum system-operating pressure at tank.
4. Construction:
   a. Tappings: Factory-fabricated steel, welded to tank before testing and labeling. Include ASME B1.20.1 pipe thread.
   b. Interior Finish: Comply with NSF 61 and NSF 372 barrier materials for potable-water tank linings, including extending finish into and through tank fittings and outlets.
   c. Air-Charging Valve: Factory installed.

B. Drain Pans: Corrosion-resistant metal with raised edge. Include dimensions not less than base of domestic-water heater, and include drain outlet not less than NPS 3/4 with ASME B1.20.1 pipe threads.

C. Piping-Type Heat Traps: Field-fabricated piping arrangement in accordance with ASHRAE/IES 90.1.

D. Combination Temperature-and-Pressure Relief Valves: ASME rated and stamped. Include relieving capacity at least as great as heat input, and include pressure setting less than working-pressure rating of domestic-water heater. Select relief valves with sensing element that extends into storage tank.

E. Shock Absorbers: ASSE 1010 or PDI-WH 201, Size A water hammer arrester.

PART 3 - EXECUTION

3.1 DOMESTIC-WATER HEATER INSTALLATION

A. Commercial, Electric, Domestic-Water Heater Mounting: Install commercial, electric, domestic-water heaters on concrete base. Comply with requirements for concrete bases specified in Section 03 30 00 "Cast-in-Place Concrete."

1. Exception: Omit concrete bases for commercial, electric, domestic-water heaters if installation on stand, bracket, suspended platform, or directly on floor is indicated.
2. Maintain manufacturer's recommended clearances.
3. Arrange units so controls and devices that require servicing are accessible.
4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
6. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
7. Install anchor bolts to elevations required for proper attachment to supported equipment.
8. Anchor domestic-water heaters to substrate.

B. Install electric, domestic-water heaters level and plumb, in accordance with layout drawings, original design, and referenced standards. Maintain manufacturer's recommended clearances. Arrange units so controls and devices needing service are accessible.

1. Install shutoff valves on domestic-water-supply piping to domestic-water heaters and on domestic-hot-water outlet piping. Comply with requirements for shutoff valves specified in Section 22 05 23.12 "Ball Valves for Plumbing Piping," Section 22 05 23.13 "Butterfly Valves for Plumbing Piping," and Section 22 05 23.15 "Gate Valves for Plumbing Piping."

C. Install combination temperature-and-pressure relief valves in top portion of storage tanks. Use relief valves with sensing elements that extend into tanks. Extend domestic-water heater relief-valve outlet, with drain piping same as domestic-water piping in continuous downward pitch, and discharge by positive air gap onto closest floor drain.

D. Install combination temperature-and-pressure relief valves in water piping for electric, domestic-water heaters without storage. Extend domestic-water heater relief-valve outlet, with drain piping same as domestic-water piping in continuous downward pitch, and discharge by positive air gap onto closest floor drain.

E. Install water-heater drain piping as indirect waste to spill by positive air gap into open drains or over floor drains. Install hose-end drain valves at low points in water piping for electric, domestic-water heaters that do not have tank drains. Comply with requirements for hose-end drain valves specified in Section 22 11 19 "Domestic Water Piping Specialties."

F. Install thermometers on outlet piping of electric, domestic-water heaters. Comply with requirements for thermometers specified in Section 22 05 19 "Meters and Gauges for Plumbing Piping."

G. Install piping-type heat traps on inlet and outlet piping of electric, domestic-water heater storage tanks without integral or fitting-type heat traps.

H. Fill electric, domestic-water heaters with water.

I. Charge domestic-water expansion tanks with air to required system pressure.

J. Install dielectric fittings in all locations where piping of dissimilar metals is to be joined. The wetted surface of the dielectric fitting contacted by potable water shall contain less than 0.25 percent of lead by weight.

3.2 PIPING CONNECTIONS

A. Comply with requirements for piping specified in Section 22 11 16 "Domestic Water Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

B. Where installing piping adjacent to electric, domestic-water heaters, allow space for service and maintenance of water heaters. Arrange piping for easy removal of domestic-water heaters.

3.3 IDENTIFICATION

A. Identify system components. Comply with requirements for identification specified in Section 22 05 53 "Identification for Plumbing Piping and Equipment."

3.4 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain commercial, electric, domestic-water heaters. Training shall be a minimum of one hour(s).

END OF SECTION

SECTION 22 42 13.13

COMMERCIAL WATER CLOSETS

PART 1 - GENERAL

1.1 DEFINITIONS

A. High-Efficiency Flush Volume: 1.28 gal. or less per flush.

B. WaterSense Fixture: Water closet and/or flushometer valve/tank certified by the EPA to meet the WaterSense performance criteria.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for water closets.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For flushometer valves and electronic sensors to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Standards:

1. Comply with ASME A112.19.2/CSA B45.1 for water closets.
2. Comply with ASME A112.19.5/CSA B45.15 for flush valves and spuds for water closets and tanks.
3. Comply with ASSE 1037/ASME A112.1037/CSA B125.37 for flush valves.
4. Comply with IAMPO/ANSI Z124.5 for water-closet (toilet) seats.
5. Comply with ASME A112.6.1M for water-closet supports.
6. Comply with ICC A117.1 for ADA-compliant water closets.
7. Comply with ASTM A1045 for flexible PVC gaskets used in connection of vitreous china water closets to sanitary drainage systems.
8. Comply with ASME A112.4.3 for plastic fittings used in connection of vitreous china water closets to sanitary drainage systems.

2.2 WALL-MOUNTED WATER CLOSETS

A. Water Closets - Wall Mounted, Top Spud: WC-1.

1. Manufacturers: Subject to compliance with requirements, provide products indicated in schedule on drawings or by one of the following:
   a. American Standard.
   b. Kohler Co.
   c. ProFlo; a Ferguson Enterprises, Inc. brand.
   d. Sloan Valve Company.
   e. TOTO USA, INC.
   f. Zurn Industries, LLC.
2. Source Limitations: Obtain water closets from single source from single manufacturer.
3. Bowl:
   a. Material: Vitreous china.
   b. Type: Siphon jet.
   c. Style: Flushometer valve.
   d. Mounting Height: ADA compliant.
   e. Rim Contour: Elongated.
   f. Water Consumption: 1.28 gal. per flush.
   g. Spud Size and Location: NPS 1-1/2; top.
   h. Color: White.
4. Flushometer Valve: FV-1.
5. Toilet Seat: TS-1.
6. Support: Water-closet carrier.

2.3 FLUSHOMETER VALVES

A. Flushometer Valves - Diaphragm, Solenoid Actuated: FV-1.

1. Manufacturers: Subject to compliance with requirements, provide products indicated in schedule on drawings or by one of the following:
   a. Delany Products.
   b. Sloan Valve Company.
   c. Zurn Industries, LLC.
2. Source Limitations: Obtain flushometer valve from single source from single manufacturer.
3. Minimum Pressure Rating: 125 psig.
4. Features: Include integral check stop and backflow-prevention device.
5. Material: Brass body with corrosion-resistant components.
6. Style: Exposed.
7. Exposed Flushometer-Valve Finish: Chrome-plated.
8. Actuator: Side or top mounted; listed and labeled as defined in NFPA 70, by qualified testing agency, and marked for intended location and application.
9. Trip Mechanism: Battery-powered electronic sensor; listed and labeled as defined in NFPA 70, by qualified testing agency, and marked for intended location and application.
10. Consumption: 1.28 gal. per flush.
11. Minimum Inlet: NPS 1.
12. Minimum Outlet: NPS 1-1/4.

2.4 TOILET SEATS

A. Toilet Seats: TS-1.

1. Manufacturers: Subject to compliance with requirements, provide products indicated in schedule on drawings or by one of the following:
   a. American Standard.
   b. Bemis Manufacturing Company.
   c. Centoco Manufacturing Corporation.
   d. Church Seats; Bemis Manufacturing Company.
   e. Kohler Co.
   f. ProFlo; a Ferguson Enterprises, Inc. brand.
   g. TOTO USA, INC.
   h. Zurn Industries, LLC.
2. Source Limitations: Obtain toilet seat from single source from single manufacturer.
3. Material: Plastic.
4. Type: Commercial (Heavy duty).
5. Shape: Elongated rim, open front.
6. Hinge: Self-sustaining, check.
7. Hinge Material: Noncorroding metal.
8. Seat Cover: Not required.
9. Color: White.
10. Surface Treatment: Antimicrobial.

2.5 SUPPORTS

A. Water-Closet Carrier:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Jay R. Smith Mfg Co; a division of Morris Group International.
   b. Josam Company.
   c. WATTS; A Watts Water Technologies Company.
   d. Zurn Industries, LLC.
2. Source Limitations: Obtain water-closet carrier from single source from single manufacturer.
3. Description: Waste-fitting assembly, as required to match drainage piping material and arrangement with faceplates, couplings gaskets, and feet; bolts and hardware matching fixture. Include additional extension coupling, faceplate, and feet for installation in wide pipe space.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in for water-supply piping and sanitary drainage and vent piping systems to verify actual locations of piping connections before water-closet installation.

B. Examine walls and floors for suitable conditions where water closets will be installed.

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

3.2 INSTALLATION, GENERAL

A. Water-Closet Installation:

1. Install level and plumb.
2. Install accessible, wall-mounted water closets at mounting height in accordance with ICC A117.1.

B. Support Installation:

1. Install supports, affixed to building substrate, for floor-mounted, back-outlet water closets.
2. Use carrier supports with waste-fitting assembly and seal.
3. Install wall-mounted, back-outlet water-closet supports with waste-fitting assembly and waste-fitting seals; and affix to building substrate.
4. Measure support height installation from finished floor, not structural floor.

C. Flushometer-Valve Installation:

1. Install flushometer-valve, water-supply fitting on each supply to each water closet.
2. Attach supply piping to supports or substrate within pipe spaces behind fixtures.
3. Install lever-handle flushometer valves for accessible water closets with handle mounted on open side of water closet.
4. Install actuators in locations easily reachable for people with disabilities.
5. Install new batteries in battery-powered, electronic-sensor mechanisms.

D. Install toilet seats on water closets.

E. Wall Flange and Escutcheon Installation:

1. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations and within cabinets and millwork.
2. Install deep-pattern escutcheons if required to conceal protruding fittings.
3. Comply with escutcheon requirements specified in Section 22 05 00 "Common Work Results for Plumbing."

F. Joint Sealing:

1. Seal joints between water closets and walls and floors using sanitary-type, one-part, mildew-resistant silicone sealant.
2. Match sealant color to water-closet color.

3.3 PIPING CONNECTIONS

A. Connect water closets with water supplies and soil, waste, and vent piping. Use size fittings required to match water closets.

B. Comply with water piping requirements specified in Section 22 11 16 "Domestic Water Piping."

C. Comply with soil and waste piping requirements specified in Section 22 13 16 "Sanitary Waste and Vent Piping."

D. Where installing piping adjacent to water closets, allow space for service and maintenance.

3.4 ADJUSTING

A. Operate and adjust water closets and controls. Replace damaged and malfunctioning water closets, fittings, and controls.

B. Adjust water pressure at flushometer valves to produce proper flow.

C. Install new batteries in battery-powered, electronic-sensor mechanisms.

3.5 CLEANING AND PROTECTION

A. Clean water closets and fittings with manufacturers' recommended cleaning methods and materials.

B. Install protective covering for installed water closets and fittings.

C. Do not allow use of water closets for temporary facilities unless approved in writing by Director’s Representative.

END OF SECTION

SECTION 22 42 16.13

COMMERCIAL LAVATORIES

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for lavatories.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1.2 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For lavatories and faucets to include in operation and maintenance manuals.

1. In addition to items specified in Section 01 78 23 "Operation and Maintenance Data," include the following:
   a. Servicing and adjustments of automatic faucets.

PART 2 - PRODUCTS

2.1 VITREOUS-CHINA, WALL-MOUNTED LAVATORIES

A. Lavatory - Wheelchair, Vitreous China, Wall Mounted LAV-1:

1. Manufacturers: Subject to compliance with requirements, provide products indicated in schedule on drawings or by one of the following:
   a. American Standard.
   b. Kohler Co.
   c. Sloan Valve Company.
   d. Zurn Industries, LLC.
2. Fixture:
   a. Standard: ASME A112.19.2/CSA B45.1.
   b. Type: Slab or wheelchair.
   c. Nominal Size: Rectangular, 20 by 18 inches.
   d. Faucet-Hole Punching: Three holes, 4-inch centers.
   e. Faucet-Hole Location: Top.
   f. Color: White.
   g. Mounting: For concealed-arm carrier.
3. Faucet: LF-1.
4. Support: Type II, concealed-arm lavatory carrier. Include rectangular, steel uprights.
5. Lavatory Mounting Height: Handicapped/elderly in accordance with ICC A117.1.

2.2 AUTOMATICALLY OPERATED LAVATORY FAUCETS

A. Lavatory faucets intended to convey or dispense water for human consumption are to comply with the U.S. Safe Drinking Water Act (SDWA), requirements of the Authority Having Jurisdiction (AHJ), and with NSF 61/NSF 372, or be certified in compliance with NSF 61/NSF 372 by an American National Standards Institute (ANSI) accredited third-party certification body, that the weighted average lead content at wetted surfaces is less than or equal to 0.25 percent.

B. Lavatory Faucets - Automatic Type: Battery Powered Electronic Sensor Operated, Mixing , LF-1:

1. Manufacturers: Subject to compliance with requirements, provide products indicated in schedule on drawings or by one of the following :
   a. American Standard.
   b. Bradley Corporation.
   c. Chicago Faucets; Geberit Company.
   d. Kohler Co.
   e. Moen Incorporated.
   f. Sloan Valve Company.
   g. Speakman Company.
   h. T&S Brass and Bronze Works, Inc.
   i. TOTO USA, INC.
   j. Zurn Industries, LLC.
2. Standards: ASME A112.18.1/CSA B125.1 and UL 1951.
3. 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.
4. General: Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture hole punchings; coordinate outlet with spout and fixture receptor.
5. Body Type: Single hole 3-hole mounting.
6. Body Material: Commercial, solid-brass, or die-cast housing with brazed copper and brass waterway.
7. Finish: Polished chrome plate.
8. Maximum Flow Rate: 0.5 gpm.
9. Mounting Type: Deck, concealed.
10. Spout: Rigid type.
11. Spout Outlet: Spray.
12. Drain: Not part of faucet.

2.3 SUPPLY FITTINGS

A. NSF Standard: Comply with NSF 61 and NSF 372 for supply-fitting materials that will be in contact with potable water.

B. Standard: ASME A112.18.1/CSA B125.1.

C. Supply Piping: Chrome-plated-brass pipe or chrome-plated copper tube matching water-supply piping size. Include chrome-plated-brass or stainless steel wall flange.

D. Supply Stops: Chrome-plated-brass, one-quarter-turn, ball-type or compression valve with inlet connection matching supply piping.

E. Operation: Loose key.

F. Risers:

1. NPS 3/8.
2. Chrome-plated, soft-copper flexible tube riser.

2.4 WASTE FITTINGS

A. Standard: ASME A112.18.2/CSA B125.2.

B. Drain: Grid type with NPS 1-1/4 offset and straight tailpiece.

C. Trap:

1. Size: NPS 1-1/2 by NPS 1-1/4.
2. Material:
   a. Chrome-plated, and chrome-plated, brass or steel wall flange.

2.5 LAVATORY SUPPORTS

A. Lavatory Carrier:

1. Manufacturers: Subject to compliance with requirements, provide products indicated in schedule on drawings or by one of the following :
   a. Jay R. Smith Mfg Co; a division of Morris Group International.
   b. Josam Company.
   c. Wade; a subsidiary of McWane Inc.
   d. WATTS.
   e. Zurn Industries, LLC.
2. Standard: ASME A112.6.1M.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before lavatory installation.

B. Examine counters and walls for suitable conditions where lavatories will be installed.

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

3.2 INSTALLATION

A. Install lavatories level and plumb in accordance with roughing-in drawings.

B. Install supports, affixed to building substrate, for wall-mounted lavatories.

C. Install accessible wall-mounted lavatories at handicapped/elderly mounting height for people with disabilities or the elderly, in accordance with ICC A117.1.

D. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 22 05 18 "Escutcheons for Plumbing Piping."

E. Seal joints between lavatories, counters, and walls using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color.

F. Install protective shielding pipe covers and enclosures on exposed supplies and waste piping of accessible lavatories. Comply with requirements in Section 22 07 19 "Plumbing Piping Insulation."

3.3 PIPING CONNECTIONS

A. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.

B. Comply with water piping requirements specified in Section 22 11 16 "Domestic Water Piping."

C. Comply with soil and waste piping requirements specified in Section 22 13 16 "Sanitary Waste and Vent Piping."

3.4 ADJUSTING

A. Operate and adjust lavatories and controls. Replace damaged and malfunctioning lavatories, fittings, and controls.

B. Install new batteries in battery-powered, electronic-sensor mechanisms.

3.5 CLEANING AND PROTECTION

A. After completing installation of lavatories, inspect and repair damaged finishes.

B. Clean lavatories, faucets, and other fittings with manufacturers' recommended cleaning methods and materials.

C. Provide protective covering for installed lavatories and fittings.

D. Do not allow use of lavatories for temporary facilities unless approved in writing by Director’s Representative.

END OF SECTION

SECTION 22 42 16.16

COMMERCIAL SINKS

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for sinks.
2. Include rated capacities, operating characteristics and furnished specialties and accessories.

1.2 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For sinks and faucets to include in operation and maintenance manuals.

1. In addition to items specified in Section 01 78 23 "Operation and Maintenance Data," include the following:
   a. Servicing and adjustments for automatic faucets.

PART 2 - PRODUCTS

2.1 SERVICE SINKS

A. Service Sinks - Plastic, Floor Mounted: MS-1.

1. Manufacturers: Subject to compliance with requirements, provide products indicated in schedule on drawings or by one of the following:
   a. Zurn Industries, LLC.
2. Source Limitations: Obtain sinks from single source from single manufacturer.
3. Fixture:
   a. Standard: CSA B45.5/IAPMO Z124.
   b. Material: Molded polymer.
   c. Nominal Size: 24 x 24 10 inches.
   d. Rim Guard: On front top surfaces.
   e. Color: White. .
   f. Drain: Grid with NPS 3 outlet.
4. Mounting: On floor and flush to wall.
5. Faucet: SF-2 .

2.2 KITCHEN/UTILITY SINKS

A. Kitchen/Utility Sinks - Stainless Steel, Counter Mounted: SK-1.

1. Manufacturers: Subject to compliance with requirements, provide products indicated in schedule on drawings or by one of the following:
   a. Advance Tabco.
   b. Elkay.
   c. Franke.
2. Source Limitations: Obtain sinks from single source from single manufacturer.
3. Fixture:
   a. Standard: ASME A112.19.3/CSA B45.4.
   b. Type: Stainless steel, self-rimming, sound-deadened unit with ledge back.
   c. Number of Compartments: One.
   d. Overall Dimensions: Refer to schedule.
   e. Material: 18 gauge, Type 304 stainless steel.
   f. Compartment:
      1) Dimensions: Refer to schedule.
      2) Drain: 3 1/2 inch drain fitting with crumb cup NPS 1 1/2 tailpiece.
      3) Drain Location: Near back of compartment .
      4) Depth: Wheelchair accessible.
4. Faucet(s): SF-1 .
   a. Number Required: One.
   b. Mounting: On ledge.
5. Supply Fittings:
   a. Standard: ASME A112.18.1/CSA B125.1.
   b. Supplies: Chrome-plated brass compression stop with inlet connection matching water-supply piping type and size.
      1) Operation: Loose key .
      2) Risers: NPS 1/2, chrome-plated, soft-copper flexible tube.
6. Waste Fittings:
   a. Standard: ASME A112.18.2/CSA B125.2.
   b. Trap(s):
      1) Size: NPS 1-1/2.
      2) Material:
         a) Chrome-plated, two-piece, cast-brass trap and ground-joint swivel elbow with 17-gauge brass tube to wall ; and chrome-plated brass or steel wall flange.
7. Mounting: On counter with sealant.

2.3 MANUALLY OPERATED SINK FAUCETS

A. Sink faucets intended to convey or dispense water for human consumption are to comply with the U.S. Safe Drinking Water Act (SDWA), with requirements of the Authority Having Jurisdiction (AHJ), and with NSF 61 and NSF 372, or be certified in compliance with NSF 61 and NSF 372 by an ANSI-accredited third-party certification body, in that the weighted average lead content at wetted surfaces is less than or equal to 0.25 percent.

B. Commercial Sink Faucets - Manual Type: Two-handle mixing , SF-1 .

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. American Standard.
b. Chicago Faucets; Geberit Group.
c. Elkay.
d. Just Manufacturing.
e. Kohler Co.
f. Speakman Company.
g. T&S Brass and Bronze Works, Inc.
h. Zurn Industries, LLC.

2. Source Limitations: Obtain sink faucets from single source from single manufacturer.
3. Standard: ASME A112.18.1/CSA B125.1.
4. General: Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture hole punchings; coordinate outlet with spout and sink receptor.
5. Body Type: Widespread .
6. Body Material: Commercial, solid brass, or die-cast housing with brazed copper and brass waterway.
7. Finish: Polished chrome plate .
8. Maximum Flow Rate: 1.5 gpm .
9. Mounting Type: Deck, exposed .
10. Valve Handle(s): Lever .
11. Spout Type: Rigid gooseneck .
12. Vacuum Breaker: Not required for hose outlet.
13. Spout Outlet: Laminar flow .

C. Commercial Service Sink Faucets - Manual Type: SF-2 .

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Acorn Engineering Company; a Division of Morris Group International.
   b. American Standard.
   c. Chicago Faucets; Geberit Group.
   d. Fiat Products.
   e. Kohler Co.
   f. Speakman Company.
   g. Stern-Williams Co., Inc.
   h. T&S Brass and Bronze Works, Inc.
   i. Zurn Industries, LLC.
2. Source Limitations: Obtain sink faucets from single source from single manufacturer.
3. Description: Wall/back mounted, brass body, with integral service stops, checks, spout with bucket/pail hook, 3/4-inch hose thread end, integral vacuum breaker, inlets 8 inches o.c., and two-handle mixing.
4. Faucet:
   a. Standards:
      1) ASME A112.18.1/CSA B125.1.
      2) NSF 61 and NSF 372.
      3) ICC A117.1.
      4) ASSE 1001 (VB).
   b. Finish: Rough chrome plated .
   c. Handles: Lever .

d. Cartridges: One-fourth turn compression .
e. Brace: Adjustable top brace .

2.4 SUPPLY FITTINGS

A. NSF Standard: Comply with NSF 61 and NSF 372 for supply-fitting materials that will be in contact with potable water.

B. Standard: ASME A112.18.1/CSA B125.1.

C. Supply Piping: Chrome-plated brass pipe or chrome-plated copper tube matching water-supply piping size. Include chrome-plated brass or stainless steel wall flange.

D. Supply Stops: Chrome-plated brass, one-quarter-turn, ball-type or compression valve with inlet connection matching supply piping.

E. Operation: Loose key .

F. Risers:

1. NPS 1/2.
2. Chrome-plated, soft-copper flexible tube .

2.5 WASTE FITTINGS

A. Standard: ASME A112.18.2/CSA B125.2.

B. Drain: Grid type with NPS 1-1/2 offset and straight tailpiece.

C. Trap:

1. Size: NPS 1-1/2.
2. Material:
   a. Chrome-plated, two-piece, cast-brass trap and ground-joint swivel elbow with 17-gauge brass tube to wall ; and chrome-plated brass or steel wall flange.

2.6 GROUT

A. Standard: ASTM C1107/C1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

B. Characteristics: Nonshrink; recommended for interior and exterior applications.

C. Design Mix: 5000 psi, 28-day compressive strength.

D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in for water-supply piping and sanitary drainage and vent piping systems to verify actual locations of piping connections before sink installation.

B. Examine walls, floors, and counters for suitable conditions where sinks will be installed.

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

3.2 INSTALLATION

A. Install sinks level and plumb in accordance with rough-in drawings.

B. Install supports, affixed to building substrate, for wall-hung sinks.

C. Install wall-mounted sinks at accessible mounting height in accordance with ICC A117.1.

D. Set floor-mounted sinks in leveling bed of cement grout.

E. Install water-supply piping with stop on each supply to each sink faucet.

1. Exception: Use ball valves if supply stops are not specified with sink. Comply with valve requirements specified in Section 22 05 23.12 "Ball Valves for Plumbing Piping".
2. Install stops in locations where they can be easily reached for operation.

F. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 22 05 18 "Escutcheons for Plumbing Piping."

G. Seal joints between sinks and counters, floors, and walls using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color.

H. Install protective shielding pipe covers and enclosures on exposed supplies and waste piping of accessible sinks.

3.3 PIPING CONNECTIONS

A. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.

B. Comply with water piping requirements specified in Section 22 11 16 "Domestic Water Piping."

C. Comply with soil and waste piping requirements specified in Section 22 13 16 "Sanitary Waste and Vent Piping."

3.4 ADJUSTING

A. Operate and adjust sinks and controls. Replace damaged and malfunctioning sinks, fittings, and controls.

3.5 CLEANING AND PROTECTION

A. After completing installation of sinks, inspect and repair damaged finishes.

B. Clean sinks, faucets, and other fittings with manufacturers' recommended cleaning methods and materials.

C. Provide protective covering for installed sinks and fittings.

D. Do not allow use of sinks for temporary facilities unless approved in writing by Director’s Representative.

END OF SECTION

SECTION 22 45 00

EMERGENCY PLUMBING FIXTURES

PART 1 - GENERAL

1.1 DEFINITIONS

A. Accessible Fixture: Emergency plumbing fixture that can be approached, entered, and used by people with disabilities.

B. Plumbed Emergency Plumbing Fixture: Fixture with fixed, potable-water supply.

C. Portable, Self-Contained Emergency Plumbing Fixture: Fixture with flushing-fluid supply.

D. Tepid: Between 60 and 100 deg F.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include flow rates and capacities, furnished specialties, and accessories.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For emergency plumbing fixtures.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Comply with ANSI/ISEA Z358.1 for emergency plumbing fixtures including third-party certification of fixtures.

B. Comply with ASSE 1071 for temperature-actuated mixing valves for plumbed emergency fixtures.

C. Comply with ASME A112.18.1/CSA B125.1 for water-supply fittings.

D. Comply with ASME A112.18.2/CSA B125.2 for plumbing waste fittings.

E. Comply with NSF 61 and NSF 372 for fixture materials that will be in contact with potable water.

F. Comply with requirements in ICC A117.1 for plumbing fixtures for people with disabilities.

2.2 EYE/FACE WASH EQUIPMENT

A. Eye/Face Wash Units - Accessible, Wall Mounted, Plumbed: EEW-1 .

1. Manufacturers: Subject to compliance with requirements, provide products indicated in schedule on drawings or by one of the following:
    a. Acorn Safety; a Division of Morris Group International.
    b. Bradley Corporation.
    c. Guardian Equipment Co.
    d. Haws Corporation.
    e. Speakman Company.
    f. Stingray Systems LLC.
2. Source Limitations: Obtain eye/face wash units, accessible, wall mounted, plumbed, from single manufacturer.
3. Capacity: Not less than 3.0 gpm for at least 15 minutes.
4. Supply Piping: NPS 1/2 chrome-plated brass or stainless steel with flow regulator and stay-open control valve.
5. Control-Valve Actuator: Paddle .
6. Spray-Head Assembly: Two or four receptor-mounted spray heads.
7. Receptor: ABS plastic bowl.
8. Mounting: Wall bracket.
9. Accessories:
    a. Thermostatic mixing valve assembly including ball valve shutoffs and outlet temperature gauge.

2.3 WATER-TEMPERING EQUIPMENT

A. Water-Tempering Equipment - Hot and Cold Water: TMV-3 .

1. Manufacturers: Subject to compliance with requirements, provide products indicated in schedule on drawings or by one of the following:
    a. Acorn Safety; a Division of Morris Group International.
    b. Armstrong International, Inc.
    c. Bradley Corporation.
    d. Guardian Equipment Co.
    e. Haws Corporation.
    f. Lawler Manufacturing Company, Inc.
    g. Speakman Company.
    h. Stingray Systems LLC.
    i. WATTS; A Watts Water Technologies Company.
2. Source Limitations: Obtain water-tempering equipment, hot and cold water, from single manufacturer.
3. Description: Factory-fabricated equipment with thermostatic mixing valve.
    a. Thermostatic Mixing Valve: Designed to provide tepid, potable water at emergency plumbing fixtures, to maintain temperature at plus or minus 5 deg F throughout required 15-minute test period, and in case of unit failure to continue cold-water flow, with union connections, controls, metal piping, and corrosion-resistant enclosure.
    b. Supply Connections: For hot and cold water.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in for water and waste piping systems to verify actual locations of piping connections before plumbed emergency plumbing fixture installation.

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

3.2 INSTALLATON OF EMERGENCY PLUMBING FIXTURE

A. Assemble emergency plumbing fixture piping, fittings, control valves, and other components.

B. Install fixtures level and plumb.

C. Fasten fixtures to substrate.

D. Install shutoff valves in water-supply piping to fixtures, to facilitate maintenance of equipment. Use ball valve if specific type valve is not indicated. Install valves chained or locked in open position if permitted. Install valves in locations where they can easily be reached for operation. Comply with requirements for valves specified in Section 22 05 23.12 "Ball Valves for Plumbing Piping".

1. Exceptions:
    a. Omit shutoff valve on supply to group of plumbing fixtures that includes emergency equipment.
    b. Omit shutoff valve on supply to emergency equipment if prohibited by authorities having jurisdiction.

E. Install dielectric fitting in supply piping to emergency equipment if piping and equipment connections are made of different metals. Comply with requirements for dielectric fittings specified in Section 22 11 16 "Domestic Water Piping."

F. Install thermometers in supply and outlet piping connections to water-tempering equipment. Comply with requirements for thermometers specified in Section 22 05 19 "Meters and Gages for Plumbing Piping."

G. Install trap and waste piping on drain outlet of emergency equipment receptors that are indicated to be directly connected to drainage system. Comply with requirements for waste piping specified in Section 22 13 16 "Sanitary Waste and Vent Piping."

H. Install indirect waste piping on drain outlet of emergency equipment receptors that are indicated to be indirectly connected to drainage system. Comply with requirements for waste piping specified in Section 22 13 16 "Sanitary Waste and Vent Piping."

I. Install escutcheons on piping wall and ceiling penetrations in exposed, finished locations. Comply with requirements for escutcheons specified in Section 22 05 18 "Escutcheons for Plumbing Piping."

3.3 PIPING CONNECTIONS

A. Connect hot- and cold-water-supply piping to hot- and cold-water, water-tempering equipment. Connect output from water-tempering equipment to emergency plumbing fixtures. Comply with requirements for hot- and cold-water piping specified in Section 22 11 16 "Domestic Water Piping."

B. Directly connect emergency plumbing fixture receptors with trapped drain outlet to sanitary waste and vent piping. Comply with requirements for waste piping specified in Section 22 13 16 "Sanitary Waste and Vent Piping."

C. Indirectly connect emergency plumbing fixture receptors without trapped drain outlet to sanitary waste or storm drainage piping.

D. Where installing piping adjacent to emergency plumbing fixtures, allow space for service and maintenance of fixtures.

3.4 IDENTIFICATION

A. Install equipment nameplates or equipment markers on emergency plumbing fixtures and equipment and equipment signs on water-tempering equipment. Comply with requirements for identification materials specified in Section 22 05 53 "Identification for Plumbing Piping and Equipment."

3.5 ADJUSTING

A. Operate and adjust emergency plumbing fixtures and controls. Replace damaged and malfunctioning fixtures and controls.

B. Adjust or replace fixture flow regulators for proper flow.

C. Adjust equipment temperature settings.

3.6 CLEANING AND PROTECTION

A. Clean emergency plumbing fixtures with manufacturers' recommended cleaning methods and materials.

B. Install protective covering for installed emergency plumbing fixtures and fittings.

C. Do not allow use of emergency plumbing fixtures for temporary facilities unless approved in writing by Director’s Representative.

END OF SECTION

SECTION 22 47 16

PRESSURE WATER COOLERS

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For each type of pressure water cooler and bottle filling station.

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.

1.2 CLOSEOUT SUBMITTALS

A. Maintenance Data: For pressure water coolers to include in maintenance manuals.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Standards:

1. Pressure water coolers and bottle filling stations intended to convey or dispense water for human consumption are to comply with the U.S. Safe Drinking Water Act (SDWA), requirements of the Authority Having Jurisdiction (AHJ), and with NSF 61 or NSF 372, or be certified in compliance with NSF 61 or NSF 372 by an ANSI-accredited third-party certification body, that the weighted average lead content at wetted surfaces is less than or equal to 0.25 percent.
2. Comply with ASHRAE 34 for water coolers. Provide HFC 134a (tetrafluoroethane) refrigerant unless otherwise indicated.
3. Comply with UL 399.
4. Comply with ASME A112.19.3/CSA B45.4.
5. 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.
6. Comply with NSF 42 and NSF 53 for water filters for water coolers and bottle filling stations.
7. Comply with ICC A117.1 for accessible water coolers and bottle filling stations.

2.2 PRESSURE WATER COOLERS

A. Pressure Water Coolers - Surface Wall-Mounted, Stainless Steel, two level with bottle filling station: EWC-1.

1. Manufacturers: Subject to compliance with requirements, provide products indicated in schedule on drawings or by one of the following:
   a. Elkay.
   b. Halsey Taylor.
   c. Oasis International.
2. Source Limitations: Obtain surface wall-mounted, stainless steel, pressure water coolers from single source from single manufacturer.
3. Type: Vandal resistant.
4. Bubbler: One, with adjustable stream regulator, located on each cabinet deck.
5. Control: Push bar.
6. Glass filler.
7. Bottle Filler: Sensor activation with 20-second automatic shutoff timer: Fill rate 0.5 to 1.5 gpm.
8. Drain: Grid with NPS 1-1/4 tailpiece.
9. Supply: NPS 3/8 with shutoff valve.
10. Waste Fitting: ASME A112.18.2/CSA B125.2, NPS 1-1/4 brass P-trap.
11. Filter: One or more water filters with capacity sized for unit peak flow rate.
12. Cooling System: Electric, with hermetically sealed compressor, cooling coil, air-cooled condensing unit, corrosion-resistant tubing, refrigerant, corrosion-resistant-metal storage tank, and adjustable thermostat.
13. Support: Water-cooler carrier.
14. Water-Cooler Mounting Height: Standard Accessible in accordance with ICC A117.1 High/low - standard/accessible in accordance with ICC A117.1.
15. Capacities and Characteristics:
    a. Cooled Water: 8 gph.
    b. Ambient-Air Temperature: 90 deg F.
    c. Inlet-Water Temperature: 80 deg F.
    d. Cooled-Water Temperature: 50 deg F.
    e. Electrical Characteristics:
       1) Volts: 120 V ac.
       2) Phase: Single.
       3) Hertz: 60 Hz.
       4) Full-Load Amperes: 3.0 A.

2.3 SUPPORTS

A. Water-Cooler Carrier:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Jay R. Smith Mfg Co; a division of Morris Group International.
   b. Josam Company.
   c. MIFAB, Inc.
   d. Wade; a subsidiary of McWane Inc.
   e. Zurn Industries, LLC.
2. Standard: ASME A112.6.1M.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in for water-supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before fixture installation.

B. Examine walls and floors for suitable conditions where fixtures will be installed.

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

3.2 INSTALLATION

A. Install fixtures level and plumb according to roughing-in drawings. For fixtures indicated for children, install at height required by authorities having jurisdiction.

B. Install off-the-floor carrier supports, affixed to building substrate, for wall-mounted fixtures.

C. Install mounting frames, affixed to building construction, and attach recessed, pressure water coolers, and bottle filling stations to mounting frames.

D. Install water-supply piping with shutoff valve on supply to each fixture to be connected to domestic-water distribution piping. Use ball valve. Install valves in locations where they can be easily reached for operation. Valves are specified in Section 22 05 23.12 "Ball Valves for Plumbing Piping".

E. Install trap and waste piping on drain outlet of each fixture to be connected to sanitary drainage system.

F. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons where required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 22 05 18 "Escutcheons for Plumbing Piping."

G. Seal joints between fixtures and walls using sanitary-type, one-part, mildew-resistant, silicone sealant. Match sealant color to fixture color.

3.3 PIPING CONNECTIONS

A. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.

B. Comply with water piping requirements specified in Section 22 11 16 "Domestic Water Piping."

C. Install ball shutoff valve on water supply to each fixture. Install valve upstream from filter for water cooler. Comply with valve requirements specified in Section 22 05 23.12 "Ball Valves for Plumbing Piping".

D. Comply with soil and waste piping requirements specified in Section 22 13 16 "Sanitary Waste and Vent Piping."

3.4 ELECTRICAL CONNECTIONS

A. Ground equipment according to Section 26 05 26 "Grounding and Bonding for Electrical Systems."

B. Install electrical devices furnished by manufacturer, but not factory mounted, according to NFPA 70 and NECA 1.

3.5 ADJUSTING

A. Adjust fixture flow regulators for proper flow and stream height.

B. Adjust pressure water-cooler temperature settings.

3.6 CLEANING

A. After installing fixture, inspect unit. Remove paint splatters and other spots, dirt, and debris. Repair damaged finish to match original finish.

B. Clean fixtures, on completion of installation, according to manufacturer's written instructions.

C. Provide protective covering for installed fixtures.

D. Do not allow use of fixtures for temporary facilities unless approved in writing by Director’s Representative.

END OF SECTION

SECTION 23 05 13

COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

PART 1 - GENERAL

1.1 COORDINATION

A. Coordinate features of motors, installed units, and accessory devices to be compatible with the following:

1. Motor controllers.
2. Torque, speed, and horsepower requirements of the load.
3. Ratings and characteristics of supply circuit and required control sequence.
4. Ambient and environmental conditions of installation location.

PART 2 - PRODUCTS

2.1 GENERAL MOTOR REQUIREMENTS

A. Comply with NEMA MG 1 unless otherwise indicated.

2.2 MOTOR CHARACTERISTICS

A. Duty: Continuous duty at ambient temperature of 40 deg C and at altitude of 3300 feet above sea level.

B. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

2.3 POLYPHASE MOTORS

A. Description: NEMA MG 1, Design B, medium induction motor.

B. Efficiency: Premium efficient, as defined in NEMA MG 1.

C. Service Factor: 1.15.

D. Multispeed Motors: Variable torque.

1. For motors with 2:1 speed ratio, consequent pole, single winding.
2. For motors with other than 2:1 speed ratio, separate winding for each speed.

E. Multispeed Motors: Separate winding for each speed.

F. Rotor: Random-wound, squirrel cage.

G. Bearings: Regreasable, shielded, antifriction ball bearings suitable for radial and thrust loading.

H. Temperature Rise: Match insulation rating.

I. Insulation: Class F.

J. Code Letter Designation:

1. Motors Smaller Than 15 HP: Manufacturer's standard starting characteristic.

2.4 ADDITIONAL REQUIREMENTS FOR POLYPHASE MOTORS

A. Motors Used with Reduced-Voltage and Multispeed Controllers: Match wiring connection requirements for controller with required motor leads. Provide terminals in motor terminal box, suited to control method.

2.5 SINGLE-PHASE MOTORS

A. Motors larger than 1/20 hp shall be one of the following, to suit starting torque and requirements of specific motor application:

1. Permanent-split capacitor.
2. Split phase.
3. Capacitor start, inductor run.
4. Capacitor start, capacitor run.

B. Multispeed Motors: Variable-torque, permanent-split-capacitor type.

C. Bearings: Prelubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.

D. Motors 1/20 HP and Smaller: Shaded-pole type.

E. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 23 05 48.13

VIBRATION CONTROLS FOR HVAC

PART 1 - GENERAL

1.1 DEFINITIONS

A. IBC: International Building Code.

B. OSHPD: Office of Statewide Health Planning and Development (for the State of California owned and regulated medical facilities).

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include rated load, rated deflection, and overload capacity for each vibration isolation device.
2. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of vibration isolation device component.
3. Annotate to indicate application of each product submitted and compliance with requirements.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Component Supports:

1. Load ratings, features, and applications of all reinforcement components must be based on testing standards of a nationally recognized testing agency.

2.2 ELASTOMERIC ISOLATION PADS

A. Elastomeric Isolation Pads:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Kinetics Noise Control, Inc.
   b. Mason Industries, Inc.
   c. Vibration Mountings & Controls, Inc.
2. Fabrication: Single or multiple layers of sufficient durometer stiffness for uniform loading over pad area.
3. Size: Factory or field cut to match requirements of supported equipment.
4. Pad Material: Neoprene.

2.3 ELASTOMERIC ISOLATION MOUNTS

A. Elastomeric Isolation Mounts:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Kinetics Noise Control, Inc.
   b. Mason Industries, Inc.
   c. Vibration Mountings & Controls, Inc.
2. Elastomeric Material: Molded, oil-resistant rubber, neoprene, or other elastomeric material.

2.4 ELASTOMERIC HANGERS

A. Elastomeric Mount in a Steel Frame with Upper and Lower Steel Hanger Rods: .

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Kinetics Noise Control, Inc.
   b. Mason Industries, Inc.
   c. Vibration Mountings & Controls, Inc.
2. Frame: Steel, fabricated with a connection for an upper threaded hanger rod and an opening on the underside to allow for a maximum of 30 degrees of angular lower hanger-rod misalignment without binding or reducing isolation efficiency.
3. Damping Element: Molded, oil-resistant rubber, neoprene, or other elastomeric material with a projecting bushing for the underside opening preventing steel-to-steel contact.

2.5 SPRING HANGERS

A. Combination Coil-Spring and Elastomeric-Insert Hanger with Spring and Insert in Compression:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Kinetics Noise Control, Inc.
   b. Mason Industries, Inc.
   c. Vibration Mountings & Controls, Inc.
2. Frame: Steel, fabricated for connection to threaded hanger rods and to allow for a maximum of 30 degrees of angular hanger-rod misalignment without binding or reducing isolation efficiency.
3. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
4. Minimum Additional Travel: 50 percent of the required deflection at rated load.
5. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
6. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
7. Elastomeric Element: Molded, oil-resistant rubber or neoprene. Steel-washer-reinforced cup to support spring and bushing projecting through bottom of frame.

8. Adjustable Vertical Stop: Steel washer with neoprene washer "up-stop" on lower threaded rod.
9. Self-centering hanger rod cap to ensure concentricity between hanger rod and support spring coil.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and equipment to receive vibration isolation devices for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in of reinforcement and cast-in-place anchors to verify actual locations before installation.

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

3.2 INSTALLATION OF VIBRATION CONTROL DEVICES

A. Provide vibration control devices for systems and equipment where indicated in Equipment Schedules or, where Specifications indicate they are to be installed on specific equipment and systems, and where required by applicable codes.

B. Coordinate location of embedded connection hardware with supported equipment attachment and mounting points and with requirements for concrete reinforcement and formwork specified in Section 03 30 00 "Cast-in-Place Concrete."

C. Installation of vibration isolators must not cause any change of position of equipment, piping, or ductwork resulting in stresses or misalignment.

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.

3.3 ADJUSTING

A. Adjust isolators after system is at operating weight.

B. Adjust limit stops on restrained-spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.

END OF SECTION

SECTION 23 05 53

IDENTIFICATION FOR HVAC EQUIPMENT

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Equipment-Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

A. Plastic Labels for Equipment:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Brady Corporation.
    b. Brimar Industries, Inc.
    c. Seton Identification Products; a Brady Corporation company.

2. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, with predrilled holes for attachment hardware.
3. Letter and Background Color: As indicated for specific application under Part 3.
4. Maximum Temperature: Able to withstand temperatures of up to 160 deg F.
5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances of up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
7. Fasteners: Stainless steel rivets or self-tapping screws.
8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), and the Specification Section number and title where equipment is specified.

2.2 DUCT LABELS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Brady Corporation.
2. Brimar Industries, Inc.
3. Seton Identification Products; a Brady Corporation company.

B. Letter and Background Color: As indicated for specific application under Part 3.

C. Maximum Temperature: Able to withstand temperatures up to 160 deg F.

D. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.

E. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances of up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

F. Fasteners: Stainless steel rivets or self-tapping screws.

G. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

H. Duct Label Contents: Include identification of duct service using same designations or abbreviations as used on Drawings. Also include the following:

1. Duct size.
2. Flow-Direction Arrows: Include flow-direction arrows on main distribution ducts. Arrows may be either integral with label or may be applied separately.
3. Lettering Size: At least 1/2 inch for viewing distances of up to 72 inches and proportionately larger lettering for greater viewing distances.

2.3 STENCILS

A. Stencils for Ducts:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Brimar Industries, Inc.
   b. Craftmark Pipe Markers.
   c. Kolbi Pipe Marker Co.

2. Lettering Size: Minimum letter height of 1-1/4 inches for viewing distances of up to 15 ft. and proportionately larger lettering for greater viewing distances.
3. Stencil Material: Fiberboard or metal .
4. Stencil Paint: Exterior, gloss, acrylic enamel . Paint may be in pressurized spray-can form.
5. Identification Paint: Exterior, acrylic enamel . Paint may be in pressurized spray-can form.
6. Letter and Background Color: Color as indicated for specific application under Part 3.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean duct and equipment surfaces of incompatible primers, paints, and encapsulants, as well as dirt, oil, grease, release agents, and other substances that could impair bond of identification devices.

3.2 INSTALLATION, GENERAL REQUIREMENTS

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Coordinate installation of identifying devices with locations of access panels and doors.

C. Install identifying devices before installing acoustical ceilings and similar concealment.

D. Locate identifying devices so that they are readily visible from the point of normal approach.

3.3 INSTALLATION OF EQUIPMENT LABELS

A. Permanently fasten labels on each item of mechanical equipment.

B. Sign and Label Colors:

1. White letters on an ANSI Z535.1 safety-blue background.

C. Locate equipment labels where accessible and visible.

3.4 INSTALLATION OF DUCT LABELS

A. Install self-adhesive duct labels showing service and flow direction with permanent adhesive on air ducts.

1. Provide labels in the following color codes:
   a. For air supply ducts: White letters on blue background.
   b. For air return ducts: White letters on blue background.
   c. For exhaust-, outside-, relief-, return-, and mixed-air ducts: White letters on blue background.

B. Stenciled Duct-Label Option: Stenciled labels showing service and flow direction may be provided instead of plastic-laminated duct labels, at Installer's option.

1. For all air ducts: Black letters on white background.

C. Locate label near each point where ducts enter into and exit from concealed spaces and at maximum intervals of 20 ft. where exposed or are concealed by removable ceiling system.

D. Stenciled Access Panels and Door Labels, Equipment Labels, and Similar Operational Instructions:

1. Black letters on White background.

END OF SECTION

SECTION 23 05 93

TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 DEFINITIONS

A. NEBB: National Environmental Balancing Bureau.

B. TAB: Testing, adjusting, and balancing.

C. TABB: Testing, Adjusting, and Balancing Bureau.

D. TAB Specialist: An independent entity meeting qualifications to perform TAB work.

1.2 INFORMATIONAL SUBMITTALS

A. Qualification Data: Within 60 days of Contractor's Notice to Proceed, submit documentation that the TAB specialist and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.

B. Certified TAB reports.

C. Instrument calibration reports, to include the following:

1. Instrument type and make.
2. Serial number.
3. Application.
4. Dates of use.
5. Dates of calibration.

1.3 QUALITY ASSURANCE

A. TAB Specialists Qualifications, Certified by NEBB or TABB:

1. TAB Field Supervisor: Employee of the TAB specialist and certified by NEBB or TABB.
2. TAB Technician: Employee of the TAB specialist and certified by NEBB or TABB.

B. Instrumentation Type, Quantity, Accuracy, and Calibration: Comply with requirements in ASHRAE 111, Section 4, "Instrumentation."

C. Code and AHJ Compliance: TAB is required to comply with governing codes and requirements of authorities having jurisdiction.

1.4 FIELD CONDITIONS

A. Partial Owner Occupancy: Owner may occupy completed areas of building before Substantial Completion. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems designs that may preclude proper TAB of systems and equipment.

B. Examine installed systems for balancing devices, such as test ports, and manual volume dampers. Verify that locations of these balancing devices are applicable for intended purpose and are accessible.

C. Examine the approved submittals for HVAC systems and equipment.

D. Examine design data, including HVAC system descriptions, statements of design assumptions for environmental conditions and systems output, and statements of philosophies and assumptions about HVAC system and equipment controls.

E. Examine equipment performance data, including fan curves.

1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.

F. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.

G. Examine test reports specified in individual system and equipment Sections.

H. Examine HVAC equipment and verify that bearings are greased, belts are aligned and tight, filters are clean, and equipment with functioning controls is ready for operation.

I. Examine operating safety interlocks and controls on HVAC equipment.

J. Examine control dampers for proper installation for their intended function of isolating, throttling, diverting, or mixing air flows.

K. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.2 PREPARATION

A. Prepare a TAB plan that includes the following:

1. Equipment and systems to be tested.
2. Strategies and step-by-step procedures for balancing the systems.
3. Instrumentation to be used.
4. Sample forms with specific identification for all equipment.

B. Perform system-readiness checks of HVAC systems and equipment to verify system readiness for TAB work. Include, at a minimum, the following:

1. Airside:

a. Verify that leakage and pressure tests on air distribution systems have been satisfactorily completed.
b. Duct systems are complete with terminals installed.
c. Volume, smoke, and fire dampers are open and functional.
d. Clean filters are installed.
e. Fans are operating, free of vibration, and rotating in correct direction.
f. Variable-frequency controllers' startup is complete and safeties are verified.
g. Automatic temperature-control systems are operational.
h. Ceilings are installed.
i. Windows and doors are installed.
j. Suitable access to balancing devices and equipment is provided.

3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. Perform testing and balancing procedures on each system in accordance with the procedures contained in the contractors certifying agency's standards and in this Section.

B. Cut insulation, ducts, and equipment casings for installation of test probes to the minimum extent necessary for TAB procedures.

1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
2. After testing and balancing, install test ports and duct access doors that comply with requirements in Section 23 33 00 "Air Duct Accessories."
3. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish in accordance with Section 23 07 13 "Duct Insulation."

C. Mark equipment and balancing devices, including damper-control positions, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.

D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.4 TESTING, ADJUSTING, AND BALANCING OF HVAC EQUIPMENT

A. Test, adjust, and balance HVAC equipment indicated on Drawings, including, but not limited to, the following:

1. Motors.
2. Fans and ventilators.
3. Energy-recovery units.

3.5 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.

B. Prepare schematic diagrams of systems' Record drawings duct layouts.

C. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.

D. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.

E. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.

F. Verify that motor starters are equipped with properly sized thermal protection.

G. Check dampers for proper position to achieve desired airflow path.

H. Check for airflow blockages.

I. Check condensate drains for proper connections and functioning.

3.6 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.

1. Measure total airflow.

a. Set outside-air, return-air, and relief-air dampers for proper position that simulates minimum outdoor-air conditions.
b. Where duct conditions allow, measure airflow by main Pitot-tube traverse. If necessary, perform multiple Pitot-tube traverses close to the fan and prior to any outlets, to obtain total airflow.
c. Where duct conditions are unsuitable for Pitot-tube traverse measurements, a coil traverse may be acceptable.

2. Measure fan static pressures as follows:

    a. Measure static pressure directly at the fan outlet or through the flexible connection.
    b. Measure static pressure directly at the fan inlet or through the flexible connection.
    c. Measure static pressure across each component that makes up the air-handling system.
    d. Report artificial loading of filters at the time static pressures are measured.
3. Review Contractor-prepared shop drawings and Record drawings to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
4. Obtain approval from Architect for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in HVAC Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
5. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload occurs. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.

B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows.

1. Measure airflow of submain and branch ducts.
2. Adjust submain and branch duct volume dampers for specified airflow.
3. Re-measure each submain and branch duct after all have been adjusted.

C. Adjust air inlets and outlets for each space to indicated airflows.

1. Set airflow patterns of adjustable outlets for proper distribution without drafts.
2. Measure inlets and outlets airflow.
3. Adjust each inlet and outlet for specified airflow.
4. Re-measure each inlet and outlet after they have been adjusted.

D. Verify final system conditions.

1. Re-measure and confirm that minimum outdoor, return, and relief airflows are within design. Readjust to design if necessary.
2. Re-measure and confirm that total airflow is within design.
3. Re-measure all final fan operating data, speed, volts, amps, and static profile.
4. Mark all final settings.
5. Test system in economizer mode. Verify proper operation and adjust if necessary.
6. Measure and record all operating data.
7. Record final fan-performance data.

3.7 PROCEDURES FOR MOTORS

A. Motors 1/2 HP and Larger: Test at final balanced conditions and record the following data:

1. Manufacturer's name, model number, and serial number.
2. Motor horsepower rating.
3. Motor rpm.
4. Phase and hertz.
5. Nameplate and measured voltage, each phase.
6. Nameplate and measured amperage, each phase.
7. Starter size and thermal-protection-element rating.
8. Service factor and frame size.

B. Motors Driven by Variable-Frequency Controllers: Test manual bypass of controller to prove proper operation.

3.8 HVAC CONTROLS VERIFICATION

A. In conjunction with system balancing, perform the following:

1. Verify HVAC control system is operating within the design limitations.
2. Confirm that the sequences of operation are in compliance with Contract Documents.
3. Verify that controllers are calibrated and function as intended.
4. Verify that controller set points are as indicated.
5. Verify the operation of lockout or interlock systems.
6. Verify the operation of damper actuators.
7. Verify that controlled devices are properly installed and connected to correct controller.
8. Verify that controlled devices travel freely and are in position indicated by controller: open, closed, or modulating.
9. Verify location and installation of sensors to ensure that they sense only intended temperature, humidity, or gas.

B. Reporting: Include a summary of verifications performed, remaining deficiencies, and variations from indicated conditions.

3.9 TOLERANCES

A. Set HVAC system's airflow rates within the following tolerances:

1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent. If design value is less than 100 cfm, within 10 cfm.
2. Air Outlets and Inlets: Plus or minus 10 percent. If design value is less than 100 cfm, within 10 cfm.

B. Maintaining pressure relationships as designed shall have priority over the tolerances specified above.

3.10 FINAL REPORT

A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.

1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
2. Include a list of instruments used for procedures, along with proof of calibration.
3. Certify validity and accuracy of field data.

B. Final Report Contents: In addition to certified field-report data, include the following:

1. Fan curves.
2. Manufacturers' test data.
3. Field test reports prepared by system and equipment installers.
4. Other information relative to equipment performance; do not include Shop Drawings and Product Data.

C. General Report Data: In addition to form titles and entries, include the following data:

1. Title page.
2. Name and address of the TAB specialist.
3. Project name.
4. Project location.
5. Architect's name and address.
6. Engineer's name and address.
7. Contractor's name and address.
8. Report date.
9. Signature of TAB supervisor who certifies the report.
10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
11. Summary of contents, including the following:

    a. Indicated versus final performance.
    b. Notable characteristics of systems.
    c. Description of system operation sequence if it varies from the Contract Documents.

12. Nomenclature sheets for each item of equipment.
13. Data for terminal units, including manufacturer's name, type, size, and fittings.
14. Notes to explain why certain final data in the body of reports vary from indicated values.
15. Test conditions for fans performance forms, including the following:

    a. Settings for outdoor-, return-, and exhaust-air dampers.
    b. Conditions of filters.
    c. Fan drive settings, including settings and percentage of maximum pitch diameter.
    d. Other system operating conditions that affect performance.

D. Electric-Coil Test Reports: For electric furnaces, duct coils, and electric coils installed in central-station air-handling units, include the following:

1. Unit Data:

a. System identification.
b. Location.
c. Coil identification.
d. Capacity in Btu/h.
e. Number of stages.
f. Connected volts, phase, and hertz.
g. Rated amperage.
h. Airflow rate in cfm.
i. Face area in sq. ft..
j. Minimum face velocity in fpm.

2. Test Data (Indicated and Actual Values):

a. Heat output in Btu/h.
b. Airflow rate in cfm.
c. Air velocity in fpm.
d. Entering-air temperature in deg F.
e. Leaving-air temperature in deg F.
f. Voltage at each connection.
g. Amperage for each phase.

E. Fan Test Reports: For supply, return, and exhaust fans, include the following:

1. Fan Data:

a. System identification.
b. Location.
c. Make and type.
d. Model number and size.
e. Manufacturer's serial number.
f. Arrangement and class.
g. Sheave make, size in inches, and bore.
h. Center-to-center dimensions of sheave and amount of adjustments in inches.

2. Motor Data:

a. Motor make, and frame type and size.
b. Horsepower and speed.
c. Volts, phase, and hertz.
d. Full-load amperage and service factor.
e. Sheave make, size in inches, and bore.
f. Center-to-center dimensions of sheave and amount of adjustments in inches.
g. Number, make, and size of belts.

3. Test Data (Indicated and Actual Values):

    a. Total airflow rate in cfm.
    b. Total system static pressure in inches wg.
    c. Fan speed.
    d. Discharge static pressure in inches wg.
    e. Suction static pressure in inches wg.

F. Round, Flat-Oval, and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:

1. Report Data:

    a. System fan and air-handling-unit number.
    b. Location and zone.
    c. Traverse air temperature in deg F.
    d. Duct static pressure in inches wg.
    e. Duct size in inches.
    f. Duct area in sq. ft..
    g. Indicated airflow rate in cfm.
    h. Indicated velocity in fpm.
    i. Actual airflow rate in cfm.
    j. Actual average velocity in fpm.
    k. Barometric pressure in psig.

G. Air-Terminal-Device Reports:

1. Unit Data:

    a. System and air-handling unit identification.
    b. Location and zone.
    c. Apparatus used for test.
    d. Area served.
    e. Make.
    f. Number from system diagram.
    g. Type and model number.
    h. Size.
    i. Effective area in sq. ft..

2. Test Data (Indicated and Actual Values):

    a. Airflow rate in cfm.
    b. Air velocity in fpm.
    c. Preliminary airflow rate as needed in cfm.
    d. Preliminary velocity as needed in fpm.
    e. Final airflow rate in cfm.
    f. Final velocity in fpm.
    g. Space temperature in deg F.

3.11 ADDITIONAL TESTS

A. Within 90 days of completing TAB, perform additional TAB to verify that balanced conditions are being maintained throughout and to correct unusual conditions.

B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional TAB during near-peak summer and winter conditions.

END OF SECTION

SECTION 23 09 23.12

CONTROL DAMPERS

PART 1 - GENERAL

1.1 DEFINITIONS

A. RMS: Root-mean-square value of alternating voltage, which is the square root of the mean value of the square of the voltage values during a complete cycle.

B. Thermal Efficiency Ratio (E): Comparison of a tested damper's thermal performance against a v-groove blade reference damper. A damper with the same thermal efficiency as the reference damper would have an E value of 0 percent, while a damper that is 4 times as efficient would have an E value of 200 percent.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Rectangular control dampers with flat blades.
2. Round control dampers.
3. Electric and electronic control-damper actuators.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For control dampers.

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. ASHRAE 62.1 Compliance: Applicable outdoor ventilation requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."

C. ASHRAE/IES 90.1 Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6 - "Heating, Ventilating, and Air-Conditioning."

D. Code Compliance: Comply with governing energy code.

E. Ground Fault: Properly ground products to prevent failing due to ground fault conditions.

F. Backup Power Source: Serve control-damper actuators from a backup power source where associated with systems and equipment served by a backup power source.

G. Environmental Conditions: For actuators not available with integral enclosures complying with requirements indicated, house in protective secondary enclosures complying with requirements.

H. Selection Criteria:

1. Fail-Safe Positions:
   a. Outdoor Air: Close.
   b. Exhaust Air: Close.
2. Select dampers with smooth and stable operation throughout full range of operation over varying pressures and temperatures encountered.
3. Sizing:
   a. Two-Position Dampers: Full size of duct or equipment connection unless otherwise indicated.

2.2 RECTANGULAR CONTROL DAMPERS WITH FLAT BLADES

A. General Requirements:

1. Factory assemble multiple damper sections to provide a single damper assembly of size required by the application.
   a. Include multisection damper assemblies with intermediate reinforcing where required between individual sections being joined together. Construct reinforcing of same material (aluminum, galvanized steel, stainless steel) as damper frame.
2. Factory install actuator(s) as integral part of damper assembly. Coordinate, with damper manufacturer, field requirements for actuators, such as type, fail-safe position, power supply, location, and mounting requirements.

B. Rectangular Control Dampers with Galvanized-Steel Flat Blades and Frames:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. American Warming and Ventilating (AWV); Mestek, Inc.
   b. Arrow United Industries; Mestek, Inc.
   c. Greenheck Fan Corporation.
   d. Johnson Controls, Inc.
   e. Ruskin; Air Distribution Technologies, Inc.; Johnson Controls, Inc.
2. Source Limitations: Obtain rectangular control dampers, with galvanized-steel flat blades and frames, from single manufacturer.
3. Performance:
   a. Leakage:
      1) AMCA 511, Class II, at 1 in. wg Differential Static Pressure: Leakage not to exceed 5.4 cfm/sq. ft. against 1 in. wg differential static pressure when tested in accordance with AMCA 500D.
   b. Pressure Drop: 0.1 in. wg at 1500 fpm across a 24-by-24-inch damper when tested in accordance with AMCA 500D, figure 5.3.
   c. Pressure Rating: 2.0 in. wg.
   d. Temperature: Minus 20 to plus 185 deg F.

e. Velocity: Up to 2000 fpm.

4. Construction:
   a. Frame:
      1) Material: ASTM A653/A653M galvanized steel, minimum 0.06 inch thick.
      2) Arrangement: Hat-shaped channel with integral extended face flange(s) having mating face of minimum 1-1/2 inches for attachment to duct flanges, plenum walls, and equipment.
      3) Width: Not less than 5 inches.
   b. Blades:
      1) Configuration: Parallel or opposed blade configuration as required by application.
      2) Material: ASTM A653/A653M galvanized steel, 0.06 inch thick.
      3) Shape: Single thickness with bends for reinforcing.
      4) Length: As required by pressure rating, not to exceed 48 inches.
      5) Width: Not to exceed 8 inches.
   c. Seals:
      1) Blades: Replaceable; extruded silicone, vinyl, or damper manufacturer-offered equivalent, as required by performance requirements. Seals are to be mechanically attached in extruded blade slots.
      2) Jambs: Stainless steel, compression type.
   d. Axles:
      1) Diameter: Minimum 0.375 inch.
      2) Material: Plated steel or stainless steel.
      3) Mechanically attached to blades.
   e. Bearings:
      1) Material: Molded nylon or synthetic, or stainless steel sleeve, as required by operating conditions, mounted in frame.
      2) Where blade axles are installed in vertical position, provide thrust bearings.
   f. Linkage:
      1) Hardware: Plated or stainless steel.
      2) Material: Plated steel or stainless steel.
      3) Mounting: Concealed in frame.
   g. Transitions with Sleeve:
      1) For round and flat oval duct applications, provide damper assembly with integral transitions to mate to adjoining field connections.
      2) Factory mount damper in a sleeve with a close transition to mate to field connection.
         a) Sleeve length not less than 12 inches for dampers without jackshafts and not less than 16 inches for dampers with jackshafts.
         b) Oversize damper and sleeve for duct connection size plus minimum 4 inches .
      3) Fabricate sleeve and transitions of galvanized steel.
      4) Match end connections (flange or sleeve) to field connections.

2.3 ROUND CONTROL DAMPERS

A. General Requirements:

1. Factory install actuator as integral part of damper assembly. Coordinate field requirements for actuators, such as type, fail-safe position, power supply, location, and mounting requirements with damper manufacturer.

B. Round, Galvanized-Steel Control Dampers with Sleeve End Connections:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. American Warming and Ventilating (AWV); Mestek, Inc.
   b. Arrow United Industries; Mestek, Inc.
   c. Greenheck Fan Corporation.
   d. Johnson Controls, Inc.
   e. Ruskin; Air Distribution Technologies, Inc.; Johnson Controls, Inc.
2. Source Limitations: Obtain round, galvanized-steel control dampers with sleeve end connections from single manufacturer.
3. Performance:
   a. Leakage: Not to exceed 0.15 cfm/in. of perimeter blade at 4 in. wg differential static pressure when tested in accordance with AMCA 500D.
   b. Pressure Drop: 0.05 in. wg at 1500 fpm across a 12-inch damper when tested in accordance with AMCA 500D, figure 5.3.
   c. Pressure Rating: 4 in. wg .
   d. Temperature: Up to 180 deg F .
   e. Velocity: Up to 3000 fpm .
4. Size Range: 4 to 24 inches .
5. Construction:
   a. Frame:
      1) End Connection: Sleeve-type connection for mating to adjacent ductwork.
      2) Length: Minimum 6 inches.
      3) Material: Galvanized steel, minimum 20 gauge thick.
      4) Stiffeners: Outward-turned beads positioned approximately 1-1/2 inches inboard of each end.
      5) Standoff: Provide 2-inch- high, sheet metal standoff for mounting actuator to axle while accommodating field-installed duct insulation.
   b. Blade: Double-thickness circular flat blades sandwiched together and constructed of galvanized steel.
   c. Blade Seal: EPDM, neoprene or silicone seal fully encompassing blade edge.
   d. Axle: 0.5-inch- diameter plated steel, mechanically attached to blade.
   e. Bearings: Bronze or stainless steel sleeve pressed into frame.

2.4 GENERAL CONTROL-DAMPER ACTUATORS REQUIREMENTS

A. Select actuators to operate related damper(s) with sufficient reserve power to provide smooth modulating action or two-position action and proper speed of response at velocity and pressure conditions to which the damper is subjected.

B. Select actuators with sufficient power and torque to close off against the maximum system pressures encountered. Actuators are to be sized to close off against the fan shutoff pressure as a minimum requirement.

C. The total damper area operated by an actuator is not to exceed 80 percent of manufacturer's maximum area rating.

D. Provide one actuator for each damper assembly where possible. Operate multiple actuators required to drive a single damper assembly in unison.

E. Avoid the use of excessively oversized actuators, which could overdrive and cause linkage failure when the damper blade has reached either its full open or closed position.

F. Use jackshafts and shaft couplings in lieu of blade-to-blade linkages when driving axially aligned damper sections.

G. Provide mounting hardware and linkages for connecting actuator to damper.

H. Select actuators to fail-safe in desired position in the event of a power failure.

I. Actuator Fail-Safe Positions:

1. Exhaust Air: Close .
2. Outdoor Air: Close .

2.5 ELECTRIC AND ELECTRONIC CONTROL-DAMPER ACTUATORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Belimo Aircontrols (USA), Inc.
2. Honeywell Building Solutions; Honeywell International, Inc.
3. Johnson Controls, Inc.
4. Schneider Electric USA, Inc.
5. Siemens Industry, Inc., Building Technologies Division.

B. Source Limitations: Obtain electric and electronic control-damper actuators from single manufacturer.

C. Type: Motor operated, with or without gears, electric and electronic.

D. Voltage:

1. 24 V or 120 V.
2. Actuator to deliver torque required for continuous uniform movement of controlled device from limit to limit when operated at rated voltage.
3. Actuator to function properly within a range of 85 to 120 percent of nameplate voltage.

E. Construction:

1. Less Than 100 W: Fiber or reinforced nylon gears with steel shaft, copper alloy or nylon bearings, and pressed-steel enclosures.

2. 100 up to 400 W: Gears ground steel, oil immersed, shaft-hardened steel running in bronze, copper alloy, or ball bearings. Operator and gear trains are to be totally enclosed in dustproof cast-iron, cast-steel, or cast-aluminum housing.
3. Greater Than 400 W: Totally enclosed reversible induction motors with auxiliary hand crank and permanently lubricated bearings.

F. Local Field Adjustment: Make spring-return actuators easily switchable from fail-safe open to fail-safe closed in the field without replacement.

G. Local Manual Override: Provide gear-type actuators with an external manual adjustment mechanism to allow manual positioning of the damper when the actuator is not powered.

H. Two-Position Actuators: Single direction, spring return or reversing type.

I. Fail-Safe:

1. Where indicated, provide actuator to fail-safe to an end position.
2. Internal spring-return mechanism to drive controlled device to an end position (open or close) on loss of power.
3. Batteries, capacitors, and other nonmechanical forms of fail-safe operation are acceptable only where uniquely indicated.

J. Integral Overload Protection:

1. Provide against overload throughout the entire operating range in both directions.
2. Electronic overload, digital rotation sensing circuitry, mechanical end switches, or magnetic clutches are acceptable methods of protection.

K. Damper Attachment:

1. Unless otherwise required for damper interface, provide actuator designed to be directly coupled to damper shaft without need for connecting linkages.
2. Attach actuator to damper drive shaft in a way that ensures maximum transfer of power and torque without slippage.
3. Bolt and setscrew method of attachment is acceptable only if provided with at least two points of attachment.

L. Temperature and Humidity:

1. Temperature: Suitable for operating temperature range encountered by application with minimum operating temperature range of minus 20 to plus 120 deg F .
2. Humidity: Suitable for humidity range encountered by application; minimum operating range is to be from 5 to 95 percent relative humidity, noncondensing.

M. Enclosure:

1. Suitable for ambient conditions encountered by application.
2. NEMA 250, Type 2 or Type 4 for indoor and protected applications.
3. Provide actuator enclosure with a heater and controller where required by application.

N. Stroke Time:

1. Select operating stroke time to be compatible with equipment and system operation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for dampers and instruments installed in duct systems to verify actual locations of connections before installation.

C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance.

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

3.2 INSTALLATION, GENERAL

A. Furnish and install products required to satisfy most stringent requirements indicated.

B. Properly support dampers and actuators, tubing, wiring, and conduit to comply with requirements indicated. Brace all products to prevent lateral movement and sway or a break in attachment when subjected to a seismic, wind, or others forces common to the application.

C. Provide wall openings , and sleeves required by installation. Before proceeding with drilling, punching, or cutting, check location first for concealed products that could potentially be damaged. Patch, flash, grout, seal, and refinish openings to match adjacent condition.

D. Seal penetrations made in fire-rated and acoustically rated assemblies.

E. Fastening Hardware:

1. Wrenches, pliers, or other tools that will cause injury to or mar surfaces of rods, nuts, and other parts are prohibited for assembling and tightening nuts.
2. Tighten bolts and nuts firmly and uniformly. Do not overstress threads by excessive force or by oversized wrenches.
3. Lubricate threads of bolts, nuts, and screws with graphite and oil before assembly.

3.3 CONTROL DAMPERS

A. Install smooth transitions, not exceeding 30 degrees, to dampers larger or smaller than adjacent duct. Install transitions as close to damper as possible but at distance to avoid interference and impact to performance. Consult manufacturer for recommended clearance.

B. Clearance:

1. Locate dampers for easy access and provide separate support of dampers that cannot be handled by service personnel without hoisting mechanism.
2. Install dampers with at least 24 inches of clear space on sides of dampers requiring service access unless more space is recommended by manufacturer. Provide code required clearances as applicable.

C. Service Access:

1. Install dampers and actuators to be accessible for visual inspection and service.
2. Install access door(s) in duct or equipment located upstream of damper to allow service personnel to hand clean any portion of damper, linkage, and actuator. Comply with requirements in Section 23 33 00 "Air Duct Accessories."

D. Install dampers straight and true, level in all planes, and square in all dimensions.

E. Install supplementary structural reinforcement for large multiple-section dampers if factory-furnished support alone cannot handle loading.

F. Attach field-installed actuator(s) to damper drive shaft.

G. For duct-mounted and equipment-mounted dampers installed outside of equipment, install a visible and accessible indication of damper position from outside.

3.4 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Each piece of wire, cable, and tubing is to have the same designation at each end for operators to determine continuity at points of connection. Comply with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."

B. Install engraved phenolic nameplate with damper identification on damper.

3.5 ELECTRICAL CONNECTIONS

A. Install electrical power to field-mounted control devices requiring electrical power.

B. Connect wiring in accordance with Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables" and Section 26 05 23 "Control-Voltage Electrical Power Cables."

C. Ground equipment in accordance with Section 26 05 26 "Grounding and Bonding for Electrical Systems."

D. Furnish and install raceways. Comply with requirements in Section 26 05 33.13 "Conduits for Electrical Systems."

E. Furnish and install circuit breakers. Comply with requirements in Section 26 28 16 "Enclosed Switches and Circuit Breakers."

F. Install electrical devices furnished by manufacturer, but not factory mounted, in accordance with NFPA 70 and NECA 1.

G. Install nameplate for each electrical connection, indicating electrical equipment designation and circuit number feeding connection.

1. Nameplate to be laminated acrylic or melamine plastic signs with a black background and engraved white letters at least 1/2 inch high.

3.6 CONTROL CONNECTIONS

A. Install control signal wiring to field-mounted control devices.

B. Connect control signal wiring in accordance with Section 26 05 23 "Control-Voltage Electrical Power Cables."

C. Furnish and install raceways. Comply with requirements in Section 26 05 33.13 "Conduits for Electrical Systems."

3.7 CLEANING

A. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from exposed surfaces.

3.8 ADJUSTMENT, CALIBRATION, AND TESTING

A. Stroke and adjust control dampers following manufacturer's recommended procedure, from 100 percent open to 100 percent closed back to 100 percent open.

END OF SECTION

SECTION 23 09 23.16

GAS DETECTION AND ALARM

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Gas Detection and Alarm components of the following types:
   1. Standalone Detectors.
   2. Remote Transmitters.

B. Accessories.

1.2 REFERENCES

A. American National Standards Institute (ANSI):
   1. ANSI/ISA 92.00.01-2010 (R2015) - Performance Requirements For Toxic Gas Detectors.

B. European National Standards (EN):
   1. EN 50270 - Electromagnetic compatibility. Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen.
   2. EN 60204-1 - Safety of machinery - Electrical equipment of machines - Part 1: General requirements.
   3. EN 60825-1, identical to IEC 825 and DIN-VDE 0837 - Safety of laser products - Part 1: Equipment classification and requirements.

C. Federal Communications Commission (FCC):
   1. FCC Part 15 Subpart B - Electromagnetic compatibility. Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen.

D. German institute for Standardization (DIN):
   1. DIN EN 54 - Fire detection and fire alarm systems.
   2. DIN EN 842 - Safety of machinery - Visual danger signals - General requirements, design and testing.
   3. DIN EN 981 - Safety of machinery - System of auditory and visual danger and information signals.
   4. DIN EN ISO 7731 - Ergonomics - Danger signals for public and work areas - Auditory danger signals.

E. International Electrotechnical Commission (IEC):
   1. IEC 73 / DIN EN 60073 / VDE 0199 - Coding of indicating devices and actuators by colors and supplementary means.

F. Intertek ETL (ETL).

G. National Electrical Manufacturers Association (NEMA):
   1. NEMA 1 - Enclosures constructed for indoor use.
   2. NEMA 4X - Watertight and corrosion resistant enclosures constructed for wet environments, indoor or outdoor use.

H. Restriction of Hazardous Substances Directive (RoHS):

I. Underwriters Laboratory (UL):
   1. UL 248 - Low Voltage Fuses.

1.3 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

B. Product Data:
   1. Manufacturer's data sheets on each product to be used.
   2. Preparation instructions and recommendations.
   3. Storage and handling requirements and recommendations.
   4. Typical installation methods.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum five years documented experience.

B. Installer Qualifications: Company specializing in performing Work of this section with minimum two years documented experience with projects of similar scope and complexity.

C. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store and handle in strict compliance with manufacturer's written instructions and recommendations.

B. Protect from damage due to weather, excessive temperature, and construction operations.

1.6 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.7 WARRANTY

A. Manufacturer's Warranty: Provide manufacturer's standard limited warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering product that may be incorporated into the work include, but are not limited to the following:
   1. Brasch Environmental Technologies
   2. Senva Inc.
   3. Macuro Inc.

2.2 STANDALONE DETECTORS

A. Performance Requirements:
   1. Standards Compliance:
      a. Performance: ANSI/ISA 92.00.01-2010 (R2015)
      b. Electromagnetic Interference: EN 50270, FCC Part 15 Subpart B.
      c. Environmental: RoHS compliant.

B. General Features: Unless specified otherwise.
   1. User-Adjustable Setpoints, Delays, Outputs, and Relays.
   2. Built-in Manual Fan Activation.
   3. Preconfigured Wiring
   4. Factory Calibration
   5. Customized Programming
   6. Works with New and Existing Building Controls Systems
   7. Fully Backwards Compatible with GSE Generation 1
   8. Power Requirements: 24 VAC, 0.500 A, 50/60 Hz.
   9. Power Requirements: 120 VAC, 0.125 A, 50/60 Hz.
   10. Power Consumption: 24 VA.
   11. Control Relays: 6 relays, 5A at 125 VAC / 250 VA.
   12. Analog Outputs:
      a. User-Selectable: 4 to 20 mA, 0.2 to 1 VDC, 1 to 5 VDC, or 2 to 10 VDC.
   13. Storage Temperature: Minus 58 to 248 degrees F (Minus 50 to 120 degrees C).
   14. Operating Temperature: Minus 4 to 122 degrees F (Minus 20 to 50 degrees C).
   15. Humidity: 10 to 90 percent, non-condensing.
   16. Display: 4 digits, numeric. Color: Red.
   17. Front Panel Indicators: 10 LEDs.
      a. Power: Quantity: 1 Color: Green.
      b. Sensors: Quantity: 4. Color: Yellow.
      c. Zones: Quantity: 2. Color: Yellow.
      d. Alert: Quantity: 2. Color: Red.
      e. Alarm: Quantity: 1. Color: Red.
   18. Alarm: 106 dB at (100 mm), 3.8 kHz piezoelectric element.
   19. Sensor Lifespan: Up to 10 years, end-of-life notification.
   20. Sensor Calibration: recalibration every 2 years.
   21. Sensor Capacity: Up to 4 sensors. A maximum of 2 locally mounted sensors.
      a. Coverage: 36,000 sq ft (3344.5 sq m)
   22. Dimensions (WxHxD): 8.15 x 9.93 x 2.70 inch (210 x 250 x 70 mm).

23. Weight: 5.5 lbs (2.49 kg).
24. Housing: Gray, NEMA 3R, polycarbonate plastic.

C. Basis of Design: Combination Detector, Nitrogen Dioxide and Carbon Monoxide; GSE2-NCM; as manufactured by Brasch Environmental Technologies.
1. Sensors: 2 local sensors.

2.3 REMOTE TRANSMITTERS

A. Performance Requirements:
1. Performance: ANSI/ISA 92.00.01-2010 (R2015)
2. Electromagnetic Interference: EN 50270, FCC Part 15 Subpart B
3. Environmental: RoHS.

B. Basis of Design: Remote Analog/Digital Transmitter, Carbon Monoxide and Nitrogen Dioxide as manufactured by Brasch Environmental Technologies.
1. Analog: TRNS2-NCM-Analog.
a. User Selectable Output: 4 to 20 mA, 0.2 to 1 VDC, 1 to 5 VDC, or 2 to 10 VDC.
2. Digital: TRNS2-NCM-Digital.
a. Digital Communication: Modbus RTU
3. Input Power: 24 VAC, 50/60 Hz, 0.25 A
4. Power Consumption: 6 VA
5. Storage Temperature: Minus 58 to 248 degrees F (Minus 50 to 120 degrees C).
6. Operating Temperature: Minus 4 to 122 degrees F (Minus 20 to 50 degrees C).
7. Humidity: 10 to 90 percent; non-condensing.
8. Front Panel Indicators; 2 LEDs: Power - Green. Fault - Yellow.
9. Sensor Lifespan: Up to 10 years, end-of-life notification.
10. Sensor Calibration: Recalibration every 2 years
11. Sensor Coverage: 9,000 sq ft (836 sq m).
12. Dimensions (WxHxD): 4.8 x 4.72 x 2.16 inch (122 x 120 x 55 mm)
13. Weight: 1 lbs (0.5 kg).
14. Housing: Gray, NEMA 3R, polycarbonate plastic.

2.4 ACCESSORIES

A. Combined External Audible Alarm and Strobe: Patrol LED Sounder Max. 105 dB(A) / 76 cd by Pfannenberg.
1. Standards Compliance:
a. DIN EN 54.
b. DIN EN 842.
c. DIN EN 981.
d. DIN 54113-2.
e. DIN EN ISO 7731.
f. EN 60204-1.
g. EN 60825-1.
h. IEC 73 / DIN EN 60073 / VDE 0199.
2. Model: PA L1.
a. 3D-Visual Coverage:
1) Indicate: 115.16 x 48.88 x 46.59 ft (35.1 x 14.9 x 14.2 m).

2) Warn: 51.18 x 21.65 x 21 ft (15.6 x 6.6 x 6.4 m).
3) Alarm: 25.59 x 10.83 x 10.50 ft (7.8 x 3.3 x 3.2 m).

b. 3D-Audible Coverage:
1) Indicate: 52.48 x 24.28 x 52.48 ft (16 x 13.8 x 16 m).
2) Warn: 29.53 x 25.59 x 29.53 ft (9 x 7.8 x 9 m).
3) Alarm: 16.73 x 14.44 x 16.73 ft (5.1 x 4.4 x 5.1 m).

3. Rated Voltage: 115 V. AC 50 / 60 Hz / DC.
a. Operating Range: 195 - 127 V.
b. Current Consumption Light: 51 mA at 115 VAC maximum.
c. Current Consumption Sounder: 30 mA at 115 VAC maximum.
4. Sound Level: 105 dB(A) at 3.28 ft (1 m) maximum.
5. Volume Control: 12 dB maximum.
6. Tones: 80.
7. Operating Mode Internally Selectable: Continuous light / blinking light / flashing light.
8. Light Source: One high output LED per single unit.
9. Light Intensity per DIN 5037, clear lens: 1 76 cd per single unit. Reducible.
10. Viewing Distance: 662.73 inches (202 m) maximum.
11. Operating Temperature: Minus 40 to 131 degrees F (Minus 40 to 55 degrees C).
12. Storage Temperature: Minus 40 to 158 degrees F (Minus 40 to 70 degrees C).
13. Installation Position: Any.
14. Degree of Protection.
a. Per EN60529: IP 66.
b. NEMA TYPE 4/4x.
c. Per EN 50102: IK 08.
15. Service Life of Light Source: Greater than or equal to 50,000 hrs.
16. Material, Lens, RGB: Polycarbonate (PC).
17. Material, Housing: PC / ABS blend.
18. Cable Entry: 6x M20 pre-embossed.
19. Connecting Terminal: 0.14 - 2.5 sq mm fine stranded.
20. Weight: 1.48 lbs (670 grams) maximum.

B. Fuse:
1. Basis of Design: Radial Lead Fuse, 374 Series, TR5 Fuse, Time Lag; as manufactured by Littelfuse.
2. Compliance: UL 248.
3. Halogen free and lead-free.
4. Reduced PCB space requirements.
5. Low internal resistance.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly constructed and prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions, approved submittals, and in proper relationship with adjacent construction.

3.4 FIELD QUALITY CONTROL

A. Field Inspection: Coordinate field inspection in accordance with appropriate sections in Division 01.

B. Manufacturer's Services: Coordinate manufacturer's services in accordance with appropriate sections in Division 01.

3.5 CLEANING AND PROTECTION

A. Clean products in accordance with the manufacturer's recommendations.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 23 31 13

METAL DUCTS

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For each type of the following products:

1. Sealants and gaskets.
2. Seismic-restraint devices.

B. Shop Drawings:

1. Factory- and shop-fabricated ducts and fittings.
2. Fittings.
3. Reinforcement and spacing.
4. Seam and joint construction.
5. Equipment installation based on equipment being used on Project.
6. Hangers and supports, including methods for duct and building attachment.

C. Product Declarations: Provide current Environmental Product Declarations (EPDs), that include the amount of embodied carbon in metal ducts.

1. Acceptable EPDs are non-expired, Product-specific, Facility or Plant-specific, or Supply Chain-specific Type III (Third-Party Reviewed), in adherence with ISO 14025 Environmental labels and declarations, ISO 14044 Environmental management – Life cycle assessment, and ISO 21930 Core rules for environmental product declarations of construction products and services.
2. Provide the EPD Material Tracking Form containing the total anticipated quantity/volume/weight (matching the units used in the EPDs) of each product being incorporated into the project.
    a. With each application for payment, provide an updated EPD Material Tracking Form and copies of delivery tickets for each product incorporated into the project for the period covered by the payment application.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Airstream Surfaces: Surfaces in contact with airstream shall comply with requirements in ASHRAE 62.1.

B. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment," and Section 7 - "Construction and System Startup."

C. ASHRAE/IES Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6.4.4 - "HVAC System Construction and Insulation."

D. Duct Dimensions: Unless otherwise indicated, all duct dimensions indicated on Drawings are inside clear dimensions and do not include insulation or duct wall thickness.

2.2 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.
2. For ducts subject to moisture, i.e. Wash Bay exhaust, construct of aluminum.

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.
3. Where specified for specific applications, all joints shall be welded.

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." All longitudinal seams shall be Pittsburgh lock seams unless otherwise specified for specific application.

1. Where specified for specific applications, all joints shall be welded.

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."

2.3 SINGLE-WALL ROUND DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Ch. 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.

1. Construct ducts of galvanized sheet steel unless otherwise indicated.

2. For ducts subject to moisture, i.e. Wash Bay exhaust, construct of aluminum.
3. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. McGill AirFlow LLC.
   b. MKT Metal Manufacturing.
   c. Sheet Metal Connectors, Inc.

B. Transverse Joints: Select joint types and fabricate in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Round 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. Transverse Joints in Ducts Larger Than 60 Inches in Diameter: Flanged.

C. Longitudinal Seams: Select seam types and fabricate in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Round 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. Tees and Laterals: Select types and fabricate in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees," 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."

2.4 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 shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.

1. Galvanized Coating Designation: G60 .
2. Finishes for Surfaces Exposed to View: Mill phosphatized.

C. Aluminum Sheets: Comply with ASTM B209 Alloy 3003, H14 temper; with mill finish for concealed ducts, and standard, one-side bright finish for duct surfaces exposed to view.

D. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

E. 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.

2.5 SEALANT AND GASKETS

A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall 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.
10. Verify sealant has a VOC content of 420 g/L or less.
11. Verify sealant complies with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

C. 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. Solvent-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Base: Synthetic rubber resin.
3. Solvent: Toluene and heptane.
4. Solids Content: Minimum 60 percent.
5. Shore A Hardness: Minimum 60.
6. Water resistant.
7. Mold and mildew resistant.

8. Verify sealant has a VOC content of 420 g/L or less.
9. Verify sealant complies with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
10. Maximum Static-Pressure Class: 10-inch wg, positive or negative.
11. Service: Indoor or outdoor.
12. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

E. Flanged Joint Sealant: Comply with ASTM C 920.

1. General: Single-component, acid-curing, silicone, elastomeric.
2. Type: S.
3. Grade: NS.
4. Class: 25.
5. Use: O.
6. Verify sealant has a VOC content of 420 g/L or less.

F. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

G. Round Duct Joint O-Ring Seals:

1. Seal shall provide maximum leakage class of 3 cfm/100 sq. ft. at 1-inch wg and shall be rated for10-inch wg static-pressure class, positive or negative.
2. EPDM O-ring to seal in concave bead in coupling or fitting spigot.
3. Double-lipped, EPDM O-ring seal, mechanically fastened to factory-fabricated couplings and fitting spigots.

2.6 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 A 603.

E. Steel Cables for Stainless-Steel Ducts: Stainless steel complying with ASTM A 492.

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.
2. Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.
3. Supports for Aluminum Ducts: Aluminum or galvanized steel coated with zinc chromate.

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 heating coils, dampers, and all other duct-mounted accessories in air ducts where indicated on Drawings.

K. Protect duct interiors from moisture, construction debris and dust, and other foreign materials both before and after installation. Comply with SMACNA's "IAQ Guidelines for Occupied Buildings Under Construction," Appendix G, "Duct Cleanliness for New Construction Guidelines."

L. 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.

M. Branch Connections: Use lateral or conical branch connections.

3.2 INSTALLATION OF EXPOSED DUCTWORK

A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.

B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.

C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.

D. Maintain consistency, symmetry, and uniformity in arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.

E. Repair or replace damaged sections and finished work that does not comply with these requirements.

3.3 DUCT SEALING

A. Seal all ductwork to SMACNA Seal Class A with a maximum allowable SMACNA Leakage Class of 4.

3.4 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. Where practical, install concrete inserts before placing concrete.
2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
4. 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.

3.5 CONNECTIONS

A. Make connections to equipment with flexible connectors complying with Section 23 33 00 "Air Duct Accessories."

B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.6 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. 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 shall not exceed 0.75 mg/100 sq. cm.

C. Duct system will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

3.7 DUCT CLEANING

A. Clean new duct system(s) before testing, adjusting, and balancing.

B. Use duct cleaning methodology as indicated in NADCA ACR.

C. 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 23 33 00 "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.

D. 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.

E. 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.

F. 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 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.
5. Provide drainage and cleanup for wash-down procedures.
6. 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.

3.8 STARTUP

A. Air Balance: Comply with requirements in Section 23 05 93 "Testing, Adjusting, and Balancing for HVAC."

3.9 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 as indicated below.

B. Supply Ducts:

1. Ducts Connected to Constant-Volume Air-Handling Units :
   a. Pressure Class: Positive 3- inch wg.

C. Return Ducts:

1. Ducts Connected to Air-Handling Units :
   a. Pressure Class: Positive or negative 3- inch wg.

D. Exhaust Ducts:

1. Ducts Connected to Fans Exhausting (ASHRAE 62.1, Class 1 and 2) Air:
   a. Pressure Class: Negative 2- inch wg.
2. Ducts Connected to Air-Handling Units :
   a. Pressure Class: Positive or negative 3- inch wg.

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.

F. Elbow Configuration:

1. Rectangular Duct: 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."
2. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "Round Duct Elbows."
   a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.
      1) Radius-to Diameter Ratio: 1.5.
   b. Round Elbows, 12 Inches and Smaller in Diameter: Stamped or pleated.
   c. Round Elbows, 14 Inches and Larger in Diameter: Standing seam or Welded.

G. Branch Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-6, "Branch Connection."
   a. Rectangular Main to Rectangular Branch: 45-degree entry.
   b. Rectangular Main to Round Branch: Conical spin in or 45-degree boot tap.
2. Round and Flat Oval: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees." Saddle taps are permitted in existing duct.
   a. Velocity 1000 fpm or Lower: 90-degree tap.
   b. Velocity 1000 to 1500 fpm: Conical tap.
   c. Velocity 1500 fpm or Higher: 45-degree lateral.

END OF SECTION

SECTION 23 33 00

AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.2 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 MANUAL VOLUME DAMPERS

A. Standard, Steel, Manual Volume Dampers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Greenheck Fan Corporation.
   b. Ruskin Company.
   c. United Enertech.
2. Performance:
   a. Leakage Rating Class III: Leakage not exceeding 40 cfm/sq. ft. against 1-inch wg differential static pressure.
3. Construction:
   a. Linkage out of airstream.
   b. Suitable for horizontal or vertical airflow applications.
4. Frames:
   a. Hat-shaped, 16-gauge- thick, galvanized sheet steel.
   b. Mitered and welded corners.
   c. Flanges for attaching to walls and flangeless frames for installing in ducts.
5. Blades:
   a. Multiple or single blade.
   b. Parallel- or opposed-blade design.

c. Stiffen damper blades for stability.
d. Galvanized steel; 16 gauge thick.

6. Blade Axles: Galvanized steel or Stainless steel.
7. Bearings:
   a. Oil-impregnated bronze or Molded synthetic.
   b. Dampers mounted with vertical blades to have thrust bearing at each end of every blade.
8. Tie Bars and Brackets: Galvanized steel.
9. Locking device to hold damper blades in a fixed position without vibration.

B. Standard, Aluminum, Manual Volume Dampers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Greenheck Fan Corporation.
   b. Ruskin Company.
   c. United Enertech.
2. Performance:
   a. Leakage Rating Class III: Leakage not exceeding 40 cfm/sq. ft. against 1-inch wg differential static pressure.
3. Construction:
   a. Linkage out of airstream.
   b. Suitable for horizontal or vertical airflow applications.
4. Frames:
   a. Hat-shaped, 0.10-inch- thick, aluminum sheet steel.
   b. Flanges for attaching to walls and flangeless frames for installing in ducts.
5. Blades:
   a. Multiple or single blade.
   b. Parallel- or opposed-blade design.
   c. Stiffen damper blades for stability.
   d. Roll-Formed Aluminum Blades: 0.10-inch-thick aluminum sheet.
6. Blade Axles: Stainless steel.
7. Bearings:
   a. Oil-impregnated bronze or Molded synthetic.
   b. Dampers mounted with vertical blades to have thrust bearing at each end of every blade.
8. Tie Bars and Brackets: Aluminum.
9. Locking device to hold damper blades in a fixed position without vibration.

2.3 CONTROL DAMPERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. American Warming and Ventilating; a Mestek Architectural Group company.
2. Greenheck Fan Corporation.
3. Ruskin Company.

B. General Requirements:

1. Unless otherwise indicated, use parallel-blade configuration for two-position control, equipment isolation service, and when mixing two airstreams. For other applications, use opposed-blade configuration.
2. Factory or field assemble multiple damper sections to provide a single damper assembly of size required by the application.

C. Performance:

1. AMCA Certification: Test and rate in accordance with AMCA 511.
2. Leakage:
   a. Class I: Leakage shall not exceed 4 cfm/sq. ft. against 1-inch wg differential static pressure.
3. Pressure Drop: 0.05 inch wg at 1500 fpm across a 24-by-24-inch damper when tested in accordance with AMCA 500-D, Figure 5.3.
4. Velocity: Up to 3000 fpm
5. Temperature: Minus 25 to plus 180 deg F.
6. Pressure Rating: Damper close-off pressure equal to fan shutoff pressure with a maximum blade deflection of 1/200 of blade length.

D. Construction:

1. Linkage out of airstream.
2. Suitable for horizontal or vertical airflow applications.
3. Frames:
   a. Hat, U, or angle shaped.
   b. 0.08-inch- thick extruded aluminum or 16-gauge- thick, galvanized sheet steel.
   c. [Mitered and welded] [Interlocking, gusseted] corners.
   d. Flanges for attaching to walls and flangeless frames for installing in ducts.
4. Blades:
   a. Multiple blade with maximum blade width of 6 inches.
   b. Parallel-blade design.
   c. Galvanized steel or Aluminum.
   d. 16-gauge- thick single skin.
5. Blade Edging Seals:
   a. Replaceable Closed-cell neoprene or PVC.
   b. Inflatable seal blade edging, or replaceable rubber seals.
6. Blade Jamb Seal: Flexible stainless steel, compression type.
7. Blade Axles: 1/2-inch diameter; [galvanized] [stainless] steel.
8. Blade-Linkage Hardware: Zinc-plated steel and brass; ends sealed against blade bearings. Linkage mounted out of air stream.
9. Bearings:
   a. Oil-impregnated bronze, Molded synthetic or Oil-impregnated stainless steel sleeve.

E. Damper Actuator - Electric:

1. Electric - 120 V ac or 24 V ac.
2. UL 873, plenum rated.
3. Two position with fail-safe spring return.
   a. Sufficient motor torque and spring torque]to drive damper fully open and fully closed with adequate force to achieve required damper seal.
   b. Minimum 90-degree drive rotation.
4. Clockwise or counterclockwise drive rotation as required for application.
5. Environmental Operating Range:
   a. Temperature: Minus 40 to plus 130 deg F.
   b. Humidity: 5 to 95 percent relative humidity noncondensing.
6. Environmental enclosure: NEMA 2.
7. Actuator to be factory mounted and provided with a single-point wiring connection.

2.4 FLANGE CONNECTORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. CL WARD & Family Inc.
2. Ductmate Industries, Inc; a DMI company.
3. Ward Industries; a brand of Hart & Cooley, Inc.

B. Description: Add-on or roll-formed, factory fabricated, slide-on transverse flange connectors, gaskets, and components.

C. Material: Galvanized steel.

D. Gauge and Shape: Match connecting ductwork.

2.5 TURNING VANES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. CL WARD & Family Inc.
2. Ductmate Industries, Inc; a DMI company.
3. Ward Industries; a brand of Hart & Cooley, Inc.

B. Manufactured Turning Vanes for Metal Ducts: Fabricate curved blades of galvanized sheet steel; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.

1. Acoustic Turning Vanes: Fabricate airfoil-shaped aluminum extrusions with perforated faces and fibrous-glass fill.

C. General Requirements: Comply 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."

D. Vane Construction:

1. Double wall.

2.6 DUCT-MOUNTED ACCESS DOORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Aire Technologies, Inc.; a DMI company.
2. Ductmate Industries, Inc; a DMI company.
3. Flexmaster U.S.A., Inc.
4. Ruskin Company.
5. United Enertech.
6. Ventfabrics, Inc.

B. Duct-Mounted Access Doors: Fabricate access panels in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figure 7-2 (7-2M), "Duct Access Doors and Panels," and Figure 7-3, "Access Doors - Round Duct."

1. Door:
   a. Double wall, rectangular.
   b. Galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class.
   c. 24-gauge- thick galvanized steel door panel.
   d. Hinges and Latches: 1-by-1-inch butt or piano hinge and cam latches.
   e. Fabricate doors airtight and suitable for duct pressure class.
2. Frame: Galvanized sheet steel, with bend-over tabs and foam gaskets.
   a. 24-gauge- thick galvanized steel frame.
3. Number of Hinges and Locks:
   a. Access Doors Less Than 12 Inches Square: No hinges and two sash locks.
   b. Access Doors up to 18 Inches Square: Two hinges and two sash locks.
   c. Access Doors up to 24 by 48 Inches: Three hinges Continuous and two compression latches with outside and inside handles.
   d. Access Doors Larger Than 24 by 48 Inches: Continuous and two compression latches with outside and inside handles.

2.7 DUCT ACCESS PANEL ASSEMBLIES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. CL WARD & Family Inc.
2. Ductmate Industries, Inc; a DMI company.
3. Flame Gard, Inc.

B. Access panels used in cooking applications:

1. Labeled compliant to NFPA 96 for grease duct access doors.

2. Labeled in accordance with UL 1978 by an NRTL.

C. Panel and Frame: Minimum thickness 16-gauge stainless steel.

D. Fasteners: Stainless steel. Panel fasteners shall not penetrate duct wall.

E. Gasket: Comply with NFPA 96, grease-tight, high-temperature ceramic fiber, rated for minimum 2000 deg F.

F. Minimum Pressure Rating: 10 inches wg positive or negative.

2.8 FLEXIBLE CONNECTORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. CL WARD & Family Inc.
2. Ductmate Industries, Inc; a DMI company.
3. Ward Industries; a brand of Hart & Cooley, Inc.

B. 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.

C. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

D. Materials: Flame-retardant or noncombustible fabrics.

E. Coatings and Adhesives: Comply with UL 181, Class 1.

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.

2.9 DUCT ACCESSORY HARDWARE

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. CL WARD & Family Inc.
2. Ductmate Industries, Inc; a DMI company.
3. United Enertech.

B. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments and of length to suit duct-insulation thickness.

C. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

2.10 MATERIALS

A. Galvanized Sheet Steel: Comply with ASTM A653/A653M.

1. Galvanized Coating Designation: G60 .
2. Exposed-Surface Finish: Mill phosphatized.

B. Stainless Steel Sheets: Comply with ASTM A480/A480M, Type 304, and having a No. 2 finish for concealed ducts and No. 4 finish for exposed ducts.

C. Aluminum Sheets: Comply with ASTM B209, Alloy 3003, Temper H14; with mill finish for concealed ducts and standard, one-side bright finish for exposed ducts.

D. Extruded Aluminum: Comply with ASTM B221, Alloy 6063, Temper T6.

E. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless steel ducts.

F. 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 aluminum accessories in aluminum ducts.

C. Where multiple damper sections are necessary to achieve required dimensions, provide reinforcement to fully support damper assembly when fully closed at full system design static pressure.

D. Install volume dampers at points on supply, return, and exhaust systems where branches extend from larger ducts. Where dampers are installed in ducts having duct liner, install dampers with hat channels of same depth as liner, and terminate liner with nosing at hat channel.

1. Install steel volume dampers in steel ducts.
2. Install aluminum volume dampers in aluminum ducts.

E. Set dampers to fully open position before testing, adjusting, and balancing.

F. Install test holes at fan inlets and outlets and elsewhere as indicated and as needed for testing and balancing.

G. Install duct access doors on sides of ducts to allow for inspecting, adjusting, and maintaining accessories and equipment at the following locations:

1. On both sides of duct coils.
2. At outdoor-air intakes and mixed-air plenums.
3. Downstream from control dampers, and equipment.
4. Control devices requiring inspection.
5. Elsewhere as indicated.

H. Install access doors with swing against duct static pressure.

I. Access Door Sizes:

1. One-Hand or Inspection Access: 8 by 5 inches.
2. Head and Hand Access: 18 by 10 inches.

J. Label access doors according to Section 23 05 53 "Identification for HVAC Piping and Equipment" to indicate the purpose of access door.

K. Install flexible connectors to connect ducts to equipment.

L. Install duct test holes where required for testing and balancing purposes.

3.2 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Operate dampers to verify full range of movement.
2. Inspect locations of access doors, and verify that size and location of access doors are adequate to perform required operation.
3. Inspect turning vanes for proper and secure installation, and verify that vanes do not move or rattle.

END OF SECTION

SECTION 23 33 46

FLEXIBLE DUCTS

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTION

A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."

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.

C. Comply with the Air Diffusion Council's "ADC Flexible Air Duct Test Code FD 72-R1."

D. Comply with ASTM E 96/E 96M, "Test Methods for Water Vapor Transmission of Materials."

2.2 INSULATED FLEXIBLE DUCTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Flexmaster U.S.A., Inc.
2. McGill AirFlow LLC.
3. Thermaflex; a Flex-Tek Group company.

B. Insulated, Flexible Duct: UL 181, Class 1, multiple layers of aluminum laminate supported by helically wound, spring-steel wire; fibrous-glass insulation; aluminized vapor-barrier film.

1. Pressure Rating: 10-inch wg positive and 1.0-inch wg negative.
2. Maximum Air Velocity: 4000 fpm.
3. Temperature Range: Minus 20 to plus 210 deg F.
4. Insulation R-Value: R6.

2.3 FLEXIBLE DUCT CONNECTORS

A. Clamps: Stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action in sizes 3 through 18 inches, to suit duct size.

B. Non-Clamp Connectors: Liquid adhesive plus tape .

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install flexible ducts according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.

B. Install in indoor applications only. Flexible ductwork should not be exposed to UV lighting.

C. Connect terminal units to supply ducts directly or with maximum 12-inch lengths of flexible duct. Do not use flexible ducts to change directions.

D. Connect diffusers or light troffer boots to ducts directly or with maximum 48-inch lengths of flexible duct clamped or strapped in place.

E. Connect flexible ducts to metal ducts with clamps or liquid adhesive plus tape .

F. Install duct test holes where required for testing and balancing purposes.

G. Installation:

1. Install ducts fully extended.
2. Do not bend ducts across sharp corners.
3. Bends of flexible ducting shall not exceed a minimum of one duct diameter.
4. Avoid contact with metal fixtures, water lines, pipes, or conduits.
5. Install flexible ducts in a direct line, without sags, twists, or turns.

H. Supporting Flexible Ducts:

1. Suspend flexible ducts with bands 1-1/2 inches wide or wider and spaced a maximum of 48 inches apart. Maximum centerline sag between supports shall not exceed 1/2 inch per 12 inches.
2. Install extra supports at bends placed approximately one duct diameter from center line of the bend.
3. Ducts may rest on ceiling joists or truss supports. Spacing between supports shall not exceed the maximum spacing per manufacturer's written installation instructions.
4. Vertically installed ducts shall be stabilized by support straps at a maximum of 48 inches o.c.

END OF SECTION

SECTION 23 34 16

CENTRIFUGAL HVAC FANS

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Construction details, material descriptions, dimensions of individual components and profiles, and finishes for fans.
2. Rated capacities, operating characteristics, and furnished specialties and accessories.
3. Certified fan performance curves with system operating conditions indicated.
4. Certified fan sound-power ratings.
5. Motor ratings and electrical characteristics, plus motor and electrical accessories.
6. Fan speed controllers.

1.2 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For centrifugal fans to include in normal operation, emergency operation, and maintenance manuals with replacement parts listing.

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 unit components.

2.2 SQUARE IN-LINE CENTRIFUGAL FANS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Greenheck Fan Corporation.
2. Loren Cook Company.
3. PennBarry.

B. Description: Square in-line centrifugal fans.

C. Housing:

1. Housing Material: Reinforced steel Aluminum .
2. Housing Coating: Hot-dip galvanized .
3. Housing Construction: Side panels shall be easily removable for service. Include inlet and outlet flanges, and support bracket adaptable to floor, side wall, or ceiling mounting.

D. Fan Wheels: Aluminum airfoil blades welded to aluminum hub.

E. Motor Enclosure: Open, dripproof.

2.3 MOTORS

A. Comply with NEMA designation, temperature rating, service factor, and efficiency requirements for motors specified in Section 23 05 13 "Common Motor Requirements for HVAC Equipment."

2.4 SOURCE QUALITY CONTROL

A. AMCA Certification for Fan Sound Performance Rating: Test, rate, and label in accordance with AMCA 311.

B. AMCA Certification for Fan Aerodynamic Performance Ratings: Test, rate, and label in accordance with AMCA 211.

C. AMCA Certification for Fan Energy Index (FEI): Test, rate, and label in accordance with AMCA 211.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Install centrifugal fans level and plumb.

B. Disassemble and reassemble units, as required for moving to the final location, according to manufacturer's written instructions.

C. Lift and support units with manufacturer's designated lifting or supporting points.

D. Equipment Mounting:

1. Support duct-mounted and other hanging centrifugal fans directly from the building structure, using suitable hanging systems as specified in Section 23 05 29 "Hangers and Supports for HVAC Piping and Equipment."
2. Comply with requirements for vibration isolation devices specified in Section 23 05 48.13 "Vibration Controls for HVAC."

E. Install units with clearances for service and maintenance.

F. Label fans according to requirements specified in Section 23 05 53 "Identification for HVAC Piping and Equipment."

3.2 DUCTWORK AND PIPING CONNECTIONS

A. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors. Flexible connectors are specified in Section 23 33 00 "Air Duct Accessories."

B. Install ducts adjacent to fans to allow service and maintenance.

3.3 ELECTRICAL CONNECTIONS

A. Connect wiring according to Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."

B. Ground equipment according to Section 26 05 26 "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 high.

3.4 CONTROL CONNECTIONS

A. Install control and electrical power wiring to field-mounted control devices.

B. Connect control wiring according to Division 26 Specifications.

3.5 STARTUP SERVICE:

A. Perform startup service.

1. Complete installation and startup checks in accordance with 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 ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.
4. Verify that cleaning and adjusting are complete.
5. For direct-drive fans, verify proper motor rotation direction and verify fan wheel free rotation and smooth bearing operation.
6. Adjust damper linkages for proper damper operation.
7. Verify lubrication for bearings and other moving parts.

8. Verify that manual and automatic volume control and fire and smoke dampers in connected ductwork systems are in fully open position.
9. Disable automatic control operators, energize motor and confirm proper motor rotation and unit operation, adjust fan to indicated rpm, and measure and record motor voltage and amperage.
10. Shut unit down and reconnect automatic control operators.
11. Remove and replace malfunctioning units and retest as specified above.

3.6 ADJUSTING

A. Adjust damper linkages for proper damper operation.

B. Adjust belt tension.

C. Lubricate bearings.

D. Comply with requirements in Section 23 05 93 "Testing, Adjusting, and Balancing for HVAC."

3.7 CLEANING

A. After completing system installation and testing, adjusting, and balancing and after completing startup service, clean fans internally to remove foreign material and construction dirt and dust

3.8 FIELD QUALITY CONTROL

A. Test and inspect components, assemblies, and equipment installations, including connections.

1. Fan Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
3. Fans and components will be considered defective if they do not pass tests and inspections.

B. Prepare test and inspection reports.

3.9 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain centrifugal fans.

END OF SECTION

SECTION 23 34 23

HVAC POWER VENTILATORS

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Construction details, material descriptions, dimensions of individual components and profiles, and finishes for fans.
2. Rated capacities, operating characteristics, and furnished specialties and accessories.
3. Certified fan performance curves with system operating conditions indicated.
4. Certified fan sound-power ratings.
5. Motor ratings and electrical characteristics, plus motor and electrical accessories.
6. Material thickness and finishes, including color charts.
7. Prefabricated roof curbs.
8. Fan speed controllers.

1.2 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For HVAC power ventilators to include in normal and emergency operation, and maintenance manuals.

1.3 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.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.

B. NFPA Compliance: Comply with NFPA 90A for design, fabrication, and installation of unit 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."

2.2 CEILING-MOUNTED & INLINE VENTILATORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Greenheck Fan Corporation.
2. Loren Cook Company.
3. PennBarry.

B. Housing: Steel, lined with acoustical insulation.

C. Fan Wheel: Centrifugal wheels directly mounted on motor shaft. Fan shrouds, motor, and fan wheel removable for service.

D. Back-draft damper: Integral.

E. Grille (ceiling type units): Plastic or Painted aluminum, louvered grille with flange on intake and thumbscrew or spring retainer attachment to fan housing.

F. Duct Connections: Round or rectangular outlet connection. Rectangular inlet connection (inline type only).

G. Electrical Requirements: Junction box for electrical connection on housing and receptacle for motor plug-in.

H. Accessories:

1. Isolation: Rubber-in-shear vibration isolators.

2.3 MOTORS

A. Comply with NEMA designation, temperature rating, service factor, and efficiency requirements for motors specified in Section 23 05 13 "Common Motor Requirements for HVAC Equipment."

1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.

2.4 SOURCE QUALITY CONTROL

A. AMCA Certification for Fan Sound Performance Rating: Test, rate, and label in accordance with AMCA 311.

B. AMCA Certification for Fan Aerodynamic Performance Ratings: Test, rate, and label in accordance with AMCA 211.

C. AMCA Certification for Fan Energy Index (FEI): Test, rate, and label in accordance with AMCA 211.

D. UL Standards: Power ventilators shall comply with UL 705. Power ventilators for use for restaurant kitchen exhaust shall also comply with UL 762.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Install power ventilators level and plumb.

B. Equipment Mounting:

1. Comply with requirements for vibration isolation devices specified in Section 23 05 48.13 "Vibration Controls for HVAC."

C. Install units with clearances for service and maintenance.

D. Label units according to requirements specified in Section 23 05 53 "Identification for HVAC Piping and Equipment."

3.2 DUCTWORK CONNECTIONS

A. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors. Flexible connectors are specified in Section 23 33 00 "Air Duct Accessories."

3.3 ELECTRICAL CONNECTIONS

A. Connect wiring according to Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."

B. Ground equipment according to Section 26 05 26 "Grounding and Bonding for Electrical Systems."

C. Install electrical devices furnished by manufacturer, but not factory mounted, according to NFPA 70 and NECA 1.

1. Nameplate shall be laminated acrylic or melamine plastic signs with a black background and engraved white letters at least 1/2 inch high.

3.4 CONTROL CONNECTIONS

A. Install control and electrical power wiring to field-mounted control devices.

B. Connect control wiring according to Division 26 Specifications.

3.5 ADJUSTING

A. Adjust damper linkages for proper damper operation.

B. Lubricate bearings.

C. Comply with requirements in Section 23 05 93 "Testing, Adjusting, and Balancing for HVAC."

3.6 CLEANING

A. After completing system installation and testing, adjusting, and balancing and after completing startup service, clean fans internally to remove foreign material and construction dirt and dust.

3.7 DEMONSTRATION

A. Train Director's maintenance personnel to adjust, operate, and maintain centrifugal fans.

END OF SECTION

SECTION 23 37 13.23

REGISTERS AND GRILLES

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
2. Register and Grille Schedule: Indicate drawing designation, room location, quantity, model number, size, airflow, NC rating and accessories furnished.

PART 2 - PRODUCTS

2.1 REGISTERS

A. Adjustable Airfloil Blade Face Register:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Krueger-HVAC; brand of Johnson Controls International plc, Global Products.
   b. Nailor Industries Inc.
   c. Titus; brand of Johnson Controls International plc, Global Products.
2. Material: Steel.
3. Finish: Baked enamel, white .
4. Face Blade Arrangement: Horizontal 3/4 inch apart.
5. Core Construction: Integral .
6. Rear-Blade Arrangement: Vertical spaced 3/4 inch .
7. Frame: 1-1/4 inches wide.
8. Mounting: Countersunk screw.

2.2 GRILLES

A. Fixed Blade Face Grille:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Krueger-HVAC; brand of Johnson Controls International plc, Global Products.
   b. Price Industries.
   c. Titus; brand of Johnson Controls International plc, Global Products.
2. Material: Steel.
3. Finish: Baked enamel, color selected by Architect.
4. Face Blade Arrangement: Horizontal spaced 3/4 inch apart, 35 degree deflection.

5. Core Construction: Integral.
6. Frame: 1-1/4 inches wide.
7. Mounting: Countersunk screw .

B. Heavy Duty Fixed Blade Face Grille:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Krueger-HVAC; brand of Johnson Controls International plc, Global Products.
   b. Price Industries.
   c. Titus; brand of Johnson Controls International plc, Global Products.
2. Material: Steel.
3. Finish: Baked enamel, color selected by Architect.
4. Face Blade Arrangement: Horizontal ; spaced 1/2 inch apart, 38 to 45 degree deflection.
5. Core Construction: Integral.
6. Frame: 1-1/4 inches wide.
7. Mounting: Countersunk screw.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas where registers and grilles are installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.

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

3.2 INSTALLATION

A. Install registers and grilles level and plumb.

B. Outlets and Inlets Locations: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.

C. Install registers and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

3.3 ADJUSTING

A. After installation, adjust registers and grilles to air patterns indicated, or as directed, before starting air balancing.

END OF SECTION

SECTION 23 82 39.16

PROPELLER UNIT HEATERS

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include rated capacities, operating characteristics, furnished specialties, and accessories.

1.2 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For propeller unit heaters to include in emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Reznor.
2. TPI Corporation.
3. Qmark.

2.2 DESCRIPTION

A. Assembly including casing, coil, fan, and motor in horizontal discharge configuration with adjustable discharge louvers.

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.

2.3 PERFORMANCE REQUIREMENTS

A. ASHRAE/IESNA 90.1 Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6 - "Heating, Ventilating, and Air-Conditioning."

2.4 STANDARD DUTY UNITS

A. Housings

1. Finish: Manufacturer's standard baked enamel applied to factory-assembled and -tested propeller unit heaters before shipping.

2. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.
3. Discharge Louver: Adjustable fin diffuser for horizontal units and conical diffuser for vertical units.

B. Coils

1. Electric-Resistance Heating Coil: Nickel-chromium heating wire, free from expansion noise and 60-Hz hum, embedded in magnesium oxide refractory and sealed in steel or corrosion-resistant metallic sheath with fins no closer than 0.16 inch. Element ends shall be enclosed in terminal box. Fin surface temperature shall not exceed 550 deg F at any point during normal operation.
   a. Circuit Protection: One-time fuses in terminal box for overcurrent protection and limit controls for high-temperature protection of heaters.
   b. Wiring Terminations: Stainless-steel or corrosion-resistant material.

C. Fan and Motor

1. Fan: Propeller type with aluminum wheel directly mounted on motor shaft in the fan venturi.
2. Motor: Permanently lubricated. Comply with requirements in Section 23 05 13 "Common Motor Requirements for HVAC Equipment."

D. Controls

1. Control Devices:
   a. Unit-mounted thermostat.
   b. Provide factory mounted disconnect.

2.5 WASHDOWN TYPE UNITS

A. Housings

1. 16-gauge, stainless steel, moisture and corrosion resistant.
2. Adjustable stainless steel outlet louvers.
3. Stainless steel rear inlet grille

B. Coils

1. Sealed tubular heating element with stainless steel fins.

C. Fan and Motor

1. Anodized aluminum, epoxy painted, delayed-action fan.
2. Enclosed motor with permanently lubricated ball bearings.

D. Controls

1. NEMA 4x, 120V wall mounted thermostat for field installation.

2. Pilot light “power on” indicator.
3. High-limit temperature control with automatic reset.
4. NEMA 4X non-metallic electrical enclosure.
5. Factory mounted disconnect switch.

PART 2 - EXECUTION

2.1 EXAMINATION

A. Examine areas to receive propeller unit heaters for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for piping and electrical connections to verify actual locations before unit-heater installation.

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

2.2 INSTALLATION

A. Install propeller unit heaters to comply with NFPA 90A.

B. Install propeller unit heaters level and plumb.

C. Wall mount unit heaters utilizing unit manufacturer’s standard wall mounting bracket. Install in accordance with unit manufacturer’s recommendations.

2.6 CONNECTIONS

D. Ground equipment according to Section 26 05 26 "Grounding and Bonding for Electrical Systems."

E. Connect wiring according to Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."

END OF SECTION

SECTION 23 82 39.19

WALL AND CEILING UNIT HEATERS

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include rated capacities, operating characteristics, furnished specialties, and accessories.

B. Shop Drawings:

1. Include plans, elevations, sections, and details.
2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include details of anchorages and attachments to structure and to supported equipment.
4. Include equipment schedules to indicate rated capacities, operating characteristics, furnished specialties, and accessories.
5. Wiring Diagrams: Power, signal, and control wiring.

1.2 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For wall and ceiling unit heaters to include in emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Reznor
2. INDEECO.
3. QMark; Marley Engineered Products.

2.2 DESCRIPTION

A. Assembly including chassis, electric heating coil, fan, motor, and controls. Comply with UL 2021.

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.

2.3 CABINET

A. Front Panel: Extruded-aluminum bar grille, with removable panels fastened with tamperproof fasteners.

B. Finish: Baked enamel over baked-on primer with manufacturer's standard color selected by Architect, applied to factory-assembled and -tested wall and ceiling heaters before shipping.

C. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

D. Surface-Mounted Cabinet Enclosure: Steel with finish to match cabinet.

2.4 COIL

A. Electric-Resistance Heating Coil: Nickel-chromium heating wire, free from expansion noise and 60-Hz hum, embedded in magnesium oxide refractory and sealed in corrosion-resistant metallic sheath. Terminate elements in stainless-steel, machine-staked terminals secured with stainless-steel hardware, and limit controls for high-temperature protection. Provide integral circuit breaker for overcurrent protection.

2.5 FAN AND MOTOR

A. Fan: Aluminum propeller directly connected to motor.

B. Motor: Permanently lubricated , multispeed. Comply with requirements in Section 23 05 13 "Common Motor Requirements for HVAC Equipment."

2.6 CONTROLS

A. Controls: Unit-mounted thermostat.

B. Electrical Connection: Factory wire motors and controls for a single field connection with disconnect switch.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive wall and ceiling unit heaters for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for electrical connections to verify actual locations before unit-heater installation.

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

3.2 INSTALLATION

A. Install wall and ceiling unit heaters to comply with NFPA 90A.

B. Install wall and ceiling unit heaters level and plumb.

C. Install wall-mounted thermostats and switch controls in electrical outlet boxes at heights to match lighting controls. Verify location of thermostats and other exposed control sensors with Drawings and room details before installation.

D. Ground equipment according to Section 26 05 26 "Grounding and Bonding for Electrical Systems."

E. Connect wiring according to Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."

END OF SECTION

SECTION 26 05 13

MEDIUM-VOLTAGE CABLES

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For each type of cable. Include splices and terminations for cables and cable accessories.

1.2 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each type of cable and accessory.

B. Design Data: Cable pulling calculations, including conduit size and fill percentage, pulling tensions, cable sidewall pressure, jam probability, voltage drop, and ground wire sizing for each cable.

C. Field quality-control reports.

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.

B. Comply with IEEE C2 and NFPA 70.

C. Source Limitations: Obtain cables and accessories from single source from single manufacturer.

2.2 CABLES

A. Cable Type: Type MV 90.

B. Conductor Insulation: Crosslinked polyethylene with full concentric neutral.

1. Voltage Rating: 15 kV.
2. Insulation Thickness: 100 percent insulation level.

C. Conductor: Aluminum.

D. Comply with UL 1072, AEIC CS8, ICEA S-93-639/NEMA WC 74, and ICEA S-97-682, and ICEA S-94-649.

E. Conductor Stranding: Compact round, concentric lay, Class B.

F. Strand Filling: Conductor interstices are filled with impermeable compound.

G. Shielding: Copper tape, helically applied over semiconducting insulation shield.

H. Shielding and Jacket: Corrugated copper drain wires embedded in extruded, chlorinated, polyethylene jacket.

I. Cable Sheath: Interlocked aluminum applied over cable.

J. Cable Jacket: Sunlight-resistant PVC.

2.3 CONNECTORS

A. Comply with ANSI C119.4 for connectors between aluminum conductors or for connections between aluminum to copper conductors.

2.4 SOLID TERMINATIONS

A. Shielded-Cable Terminations: Comply with the following classes of IEEE 48. Insulation class shall be equivalent to that of cable. Include shield ground strap for shielded cable terminations.

2.5 SEPARABLE INSULATED CONNECTORS

A. Description: Modular system, complying with IEEE 386, with disconnecting, single-pole, cable terminators and with matching, stationary, plug-in, dead-front terminals designed for cable voltage and for sealing against moisture.

B. Terminations at Distribution Points: Modular type, consisting of terminators installed on cables and modular, dead-front, terminal junctions for interconnecting cables.

C. Load-Break Cable Terminators: Elbow-type units with 200 A load make/break and continuous-current rating; coordinated with insulation diameter, conductor size, and material of cable being terminated. Include test point on terminator body that is capacitance coupled.

D. Dead-Front Terminal Junctions: Modular bracket-mounted groups of dead-front stationary terminals that mate and match with above cable terminators. Two-, three-, or four-terminal units as indicated, with fully rated, insulated, watertight conductor connection between terminals and complete with grounding lug, manufacturer's standard accessory stands, stainless steel mounting brackets, and attaching hardware.

1. Protective Cap: Insulating, electrostatic-shielding, water-sealing cap with drain wire.
2. Portable Feed-Through Accessory: Two-terminal, dead-front junction arranged for removable mounting on accessory stand of stationary terminal junction.
3. Grounding Kit: Jumpered elbows, portable feed-through accessory units, protective caps, test rods suitable for concurrently grounding three phases of feeders, and carrying case.

4. Standoff Insulator: Portable, single dead-front terminal for removable mounting on accessory stand of stationary terminal junction. Insulators suitable for fully insulated isolation of energized cable-elbow terminator.

E. Test-Point Fault Indicators: Applicable current-trip ratings and arranged for installation in test points of load-break separable connectors, and complete with self-resetting indicators capable of being installed with shotgun hot stick and tested with test tool.

F. Tool Set: Shotgun hot stick with energized terminal indicator, fault-indicator test tool, and carrying case.

2.6 SPLICE KITS

A. Description: For connecting medium voltage cables; type as recommended by cable or splicing kit manufacturer for the application.

B. Standard: Comply with IEEE 404.

C. Splicing Products: As recommended, in writing, by splicing kit manufacturer for specific sizes, materials, ratings, and configurations of cable conductors. Include all components required for complete splice, with detailed instructions.

1. Combination tape and cold-shrink-rubber sleeve kit with rejacketing by cast-epoxy-resin encasement or other waterproof, abrasion-resistant material.
2. Premolded, cold-shrink-rubber, in-line splicing kit.
3. Premolded, EPDM splicing body kit with cable joint sealed by interference fit of mating parts and cable.

2.7 MEDIUM-VOLTAGE TAPES

A. Description: Electrical grade, insulating tape rated for medium voltage application.

B. Ethylene/propylene rubber-based, 30 mil splicing tape, rated for 130 deg C operation. Minimum 3/4 inch wide.

C. Silicone rubber-based, 12 mil self-fusing tape, rated for 130 deg C operation. Minimum 1-1/2 inch wide.

D. Insulating-putty, 125 mil elastic filler tape. Minimum 1-1/2 inch wide.

2.8 ARC-PROOFING MATERIALS

A. Description: Fire retardant, providing arc flash protection.

B. Tape for First Course on Metal Objects: 10 mil thick, corrosion-protective, moisture-resistant, PVC pipe-wrapping tape.

C. Arc-Proofing Tape: Fireproof tape, flexible, conformable, intumescent to 0.3 inch thick, and compatible with cable jacket.

D. Glass-Cloth Tape: Pressure-sensitive adhesive type, 1 inch wide.

2.9 FAULT INDICATORS

A. Indicators: Manually reset fault indicator with inrush restraint feature, arranged to clamp to cable sheath and provide a display after a fault has occurred in cable. Instrument shall not be affected by heat, moisture, and corrosive conditions and shall be recommended by manufacturer for installation conditions.

B. Resetting Tool: Designed for use with fault indicators, with moisture-resistant storage and carrying case.

2.10 SOURCE QUALITY CONTROL

A. Test and inspect cables according to ICEA S-97-682 before shipping.

B. Test strand-filled cables for water-penetration resistance according to ICEA T-31-610, using a test pressure of 5 psig.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install cables according to IEEE 576.

B. Pull Conductors: Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

1. Where necessary, use manufacturer-approved pulling compound or lubricant that does not deteriorate conductor or insulation.
2. Use pulling means, including fish tape, cable, rope, and basket-weave cable grips, that do not damage cables and raceways. Do not use rope hitches for pulling attachment to cable.
3. Use pull-in guides, cable feeders, and draw-in protectors as required to protect cables during installation.
4. Do not pull cables with ends unsealed. Seal cable ends with rubber tape.

C. Install exposed cables parallel and perpendicular to surfaces of exposed structural members and follow surface contours where possible.

D. Install "buried-cable" warning tape 12 inch above cables.

E. In manholes, handholes, pull boxes, junction boxes, and cable vaults, train cables around walls by the longest route from entry to exit; support cables at intervals adequate to prevent sag.

F. Install sufficient cable length to remove cable ends under pulling grips. Remove length of conductor damaged during pulling.

G. Install cable splices at pull points and elsewhere as indicated; use standard kits.

H. Install terminations at ends of conductors, and seal multiconductor cable ends with standard kits.

I. Install separable insulated-connector components as follows:

1. Protective Cap: At each terminal junction, with one on each terminal to which no feeder is indicated to be connected.
2. Portable Feed-Through Accessory: At each terminal junction, with one on each terminal.
3. Standoff Insulator: At each terminal junction, with one on each terminal.

J. Arc Proofing: Unless otherwise indicated, arc proof medium-voltage cable at locations not protected by conduit, cable tray, direct burial, or termination materials. In addition to arc-proofing tape manufacturer's written instructions, apply arc proofing as follows:

1. Clean cable sheath.
2. Wrap metallic cable components with 10 mil pipe-wrapping tape.
3. Smooth surface contours with electrical insulation putty.
4. Apply arc-proofing tape in one half-lapped layer with coated side toward cable.
5. Band arc-proofing tape with two layers of 1 inch wide half-lapped, adhesive, glass-cloth tape at each end of the arc-proof tape.

K. Seal around cables passing through fire-rated elements according to Section 07 84 13 "Penetration Firestopping."

L. Install fault indicators on each phase where indicated.

M. Ground shields of shielded cable at terminations, splices, and separable insulated connectors. Ground metal bodies of terminators, splices, cable and separable insulated-connector fittings, and hardware.

N. Ground shields of shielded cable at one point only. Maintain shield continuity and connections to metal connection hardware at all connection points.

O. Identify cables according to Section 26 05 53 "Identification for Electrical Systems." Identify phase and circuit number of each conductor at each splice, termination, pull point, and junction box. Arrange identification so that it is unnecessary to move the cable or conductor to read the identification.

3.2 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA ATS. Certify compliance with test parameters.
2. After installing medium-voltage cables and before electrical circuitry has been energized, test for compliance with requirements.
3. Perform direct-current High Potential test of each new conductor according to NETA ATS, Ch. 7.3.3. Do not exceed cable manufacturer's recommended maximum test voltage.

B. Medium-voltage cables will be considered defective if they do not pass tests and inspections.

C. Prepare test and inspection reports.

END OF SECTION

SECTION 26 05 19

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 COPPER 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. 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 B3 for bare annealed copper and with ASTM B8 for stranded conductors.

D. Conductor Insulation:

1. Type AC and MC: UL Listed.
2. Type THHN and Type THWN-2: Comply with UL 83.
3. Type XHHW-2: Comply with UL 44.

2.2 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. 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.
2. Power-Limited Fire-Alarm Circuits: Comply with UL 1424.

D. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors.

E. Ground Conductor: Bare or Insulated.

F. Conductor Insulation:

1. Type TFN/THHN/THWN-2: Comply with UL 83.
2. Type XHHW-2: Comply with UL 44.

G. Armor: Steel, interlocked.

H. Jacket: PVC applied over armor.

2.3 ARMORED CABLE, TYPE AC

A. Description: A factory assembly of insulated current-carrying conductors with or without an equipment grounding conductor 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 4.
3. 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.

D. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors.

E. Ground Conductor: Bare or Insulated.

F. Conductor Insulation: Type THHN/THWN-2. Comply with UL 83.

G. Armor: Steel, interlocked.

2.4 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. Jacketed Cable Connectors: For steel and aluminum jacketed cables, zinc die-cast with set screws, designed to connect conductors specified in this Section.

C. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.

1. Size, ampacity rating, material, type and class for application and service indicated.
2. Termination: Compression.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders:

1. Copper; solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

B. Branch Circuits:

1. Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

C. ASD Output Circuits Cable: Extra-flexible stranded for all sizes.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Service Entrance: Type THHN/THWN-2, single conductors in raceway Type XHHW-2, single conductors in raceway.

B. Exposed Feeders: Type THHN/THWN-2, single conductors in raceway Type XHHW-2, single conductors in raceway.

C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspaces: Type THHN/THWN-2, single conductors in raceway.

D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway Type XHHW-2, single conductors in raceway.

E. Exposed Branch Circuits, Including in Crawlspaces: Type THHN/THWN-2, single conductors in raceway.

F. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN/THWN-2, single conductors in raceway Armored cable, Type AC Metal-clad cable, Type MC Nonmetallic-sheathed cable.

G. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway Type XHHW-2, single conductors in raceway.

H. 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, GENERAL

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 26 05 33 "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 26 05 29 "Hangers and Supports for Electrical Systems."

3.4 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.

B. Make splices, terminations, and taps that are compatible with conductor material.

C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inch of slack.

3.5 IDENTIFICATION

A. Identify and color-code conductors and cables according to Section 26 05 53 "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 26 05 44 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.7 SEALING

A. Apply joint sealant to electrical penetrations of floor and wall assemblies to restore original water resistance of assembly according to Section 07 92 00 “Joint Sealants”.

3.8 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements.
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.

B. Cables will be considered defective if they do not pass tests and inspections.

C. 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 26

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.2 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Plans showing dimensioned locations of grounding features specified in "Field Quality Control" Article, including the following:

1. Ground rods.
2. Ground rings.

B. Field quality-control reports.

1.3 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 26 00 10 "Supplemental Requirements for Electrical," include the following:
   a. Plans showing as-built, dimensioned locations of system described in "Field Quality Control" Article, including the following:
      1) Ground rods.
      2) Ground rings.

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.

B. Comply with UL 467 for grounding and bonding materials and equipment.

2.2 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 B3.

2. Stranded Conductors: ASTM B8.

2.3 CONNECTORS

A. Listed and labeled by an 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. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

C. Mechanical-Type Bus-Bar Connectors: Cast silicon bronze, solderless compression -type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

D. Compression-Type Bus-Bar Connectors: Copper or copper alloy, with two wire terminals.

E. Beam Clamps: Mechanical type, terminal, ground wire access from four directions, with dual, tin-plated or silicon bronze bolts.

F. Cable-to-Cable Connectors: Compression type, copper or copper alloy.

G. Cable Tray Ground Clamp: Mechanical type, zinc-plated malleable iron.

H. Conduit Hubs: Mechanical type, terminal with threaded hub.

I. Ground Rod Clamps: Mechanical type, copper or copper alloy, terminal with hex head bolt.

J. Lay-in Lug Connector: Mechanical type, copper rated for direct burial terminal with set screw.

K. Signal Reference Grid Clamp: Mechanical type, stamped-steel terminal with hex head screw.

L. Straps: Solid copper, cast-bronze clamp copper lugs. Rated for 600 A.

M. Tower Ground Clamps: Mechanical type, copper or copper alloy, terminal oneortwo-piece clamp.

N. U-Bolt Clamps: Mechanical type, copper or copper alloy, terminal listed for direct burial.

O. Water Pipe Clamps:

1. Mechanical type, two pieces with zinc-plated bolts.
   a. Material: Die-cast zinc alloy.
   b. Listed for direct burial.
2. U-bolt type with malleable-iron clamp and copper ground connector rated for direct burial.

2.4 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad steel ; 3/4 inch by 10 ft. .

B. Ground Plates: 1/4 inch thick, hot-dip galvanized.

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. 2/0 AWG minimum.

1. Bury at least 30 inch below grade.

C. Grounding Conductors: Green-colored insulation with continuous yellow stripe.

D. 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 must be connected to the ground bus. Install a main bonding jumper between the neutral and ground buses.

3.3 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 inch 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. Use exothermic welds for all below-grade connections.

3. For grounding electrode system, install at least two 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.

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 for Steel Building Structure: Install a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 ft. apart.

H. Ground Ring: Install a grounding conductor, electrically connected to each building structure ground rod and to each indicated item, extending around the perimeter of area or item indicated.

1. Install copper conductor per NEC but not less than #2 for ground ring and for taps to building steel.
2. Bury ground ring not less than 24 inch from building's foundation.

I. Connections: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact are galvanically compatible.

1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
2. Make connections with clean, bare metal at points of contact.

3. Make aluminum-to-steel connections with stainless steel separators and mechanical clamps.
4. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

3.4 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
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. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal , and at individual ground rods. Make tests at ground rods before any conductors are connected.
   a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
   b. Perform tests by fall-of-potential method according to IEEE 81.
4. Prepare dimensioned Drawings locating each ground rod and ground-rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

B. Grounding system will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

D. Report measured ground resistances that exceed the following values:

1. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 10 ohms.
2. Power and Lighting Equipment or System with Capacity of 500 to 1000 kVA: 5 ohms.
3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.
4. Power Distribution Units or Panelboards Serving Electronic Equipment: 3 ohm(s).
5. Substations and Pad-Mounted Equipment: 5 ohms.
6. Manhole Grounds: 10 ohms.

E. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Director's Representative promptly and include recommendations to reduce ground resistance.

END OF SECTION

SECTION 26 05 33

RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For the following:

1. Wireways and auxiliary gutters.
2. Surface metal raceways.
3. Surface nonmetallic raceways.
4. Floor boxes.
5. Cabinets, cutout boxes, and miscellaneous enclosures.

PART 2 - PRODUCTS

2.1 TYPE EMT-S RACEWAYS AND ELBOWS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 797 and UL Category Control Number FJMX.

B. Steel Electrical Metal Tubing (EMT-S) and Elbows:

1. Material: Steel.
2. Options:
   a. Exterior Coating: Zinc or Alternate corrosion-resistant coating.
   b. Exterior Coating for Sensitive Electronic Equipment Areas: painted enamel finish or PVC coated finish.
   c. Interior Coating: Zinc free Organic coating.
   d. Minimum Trade Size: 1/2".
   e. Colors: As indicated on Drawings.

2.2 TYPE ENT RACEWAYS AND FITTINGS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 1653 and UL Category Control Number FKHU.

B. Electrical Nonmetallic Tubing (ENT) and Fittings:

1. Options:

a. Minimum Trade Size**:** 1/2" **.**
b. Fittings:
1) Mechanically Attached Fittings: UL 1653.
2) Solvent-Attached Fittings: UL 651.

2.3 TYPE ERMC-S RACEWAYS, ELBOWS, COUPLINGS, AND NIPPLES

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 6 and UL Category Control Number DYIX.

B. Galvanized-Steel Electrical Rigid Metal Conduit (ERMC-S-G), Elbows, Couplings, and Nipples:

1. Exterior Coating: Hot Dipped Galvanized.
2. Options:
a. Interior Coating: Hot Dipped Galvanized with organic top coating. .
b. Minimum Trade Size: 3/4" Metric designator 16 (trade size 1/2) Metric designator 21 (trade size 3/4).
c. Colors: As indicated on Drawings.

C. PVC-Coated-Steel Electrical Rigid Metal Conduit (ERMC-S-PVC), Elbows, Couplings, and Nipples:

1. Additional Characteristics:
a. Fittings for PVC-Coated Conduit:
1) Minimum coating thickness of 0.040 inch, with overlapping sleeves protecting threaded joints.
2) Conduit bodies must be Form 8 with an effective seal and a positive placement feature to ease and assure proper installation. Certified results confirming seal performance at 15 psig (positive) and 25 in. of mercury (vacuum) for 72 hours must be available. Conduit bodies must be supplied with plastic-encapsulated stainless steel cover screws.
3) Form 2 inch long or one pipe diameter long, whichever is less, PVC sleeve at openings of female fittings, except unions. Inside sleeve diameter must be matched to outside diameter of metal conduit.
4) PVC coating on the outside of conduit couplings must be protected from tool damage during installation.
5) Female threads on fittings and couplings must be protected by urethane coating.
6) Fittings must be from same manufacturer as conduit.
7) Beam clamps and U bolts must be formed and sized to fit outside diameter of coated conduit. Plastic-encapsulated nuts must cover the exposed portions of threads.
2. Options:
a. Exterior Coating: PVC complying with NEMA RN 1 and marked ETL Verified PVC-001.
b. Interior Coating: Zinc free Organic coating.

c. Minimum Trade Size: 3/4".
d. Colors: As indicated on Drawings.
e. Conduit Fittings for Hazardous (Classified) Locations: UL 1203.
f. Expansion and Deflection Fittings: UL 651 with flexible external bonding jumper.

2.4 TYPE FMC-S RACEWAYS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 1 and UL Category Control Number DXUZ.

B. Steel Flexible Metal Conduit (FMC-S):

1. Material: Steel.
2. Options:
   a. Minimum Trade Size: 1/2".
   b. Colors: As indicated on Drawings.

2.5 TYPE IMC RACEWAYS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 1242 and UL Category Control Number DYBY.

B. Steel Electrical Intermediate Metal Conduit (IMC):

1. Options:
   a. Exterior Coating: Zinc.
   b. Exterior Coating for Sensitive Electronic Equipment Areas: Painted enamel finish or PVC coated finish.
   c. Interior Coating: Zinc free organic coating.
   d. Minimum Trade Size: 1/2".
   e. Colors: As indicated on Drawings.

2.6 TYPE LFMC RACEWAYS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 360 and UL Category Control Number DXHR.

B. Steel Liquidtight Flexible Metal Conduit (LFMC-S):

1. Material: Steel.

2. Options:
    a. Minimum Trade Size: 1/2".
    b. Colors: As indicated on Drawings.

2.7 TYPE PVC RACEWAYS AND FITTINGS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 651 and UL Category Control Number DZYR.

B. Schedule 40 Rigid PVC Conduit (PVC-40) and Fittings:

1. Dimensional Specifications: Schedule 40.
2. Options:
    a. Minimum Trade Size: 1/2".
    b. Markings: For use with maximum 90 deg C wire.

C. Schedule 80 Rigid PVC Conduit (PVC-80) and Fittings:

1. Dimensional Specifications: Schedule 80.
2. Options:
    a. Minimum Trade Size: 1/2".
    b. Markings: For use with maximum 90 deg C wire.

2.8 FITTINGS FOR CONDUIT, TUBING, AND CABLE

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.

B. Fittings for Type ERMC, Type IMC, and Type PVC Raceways:

1. General Characteristics: UL 514B and UL Category Control Number DWTT.
2. Options:
    a. Material: Steel .
    b. Coupling Method: Compression coupling .
    c. Conduit Fittings for Hazardous (Classified) Locations: UL 1203.
    d. Expansion and Deflection Fittings: UL 651 with flexible external bonding jumper.

C. Fittings for Type EMT Raceways:

1. General Characteristics: UL 514B and UL Category Control Number FKAV.
2. Options:
    a. Material: Steel .
    b. Coupling Method: Setscrew coupling. Setscrew couplings with only single screw per conduit are unacceptable.

c. Conduit Fittings for Hazardous (Classified) Locations: UL 1203.
d. Expansion and Deflection Fittings: UL 651 with flexible external bonding jumper.

D. Fittings for Type FMC Raceways:

1. General Characteristics: UL 514B and UL Category Control Number ILNR.

E. Fittings for Type LFMC and Type LFNC Raceways:

1. General Characteristics: UL 514B and UL Category Control Number DXAS.

2.9 ELECTRICALLY CONDUCTIVE CORROSION-RESISTANT COMPOUNDS FOR THREADED CONDUIT

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 2419 and UL Category Control Number FOIZ.

2.10 SOLVENT CEMENTS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: As recommended by conduit manufacturer in accordance with UL 514B and UL Category Control Number DWTT.
3. Sustainability Characteristics:
4. VOC Content: 510 g/L or less for PVCand 490g/L or less forCPVC conduit and fittings.

2.11 SURFACE METAL RACEWAYS AND FITTINGS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 5 and UL Category Control Number RJBT.

B. Surface Metal Raceways and Fittings with Metal Covers:

1. Options:
   a. Galvanized steel base with snap-on covers.
   b. Manufacturer's standard enamel finish in color selected by Director’s Representative.
   c. Wiring Channels: Multiple channels must be capable of housing a standard 20 to 30 A NEMA device flush within the raceway.

C. Surface Metal Raceways and Fittings with Nonmetallic Covers:

1. Additional Characteristics: UL 94, V-0 requirements for self-extinguishing characteristics.
2. Options:
    a. Galvanized steel base with snap-on covers.
    b. Provide texture and color selected by Director's Representative from manufacturer's standard colors.
    c. Wiring Channels: . Multiple channels must be capable of housing a standard 20 to 30 A NEMA device flush within the raceway.

2.12 SURFACE NONMETALLIC RACEWAYS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics:
    a. UL 5A and UL Category Control Number RJTX.
    b. UL 94, V-0 requirements for self-extinguishing characteristics.

B. Surface Nonmetallic Raceways and Fittings with Nonmetallic Covers:

1. Options:
    a. Provide texture and color selected by Director's Representative from manufacturer's standard colors.
    b. Wiring Channels: . Multiple channels must be capable of housing a standard 20 to 30 A NEMA device flush within the raceway.

2.13 METALLIC OUTLET BOXES, DEVICE BOXES, RINGS, AND COVERS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 514A and UL Category Control Number QCIT.

B. Metallic Outlet Boxes:

1. Description: Box having pryout openings, knockouts, threaded entries, or hubs in either the sides of the back, or both, for entrance of conduit, conduit or cable fittings, or cables, with provisions for mounting outlet box cover, but without provisions for mounting wiring device directly to box.
2. Options:
    a. Material: Sheet steelor Cast metal.
    b. Sheet Metal Depth: Minimum 1.5 inch .
    c. Cast-Metal Depth: Minimum 1.8 inch .
    d. Luminaire Outlet Boxes and Covers: Nonadjustable, listed and labeled for attachment of luminaire weighing up to 50 lb. If more than 50lb, provide box marked with maximum allowable weight..
    e. Paddle Fan Outlet Boxes and Covers: Nonadjustable, designed for attachment of paddle fan weighing up to 70 lb.

C. Metallic Conduit Bodies:

1. Description: Means for providing access to interior of conduit or tubing system through one or more removable covers at junction or terminal point. In the United States, conduit bodies are listed in accordance with outlet box requirements.

D. Metallic Device Boxes:

1. Description: Box with provisions for mounting wiring device directly to box.
2. Options:
   a. Material: Sheet steelor Cast metal.
   b. Sheet Metal Depth: minimum 1.5 inch .
   c. Cast-Metal Depth: minimum 1.8 inch .

E. Metallic Extension Rings:

1. Description: Ring intended to extend sides of outlet box or device box to increase box depth, volume, or both.

2.14 NONMETALLIC OUTLET BOXES, DEVICE BOXES, RINGS, AND COVERS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 514C and UL Category Control Number QCMZ.

B. Nonmetallic Outlet Boxes:

1. Description: Box having pryout openings, knockouts, threaded entries, or hubs in either the sides or the back, or both, for entrance of conduit, conduit or cable fittings, or cables, with provisions for mounting outlet box cover, but without provisions for mounting wiring device directly to box.

C. Nonmetallic Conduit Bodies:

1. Description: Means for providing access to interior of conduit or tubing system through one or more removable covers at junction or terminal point. In the United States, conduit bodies are listed in accordance with outlet box requirements.

D. Nonmetallic Device Boxes:

1. Description: Box with provisions for mounting wiring device directly to box.

E. Nonmetallic Extension Rings:

1. Description: Ring intended to extend sides of outlet box or device box to increase box depth, volume, or both.

F. Nonmetallic Floor Boxes and Floor Box Covers:

1. Description: Box mounted in floor with floor box cover and other components to complete floor box enclosure.

G. Nonmetallic Raised-Floor Boxes and Floor Box Covers:

1. Description: Box mounted in raised-floor with floor box cover and other components to complete floor box enclosure.

H. Nonmetallic Recessed Access-Floor Boxes and Recessed Floor Box Covers:

1. Description: Floor box with provisions for mounting wiring devices below floor surface and floor box cover with provisions for passage of cords to recessed wiring devices mounted within floor box.

I. Nonmetallic Floor Nozzles:

1. Description: Enclosure intended primarily as housing for receptacle, provided with means, such as collar, for surface-mounting on floor, which may or may not include stem to support it above floor level, and is sealed against the entrance of scrub water at floor level.

J. Nonmetallic Concrete Boxes and Covers:

1. Description: Box intended for use in poured concrete.

2.15 CABINETS, CUTOUT BOXES, JUNCTION BOXES, PULL BOXES, AND MISCELLANEOUS ENCLOSURES

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics:
   a. Non-Environmental Characteristics: UL 50.
   b. Environmental Characteristics: UL 50E.

B. Indoor Sheet Metal Cabinets:

1. Description: Enclosure provided with frame, mat, or trim in which swinging door or doors are or can be hung.
2. Additional Characteristics: UL Category Control Number CYIV.
3. Options:
   a. Degree of Protection: Type 1 .

C. Indoor Sheet Metal Junction and Pull Boxes:

1. Description: Box with a blank cover that serves the purpose of joining different runs of raceway or cable.
2. Additional Characteristics: UL Category Control Number BGUZ.
3. Options:
    a. Degree of Protection: Type 1 .

D. Indoor Cast-Metal Junction and Pull Boxes:

1. Description: Box with a blank cover that serves the purpose of joining different runs of raceway or cable.
2. Additional Characteristics: UL Category Control Number BGUZ.
3. Options:
    a. Degree of Protection: Type 1 .

E. Outdoor Sheet Metal Cabinets:

1. Description: Enclosure provided with frame, mat, or trim in which swinging door or doors are or can be hung.
2. Additional Characteristics: UL Category Control Number CYIV.
3. Options:
    a. Degree of Protection: Type 3R .

F. Outdoor Sheet Metal Junction and Pull Boxes:

1. Description: Box with a blank cover that serves the purpose of joining different runs of raceway or cable.
2. Additional Characteristics: UL Category Control Number BGUZ.
3. Options:
    a. Degree of Protection: Type 3R .

G. Outdoor Cast-Metal Junction and Pull Boxes:

1. Description: Box with a blank cover that serves the purpose of joining different runs of raceway or cable.
2. Additional Characteristics: UL Category Control Number BGUZ.
3. Options:
    a. Degree of Protection: Type 3R .

2.16 COVER PLATES FOR DEVICES BOXES

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics:
    a. Reference Standards: UL 514D and UL Category Control Numbers QCIT and QCMZ.
    b. Wallplate-Securing Screws: Metal with head color to match wallplate finish.

B. Metallic Cover Plates for Device Boxes:

1. Options:
   a. Damp and Wet Locations: Listed, labeled, and marked for location and use. Provide gaskets and accessories necessary for compliance with listing.
   b. Wallplate Material: Steel with white baked enamel, suitable for field paintingexcept in mechanical/electrical/equipment spaces provide Galvanized steel. In Damp/Wet locations provide non-magnetic stainless steel with brushed finish, .032 inch thick type 302/304. .

C. Nonmetallic Cover Plates for Device Boxes:

1. Options:
   a. Damp and Wet Locations: Listed, labeled, and marked for location and use. Provide gaskets and accessories necessary for compliance with listing.
   b. Wallplate Material: 0.060 inch thick high-impact thermoplastic (nylon) with smooth finish and color matching wiring device .
   c. Color: White.

2.17 HOODS FOR OUTLET BOXES

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics:
   a. Reference Standards:
      1) UL 514D and UL Category Control Numbers QCIT and QCMZ.
      2) Receptacle, hood, cover plate, gaskets, and seals comply with UL 498 Supplement SA when mated with box or enclosure complying with UL 514A, UL 514C, or UL 50E.
   b. Mounts to box using fasteners different from wiring device.

B. Retractable or Reattachable Hoods for Outlet Boxes:

1. Options:
   a. Provides clear, weatherproof, "while-in-use" cover.

C. Extra-Duty, While-in-Use Hoods for Outlet Boxes:

1. Additional Characteristics: Marked "Extra-Duty" in accordance with UL 514D.
2. Options:
   a. Provides clear , weatherproof, "while-in-use" cover.
   b. Manufacturer may combine nonmetallic device box with hood as extra-duty rated assembly.

PART 3 - EXECUTION

3.1 SELECTION OF RACEWAYS

A. Unless more stringent requirements are specified in Contract Documents or manufacturers' written instructions, comply with NFPA 70 for selection of raceways. Consult Director's Representative for resolution of conflicting requirements.

B. Outdoors:

1. Exposed and Subject to Physical Damage: ERMC .
   a. Locations less than 2.5 m (8 ft) above finished floor.
2. Exposed and Not Subject to Physical Damage: ERMC PVC-80 .
3. Concealed Aboveground: ERMC .
4. Direct Buried: PVC-80 PVC-40 .
5. Concrete Encased Not in Trench: PVC-40 PVC-A .
6. Concrete Encased in Trench: PVC-40 PVC-A .
7. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC .

C. Indoors:

1. Hazardous Classified Locations: ERMC or IMC.
2. Exposed and Subject to Physical Damage: ERMC . Subject to physical damage includes the following locations:
   a. Locations less than 2.5 m (8 ft) above finished floor.
   b. Stub-ups to above suspended ceilings.
3. Exposed and Not Subject to Physical Damage: EMT .
4. Concealed in Ceilings and Interior Walls and Partitions: EMT .
5. Damp or Wet Locations: ERMC .
6. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC .
7. Circuits Operating Above 60 Hz: ERMC-A . Provide nonmetallic sleeve where aluminum raceways pass through concrete.

D. Raceway Fittings: Select fittings in accordance with NEMA FB 2.10 guidelines.

1. ERMC and IMC: Provide threaded type fittings unless otherwise indicated.

3.2 SELECTION OF BOXES AND ENCLOSURES

A. Unless more stringent requirements are specified in Contract Documents or manufacturers' written instructions, comply with NFPA 70 for selection of boxes and enclosures. Consult Director's Representative for resolution of conflicting requirements.

B. Degree of Protection:

1. Outdoors:

a. Type 3R unless otherwise indicated. Provide in-use covers for exterior receptacles.
b. Locations Exposed to Hosedown: Type 4.
c. Locations Subject to Potential Flooding: Type 6P.
d. Locations Aboveground Where Mechanism Must Operate When Ice Covered: Type 3S.
e. Locations in-Ground or Exposed to Corrosive Agents: Type 4X .
f. Locations in-Ground or Exposed to Corrosive Agents Where Mechanism Must Operate When Ice Covered: Type 3SX.

2. Indoors:
a. Type 1 unless otherwise indicated.
b. Damp or Dusty Locations: Type 4.
c. Surface Mounted in Kitchens and Other Locations Exposed to Oil or Coolants: Type 12.
d. Flush Mounted in Kitchens and Other Locations Exposed to Oil or Coolants: Type 12K.
e. Locations Exposed to Airborne Dust, Lint, Fibers, or Flyings: Type 4.
f. Locations Exposed to Hosedown: Type 4.
g. Locations Exposed to Brief Submersion: Type 6P.
h. Locations Exposed to Prolonged Submersion: Type 6P.
i. Locations Exposed to Corrosive Agents: Type 4X.
j. Locations Exposed to Spraying Oil or Coolants: Type 13.

C. Exposed Boxes Installed Less Than 2.5 m (8 ft) Above Floor:

1. Provide cast-metal boxes.
2. Provide exposed cover. Flat covers with angled mounting slots or knockouts are prohibited.

3.3 INSTALLATION OF RACEWAYS

A. Installation Standards:

1. Unless more stringent requirements are specified in Contract Documents or manufacturers' written instructions, comply with NFPA 70 for installation of raceways. Consult Director’s Representative for resolution of conflicting requirements.
2. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
3. Comply with requirements in Section 26 05 29 "Hangers and Supports for Electrical Systems" for hangers and supports.
4. Comply with NECA NEIS 101 for installation of steel raceways.
5. Comply with NECA NEIS 102 for installation of aluminum raceways.
6. Comply with NECA NEIS 111 for installation of nonmetallic raceways.
7. Install raceways square to the enclosure and terminate at enclosures without hubs with locknuts on both sides of enclosure wall. Install locknuts hand tight, plus one-quarter turn more.
8. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to metric designator 35 (trade size

1-1/4) and insulated throat metal bushings on metric designator 41 (trade size 1-1/2) and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.

9. Raceway Terminations at Locations Subject to Moisture or Vibration:
   a. Provide insulating bushings to protect conductors, including conductors smaller than No. 4 AWG. Install insulated throat metal grounding bushings on service conduits.

B. General Requirements for Installation of Raceways:

1. Complete raceway installation before starting conductor installation.
2. Provide stub-ups through floors with coupling threaded inside for plugs, set flush with finished floor. Plug coupling until conduit is extended above floor to final destination or a minimum of 2 ft above finished floor.
3. Install no more than equivalent of three 90-degree bends in conduit run except for control wiring conduits, for which no more than equivalent of two 90-degree fewer bends are permitted. Support within 12 inch of changes in direction.
4. Make bends in raceway using large-radius preformed ells except for parallel bends. Field bending must be in accordance with NFPA 70 minimum radii requirements. Provide only equipment specifically designed for material and size involved.
5. Conceal conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
6. Support conduit within 12 inch of enclosures to which attached.
7. Install raceway sealing fittings at accessible locations in accordance with NFPA 70 and fill them with listed sealing compound. For concealed raceways, install fitting in flush steel box with blank cover plate having finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings in accordance with NFPA 70.
8. 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 interior of raceways at the following points:
   a. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
   b. Where an underground service raceway enters a building or structure.
   c. Conduit extending from interior to exterior of building.
   d. Conduit extending into pressurized duct and equipment.
   e. Conduit extending into pressurized zones that are automatically controlled to maintain different pressure set points.
   f. Where otherwise required by NFPA 70.
9. Do not install conduits within 2 inch of the bottom side of a metal deck roof.
10. Keep raceways at least 6 inch away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
11. Cut conduit perpendicular to the length. For conduits metric designator 53 (trade size 2) and larger, use roll cutter or a guide to make cut straight and perpendicular to the length. Ream inside of conduit to remove burrs.
12. Install pull wires in empty raceways. Provide polypropylene or monofilament plastic line with not less than 200 lb tensile strength. Leave at least 12 inch of slack at both ends of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.

C. Requirements for Installation of Specific Raceway Types:

1. Types ERMC and IMC:
   a. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound that maintains electrical conductivity to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
2. Type ERMC-S-PVC:
   a. Follow manufacturer's installation instructions for clamping, cutting, threading, bending, and assembly.
   b. Provide PVC-coated sealing locknut for exposed male threads transitioning into female NPT threads that do not have sealing sleeves, including transitions from PVC couplings/female adapters to Type ERMC-S-PVC elbows in direct-burial applications. PVC-coated sealing locknuts must not be used in place of conduit hub. PVC-coated sealing locknut must cover exposed threads on Type ERMC-S-PVC raceway.
   c. Coat field-cut threads on PVC-coated raceway with manufacturer-approved corrosion-preventing conductive compound prior to assembly.
3. Types FMC, LFMC, and LFNC:
   a. Comply with NEMA RV 3. Provide a maximum of 72 inch of flexible conduit for recessed and semirecessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
4. Types PVC and EPEC:
   a. Do not install Type PVC or Type EPEC conduit where ambient temperature exceeds 122 deg F. Conductor ratings must be limited to 75 deg C except where installed in a trench outside buildings with concrete encasement, where 90 deg C conductors are permitted.
   b. Comply with manufacturer's written instructions for solvent welding and fittings.

D. Raceways Embedded in Slabs:

1. Run raceways larger than metric designator 27 (trade size 1) below concrete slab.
2. Arrange raceways to cross building expansion joints with expansion fittings at right angles to the joint.
3. Arrange raceways to ensure that each is surrounded by a minimum of 2 inch of concrete without voids.
4. Do not embed threadless fittings in concrete unless locations have been specifically approved by Director’s Representative.

E. Stub-ups to Above Recessed Ceilings:

1. Provide EMT, IMC, or ERMC for raceways.
2. Provide a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.

F. Raceway Fittings: Install fittings in accordance with NEMA FB 2.10 guidelines.

1. ERMC-S-PVC: Provide only fittings listed for use with this type of conduit. Patch and seal joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Provide sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
2. EMT: Provide setscrew , steel fittings. Comply with NEMA FB 2.10.
3. Flexible Conduit: Provide only fittings listed for use with flexible conduit type. Comply with NEMA FB 2.20.

G. Expansion-Joint Fittings:

1. Install in runs of aboveground PVC that are located where environmental temperature change may exceed 30 deg F and that have straight-run length that exceeds 25 ft. Install in runs of aboveground ERMC and EMT conduit that are located where environmental temperature change may exceed 100 deg F and that have straight-run length that exceeds 100 ft.
2. Install type and quantity of fittings that accommodate temperature change listed for the following locations:
   a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.
   b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.
   c. Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F temperature change.
   d. Attics: 135 deg F 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 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 of temperature change for metal conduits.
4. Install expansion fittings at locations where conduits cross building or structure expansion joints.
5. Install expansion-joint fitting with position, mounting, and piston setting selected in accordance with manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.

H. Raceways Penetrating Rooms or Walls with Acoustical Requirements:

1. Seal raceway openings on both sides of rooms or walls with acoustically rated putty or firestopping.

3.4 INSTALLATION OF SURFACE RACEWAYS

A. Install surface raceways only where indicated on Drawings.

B. Install surface raceway with a minimum 2 inch radius control at bend points.

C. Secure surface raceway with screws or other anchor-type devices at intervals not exceeding 48 inch and with no less than two supports per straight raceway section. Support surface raceway in accordance with manufacturer's written instructions. Tape and glue are unacceptable support methods.

3.5 INSTALLATION OF BOXES AND ENCLOSURES

A. Provide boxes in wiring and raceway systems wherever required for pulling of wires, making connections, and mounting of devices or fixtures.

B. 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.

C. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box, whether installed indoors or outdoors.

D. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.

E. Locate boxes so that cover or plate will not span different building finishes.

F. Support boxes in recessed ceilings independent of ceiling tiles and ceiling grid.

G. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for purpose.

H. Fasten junction and pull boxes to, or support from, building structure. Do not support boxes by conduits.

I. Set metal floor boxes level and flush with finished floor surface.

J. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

K. Do not install aluminum boxes, enclosures, or fittings in contact with concrete or earth.

L. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to ensure a continuous ground path.

M. Boxes and Enclosures in Areas or Walls with Acoustical Requirements:

1. Seal openings and knockouts in back and sides of boxes and enclosures with acoustically rated putty.
2. Provide gaskets for wallplates and covers.

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.

3.7 CLEANING

A. Boxes: Remove construction dust and debris from device boxes, outlet boxes, and floor-mounted enclosures before installing wallplates, covers, and hoods.

END OF SECTION

SECTION 26 05 43

UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 DEFINITIONS

A. Duct: A single raceway or multiple raceways, installed singly or as components of a duct bank.

B. Duct Bank: Two or more ducts installed in parallel, direct buried or with additional casing materials such as concrete.

C. Handhole: An underground chamber containing electrical cables, sized such that personnel are not required to enter in order to access the cables.

D. Manhole: An underground chamber containing electrical cables and equipment, sized to provide access with working space clearances.

E. Trafficways: Locations where vehicular or pedestrian traffic is a normal course of events.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Type PVC raceways and fittings.
2. Fittings for conduit, tubing, and cable.
3. Solvent cements.

PART 2 - PRODUCTS

2.1 TYPE PVC RACEWAYS AND FITTINGS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 651 and UL CCN DZYR.

B. Schedule 40 Rigid PVC Conduit (PVC-40) and Fittings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. ABB, Electrification Business.
   b. Calconduit; Atkore International.
   c. JM Eagle.
   d. NAPCO; Westlake Chemical Corp.
   e. Opti-Com Manufacturing Network, Inc (OMNI).

f. Topaz Lighting & Electric.
2. Dimensional Specifications: Schedule 40.
3. Options:
   a. Minimum Trade Size: Metric designator 21 (trade size 3/4).
   b. Markings: For use with maximum 90 deg C wire.

C. Schedule 80 Rigid PVC Conduit (PVC-80) and Fittings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. ABB, Electrification Business.
   b. Calconduit; Atkore International.
   c. JM Eagle.
   d. Opti-Com Manufacturing Network, Inc (OMNI).
   e. Topaz Lighting & Electric.
2. Dimensional Specifications: Schedule 80.
3. Options:
   a. Minimum Trade Size: Metric designator 21 (trade size 3/4).
   b. Markings: For use with maximum 90 deg C wire.

2.2 FITTINGS FOR CONDUIT, TUBING, AND CABLE

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.

B. Metallic Fittings for Type ERMC, Type IMC, Type PVC, Type EPEC, and Type RTRC Raceways:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. ABB, Electrification Business.
   b. Appleton; Emerson Electric Co., Automation Solutions.
   c. Crouse-Hinds; brand of Eaton, Electrical Sector.
   d. Konkore Fittings; Atkore International.
   e. O-Z/Gedney; brand of Emerson Electric Co., Automation Solutions, Appleton Group.
   f. Penn Aluminum Conduit & EMT; Penn Aluminum International LLC; Berkshire Hathaway.
   g. Raco Taymac Bell; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
   h. Southwire Company, LLC.
   i. Topaz Lighting & Electric.
2. General Characteristics: UL 514B and UL CCN DWTT.
3. Options:
   a. Material: Steel.
   b. Coupling Method: Compression coupling.
   c. Conduit Fittings for Hazardous (Classified) Locations: UL 1203.
   d. Expansion and Deflection Fittings: UL 651 with flexible external bonding jumper.

2.3 SOLVENT CEMENTS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: As recommended by conduit manufacturer in accordance with UL 514B and UL CCN DWTT.

2.4 MANHOLES FOR EXTERIOR UNDERGROUND WIRING

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics:
   a. ASTM C858 for design and manufacturing processes.
   b. SCTE 77.

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordinate layout and installation of duct, duct bank, manholes, handholes, and boxes with final arrangement of other utilities, site grading, and surface features as determined in field. Notify Director's Representative if there is conflict between areas of excavation and existing structures or archaeological sites to remain.

B. Coordinate elevations of duct and duct-bank entrances into manholes, handholes, and boxes with final locations and profiles of duct and duct banks, as determined by coordination with other utilities, underground obstructions, and surface features. Revise locations and elevations as required to suit field conditions and to ensure that duct and duct bank will drain to manholes and handholes, and as approved by Director's Representative.

C. Clear and grub vegetation to be removed, and protect vegetation to remain in accordance with Section 31 10 00 "Site Clearing." Remove and stockpile topsoil for reapplication in accordance with Section 31 10 00 "Site Clearing."

3.2 SELECTION OF UNDERGROUND DUCTS

A. Duct for Electrical Feeders 600 V and Less: PVC-40, unless otherwise indicated.

B. Duct for Electrical Branch Circuits: PVC-40, direct buried unless otherwise indicated.

C. Underground Ducts Crossing Paved Paths Walks and Driveways: rigid galvanized.

D. Stub-ups: Concrete encased, PVC-80.

3.3 EARTHWORK

A. Excavation and Backfill: Comply with Section 31 20 00 "Earth Moving," but do not use heavy-duty, hydraulic-operated, compaction equipment.

B. Restoration: Restore area immediately after backfilling is completed.

C. Restore surface features at areas disturbed by excavation, and re-establish original grades unless otherwise indicated. Replace removed sod immediately after backfilling is completed.

D. 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 32 92 00 "Turf and Grasses" and Section 32 93 00 "Plants."

E. Cut and patch existing pavement in path of underground duct, duct bank, and underground structures in accordance with "Cutting and Patching" Article in Section 01 73 00 "Execution."

3.4 INSTALLATION OF DUCTS AND DUCT BANKS

A. Reference Standards:

1. Unless more stringent requirements are specified in Contract Documents or manufacturers' published instructions, comply with NEMA TCB 2 for installation of underground ducts and duct banks.
2. Consult Director’s Representative for resolution of conflicting requirements.

B. Special Techniques:

1. Pulling Cord: Install 200 lbf test nylon cord in empty ducts.
2. Direct-Buried Duct and Duct Bank:
    a. Excavate trench bottom to provide firm and uniform support for duct. Comply with requirements in Section 31 20 00 "Earth Moving" for preparation of trench bottoms for pipes less than 6 inches in nominal diameter.
    b. Width: Excavate trench 3 inch wider than duct on each side.
    c. Depth: Install top of duct at least 36 inches below finished grade unless otherwise indicated.
    d. Set elevation of top of duct bank below frost line.
    e. Place minimum 3 inch of sand as bed for duct. Place sand to minimum of 6 inch above top level of duct.
    f. Support ducts on duct spacers coordinated with duct size, duct spacing, and outdoor temperature.
    g. Install manufactured duct elbows for stub-ups, at building entrances, and at changes of direction in duct direction unless otherwise indicated. Encase elbows for stub-up ducts throughout length of elbow.
3. Underground-Line Warning Tape: Bury nonconducting underground line specified in Section 26 05 53 "Identification for Electrical Systems" no less than 12 inches above concrete-encased duct and duct banks and approximately 12 inches below grade. Align tape parallel to and within 3 inches of centerline of duct bank. Provide additional

warning tape for each 12 inch increment of duct-bank width over nominal 18 inch. Space additional tapes 12 inches apart, horizontally across width of ducts.

4. Ground ducts and duct banks in accordance with Section 26 05 26 "Grounding and Bonding for Electrical Systems."

3.5 DIVISION OF WORK

A. Electrical Contractor:

1. All conduit – materials and placement.
2. All handholes and manholes – materials and placement
3. All wire, grounding, termination, and testing.
4. All electrical testing
5. Provide vehicle charging stations at Parking Lot – mount wire and test.
6. Provide pole mounted light fixtures at Parking Lot – mount and test.
7. Provide electrical panelboard at Parking Lot – mount, wire and test.
8. Provide sleeves for all concrete pad penetrations.
9. Coordinate between General Contractor and the Director's Representative.

B. General Contractor:

1. All excavation for conduit, manholes, handholes and light poles.
2. Concrete foundations for light poles, and EV charging stations.
3. Mounting structure for electrical distribution panel at Parking Lot, including all materials, excavation, backfill, and final surface treatments.
4. Backfill, bedding compaction, final grading, and surface treatments for all conduit, manholes, handholes, and light poles.
5. Coordinate between Electrical Contractor and the Director's Representative.

END OF SECTION

SECTION 26 05 44

SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING

PART 1 - GENERAL

1.1 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. Pipe Sleeves, PVC:

1. Description: ASTM D1785, Schedule 40.

C. Sheet Metal Sleeves, Galvanized Steel, Round:

1. Description: Galvanized-steel sheet; thickness not less than 0.0239 inch; round tube closed with welded longitudinal joint, with tabs for screw-fastening the sleeve to the board.

2.2 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.

2.3 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, 28-day compressive strength.

3. Packaging: Premixed and factory packaged.

2.4 FOAM SEALANTS

A. 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. 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 07 92 00 "Joint Sealants."
2. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
3. Size pipe sleeves to provide 1/4 inch annular clear space between sleeve and raceway or cable, unless sleeve seal system is to be installed.
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.

B. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.

C. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seal systems. Size sleeves to allow for 1 inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

D. Underground, Exterior-Wall and Floor Penetrations:

1. Install steel pipe sleeves with integral waterstops. Size sleeves to allow for 1 inch 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 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 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 53

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL (NOT USED)

PART 2 - PRODUCTS

2.1 LABELS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

B. UL PGDQ2 - Vinyl Wraparound Labels: Preprinted, flexible labels laminated with clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing label ends.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Brady Corporation.
b. Champion America.
c. emedco.
d. Grafoplast Wire Markers.
e. HellermannTyton.
f. LEM Products Inc.
g. Marking Services Inc.
h. Panduit Corp.
i. Seton Identification Products; a Brady Corporation company.

C. UL PGDQ2 - Self-Adhesive Wraparound Labels: Preprinted, 3 mil thick, polyester vinyl flexible label with acrylic pressure-sensitive adhesive.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. A'n D Cable Products.
b. Brady Corporation.
c. Brother International Corporation.
d. emedco.
e. Grafoplast Wire Markers.
f. Ideal Industries, Inc.
g. LEM Products Inc.
h. Marking Services Inc.
i. Panduit Corp.

j. Seton Identification Products; a Brady Corporation company.

2. Self-Lamination: Clear; UV-, weather-, and chemical-resistant; self-laminating, with protective shield over legend. Size labels such that clear shield overlaps entire printed legend.
3. Marker for Labels:

a. Permanent, waterproof, black ink marker recommended by tag manufacturer.
b. Machine-printed, permanent, waterproof, black ink recommended by printer manufacturer.

2.2 TAGS

A. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch, with stamped legend, punched for use with self-locking cable tie fastener.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Brady Corporation.
b. Carlton Industries, LP.
c. emedco.
d. Marking Services Inc.
e. Seton Identification Products; a Brady Corporation company.

B. Nonmetallic Preprinted Tags: Polyethylene tags, 0.015 inch thick, color-coded for phase and voltage level, with factory printed permanent designations; punched for use with self-locking cable tie fastener.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Brady Corporation.
b. Carlton Industries, LP.
c. emedco.
d. Grafoplast Wire Markers.
e. LEM Products Inc.
f. Marking Services Inc.
g. Panduit Corp.
h. Seton Identification Products; a Brady Corporation company.

2.3 SIGNS

A. Laminated Acrylic or Melamine Plastic Signs:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Brady Corporation.

b. Carlton Industries, LP.
c. emedco.
d. Marking Services Inc.
e. Seton Identification Products; a Brady Corporation company.

2. Engraved legend.
3. Thickness:

a. For signs up to 20 sq. inch, minimum 1/16 inch thick.
b. For signs larger than 20 sq. inch, 1/8 inch thick.
c. Engraved legend with black letters on white face.
d. Punched or drilled for mechanical fasteners with 1/4 inch grommets in corners for mounting.
e. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

PART 3 - EXECUTION

3.1 PREPARATION

A. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.

3.2 SELECTION OF COLORS AND IDENTIFICATION MARKINGS

A. Comply with 29 CFR 1910.144 for color identification of hazards, and the following:

1. Fire-protection and fire-alarm equipment, including raceways, must be finished, painted, or suitably marked safety red.
2. Ceiling-mounted hangers, supports, cable trays, and raceways must be finished, painted, or suitably marked safety yellow where less than 7.7 ft na above finished floor.

B. Color-Coding for Phase- and Voltage-Level Identification, 1000 V or Less: Use colors listed below for ungrounded service and conductors.

1. Color must be factory applied.
2. Colors for 240 V Circuits:

a. Phase A: Black.
b. Phase B: Red.

3. Color for Neutral (Grounded Conductor): White.
4. Color for Equipment Ground: Green.
5. Color for Isolated Ground: Green with two or more yellow stripes.

C. Color-Coding Raceways, Cable Trays, Junction Boxes, and Conductors for Intrinsically-Safe Circuits: Light blue. When used to identify intrinsically-safe circuits, Article 504 of NFPA 70 requires that the color light blue not be used for any other purpose.

D. Color-Coding Instructional Signs: Self-adhesive labels, including color code for grounded and ungrounded conductors.

E. Locations of Underground Lines: Underground-line warning tape for power and lighting.

F. Vaults, Manholes, Handholes, and Pull and Junction Boxes, More Than 1000 V: For conductors in vaults, pull and junction boxes, manholes, and handholes, use write-on tags.

G. Concealed Raceways, Duct Banks, More Than 1000 V, within Buildings: Tape and stencil. Stencil legend "DANGER - CONCEALED HIGH-VOLTAGE WIRING" with 3 inch high, black letters on 20 inch centers.

1. Locate identification at changes in direction, at penetrations of walls and floors, and at 30 ft maximum intervals.
2. Identify system voltage and system or service type with black letters on orange field.

H. Equipment Identification Labels:

1. Black letters on white field.
2. Indoor Equipment: Laminated acrylic or melamine plastic sign.
3. Outdoor Equipment: Laminated acrylic or melamine sign.
4. Equipment to Be Labeled:

a. Panelboards: Typewritten directory of circuits in location provided by panelboard manufacturer. Panelboard identification must be in form of self-adhesive, engraved, laminated acrylic or melamine label.
b. Enclosures and electrical cabinets.
c. Enclosed switches.
d. Enclosed circuit breakers.

3.3 SELECTION OF SIGNS AND HAZARD MARKINGS

A. Signs, labels, and tags required for personnel safety must comply with the following standards:

1. Safety Colors: NEMA Z535.1.
2. Facility Safety Signs: NEMA Z535.2.
3. Safety Symbols: NEMA Z535.3.
4. Product Safety Signs and Labels: NEMA Z535.4.
5. Safety Tags and Barricade Tapes for Temporary Hazards: NEMA Z535.5.

B. Electrical Hazard Warnings:

1. Arc-Flash Hazard Warning: Self-adhesive labels. Comply with requirements for arc-flash hazard warning labels.
2. Raceways and Cables Carrying Circuits at More Than 1000 V:
   a. Black letters on orange field.
   b. Legend: "DANGER - CONCEALED HIGH VOLTAGE WIRING."
3. Multiple Power Sources Warning Legend: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."

4. OSHA Workspace Clearance Warning Legend: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 3 FEET MINIMUM."

3.4 INSTALLATION

A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.

B. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.

C. Install identifying devices before installing acoustical ceilings and similar concealment.

D. Verify identity of item before installing identification products.

E. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.

F. Apply identification devices to surfaces that require finish after completing finish work.

G. Install signs with approved legend to facilitate proper identification, operation, and maintenance of electrical systems and connected items.

H. Elevated Components: Increase sizes of labels, signs, and letters to those appropriate for viewing from floor.

I. Vinyl Wraparound Labels:

1. Secure tight to surface of raceway or cable at location with high visibility and accessibility.
2. Attach labels that are not self-adhesive type with clear vinyl tape, with adhesive appropriate to location and substrate.

J. Snap-Around Labels: Secure tight to surface at location with high visibility and accessibility.

K. Self-Adhesive Wraparound Labels: Secure tight to surface at location with high visibility and accessibility.

L. Metal Tags:

1. Place in location with high visibility and accessibility.

M. Nonmetallic Preprinted Tags:

1. Place in location with high visibility and accessibility.

N. Laminated Acrylic or Melamine Plastic Signs: Attach signs that are not self-adhesive type with mechanical fasteners appropriate to location and substrate.

END OF SECTION

SECTION 26 08 00

ENHANCED TESTING/COMMISSIONING OF ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes Commissioning (Cx) process requirements for the following electrical components, systems, assemblies, and equipment:
   1. Controls and instrumentation, including the following:
      a. Lighting control systems.

1.2 DEFINITIONS

A. Enhanced Testing/Commissioning.

B. Low Voltage: 600 V and below.

C. "Systems," "Assemblies," "Subsystems," "Equipment," and "Components": Where these terms are used together or separately, they shall mean "as-built" systems, assemblies, subsystems, equipment, and components.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For electrical systems and components to include in operation and maintenance manuals. In accordance with the 2020 Energy Conservation Construction Code of New York State, provide the following:
   1. Manufacturers information
   2. Specifications and recommendations;
   3. Programming procedures and data points;
   4. Narratives;
   5. Other means of illustrating to the Director’s Representative how the lighting is to be installed, maintained, and operated;
   6. Required regular maintenance actions for equipment.

1.4 QUALITY ASSURANCE

A. Electrical Testing Technician Qualifications: Technicians to perform electrical Construction Checklist verification tests, Construction Checklist verification test demonstrations, Cx tests, and Cx test demonstrations shall have the following minimum qualifications:
   1. Journey level or equivalent skill level. Vocational school four-year-program graduate or an Associate's degree in electrical systems, or similar field. Degree may be offset by three years' experience as an apprentice or a journey-level electrician. Generally, required knowledge includes electrical concepts, building operations, and application and use of tools and instrumentation to measure performance of electrical equipment, assemblies, and systems.
   2. Minimum three years' experience installing, servicing, and operating systems manufactured by approved manufacturer.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 GENERAL TESTING REQUIREMENTS

A. Certify that electrical systems, subsystems, and equipment have been installed, calibrated, and started and that they are operating according to the Contract Documents and approved Shop Drawings and submittals.

B. Certify that electrical instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents and approved Shop Drawings and submittals, and that pretest set points have been recorded.

C. Measure capacities and effectiveness of systems, assemblies, subsystems, equipment, and components, including operational and control functions to verify compliance with acceptance criteria.

D. Construction Checklists: Prepare and submit detailed construction checklists for electrical systems, subsystems, equipment, and components.
   1. Testing includes the following:
      a. Lighting controls for each space.

E. Perform tests using design conditions, whenever possible.
   1. Simulated conditions may, with approval of Director's Representative, be imposed using an artificial load when it is impractical to test under design conditions. Before simulating conditions, calibrate testing instruments. Provide equipment to simulate loads.

END OF SECTION

SECTION 26 09 23

LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data:

1. For each type of product.

B. Field quality-control reports.

1.2 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For manufacturer's warranties.

PART 2 - PRODUCTS

2.1 ELECTRONIC TIME SWITCHES

A. Electronic Time Switches: Solid state, programmable, with alphanumeric display; complying with UL 917.

1. Listed and labeled in accordance with NFPA 70, by a qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Contact Configuration: SPST .
3. Contact Rating: 30 A inductive or resistive, 240 V(ac) .
4. Programs:
   a. Eight on-off set points on a 24-hour schedule and an annual holiday schedule that overrides the weekly operation on holidays.
   b. Two channels; each channel is individually programmable with eight on-off set points on a 24-hour schedule.
5. Circuitry: Allow connection of a photoelectric relay as substitute for on-off function of a program on selected channels.
6. Astronomic Time: All channels.
7. Automatic daylight savings time changeover.
8. Battery Backup: Not less than seven days reserve, to maintain schedules and time clock.

2.2 DIGITAL LIGHTING CONTROL SYSTEM

A. Digital Low Voltage Switches

1. Regulatory Requirements:

a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

2. General Characteristics:
   a. Reference Standards: UL and cUL listed.
3. Options:
   a. Device Color: White.
   b. Switch Style: Push Button
4. Accessories:
   a. Cover Plate: 0.060 inch thick, high-impact thermoplastic (nylon) with smooth finish and color matching wiring device; from same manufacturer as wiring device.
   b. Securing Screws for Cover Plate: Metal with head color matching wallplate finish.
5. Features, Operation, and Related Equipment:
   a. Power: Operates on Class 2 power.
   b. Connection: 2 RJ45 ports
   c. Connect to occupancy sensors and control hubs. See drawings for typical wiring diagram(s).

B. Digital Low Voltage Dimming Switches

1. Regulatory Requirements:
   a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. General Characteristics:
   a. UL and cUL listed.
3. Options:
   a. Device Color: White.
   b. Dim/Switch Style: Push Button
4. Accessories:
   a. Cover Plate: 0.060 inch thick, high-impact thermoplastic (nylon) with smooth finish and color matching wiring device; from same manufacturer as wiring device.
   b. Securing Screws for Cover Plate: Metal with head color matching wallplate finish.
5. Features, Operation, and Related Equipment:
   a. Power: Operates on Class 2 power.
   b. Connection: 2 RJ45 ports.
   c. Connect to digital lighting control occupancy sensors and control hubs. See drawings for typical wiring diagram(s).

C. Indoor Digital Lighting Control System Occupancy and Vacancy Sensors

1. General Requirements:
   a. Wall or ceiling mounted digital low voltage, indoor occupancy and vacancy sensors
   b. Passive Infrared, Ultrasonic, and Dual Technology

c. Connection: 2 RJ45 ports. Hardwire with Low voltage Cat 5 connection from Control Hub
d. Listed and labeled in accordance with NFPA 70 by a qualified electrical testing laboratory recognized by authorities having jurisdiction and marked for intended location and application.
e. Operation:
1) Occupancy Sensor: Unless otherwise indicated, turn lights on to 50% when coverage area is occupied, and turn them off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
2) Vacancy Sensor: Unless otherwise indicated, lights are manually turned on and sensor turns lights off when the room is unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
f. Power: Class 2 power supplied by control hub.

2. PIR Type: Wall or Ceiling mounted; detect occupants in coverage area by their heat and movement.
a. Detector Sensitivity: Detect occurrences of 6 inch minimum movement of any portion of a human body that presents a target of not less than 36 sq. inch.
3. Ultrasonic Type: Wall or Ceiling mounted; detect occupants in coverage area through pattern changes of reflected ultrasonic energy.
a. Detector Sensitivity: Detect a person of average size and weight moving not less than 12 inch in either a horizontal or a vertical manner at an approximate speed of 12 inch/s.
4. Dual-Technology Type: Wall or Ceiling mounted; detect occupants in coverage area using PIR and ultrasonic detection methods. The particular technology or combination of technologies that control on-off functions is selectable in the field by operating controls on unit.
a. Sensitivity Adjustment: Separate for each sensing technology.
b. Detector Sensitivity: Detect occurrences of 6 inch minimum movement of any portion of a human body that presents a target of not less than 36 sq. inch, and detect a person of average size and weight moving not less than 12 inch in either a horizontal or a vertical manner at an approximate speed of 12 inch/s.
5. Coverage as indicated on drawings.

D. Digital Lighting Control Hubs

1. General Requirements:
a. Non dimming or 0-10V dimming hubs.
b. Control hubs capable of switching up to a total of 20A
c. Power: Input voltage of 120/230/277 VAC, 50/60Hz. Output is class 2 power to sensors and switches
d. Compatible with other digital lighting control devices.
e. UL and cUL listed.
f. Connection: 3-RJ45 ports for non-dimming hubs and 4-RJ45 ports for 0-10V dimming hubs.

2.3 OUTDOOR PHOTOELECTRIC SWITCHES, SOLID STATE, FLEXIBLE MOUNTING

A. Description: Solid state, with [**SPST**] dry contacts rated for 1000 W incandescent or 1800 VA inductive , to operate connected relay, contactor coils, or microprocessor input; complying with UL 773A, and compatible with ballasts and LED lamps.

1. Listed and labeled in accordance with NFPA 70, by a qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Light-Level Monitoring Range: 1.5 to 10 fc, with an adjustment for turn-on and turn-off levels within that range , and a directional lens in front of the photocell to prevent fixed light sources from causing turn-off.
3. Time Delay: Fifteen-second minimum, to prevent false operation.
4. Surge Protection: Metal-oxide varistor.
5. Mounting: Twist lock complies with ANSI C136.10, with base-and-stem mounting or stem-and-swivel mounting accessories as required to direct sensor to the north sky exposure.
6. Failure Mode: Luminaire stays ON.

2.4 OUTDOOR PHOTOELECTRIC SWITCHES, SOLID STATE, LUMINAIRE-MOUNTED

A. Description: Solid state, with SPST dry contacts rated for 1000 W incandescent or 1800 VA inductive, to operate connected load, complying with UL 773, and compatible with CFL and LED lamps.

1. Listed and labeled in accordance with NFPA 70, by a qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Light-Level Monitoring Range: 1.5 to 10 fc, with an adjustment for turn-on and turn-off levels within that range.
3. Time Delay: Thirty-second minimum, to prevent false operation.
4. Lightning Arrester: Air-gap type.
5. Mounting: Twist lock complying with ANSI C136.10, with base.
6. Failure Mode: Luminaire stays ON.

2.5 OUTDOOR PHOTOELECTRIC SWITCHES, LOW VOLTAGE

A. Description: Solid state; one set of NO dry contacts rated for 24 V(dc) at 1 Aor24 V(ac) at 1 A, to operate connected load, complying with UL 773, and compatible with lighting control system used. .

1. Listed and labeled in accordance with NFPA 70, by a qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Light-Level Monitoring Range: 1.5 to 10 fc, with an adjustment for turn-on and turn-off levels within that range.
3. Time Delay: Thirty-second minimum, to prevent false operation.
4. Mounting: 1/2 inch threaded male conduit.

5. Failure Mode: Luminaire stays ON.
6. Power Pack:
    a. Dry contacts rated for 20 A LED load at 120 and 277 V(ac), for 13 A tungsten at 120 V(ac), and for 1 hp at 120 V(ac). Sensor has 24 V(dc), 150 mA, Class 2 power source.
        1) LED status lights to indicate load status.
        2) Plenum rated.

2.6 INDOOR OCCUPANCY AND VACANCY SENSORS

A. General Requirements for Sensors:

1. WallorCeiling-mounted, solid-state indoor occupancy and vacancy sensors.
2. Passive infraredorUltrasonicorDual technology.
3. IntegratedorSeparate power pack.
4. HardwireWireless connection to switch .
5. Listed and labeled in accordance with NFPA 70, by a qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
6. Operation:
    a. Occupancy Sensor: Unless otherwise indicated, turn lights on to 50% when coverage area is occupied, and turn them off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
    b. Vacancy Sensor: Unless otherwise indicated, lights are manually turned on and sensor turns lights off when the room is unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
7. Sensor Output: Contacts rated to operate the connected relay, complying with UL 773A Sensor is powered from the power pack .
8. Power: Line voltageto power pack and 24V to sensor..
9. Power Pack: Dry contacts rated for 20 A LED load at 120 and 277 V(ac), for 13 A tungsten at 120 V(ac), and for 1 hp at 120 V(ac). Sensor has 24 V(dc), 150 mA, Class 2 power source.
10. Mounting:
    a. Sensor: Suitable for mounting in any position in a standard device box or outlet box.
    b. Relay: Externally mounted through a 1/2 inch knockout in a standard electrical enclosure.
    c. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.
11. Indicator: Digital display, to show when motion is detected during testing and normal operation of sensor.
12. Bypass Switch: Override the "on" function in case of sensor failure.
13. Automatic Light-Level Sensor: Adjustable from 2 to 200 fc; turn lights off when selected lighting level is present.

B. PIR Type: WallorCeiling mounted; detect occupants in coverage area by their heat and movement.

1. Detector Sensitivity: Detect occurrences of 6 inch minimum movement of any portion of a human body that presents a target of not less than 36 sq. inch.
2. Detection Coverage (Room, Ceiling Mounted): Detect occupancy anywhere in a circular area of 1000 sq. ft. when mounted on a 96 inch high ceiling.
3. Detection Coverage (Room, Wall Mounted): Detect occupancy anywhere within a 180-degree pattern centered on the sensor over an area of 1000 sq. ft. 2000 sq. ft. when mounted 48 inch above finished floor.

C. Ultrasonic Type: WallorCeiling mounted; detect occupants in coverage area through pattern changes of reflected ultrasonic energy.

1. Detector Sensitivity: Detect a person of average size and weight moving not less than 12 inch in either a horizontal or a vertical manner at an approximate speed of 12 inch/s.
2. Detection Coverage (Small Room): Detect occupancy anywhere within a circular area of 600 sq. ft. when mounted on a 96 inch high ceiling.
3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. when mounted on a 96 inch high ceiling.
4. Detection Coverage (Room, Wall Mounted): Detect occupancy anywhere within a 180-degree pattern centered on the sensor over an area of 1000 sq. ft. when mounted 84 inch above finished floor.

D. Dual-Technology Type: WallorCeiling mounted; detect occupants in coverage area using PIR and ultrasonic detection methods. The particular technology or combination of technologies that control on-off functions is selectable in the field by operating controls on unit.

1. Sensitivity Adjustment: Separate for each sensing technology.
2. Detector Sensitivity: Detect occurrences of 6 inch minimum movement of any portion of a human body that presents a target of not less than 36 sq. inch, and detect a person of average size and weight moving not less than 12 inch in either a horizontal or a vertical manner at an approximate speed of 12 inch/s.
3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. when mounted on a 96 inch high ceiling.
4. Detection Coverage (Room, Wall Mounted): Detect occupancy anywhere within a 180-degree pattern centered on the sensor over an area of up to2000 sq. ft. when mounted 84 inches above finished floor.

2.7 SWITCHBOX-MOUNTED OCCUPANCY SENSORS

A. General Requirements for Sensors: Automatic-wall-switch occupancy sensor with manual on-off switch, suitable for mounting in a single gang switchbox using hardwired connection .

1. Listed and labeled in accordance with NFPA 70, by a qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application , and must comply with California Title 24.
2. Occupancy Sensor Operation: Unless otherwise indicated, turn lights on when coverage area is occupied, and turn lights off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
3. Operating Ambient Conditions: Dry interior conditions, 32 to 120 deg F.

4. Switch Rating: Not less than 800 VA LED load at 120 V, 1200 VA LED load at 277 V, and 800 W incandescent.

B. Wall-Switch Sensor - Non Dimming:

1. Standard Range: 180-degree field of view, field adjustable from 180 to 40 degrees; with a minimum coverage area of 900 sq. ft. .
2. Sensing Technology: Dual technology - PIR and ultrasonic.
3. Switch Type: SP, manual "on," automatic "off."
4. Capable of controlling load in three-way application.
5. Voltage: Dual voltage - 120 and 277 V.
6. Concealed, field-adjustable, "off" time-delay selector at up to 30 minutes.
7. Adaptive Technology: Self-adjusting circuitry detects and memorizes usage patterns of the space and helps eliminate false "off" switching.
8. Color: White .
9. Faceplate: Color matched to switch.

C. Wall-Switch Sensor - Dimming:

1. Standard Range: 210-degree field of view, with a minimum coverage area of 900 sq. ft..
2. Sensing Technology: Dual Technology, PIR and Ultrasonic.
3. Switch Type: SP, manual "on," automatic "off."
4. Capable of controlling load in three-way application.
5. Voltage: Dual voltage, 120 and 277 V.
6. Concealed, field-adjustable, "off" time-delay selector at up to 30 minutes.
7. Adaptive Technology: Self-adjusting circuitry detects and memorizes usage patterns of the space and helps eliminate false "off" switching.
8. Color: White .
9. Faceplate: Color matched to switch.

2.8 DIGITAL TIMER LIGHT SWITCH

A. Description: Combination digital timer and conventional switch lighting control unit. Switchbox-mounted, backlit LCD display, with selectable time interval in 10 minute increments.

1. Rated 960 W at 120 V(ac) for tungsten lighting, 10 A at 120 V(ac) or 10 A at 277 V(ac) for fluorescent or LED lighting, and 1/4 hp at 120 V(ac).
2. Standards: Comply with UL 20.
3. Integral relay for connection to BAS.
4. Voltage: Match the circuit voltage .
5. Color: White .
6. Faceplate: Color matched to switch.

2.9 LIGHTING CONTACTORS

A. Description: Electrically operated and mechanically held, combination-type lighting contactors with nonfused disconnect, complying with NEMA ICS 2 and UL 508.

1. Current Rating for Switching: Listing or rating consistent with type of load served, including tungsten filament, inductive, and high-inrush ballast (ballast with 15 percent or less THD of normal load current).
2. Fault Current Withstand Rating: Equal to or exceeding the available fault current at the point of installation.
3. Enclosure: Comply with NEMA 250.
4. Provide with control and pilot devices as , matching the NEMA type specified for the enclosure.

B. Interface with DDC System for HVAC: Provide hardware interface to enable the DDC system for HVAC to monitor and control lighting contactors.

1. Monitoring: On-off status, .
2. Control: On-off operation, .

2.10 EMERGENCY SHUNT RELAY

A. Description: NC, electrically held relay, arranged for wiring in parallel with manual switching contacts; complying with UL 924.

1. Coil Rating: 120 V.

2.11 CONDUCTORS AND CABLES

A. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG. Comply with requirements in Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."

B. Classes 2 and 3 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 18 AWG. Comply with requirements in Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."

C. Class 1 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 14 AWG. Comply with requirements in Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine lighting control devices before installation. Reject lighting control devices that are wet, moisture damaged, or mold damaged.

B. Examine walls and ceilings for suitable conditions where lighting control devices will be installed.

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

3.2 INSTALLATION OF SENSORS

A. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression systems, and partition assemblies.

B. Install and aim sensors in locations to achieve not less than 90 percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's instructions.

3.3 INSTALLATION OF CONTACTORS

A. Mount electrically held lighting contactors with elastomeric isolator pads to eliminate structure-borne vibration unless contactors are installed in an enclosure with factory-installed vibration isolators.

3.4 INSTALLATION OF WIRING

A. Wiring Method: Comply with Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables." Minimum conduit size is 1/2 inch.

B. Wiring within Enclosures: Separate power-limited and nonpower-limited conductors in accordance with conductor manufacturer's instructions.

C. Size conductors in accordance with lighting control device manufacturer's instructions unless otherwise indicated.

D. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, device, and outlet boxes; terminal cabinets; and equipment enclosures.

3.5 IDENTIFICATION

A. Identify components and power and control wiring in accordance with Section 26 05 53 "Identification for Electrical Systems.

1. Identify controlled circuits in lighting contactors.
2. Identify circuits or luminaires controlled by photoelectric and occupancy sensors at each sensor.

B. Label time switches and contactors with a unique designation.

3.6 FIELD QUALITY CONTROL

A. Field tests must be witnessed by authorities having jurisdiction .

B. Tests and Inspections:

1. Operational Test: After installing time switches and sensors, and after electrical circuitry has been energized, start units to confirm proper unit operation.

2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

C. Nonconforming Work:

1. Lighting control devices will be considered defective if they do not pass tests and inspections.
2. Remove and replace defective units and retest.

D. Prepare test and inspection reports.

3.7 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting lighting control devices to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

1. For occupancy and motion sensors, verify operation at outer limits of detector range. Set time delay to suit Director's Representative operations.
2. For daylighting controls, adjust set points and deadband controls to suit Director's Representative operations.
3. Align high-bay occupancy sensors using manufacturer's laser aiming tool.

END OF SECTION

SECTION 26 12 19

PAD-MOUNTED, LIQUID-FILLED, MEDIUM-VOLTAGE TRANSFORMERS

PART 1 - GENERAL

1.1 DEFINITIONS

A. Bushing: An insulating structure including a central conductor, or providing a central passage for a conductor, with provision for mounting on a barrier, conducting or otherwise, for the purpose of insulating the conductor from the barrier and conducting current from one side of the barrier to the other.

B. Bushing Elbow: An insulated device used to connect insulated conductors to separable insulated connectors on dead-front, pad-mounted transformers and to provide a fully insulated connection. This is also called an "elbow connector."

C. Bushing Insert: That component of a separable insulated connector that is inserted into a bushing well to complete a dead-front, load break or nonload break, separable insulated connector (bushing).

D. Bushing Well: A component of a separable insulated connector, either permanently welded or clamped to an enclosure wall or barrier, having a cavity that receives a replaceable component (bushing insert) to complete the separable insulated connector (bushing).

E. Elbow Connector: See "bushing elbow" above.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Coordination Meeting(s): For {medium voltage work}. Conduct meeting(s) as videoconference or at Project site..

1. Attendees: Installers, fabricators, representatives of manufacturers, and administrants for field tests and inspections. Notify Architect, and Owner's Commissioning Authority of scheduled meeting dates.

1.3 ACTION SUBMITTALS

A. Product Data:

1. For each type of product.
   a. Include rated capacities, operating characteristics, and furnished specialties and accessories.

B. Shop Drawings:

1. For pad-mounted, liquid-filled, medium-voltage transformers.
   a. Include plans and elevations showing major components and features.

1) Include plan view and cross section of equipment base, showing clearances, required workspace, and locations of penetrations for grounding and conduits.

b. Include details of equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of field connections.

c. Include single-line diagram.

d. Include list of materials.

e. Include nameplate data.

f. Manufacturer's published time-current curves of transformer line-side fuses, with transformer damage curve, inrush curve, and thru fault current indicated.

1.4 INFORMATIONAL SUBMITTALS

A. Source quality-control reports.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Electrical Components, Devices, and Accessories: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

B. Comply with IEEE C2.

C. Comply with IEEE C57.12.00.

2.2 PERFORMANCE REQUIREMENTS

A. Windings Material: Copper.

B. Surge Arresters: Comply with IEEE C62.11, Distribution Class; metal-oxide-varistor type, fully shielded, separable-elbow type, suitable for plugging into inserts provided in line-side section of transformer. Connected in each phase of incoming circuit and ahead of disconnecting device.

C. Winding Connections: Connection of windings and terminal markings must comply with IEEE C57.12.70.

D. Efficiency: Comply with 10 CFR 431, Subpart K.

E. Insulation: Transformer kVA rating must be as follows: Average winding temperature rise above 30 deg C ambient temperature must not exceed 65 deg C and 80 deg C hottest-spot temperature rise at rated kVA when tested in accordance with IEEE C57.12.90, using combination of connections and taps that give highest average winding temperature rise.

F. Tap Changer: External handle, for de-energized operation.

G. Tank: Sealed, with welded-on cover.

H. Enclosure Integrity: Comply with IEEE C57.12.28 for pad-mounted enclosures that contain energized electrical equipment in excess of 600 V that may be exposed to public.

I. Mounting: Integral skid mounting frame, suitable to allow skidding or rolling of transformer in any direction, and with provision for anchoring frame to pad.

J. Insulating Liquids:

1. Less-Flammable Liquids:
   a. Edible-Seed-Oil-Based Dielectric: Listed and labeled by qualified electrical testing laboratory recognized by authorities having jurisdiction as complying with NFPA 70 requirements for fire point of not less than 300 deg C when tested in accordance with ASTM D92. Liquid must be biodegradable and nontoxic, having passed Organisation for Economic Co-operation and Development G.L.203 with zero mortality, and must be certified by U.S. Environmental Protection Agency as biodegradable, meeting Environmental Technology Verification requirements.
   b. Biodegradable and Nontoxic Dielectric: Listed and labeled by qualified electrical testing laboratory recognized by authorities having jurisdiction as complying with NFPA 70 requirements for fire point of not less than 300 deg C when tested in accordance with ASTM D92.

K. Sound level must comply with NEMA TR 1 requirements.

L. Corrosion Protection:

1. Transformer coating system must be factory applied, complying with requirements of IEEE C57.12.28 , in manufacturer's standard color green .
2. Fabricate front sill, hood, and tank base of single-compartment transformers from stainless steel in accordance with ASTM A167, Type 304 or 304L, not less than No. 13 U.S. gage, complying with requirements of IEEE C57.12.28 , standard color green .

2.3 THREE-PHASE TRANSFORMERS

A. Description:

1. Electrical Components, Devices, and Accessories: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Comply with IEEE C57.12.26.

B. Compartment Construction:

1. Single-Compartment Construction: Clamshell style, with provision for padlocking, hinged cover, and single-point latching.

C. Primary Fusing: Designed and rated to provide thermal protection of transformer by sensing overcurrent and high liquid temperature.

1. 150 kV BIL current-limiting fuses, conforming to requirements of IEEE C37.47.
2. Interrupting Rating: 50 000 A(rms sym) at system voltage.
3. Fuse Assembly: Bayonet-type, liquid-immersed, expulsion fuses in series with liquid-immersed, partial-range, current-limiting fuses. Bayonet fuse must sense both high currents and high oil temperature to provide thermal protection to transformer.
4. Provide bayonet fuse assembly with oil retention valve and external drip shield inside housing to eliminate or minimize oil spills. Valve must close when fuse holder is removed and external drip shield is installed.
5. Provide conspicuously displayed warning adjacent to bayonet fuse(s), cautioning against removing or inserting fuses unless transformer has been de-energized and tank pressure has been released.

D. Line-Side Section: Dead-front design.

1. To connect primary cable, use separable insulated connectors; coordinated with and complying with requirements of Section 26 05 13 "Medium-Voltage Cables." Bushings must be one-piece units, with ampere and BIL ratings same as connectors.
2. Access to liquid-immersed fuses.
3. Dead-front surge arresters.
4. Tap-changer operator.
5. Ground pad.

E. Capacities and Characteristics:

1. Power Rating: As indicated on drawings.
2. Voltage Ratings: 4800 V - 208Y/120 V.
3. Taps: Comply with IEEE C57.12.26 requirements .
4. Transformer BIL (kV): Comply with IEEE C57.12.26 requirements.
5. Comply with UL listing requirements for combination classification and listing for transformer and less-flammable insulating liquid.

F. Transformer Accessories:

1. Drain and filter connection.
2. Filling and top filter press connections.
3. Pressure-vacuum gauge.
4. Dial-type analog thermometer with alarm contacts.
5. Magnetic liquid level indicator with high and low alarm contacts.
6. Automatically resetting pressure-relief device. Device flow must be as recommended by manufacturer.
7. Stainless steel ground connection pads.
8. Machine-engraved nameplate, made of anodized aluminum or stainless steel.

2.4 WARNING LABELS AND SIGNS

A. Comply with requirements for labels and signs specified in Section 26 05 53 "Identification for Electrical Systems."

1. High-Voltage Warning Label: Provide self-adhesive warning signs on outside of line-side compartment door(s). Sign legend must be "DANGER HIGH VOLTAGE" printed in two lines of nominal 2 inch high letters. Word "DANGER" must be in white letters on red background and words "HIGH VOLTAGE" must be in black letters on white background.
2. Arc Flash Warning Label: Provide self-adhesive warning signs on outside of line-side compartment door(s), warning of potential electrical arc flash hazards and appropriate personal protective equipment required.

2.5 SOURCE QUALITY CONTROL

A. Testing Administrant: Engage qualified electrical testing agency to evaluate transformer.

B. Testing: Test and inspect transformer in accordance with IEEE C57.12.90.

C. Factory Tests and Inspections: Perform the following tests and inspections, by, or under supervision of, qualified electrical testing laboratory recognized by authorities having jurisdiction, before delivering to site. Affix label with name and date of qualified electrical testing laboratory's certification of system compliance on control units.

1. Resistance.
2. Turns ratio, polarity, and phase relation.
3. Transformer no-load losses and excitation current at 100 percent of ratings.
4. Transformer impedance voltage and load loss.
5. Operation of devices.
6. Lightning impulse.
7. Low frequency.
8. Leak.
9. Perform Optional Tests:
    a. Transformer no-load losses and excitation current at 110 percent of ratings.
    b. Insulation power factor.
    c. Applied potential, except that this test is not required for single-phase transformers or for three-phase Y-Y-connected transformers.
    d. Induced potential.
    e. Resistance measurements of windings on rated voltage connection and at tap extreme connections.
    f. Ratios on rated voltage connection and at tap extreme connections.
    g. Polarity and phase relation on rated voltage connection.
    h. No-load loss at rated voltage on rated voltage connection.
    i. Exciting current at rated voltage on rated voltage connection.
    j. Impedance.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine pad-mounted, liquid-filled, medium-voltage transformers upon delivery.

1. Upon delivery of transformers and prior to unloading, inspect equipment for damage that may have occurred during shipment or storage.
2. Verify that tie rods and chains are undamaged and tight, and that blocking and bracing is tight. Verify that there is no evidence of load shifting in transit, and that readings from transportation shock recorders, if equipped, are within manufacturer's recommendations.
3. Verify that there is no indication of external damage and no dents or scratches in doors and sill, tank walls, radiators and fins, or termination provisions.
4. Verify that there is no evidence of insulating-liquid leakage on transformer surfaces, at weld seams, on line- or load-side bushing parts, and at transformer base.
5. Verify that there is positive pressure or vacuum on tank. Check pressure gauge; it is required to read other than zero.
6. Compare transformers and accessories received with bill of materials to verify that shipment is complete. Verify that transformers and accessories conform with manufacturer's quotation and shop drawings. If shipment is incomplete or does not comply with Project requirements, notify manufacturer in writing immediately.
7. Verify presence of polychlorinated biphenyl content labeling.
8. Unload transformers carefully, observing packing label warnings and handling instructions.
9. Open termination compartment doors and inspect components for damage or displaced parts, loose or broken connections, cracked or chipped insulators, bent mounting flanges, dirt or foreign material, and water or moisture.

B. Handling:

1. Handle transformers carefully, in accordance with manufacturer recommendations, to avoid damage to enclosure, termination compartments, base, frame, tank, and internal components. Do not subject transformers to impact, jolting, jarring, or rough handling.
2. Protect transformer termination compartments against entrance of dust, rain, and snow.
3. Transport transformers upright, to avoid internal stresses on core and coil mounting assembly and to prevent trapping air in windings. Do not tilt or tip transformers.
4. Verify that transformer weights are within rated capacity of handling equipment.
5. Use only manufacturer-recommended points for lifting, jacking, and pulling. Use lifting lugs when lifting transformers.
6. Use jacks only at corners of tank base plate.
7. Use nylon straps of same length to balance and distribute weight when handling transformers with crane.
8. Use spreaders or lifting beam to obtain vertical lift and to protect transformer from straps bearing against enclosure. Lifting cable pull angles may not be greater than 15 degrees from vertical.
9. Exercise care not to damage tank base structure when handling transformer using skids or rollers. Use skids to distribute stresses over tank base when using rollers under large transformers.

C. Storage:

1. Store transformers in accordance with manufacturer's recommendations.

2. Transformers may be stored outdoors. If possible, store transformers at final installation locations on concrete pads. If dry concrete surfaces are unavailable, use pallets of adequate strength to protect transformers from direct contact with ground. Ensure transformer is level.
3. Ensure that transformer storage location is clean and protected from severe conditions. Protect transformers from dirt, water, contamination, and physical damage. Do not store transformers in presence of corrosive or explosive gases. Protect transformers from weather when stored for more than three months.
4. Store transformers with compartment doors closed.
5. Regularly inspect transformers while in storage and maintain documentation of storage conditions, noting discrepancies or adverse conditions. Verify that effective pressure seal is maintained using pressure gauges. Visually check for insulating-liquid leaks and rust spots.

D. Examine areas and space conditions for compliance with requirements for pad-mounted, liquid-filled, medium-voltage transformers and other conditions affecting performance of the Work.

E. Examine roughing-in of conduits and grounding systems to verify the following:

1. Wiring entries comply with layout requirements.
2. Entries are within conduit-entry tolerances specified by manufacturer, and no feeders will cross section barriers to reach load or line lugs.

F. Examine concrete bases for suitable conditions for transformer installation.

G. Pre-Installation Checks:

1. Verify removal of shipping bracing after placement.
2. Remove sample of insulating liquid in accordance with ASTM D923. Insulating-liquid values must comply with NETA ATS, Table 100.4. Sample must be tested for the following:
   a. Dielectric Breakdown Voltage: ASTM D877 or ASTM D1816.
   b. Acid Neutralization Number: ASTM D974.
   c. Specific Gravity: ASTM D1298.
   d. Interfacial Tension: ASTM D971.
   e. Color: ASTM D1500.
   f. Visual Condition: ASTM D1524.
   g. Water in Insulating Liquids: Comply with ASTM D1533.
   h. Power Factor or Dissipation Factor: ASTM D924.

H. Verify that ground connections are in place and that requirements in Section 26 05 26 "Grounding and Bonding for Electrical Systems" have been met. Maximum ground resistance must be 5 ohms at transformer location.

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

3.2 INSTALLATION

A. Install transformers on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases and foundations specified in Section 26 05 29 "Hangers and Supports for Electrical Systems."

B. Transformer must be installed level and plumb and must tilt less than 1.5 degrees while energized.

C. Maintain minimum clearances and workspace at equipment in accordance with manufacturer's published instructions and IEEE C2.

3.3 CONNECTIONS

A. Ground equipment in accordance with Section 26 05 26 "Grounding and Bonding for Electrical Systems."

1. For counterpoise, use tinned bare copper cable not smaller than 4/0 AWG, buried not less than 30 inch below grade interconnecting grounding electrodes. Bond surge arrester and neutrals directly to transformer enclosure and then to grounding electrode system with bare copper conductors, sized as shown. Keep lead lengths as short as practicable, with no kinks or sharp bends.
2. Make joints in grounding conductors and loops by exothermic weld or compression connector.
3. Terminate grounding and bonding conductors on common equipment grounding terminal on transformer enclosure.
4. Complete transformer tank grounding and lightning arrester connections prior to making other electrical connections.

B. Connect wiring in accordance with Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."

1. Maintain air clearances between energized live parts and between live parts and ground for exposed connections in accordance with manufacturer recommendations.
2. Bundle associated phase, neutral, and equipment grounding conductors together within transformer enclosure. Arrange conductors such that there is not excessive strain that could cause loose connections. Allow adequate slack for expansion and contraction of conductors.

C. Terminate medium-voltage cables in incoming section of transformers in accordance with Section 26 05 13 "Medium-Voltage Cables."

3.4 SIGNS AND LABELS

A. Comply with installation requirements for labels and signs specified in Section 26 05 53 "Identification for Electrical Systems."

B. Install warning signs as required to comply with 29 CFR 1910.269.

3.5 FIELD QUALITY CONTROL

A. Field tests and inspections must be witnessed by authorities having jurisdiction .

B. Tests and Inspections:

1. General Field-Testing Requirements:
   a. Comply with provisions of "Testing and Test Methods" Chapter in NFPA 70B.
   b. Perform visual and mechanical inspections and electrical tests. Certify compliance with test parameters.
   c. After installing transformer but before primary is energized, verify that grounding system at transformer is tested at specified value or less.
   d. After installing transformer and after electrical circuitry has been energized, test for compliance with requirements.
   e. Visual and Mechanical Inspection:
      1) Verify equipment nameplate data complies with Contract Documents.
      2) Inspect bolted electrical connections for high resistance using one of the following two methods:
         a) Use low-resistance ohmmeter to compare bolted connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of lowest value.
         b) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or NETA ATS, Table 100.12. Bolt-torque levels must be in accordance with manufacturer's published data. In absence of manufacturer's published data, use NETA ATS, Table 100.12.
2. Medium-Voltage Surge Arrester Field Tests:
   a. Visual and Mechanical Inspection:
      1) Inspect physical and mechanical condition.
      2) Verify arresters are clean.
      3) Verify that ground leads on devices are individually attached to ground bus or ground electrode.
   b. Electrical Test:
      1) Perform insulation-resistance test on arresters, phase terminal-to-ground. Apply voltage in accordance with manufacturer's published data. In absence of manufacturer's published data, comply with NETA ATS, Table 100.1. Replace units that fail to comply with recommended minimum insulation resistance listed in that table.
3. Liquid-Filled Transformer Field Tests:
   a. Visual and Mechanical Inspection:
      1) Inspect anchorage, alignment, and grounding.
      2) Verify bushings are clean.
      3) Verify that liquid level in tanks is within manufacturer's published tolerances.
      4) Perform specific inspections and mechanical tests recommended by manufacturer.

5) Verify presence of transformer surge arresters and that their ratings are as specified.
6) Verify that as-left tap connections are as specified.

b. Electrical Tests:
1) Perform insulation-resistance tests winding-to-winding and windings-to-ground. Apply voltage in accordance with manufacturer's published data. In absence of manufacturer's published data, comply with NETA ATS, Table 100.5. Calculate polarization index; value of index may not be less than 1.0.
2) Perform power-factor or dissipation-factor tests on windings in accordance with test equipment manufacturer's published data. Maximum winding insulation power-factor/dissipation-factor values must be in accordance with manufacturer's published data. In absence of manufacturer's published data, comply with NETA ATS, Table 100.3.
3) Perform Optional Field Tests:
a) Perform turns-ratio tests at tap positions. Turns-ratio test results may not deviate by more than one-half percent from either adjacent coils or calculated ratio. If test fails, replace transformer.
b) Measure resistance of windings at tap connections, and record temperature-corrected winding-resistance values in Operations and Maintenance Manual.
4) Verify correct secondary voltage, phase-to-phase and phase-to-neutral, after energization and prior to loading.

C. Nonconforming Work:

1. Equipment and devices will be considered defective if they do not pass tests and inspections.
2. Remove and replace malfunctioning units and retest.

D. Prepare test and inspection reports. Record as-left set points of adjustable devices.

E. Manufacturer Services:

1. Engage factory-authorized service representative to support field tests and inspections.

END OF SECTION

SECTION 26 24 16

PANELBOARDS

PART 1 - GENERAL

1.1 DEFINITIONS

A. ATS: Acceptance testing specification.

B. GFCI: Ground-fault circuit interrupter.

C. GFEP: Ground-fault equipment protection.

D. HID: High-intensity discharge.

E. MCCB: Molded-case circuit breaker.

F. SPD: Surge protective device.

G. VPR: Voltage protection rating.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of panelboard.

1. Include materials, switching and overcurrent protective devices, SPDs, accessories, and components indicated.
2. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: For each panelboard and related equipment.

1. Include dimensioned plans, elevations, sections, and details.
2. Show tabulations of installed devices with nameplates, conductor termination sizes, equipment features, and ratings.
3. Detail enclosure types including mounting and anchorage, environmental protection, knockouts, corner treatments, covers and doors, gaskets, hinges, and locks.
4. Detail bus configuration, current, and voltage ratings.
5. Short-circuit current rating of panelboards and overcurrent protective devices.
6. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
7. Include wiring diagrams for power, signal, and control wiring.
8. Key interlock scheme drawing and sequence of operations.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Panelboard Schedules: For installation in panelboards. Submit final versions after load balancing.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For panelboards and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 01 78 23 "Operation and Maintenance Data," include the following:

1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
2. Time-current curves, including selectable ranges for each type of overcurrent protective device that allows adjustments.

1.5 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. Keys: Two spares for each type of panelboard cabinet lock.
2. Circuit Breakers Including GFCI and GFEP Types: Two spares for each panelboard.
3. Fuses for Fused Switches: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.
4. Fuses for Fused Power-Circuit Devices: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: ISO 9001 or ISO 9002 certified.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Remove loose packing and flammable materials from inside panelboards; install temporary electric heating (250 W per panelboard) to prevent condensation.

B. Handle and prepare panelboards for installation according to NEMA PB 1.

1.8 FIELD CONDITIONS

A. Environmental Limitations:

1. Do not deliver or install panelboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above panelboards is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
2. Rate equipment for continuous operation under the following conditions unless otherwise indicated:
    a. Ambient Temperature: Not exceeding 23 deg F to plus 104 deg F.

b. Altitude: Not exceeding 6600 feet.

B. Service Conditions: NEMA PB 1, usual service conditions, as follows:

1. Ambient temperatures within limits specified.
2. Altitude not exceeding 6600 feet.

C. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Director's Representative or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:

1. Notify Director's Representative no fewer than two days in advance of proposed interruption of electric service.
2. Do not proceed with interruption of electric service without Director's Representative written permission.
3. Comply with NFPA 70E.

1.9 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace panelboards that fail in materials or workmanship within specified warranty period.

1. Panelboard Warranty Period: 18 months from date of Substantial Completion.

B. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace SPD that fails in materials or workmanship within specified warranty period.

1. SPD Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PANELBOARDS AND LOAD CENTERS COMMON REQUIREMENTS

A. Product Selection for Restricted Space: Drawings indicate maximum dimensions for panelboards including clearances between panelboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.

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 NEMA PB 1.

D. Comply with NFPA 70.

E. Enclosures: Flush and Surface-mounted, dead-front cabinets.

1. Rated for environmental conditions at installed location.
   a. Indoor Dry and Clean Locations: NEMA 250, Type 1 .

b. Other Wet or Damp Indoor Locations: NEMA 250, Type 4 .
c. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 5 .

2. Height: 84 inches maximum.
3. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover. Trims shall cover all live parts and shall have no exposed hardware.
4. Finishes:
   a. Panels and Trim: Steel , factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.
   b. Back Boxes: Galvanized steel .

F. Incoming Mains:

1. Location: as indicated on drawings. Top .
2. Main Breaker: Main lug interiors up to 400 amperes shall be field convertible to main breaker.

G. Phase, Neutral, and Ground Buses:

1. Material: Tin-plated aluminumup to 400A, Hard-drawn copper, 98 percent conductivity for 600A and above.
   a. Plating shall run entire length of bus.
   b. Bus shall be fully rated the entire length.
2. Interiors shall be factory assembled into a unit. Replacing switching and protective devices shall not disturb adjacent units or require removing the main bus connectors.
3. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.
4. Full-Sized Neutral: Equipped with full-capacity bonding strap for service entrance applications. Mount electrically isolated from enclosure. Do not mount neutral bus in gutter.

H. Conductor Connectors: Suitable for use with conductor material and sizes.

1. Material: Tin-plated aluminum .
2. Terminations shall allow use of 75 deg C rated conductors without derating.
3. Size: Lugs suitable for indicated conductor sizes, with additional gutter space, if required, for larger conductors.
4. Main and Neutral Lugs: CompressionorMechanical type, with a lug on the neutral bar for each pole in the panelboard.
5. Ground Lugs and Bus-Configured Terminators: CompressionorMechanical type, with a lug on the bar for each pole in the panelboard.
6. Gutter-Tap Lugs: CompressionorMechanical type suitable for use with conductor material and with matching insulating covers. Locate at same end of bus as incoming lugs or main device.
7. Extra-Capacity Neutral Lugs: Rated 200 percent of phase lugs mounted on extra-capacity neutral bus.

I. NRTL Label: Panelboards or load centers shall be labeled by an NRTL acceptable to authority having jurisdiction for use as service equipment with one or more main service disconnecting and overcurrent protective devices. Panelboards or load centers shall have meter enclosures, wiring, connections, and other provisions for utility metering. Coordinate with utility company for exact requirements.

J. Future Devices: Panelboards or load centers shall have mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices. See drawings for quantities of spares and spaces.

K. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals. Assembly listed by an NRTL for 100 percent interrupting capacity.

1. Panelboards and overcurrent protective devices rated 240 V or less shall have short-circuit ratings as shown on Drawings, but not less than 10,000 A rms symmetrical.
2. Panelboards and overcurrent protective devices rated above 240 V and less than 600 V shall have short-circuit ratings as shown on Drawings, but not less than 14,000 A rms symmetrical.

2.2 POWER PANELBOARDS

A. Panelboards: NEMA PB 1, distribution type.

B. Doors: Secured with vault-type latch with tumbler lock; keyed alike.

1. For doors more than 36 inches high, provide two latches, keyed alike.

C. Mains: Circuit breakeror Lugs only, see drawings.

D. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes 125 A and Smaller: Bolt-on circuit breakers .

E. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers .

2.3 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

A. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.

B. Mains: Circuit breaker or lugs only, see drawings.

C. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

D. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.

E. Doors: Door-in-door construction with concealed hinges; secured with multipoint latch with tumbler lock; keyed alike. Outer door shall permit full access to the panel interior. Inner door

shall permit access to breaker operating handles and labeling, but current carrying terminals and bus shall remain concealed.

2.4 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

A. MCCB: Comply with UL 489, with interrupting capacity to meet available fault currents.

1. Thermal-Magnetic Circuit Breakers:
   a. Inverse time-current element for low-level overloads.
   b. Instantaneous magnetic trip element for short circuits.
   c. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
3. Electronic Trip Circuit Breakers:
   a. RMS sensing.
   b. Field-replaceable rating plug or electronic trip.
   c. Digital display of settings, trip targets, and indicated metering displays.
   d. Multi-button keypad to access programmable functions and monitored data.
   e. Ten-event, trip-history log. Each trip event shall be recorded with type, phase, and magnitude of fault that caused the trip.
   f. Integral test jack for connection to portable test set or laptop computer.
   g. Field-Adjustable Settings:
      1) Instantaneous trip.
      2) Long- and short-time pickup levels.
      3) Long and short time adjustments.
      4) Ground-fault pickup level, time delay, and I squared T response.
4. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.
5. GFCI Circuit Breakers: Single- and double-pole configurations with Class A ground-fault protection (6-mA trip).
6. GFEP Circuit Breakers: Class B ground-fault protection (30-mA trip).
7. Arc-Fault Circuit Interrupter Circuit Breakers: Comply with UL 1699; 120/240-V, single-pole configuration.
8. Subfeed Circuit Breakers: Vertically mounted.
9. MCCB Features and Accessories:
   a. Standard frame sizes, trip ratings, and number of poles.
   b. Breaker handle indicates tripped status.
   c. UL listed for reverse connection without restrictive line or load ratings.
   d. Lugs: CompressionorMechanical style, suitable for number, size, trip ratings, and conductor materials.
   e. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
   f. Shunt Trip: 120-V trip coil energized from separate circuit, set to trip at 75 percent of rated voltage.
   g. Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage without intentional time delay.
   h. Rating Plugs: Three-pole breakers with ampere ratings greater than 150 amperes shall have interchangeable rating plugs or electronic adjustable trip units.

i. Auxiliary Contacts: One, SPDT switch with "a" and "b" contacts; "a" contacts mimic circuit-breaker contacts and "b" contacts operate in reverse of circuit-breaker contacts.
j. Multipole units enclosed in a single housing with a single handle .
k. Handle Padlocking Device: Fixed attachment, for locking circuit-breaker handle in on or off position.
l. Handle Clamp: Loose attachment, for holding circuit-breaker handle in on position.

B. Fused Switch: NEMA KS 1, Type HD; clips to accommodate specified fuses; lockable handle.

1. Fuses and Spare-Fuse Cabinet: Comply with requirements specified in Section 26 28 13 "Fuses."
2. Fused Switch Features and Accessories:
   a. Standard ampere ratings and number of poles.
   b. Mechanical cover interlock with a manual interlock override, to prevent the opening of the cover when the switch is in the on position. The interlock shall prevent the switch from being turned on with the cover open. The operating handle shall have lock-off means with provisions for three padlocks.
   c. Auxiliary Contacts: One normally open and normally closed contact(s) that operate with switch handle operation.

2.5 IDENTIFICATION

A. Panelboard Label: Manufacturer's name and trademark, voltage, amperage, number of phases, and number of poles shall be located on the interior of the panelboard door.

B. Breaker Labels: Faceplate shall list current rating, UL and IEC certification standards, and AIC rating.

C. Circuit Directory: Typed or Computer Generated Directory card inside panelboard door, mounted in transparent card holder .

1. Circuit directory shall identify specific purpose with detail sufficient to distinguish it from all other circuits.

2.6 ACCESSORY COMPONENTS AND FEATURES

A. Accessory Set: Include tools and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation.

B. Portable Test Set: For testing functions of solid-state trip devices without removing from panelboard. Include relay and meter test plugs suitable for testing panelboard meters and switchboard class relays.

C. Sub-Metering: For MDP, provide check – meter with 0.5% accuracy, Emon-Demon or equal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify actual conditions with field measurements prior to ordering panelboards to verify that equipment fits in allocated space in, and comply with, minimum required clearances specified in NFPA 70.

B. Receive, inspect, handle, and store panelboards according to NEMA PB 1.1.

C. Examine panelboards before installation. Reject panelboards that are damaged, rusted, or have been subjected to water saturation.

D. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.

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

3.2 INSTALLATION

A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

B. Comply with NECA 1.

C. Install panelboards and accessories according to NECA 407 .

D. Equipment Mounting:

1. Attach panelboard to the vertical finished or structural surface behind the panelboard.

E. Mount top of trim at max 90 inches above finished floor and operating handle at max 79 inches above finished floor, unless otherwise indicated.

F. Mount panelboard cabinet plumb and rigid without distortion of box.

G. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.

H. Mount surface-mounted panelboards to steel slotted supports 1 1/4 inch in depth. Orient steel slotted supports vertically.

I. Install overcurrent protective devices and controllers not already factory installed.

1. Set field-adjustable, circuit-breaker trip ranges.

2. Tighten bolted connections and circuit breaker connections using calibrated torque wrench or torque screwdriver per manufacturer's written instructions.

J. Make grounding connections and bond neutral for services and separately derived systems to ground. Make connections to grounding electrodes, separate grounds for isolated ground bars, and connections to separate ground bars.

K. Install filler plates in unused spaces.

L. Stub four 1-inch empty conduits from panelboard into accessible ceiling space or space designated to be ceiling space in the future.

M. Arrange conductors in gutters into groups and bundle and wrap with wire ties after completing load balancing.

3.3 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; install warning signs complying with requirements in Section 26 05 53 "Identification for Electrical Systems."

B. Create a directory to indicate installed circuit loads after balancing panelboard loads; incorporate Director’s Representative final room designations. Obtain approval before installing. Handwritten directories are not acceptable. Install directory inside panelboard door.

C. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."

D. Install warning signs complying with requirements in Section 26 05 53 "Identification for Electrical Systems" identifying source of remote circuit.

3.4 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Acceptance Testing Preparation:

1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

C. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test for low-voltage air circuit breakers stated in NETA ATS, Paragraph 7.6 Circuit Breakers . Do not perform optional tests. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
3. Perform the following infrared scan tests and inspections and prepare reports:

a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each panelboard. Remove front panels so joints and connections are accessible to portable scanner.
b. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each panelboard 11 months after date of Substantial Completion.
c. Instruments and Equipment:
    1) Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

D. Panelboards will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports, including a certified report that identifies panelboards included and that describes scanning results, with comparisons of the two scans. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 ADJUSTING

A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

B. Set field-adjustable circuit-breaker trip ranges as indicated.

C. Load Balancing: After Substantial Completion, but not more than 60 days after Final Acceptance, measure load balancing and make circuit changes. Prior to making circuit changes to achieve load balancing, inform Director's Representative of effect on phase color coding.

1. Measure loads during period of normal facility operations.
2. Perform circuit changes to achieve load balancing outside normal facility operation schedule or at times directed by the Director's Representative . Avoid disrupting services such as fax machines and on-line data processing, computing, transmitting, and receiving equipment.
3. After changing circuits to achieve load balancing, recheck loads during normal facility operations. Record load readings before and after changing circuits to achieve load balancing.
4. Tolerance: Maximum difference between phase loads, within a panelboard, shall not exceed 20 percent.

3.6 PROTECTION

A. Temporary Heating: Prior to energizing panelboards, apply temporary heat to maintain temperature according to manufacturer's written instructions.

END OF SECTION

SECTION 26 27 26

WIRING DEVICES

PART 1 - GENERAL

1.1 DEFINITIONS

A. Commercial/Industrial-Use Cord Reel: A cord reel subject to severe use in factories, commercial garages, construction sites, and similar locations requiring a harder service-type cord.

B. UL 1472 Type I Dimmer: Dimmer in which air-gap switch is used to energize preset lighting levels.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

A. Manufacturers' Instructions: Record copy of official installation and testing instructions issued to Installer by manufacturer for each type of product.

B. Sample warranties.

PART 2 - PRODUCTS

2.1 GENERAL-USE SWITCHES, DIMMER SWITCHES, AND FAN-SPEED CONTROLLER SWITCHES

A. Toggle Switch :

1. Regulatory Requirements:
   a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. General Characteristics:
   a. Reference Standards: UL CCN WMUZ and UL 20.
3. Options:
   a. Device Color: White .
   b. Configuration:
      1) General-duty, 120-277 V, 20 A,.
4. Accessories:
   a. Cover Plate: 0.060 inch thick, high-impact thermoplastic (nylon) with smooth finish and color matching wiring device; from same manufacturer as wiring device.
   b. Securing Screws for Cover Plate: Metal with head color matching wallplate finish.

B. Air-Gap Fan-Speed Controller Switch :

1. Regulatory Requirements:
   a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. General Characteristics:
   a. Reference Standards: UL CCN GQHG and UL 1917.
3. Options:
   a. Device Color: White .
4. Accessories:
   a. Cover Plate: 0.060 inch thick, high-impact thermoplastic (nylon) with smooth finish and color matching wiring device; from same manufacturer as wiring device.
   b. Securing Screws for Cover Plate: Metal with head color matching wallplate finish.

2.2 GENERAL-GRADE SINGLE STRAIGHT-BLADE RECEPTACLES

A. Single Straight-Blade Receptacle :

1. Regulatory Requirements:
   a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. General Characteristics:
   a. Reference Standards: UL CCN RTRT and UL 498.
3. Options:
   a. Device Color: White .
   b. Configuration:
      1) General-duty, NEMA 5-20R .
      2) General-duty, NEMA 14-50R (Range).
4. Accessories:
   a. Cover Plate: 0.060 inch thick, high-impact thermoplastic (nylon) with smooth finish and color matching wiring device; from same manufacturer as wiring device.
   b. Securing Screws for Cover Plate: Metal with head color matching wallplate finish.

2.3 GENERAL-GRADE DUPLEX STRAIGHT-BLADE RECEPTACLES

A. Duplex Straight-Blade Receptacle :

1. Regulatory Requirements:
   a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. General Characteristics:
   a. Reference Standards: UL CCN RTRT and UL 498.
3. Options:

a. Device Color: White .
b. Configuration:
1) General-duty, NEMA 5-20R.

4. Accessories:
a. Cover Plate: 0.060 inch thick, high-impact thermoplastic (nylon) with smooth finish and color matching wiring device; from same manufacturer as wiring device.
b. Securing Screws for Cover Plate: Metal with head color matching wallplate finish.

2.4 RECEPTACLES WITH ARC-FAULT AND GROUND-FAULT PROTECTIVE DEVICES

A. General-Grade, Tamper-Resistant Duplex Straight-Blade Receptacle with AFCI and GFCI Device :

1. Regulatory Requirements:
a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. General Characteristics:
a. Reference Standards: UL CCN KCXX, UL 498, UL 943, UL 1699, and UL Subject 1699A.
3. Options:
a. Device Color: White .
b. Configuration: Heavy-duty, NEMA 5-20R.
4. Accessories:
a. Cover Plate: 0.060 inch thick, high-impact thermoplastic (nylon) with smooth finish and color matching wiring device; from same manufacturer as wiring device.
b. Securing Screws for Cover Plate: Metal with head color matching wallplate finish.

B. General-Grade, Weather-Resistant, Tamper-Resistant Duplex Straight-Blade Receptacle with GFCI Device :

1. Regulatory Requirements:
a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. General Characteristics:
a. Reference Standards: UL CCN KCXS, UL 498, and UL 943.
3. Options:
a. Device Color: White .
b. Configuration: Heavy-duty, NEMA 5-20R.
4. Accessories:
a. Cover Plate: 0.060 inch thick, high-impact thermoplastic (nylon) with smooth finish and color matching wiring device; from same manufacturer as wiring device.
b. Securing Screws for Cover Plate: Metal with head color matching wallplate finish.

2.5 CONNECTORS, CORDS, AND PLUGS

A. Outdoor-Use, Watertight, Sealed Cord Connector :

1. Regulatory Requirements:
   a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. General Characteristics:
   a. Reference Standards: UL CCN AXUT and UL 498.
3. Options:
   a. Configuration:
      1) NEMA 5-20.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Receptacles:

1. Verify that receptacles to be procured and installed for Director’s Representative - furnished equipment are compatible with mating attachment plugs on equipment.

B. Cord Reels:

1. Examine roughing-in for cord reel mounting and power connections to verify actual locations of mounts and power connections before cord reel installation.
2. Examine walls, floors, and ceilings for suitable conditions where cord reel will be installed.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF SWITCHES

A. Comply with manufacturer's instructions.

B. Reference Standards:

1. Unless more stringent requirements are specified in Contract Documents or manufacturers' instructions, comply with installation instructions in NECA NEIS 130.
2. Mounting Heights: Unless otherwise indicated in Contract Documents, comply with mounting heights recommended in NECA NEIS 1.
3. Consult Director’s Representative for resolution of conflicting requirements.

C. Identification:

1. Identify cover or cover plate for device with panelboard identification and circuit number in accordance with Section 26 05 53 "Identification for Electrical Systems."

D. Accessories and Related Equipment.

1. Lighting: Provide all sensors, connection hubs, and wiring as needed for a complete operating system.

3.3 INSTALLATION OF STRAIGHT-BLADE RECEPTACLES

A. Comply with manufacturer's instructions.

B. Reference Standards:

1. Unless more stringent requirements are specified in Contract Documents or manufacturers' instructions, comply with installation instructions in NECA NEIS 130.
2. Mounting Heights: Unless otherwise indicated in Contract Documents, comply with mounting heights recommended in NECA NEIS 1.
3. Receptacle Orientation: Unless otherwise indicated in Contract Documents, orient receptacle to match configuration diagram in NEMA WD 6.
4. Consult Director’s Representative for resolution of conflicting requirements.

C. Identification:

1. Identify cover or cover plate for device with panelboard identification and circuit number in accordance with Section 26 05 53 "Identification for Electrical Systems."

D. Interfaces with Other Work:

1. Do not install Type 3 SPD, including surge-protected relocatable taps and power strips, on branch circuit downstream of GFCI device.
2. Coordinate installation of new products for with existing conditions.

3.4 INSTALLATION OF LOCKING RECEPTACLES

A. Comply with manufacturer's instructions.

B. Reference Standards:

1. Unless more stringent requirements are specified in Contract Documents or manufacturers' instructions, comply with installation instructions in NECA NEIS 130.
2. Mounting Heights: Unless otherwise indicated in Contract Documents, comply with mounting heights recommended in NECA NEIS 1.
3. Receptacle Orientation: Unless otherwise indicated in Contract Documents, orient receptacle to match configuration diagram in NEMA WD 6.
4. Consult Director’s Representative for resolution of conflicting requirements.

C. Identification:

1. Identify cover or cover plate for device with panelboard identification and circuit number in accordance with Section 26 05 53 "Identification for Electrical Systems."
    a. Healthcare Facilities: Distinctively identify covers or cover plates of device boxes and outlet boxes that are supplied from life safety and critical branch power supplies following facility's standard practice.

D. Interfaces with Other Work:

1. Coordinate installation of new products with existing conditions.

3.5 INSTALLATION OF CONNECTORS, CORDS, AND PLUGS

A. Comply with manufacturer's instructions.

3.6 FIELD QUALITY CONTROL OF SWITCHES

A. Field tests and inspections must be witnessed by authorities having jurisdiction .

B. Tests and Inspections:

1. Perform tests and inspections in accordance with manufacturers' instructions.

C. Nonconforming Work:

1. Unit will be considered defective if it does not pass tests and inspections.
2. Remove and replace defective units and retest.

D. Assemble and submit test and inspection reports.

3.7 FIELD QUALITY CONTROL OF STRAIGHT-BLADE RECEPTACLES

A. Field tests and inspections must be witnessed by authorities having jurisdiction .

B. Tests and Inspections:

1. Insert and remove test plug to verify that device is securely mounted.
2. Verify polarity of hot and neutral pins.
3. Measure line voltage.
4. Measure percent voltage drop.
5. Measure grounding circuit continuity; impedance must be not greater than 2 ohms.
6. Perform additional installation and maintenance inspections and diagnostic tests in accordance with NECA NEIS 130 and manufacturers' instructions.

C. Nonconforming Work:

1. Device will be considered defective if it does not pass tests and inspections.
2. Remove and replace defective units and retest.

D. Assemble and submit test and inspection reports.

3.8 FIELD QUALITY CONTROL OF LOCKING RECEPTACLES

A. Field tests and inspections must be witnessed by authorities having jurisdiction .

B. Tests and Inspections:

1. Insert and remove test plug to verify that device is securely mounted.
2. Verify polarity of hot and neutral pins.
3. Measure line voltage.
4. Measure percent voltage drop.
5. Measure grounding circuit continuity; impedance must be not greater than 2 ohms.
6. Perform additional installation and maintenance inspections and diagnostic tests in accordance with NECA NEIS 130 and manufacturers' instructions.

C. Nonconforming Work:

1. Device will be considered defective if it does not pass tests and inspections.
2. Remove and replace defective units and retest.

D. Assemble and submit test and inspection reports.

3.9 FIELD QUALITY CONTROL OF CONNECTORS, CORDS, AND PLUGS

A. Field tests and inspections must be witnessed by authorities having jurisdiction .

B. Tests and Inspections:

1. Perform tests and inspections indicated in manufacturer's instructions.

C. Nonconforming Work:

1. Unit will be considered defective if it does not pass tests and inspections.
2. Remove and replace defective units and retest.

D. Assemble and submit test and inspection reports.

3.10 SYSTEM STARTUP FOR SWITCHES

A. Perform startup service.

1. Complete installation and startup checks for momentary switches, dimmer switches, and fan-speed controller switches in accordance with manufacturer's instructions.

3.11 ADJUSTING

A. Occupancy Adjustments for Controlled Receptacles: 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.

B. Cord Reels and Fittings: Adjust spring mechanisms and moving parts of cord reels and fittings to function smoothly, and lubricate as recommended in writing by manufacturer.

3.12 PROTECTION

A. Devices:

1. Schedule and sequence installation to minimize risk of contamination of wires and cables, devices, device boxes, outlet boxes, covers, and cover plates by plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other materials.
2. After installation, protect wires and cables, devices, device boxes, outlet boxes, covers, and cover plates from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Director's Representative.

B. Cord Reels and Fittings:

1. After installation, protect cord reels and fittings from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Director's Representative.

C. Connectors, Cords, and Plugs:

1. After installation, protect connectors, cords, and plugs from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Director's Representative.

END OF SECTION

SECTION 26 28 13

FUSES

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for spare-fuse cabinets. Include the following for each fuse type indicated:

1. Ambient Temperature Adjustment Information: If ratings of fuses have been adjusted to accommodate ambient temperatures, provide list of fuses with adjusted ratings.
    a. For each fuse having adjusted ratings, include location of fuse, original fuse rating, local ambient temperature, and adjusted fuse rating.
    b. Provide manufacturer's technical data on which ambient temperature adjustment calculations are based.
2. Dimensions and manufacturer's technical data on features, performance, electrical characteristics, and ratings.
3. Current-limitation curves for fuses with current-limiting characteristics.
4. Time-current coordination curves (average melt) and current-limitation curves (instantaneous peak let-through current) for each type and rating of fuse. Submit in electronic format suitable for use in coordination software and in PDF format.
5. Coordination charts and tables and related data.
6. Fuse sizes for elevator feeders and elevator disconnect switches.

1.2 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fuses to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 01 77 00 "Closeout Procedures," and Section 01 78 23 "Operation and Maintenance Data," include the following:

1. Ambient temperature adjustment information.
2. Current-limitation curves for fuses with current-limiting characteristics.
3. Time-current coordination curves (average melt) and current-limitation curves (instantaneous peak let-through current) for each type and rating of fuse used on the Project. Submit in electronic format suitable for use in coordination software and in PDF format.
4. Coordination charts and tables and related data.

1.3 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. Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.

1.4 FIELD CONDITIONS

A. Where ambient temperature to which fuses are directly exposed is less than 40 deg F or more than 100 deg F , apply manufacturer's ambient temperature adjustment factors to fuse ratings.

PART 2 - PRODUCTS

2.1 CARTRIDGE FUSES

A. Characteristics: NEMA FU 1, current-limiting, nonrenewable cartridge fuses with voltage ratings consistent with circuit voltages.

1. Type RK-1: 250 -V, zero- to 600-A rating, 200 kAIC , time delay.
2. Type RK-5: 250 -V, zero- to 600-A rating, 200 kAIC , time delay.
3. Type CC: 600-V, zero- to 30-A rating, 200 kAIC , time delay.
4. Type CD: 600-V, 31- to 60-A rating, 200 kAIC , time delay.

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 NEMA FU 1 for cartridge fuses.

D. Comply with NFPA 70.

E. Coordinate fuse ratings with utilization equipment nameplate limitations of maximum fuse size and with system short-circuit current levels.

2.2 SPARE-FUSE CABINET

A. Characteristics: Wall-mounted steel unit with full-length, recessed piano-hinged door and key-coded cam lock and pull.

1. Size: Adequate for storage of spare fuses specified with 15 percent spare capacity minimum.
2. Finish: Gray, baked enamel.
3. Identification: "SPARE FUSES" in 1-1/2-inch- high letters on exterior of door.
4. Fuse Pullers: For each size of fuse, where applicable and available, from fuse manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fuses before installation. Reject fuses that are moisture damaged or physically damaged.

B. Examine holders to receive fuses for compliance with installation tolerances and other conditions affecting performance, such as rejection features.

C. Examine utilization equipment nameplates and installation instructions. Install fuses of sizes and with characteristics appropriate for each piece of equipment.

D. Evaluate ambient temperatures to determine if fuse rating adjustment factors must be applied to fuse ratings.

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

3.2 FUSE APPLICATIONS

A. Cartridge Fuses:

1. Motor Branch Circuits: Class RK1 Class RK5 Class CC, motor duty, time delay.
2. Large Motor Branch (601-4000 A): Class L, time delay.
3. Power Electronics Circuits: Class J, high speed Class T, fast acting.
4. Other Branch Circuits: Class RK1, time delay Class RK5, time delay Class J, fast acting Class J, time delay Class CC, fast acting.
5. Control Transformer Circuits: Class CC, time delay, control transformer duty.
6. Provide open-fuse indicator fuses or fuse covers with open fuse indication.

3.3 INSTALLATION

A. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.

B. Install spare-fuse cabinet(s) in location shown on the Drawings or as indicated in the field by Director’s Representative.

3.4 IDENTIFICATION

A. Install labels complying with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems" and indicating fuse replacement information inside of door of each fused switch and adjacent to each fuse block, socket, and holder.

END OF SECTION

SECTION 26 29 13.03

MANUAL AND MAGNETIC MOTOR CONTROLLERS

PART 1 - GENERAL

1.1 DEFINITIONS

A. CPT: Control power transformer.

B. MCCB: Molded-case circuit breaker.

C. MCP: Motor circuit protector.

D. NC: Normally closed.

E. OCPD: Overcurrent protective device.

F. SCCR: Short-circuit current rating.

G. SCPD: Short-circuit protective device.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Shop Drawings: For each type of magnetic controller.

1. Include plans, elevations, sections, and mounting details.
2. Indicate dimensions, weights, required clearances, and location and size of each field connection.
3. Wire Termination Diagrams and Schedules: Include diagrams for signal, and control wiring. Identify terminals and wiring designations and color-codes to facilitate installation, operation, and maintenance. Indicate recommended types, wire sizes, and circuiting arrangements for field-installed wiring, and show circuit protection features. Differentiate between manufacturer-installed and field-installed wiring.
4. Include features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.

C. Product Schedule: List the following for each enclosed controller:

1. Each installed magnetic controller type.
2. NRTL listing.
3. Factory-installed accessories.
4. Nameplate legends.

5. SCCR of integrated unit.
6. For each combination magnetic controller include features, characteristics, ratings, and factory setting of the SCPD and OCPD.
   a. Listing document proving Type 2 coordination.
7. For each series-rated combination state the listed integrated short-circuit current (withstand) rating of SCPD and OCPDs by an NRTL acceptable to authorities having jurisdiction.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Seismic Qualification Data: Certificates, for magnetic controllers, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

C. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For magnetic controllers to include in operation and maintenance manuals.

1. Include the following:
   a. Routine maintenance requirements for magnetic controllers and installed components.
   b. Manufacturer's written instructions for testing and adjusting circuit breaker and MCP trip settings.
   c. Manufacturer's written instructions for setting field-adjustable overload relays.
   d. Load-Current and Overload-Relay Heater List: Compile after motors have been installed, and arrange to demonstrate that selection of heaters suits actual motor nameplate full-load currents.
   e. Load-Current and List of Settings of Adjustable Overload Relays: Compile after motors have been installed, and arrange to demonstrate that switch settings for motor-running overload protection suit actual motors to be protected.

1.5 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. Fuses for Fused Switches: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.

2. Control Power Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than two of each size and type.
3. Indicating Lights: Two of each type and color installed.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: Accredited by NETA.

1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store controllers indoors in clean, dry space with uniform temperature to prevent condensation. Protect controllers from exposure to dirt, fumes, water, corrosive substances, and physical damage.

1.8 FIELD CONDITIONS

A. Ambient Environment Ratings: Rate equipment for continuous operation under the following conditions unless otherwise indicated:

1. Ambient Temperature: Not less than23 deg F and not exceeding 104 deg F.
2. Altitude: Not exceeding 6600 feet for electromagnetic and manual devices.
3. The effect of solar radiation is not significant.

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 use.

B. UL Compliance: Fabricate and label magnetic motor controllers to comply with UL 508 and UL 60947-4-1.

A. NEMA Compliance: Fabricate motor controllers to comply with ICS 2.

2.2 MANUAL MOTOR CONTROLLERS

A. Motor-Starting Switches (MSS): "Quick-make, quick-break" toggle or push-button action; marked to show whether unit is off or on.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. ABB, Motion Business.
   b. Eaton.
   c. Rockwell Automation, Inc.
   d. Siemens Industry, Inc., Energy Management Division.
   e. Square D; Schneider Electric USA.

2. Standard: Comply with NEMA ICS 2, general purpose, Class A.
3. Configuration: Nonreversing.
4. Surface mounting.
5. Red pilot light..

B. Fractional Horsepower Manual Controllers (FHPMC): "Quick-make, quick-break" toggle or push-button action; marked to show whether unit is off, on, or tripped.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. ABB, Electrification Business.
   b. ABB, Motion Business.
   c. Eaton.
   d. Rockwell Automation, Inc.
   e. Siemens Industry, Inc., Energy Management Division.
   f. Square D; Schneider Electric USA.
2. Configuration: Nonreversing.
3. Overload Relays: Inverse-time-current characteristics; NEMA ICS 2, Class 10 tripping characteristics; heaters matched to nameplate full-load current of actual protected motor; external reset push button; bimetallic type.
4. Overload Relays: NEMA ICS 2, bimetallic class as schedule on Drawings.
5. Pilot Light: Red.

C. Integral Horsepower Manual Controllers (IHPMC): "Quick-make, quick-break" toggle or push-button action; marked to show whether unit is off, on, or tripped.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. ABB, Electrification Business.
   b. ABB, Motion Business.
   c. Eaton.
   d. Rockwell Automation, Inc.
   e. Siemens Industry, Inc., Energy Management Division.
   f. Square D; Schneider Electric USA.
2. Configuration: Nonreversing.
3. Overload Relays: Inverse-time-current characteristics; NEMA ICS 2, Class 10 tripping characteristics; heaters matched to nameplate full-load current of actual protected motor; external reset push button; bimetallic type.
4. Overload Relays: NEMA ICS 2, bimetallic class as scheduled on Drawings.

2.3 ENCLOSED FULL-VOLTAGE MAGNETIC MOTOR CONTROLLERS

A. Description: Across-the-line start, electrically held, for nominal system voltage of 600-V ac and less.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ABB, Electrification Business.
2. ABB, Motion Business.
3. Eaton.
4. Rockwell Automation, Inc.
5. Siemens Industry, Inc., Energy Management Division.
6. Square D; Schneider Electric USA.

C. Standard: Comply with NEMA ICS 2, general purpose, Class A.

D. Configuration: Nonreversing.

E. Contactor Coils: Pressure-encapsulated type.

1. Operating Voltage: Manufacturer's standard, unless indicated.

F. Control Power:

1. For on-board control power, obtain from line circuit or from integral CPT. The CPT shall have capacity to operate integral devices and remotely located pilot, indicating, and control devices.
   a. Spare CPT Capacity as Indicated on Drawings: 50 VA.

G. Overload Relays:

1. Thermal Overload Relays:
   a. Inverse-time-current characteristic.
   b. Class 10 tripping characteristic.
   c. Heaters in each phase shall be matched to nameplate full-load current of actual protected motor and with appropriate adjustment for duty cycle.
   d. Ambient compensated.
   e. Automatic resetting.
2. Solid-State Overload Relay:
   a. Switch or dial selectable for motor-running overload protection.
   b. Sensors in each phase.
   c. Class 10 tripping characteristic selected to protect motor against voltage and current unbalance and single phasing.
   a. Class II ground-fault protection shall comply with UL 1053 to interrupt low-level ground faults. The ground-fault detection system shall include circuitry that will prevent the motor controller from tripping when the fault current exceeds the interrupting capacity of the controller. Equip with start and run delays to prevent nuisance trip on starting, and a trip indicator.

2.4 COMBINATION FULL-VOLTAGE MAGNETIC MOTOR CONTROLLER

A. Description: Factory-assembled, combination full-voltage magnetic motor controller consisting of the controller described in this article, indicated disconnecting means, SCPD and OCPD, in a single enclosure.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ABB, Electrification Business.
2. ABB, Motion Business.
3. Eaton.
4. Rockwell Automation, Inc.
5. Siemens Industry, Inc., Energy Management Division.
6. Square D; Schneider Electric USA.

C. Standard: Comply with NEMA ICS 2, general purpose, Class A.

D. Configuration: Nonreversing.

E. Contactor Coils: Pressure-encapsulated type.

1. Operating Voltage: Manufacturer's standard, unless indicated.

F. Control Power:

1. For on-board control power, obtain from line circuit or from integral CPT. The CPT shall have capacity to operate integral devices and remotely located pilot, indicating, and control devices.
   a. Spare CPT Capacity as Indicated on Drawings: 50 VA.

G. Overload Relays:

1. Thermal Overload Relays:
   a. Inverse-time-current characteristic.
   b. Class 10 tripping characteristic.
   c. Heaters in each phase shall be matched to nameplate full-load current of actual protected motor and with appropriate adjustment for duty cycle.
   d. Ambient compensated.
   e. Automatic resetting.

H. Class II ground-fault protection shall comply with UL 1053 to interrupt low-level ground faults. The ground-fault detection system shall include circuitry that will prevent the motor controller from tripping when the fault current exceeds the interrupting capacity of the controller. Equip with start and run delays to prevent nuisance trip on starting, and a trip indicator.

I. Fusible Disconnecting Means:

1. NEMA KS 1, heavy-duty, horsepower-rated, fusible switch with clips or bolt pads to accommodate indicated fuses.
2. Lockable Handle: Accepts three padlocks and interlocks with cover in closed position.

J. Nonfusible Disconnecting Means:

1. NEMA KS 1, heavy-duty, horsepower-rated, nonfusible switch.

2. Lockable Handle: Accepts three padlocks and interlocks with cover in closed position.

K. MCP Disconnecting Means:

1. UL 489 and NEMA AB 3, with interrupting capacity to comply with available fault currents, instantaneous-only circuit breaker with front-mounted, field-adjustable, short-circuit trip coordinated with motor locked-rotor amperes.
2. Lockable Handle: Accepts three padlocks and interlocks with cover in closed position.

L. MCCB Disconnecting Means:

1. UL 489 and NEMA AB 3, with interrupting capacity to comply with available fault currents; thermal-magnetic MCCB, with inverse-time-current element for low-level overloads and instantaneous magnetic trip element for short circuits.
2. Front-mounted, adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
3. Lockable Handle: Accepts three padlocks and interlocks with cover in closed position.

2.5 ENCLOSED REDUCED-VOLTAGE MAGNETIC MOTOR CONTROLLERS

A. Description: Electrically held; closed-transition; adjustable time delay on transition, 600-V ac or less.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ABB, Electrification Business.
2. ABB, Motion Business.
3. Eaton.
4. Rockwell Automation, Inc.
5. Siemens Industry, Inc., Energy Management Division.
6. Square D; Schneider Electric USA.

C. Standard: Comply with NEMA ICS 2, general purpose, Class A.

D. Contactor Coils: Pressure-encapsulated type.

1. Operating Voltage: Manufacturer's standard, unless indicated.

E. Control Power: 120-V ac; obtained from integral CPT, with primary and secondary fuses, with CPT of sufficient capacity to operate integral devices and remotely located pilot, indicating, and control devices.

1. Spare CPT Capacity: 50 VA.

F. Overload Relays:

1. Thermal Overload Relays: Melting alloy type.
   a. Inverse-time-current characteristic.

b. Class 10 tripping characteristic.
c. Heaters in each phase matched to nameplate full-load current of actual protected motor and with appropriate adjustment for duty cycle.
d. Ambient compensated.
e. Automatic resetting.

2.6 ENCLOSURES

A. Comply with NEMA 250, type designations as indicated on Drawings, complying with environmental conditions at installed location.

B. The construction of the enclosures shall comply with NEMA ICS 6.

C. Controllers in hazardous (classified) locations shall comply with UL 1203.

2.7 ACCESSORIES

A. General Requirements for Control Circuit and Pilot Devices: NEMA ICS 5; factory installed in controller enclosure cover unless otherwise indicated.

1. Push Buttons, Pilot Lights, and Selector Switches: Standard-duty, except as needed to match enclosure type. Heavy-duty or oil-tight where indicated in the controller schedule.
   a. Push Buttons: As indicated in the controller schedule.
   b. Pilot Lights: As indicated in the controller schedule.
2. Elapsed Time Meters: Heavy duty with digital readout in hours nonresettable.
3. Meters: Panel type, 2-1/2-inch minimum size with 90- or 120-degree scale and plus or minus two percent accuracy. Where indicated, provide selector switches with an off position.

B. Motor protection relays shall be with solid-state sensing circuit and isolated output contacts for hardwired connections.

1. Phase-failure.
2. Phase-reversal, with bicolor LED to indicate normal and fault conditions. Automatic reset when phase reversal is corrected.
3. Under/overvoltage, operate when the circuit voltage reaches a preset value, and drop out when the operating voltage drops to a level below the preset value. Include adjustable time-delay setting.

C. Breather assemblies, to maintain interior pressure and release condensation in Type 4 enclosures installed outdoors or in unconditioned interior spaces subject to humidity and temperature swings.

D. Space heaters, with NC auxiliary contacts, to mitigate condensation in all enclosures installed outdoors or in unconditioned interior spaces subject to humidity and temperature swings.

E. Sun shields installed on fronts, sides, and tops of enclosures installed outdoors and subject to direct and extended sun exposure.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and space conditions for compliance with requirements for motor controllers, their relationship with the motors, and other conditions affecting performance of the Work.

3.2 INSTALLATION

A. Comply with NECA 1.

B. Wall-Mounted Controllers: Install magnetic controllers on walls with tops at uniform height indicated, and by bolting units to wall or mounting on lightweight structural-steel channels bolted to wall. For controllers not at walls, provide freestanding racks complying with Section 26 05 29 "Hangers and Supports for Electrical Systems" unless otherwise indicated.

C. Floor-Mounted Controllers: Install controllers on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases and foundations specified in Section 03 30 00 "Cast-in-Place Concrete."

D. Comply with requirements for seismic control devices specified in Section 26 05 48.16 "Seismic Controls for Electrical Systems."

E. Maintain minimum clearances and workspace at equipment according to manufacturer's written instructions and NFPA 70.

F. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.

G. Setting of Overload Relays: Select and set overloads on the basis of full-load current rating as shown on motor nameplate. Adjust setting value for special motors as required by NFPA 70 for motors that are high-torque, high-efficiency, and so on.

3.3 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."

3.4 SYSTEM FUNCTION TESTS

A. System function tests shall prove the correct interaction of sensing, processing, and action devices. Perform system function tests after field quality control tests have been completed and all components have passed specified tests.

1. Develop test parameters and perform tests for the purpose of evaluating performance of integral components and their functioning as a complete unit within design requirements and manufacturer's published data.

2. Verify the correct operation of interlock safety devices for fail-safe functions in addition to design function.
3. Verify the correct operation of sensing devices, alarms, and indicating devices.

B. Motor controller will be considered defective if it does not pass the system function tests and inspections.

C. Prepare test and inspection reports.

3.5 DEMONSTRATION

A. Train the NYSOPRHP's maintenance personnel to adjust, operate, and maintain controllers.

END OF SECTION

SECTION 27 51 29

EMERGENCY RESPONDER COMMUNICATION ENHANCEMENT SYSTEM (ERCES)

PART 1 – GENERAL

1.1 GENERAL

A. It is the intent of this specification to require that the bidder include an ERCES with all required ancillary devices with their proposal.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product, including furnished options and accessories.

1. Include construction details, material descriptions, dimensions, profiles, and finishes.
2. Include rated capacities, operating characteristics, and electrical characteristics.

B. Shop Drawings: ERCES System.

1. Include results of site radio signal survey.
2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and locations. Indicate conductor sizes, indicate termination locations and requirements, and distinguish between factory and field wiring.
3. Detail assembly and support requirements.
4. Include voltage drop calculations.
5. Include battery-size calculations.
6. Include input/output matrix.
7. Include statement from manufacturer that all equipment and components have been tested as a system and meet all requirements in this Specification and in NFPA 72.
8. Include performance parameters and installation details for each detector.
9. Include floor plans to indicate final outlet locations showing address of each device. Show size and route of cable and conduits and point-to-point wiring diagrams.

C. General Submittal Requirements:

1. Submittals shall be approved by authorities having jurisdiction prior to submitting them to Director's Representative.
2. Shop Drawings shall be prepared by persons with the following qualifications:

    a. NICET-certified, fire-alarm technician; Level III minimum.
    b. Licensed or certified by authorities having jurisdiction.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Field quality-control reports.

C. Sample Warranty: For special warranty.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For ERCES system and components to include in emergency, operation, and maintenance manuals.

1. In addition to items specified in Division 01 requirements, include the following and deliver copies to authorities having jurisdiction:

a. Complete wiring diagrams showing connections between all devices and equipment. Each conductor shall be numbered at every junction point with indication of origination and termination points.
b. Riser diagram.
c. Device addresses.
d. Record copy of site-specific software.

1) Equipment tested.
2) Frequency of testing of installed components.
3) Frequency of inspection of installed components.
4) Requirements and recommendations related to results of maintenance.
5) Manufacturer's user training manuals.

e. Manufacturer's required maintenance related to system warranty requirements.
f. Abbreviated operating instructions for mounting at fire-alarm control unit and each annunciator unit.

1.5 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. Keys and Tools: One extra set for access to locked or tamperproofed components.
2. Fuses: Two of each type installed in the system. Provide in a box or cabinet with compartments marked with fuse types and sizes.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.

B. Installer Qualifications: Installation shall be by personnel certified by NICET as fire-alarm Level III technician.

C. NFPA Certification: Obtain certification according to NFPA 72 by an NRTL (nationally recognized testing laboratory).

1.7 PROJECT CONDITIONS

A. Provide survey of radio signal coverage prior to developing shop drawings.

B. Perform a full test of the antenna system prior to starting work.

C. Interruption of Existing Antenna Service: Do not interrupt antenna service to facilities occupied by Director or others unless permitted under the following conditions and then only after arranging to provide temporary guard service according to requirements indicated:

D. Notify Director no fewer than seven days in advance of proposed interruption of antenna service.

E. Do not proceed with interruption of antenna service without Director's Representative written permission.

F. Use of Devices during Construction: Protect devices during construction unless devices are placed in service to protect the facility during construction.

1.8 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace ERCES system equipment and components that fail in materials or workmanship within specified warranty period.

1. Warranty Extent: All equipment and components not covered in the Maintenance Service Agreement.
2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 DESIGN REQUIREMENTS

A. In-building emergency radio communication enhancement systems for emergency responders are an integral component of the life safety equipment of a building or structure. The primary function is to provide reliable emergency responder communications at the required signal strength within the specified areas.

B. General building areas shall be provided with 95% radio coverage, or as specified by AHJ.

C. Provide delegated design services to propose a system to provide specified coverage. Advise the Director if existing radio coverage is adequate without need for supplemental ERCES.

D. The In-building emergency radio communication enhancement systems must provide the following signal strengths:

1. Downlink - Minimum signal strength of -95 dBm throughout the coverage area.
2. Uplink - Minimum signal strength of -95 dBm received at the AHJ Radio System.
3. OR As otherwise required by the AHJ

E. The system shall be complete with all components and wiring required for compliance with all applicable codes and regulations, and for its operations described hereinafter.

F. An approved manufacturer or a qualified and approved vendor shall supply, test and determine locations of components which are required for proper operation as well as to supply, install, test and certify the performance of the complete system. Vendor qualifications must be acceptable to the AHJ.

G. Design may include iBwave software-simulated radio propagation modeling with heat maps showing predicted signal coverage levels within the building. The iBWave design shall be done by iBWave certified personnel.

H. All tests shall be conducted, documented, and signed by a person in possession of an FCC General Radio Telephone Operators License. All testing personnel shall be certified and authorized by the signal booster manufacturer in the installation and operation of their equipment. Personnel qualifications must be acceptable to the AHJ.

I. The system design shall be based on the Radio Solutions, Inc (Norwell, MA) line of Public Safety Signal Boosters UL2524, NFPA 72, NFPA 1221, IFC and FCC certified to establish standards of quality for materials and performance. The naming of a specific manufacturer or a catalog number does not waiver any requirement or performance of individual components described in the specifications.

J. Assembly and installation of all components of the Emergency Responder Radio Communication Enhancement System shall comply with all applicable sections of the National Electrical Code.

K. Survivability from attack by fire shall meet requirements of NFPA 72, NFPA 1221, IFC or as required by the local jurisdiction.

L. The system must comply with all applicable sections of the FCC rules. Signal booster shall have FCC certification prior to installation.

M. Antenna isolation shall be maintained between the donor antenna and all inside antennas (D.A.S.) to a minimum of 20dB under all operating conditions.

2.2 TECHNICAL SPECIFICATIONS AND PERFORMANCE REQUIREMENTS

A. The system specified shall be based upon Radio Solutions, Inc (Norwell, MA) line of Public Safety UL 2524 Listed and NFPA 72, NFPA 1221, IFC compliant signal boosters, or approved equal.

B. The signal booster shall be a Class B Public Safety type as designated by the FCC or as required by the AHJ.

C. The secondary power supplies, battery chargers and system monitoring shall be fully compliant with NFPA 72, NFPA 1221 and IFC. The signal booster shall have both the primary and the secondary power supplies within a waterproof, type-4 approved enclosure.

D. All signal boosters and other active system components must have FCC certification prior to installation. The equipment FCC ID must be shown on the product datasheets and technical submittals. The ID must also be displayed on the product as required by the FCC.

E. The signal booster shall be pre-set by the equipment manufacturer for the frequencies specified by the AHJ. Field tuning of RF filters and duplexers is not allowed.

F. UHF and VHF signal boosters shall be band selective type with a maximum 3dB channel bandwidth of 200KHz (Fc +/- 100KHz) per band. Non-selective wide-band signal boosters shall not be accepted, unless required to cover multiple channels within the same band.

G. Signal Boosters shall have oscillation suppression circuitry to protect the public safety radio system in case of system malfunction or other causes. The oscillation suppression circuit shall not disable the system operation. Systems that automatically disable the signal booster upon oscillation detection shall not be allowed.

H. Signal Boosters shall have uplink noise suppression function to eliminate uplink noise while in standby (i.e. no radio transmission from within a building). Systems that produce any measurable level of uplink noise while in standby shall not be allowed.

I. Signal Booster gain shall be rated at minimum of 80dB and the gain shall be adjustable in a minimum of 30dB range. System gain shall be set and documented at the time of the final system test.

J. Maximum Propagation delay of the signal booster system shall be the lesser of 14µs (microseconds) or as specified by AHJ.

K. The signal booster system shall include built-in automatic supervision of malfunctions of the signal booster and battery system as per NFPA 1221 NFPA 72 and IFC. Non-OEM equipment add-ons and modifications to comply with this specification shall not be allowed.

L. A dedicated supervised monitoring panel shall be provided in a location as designated by AHJ to annunciate the status of all signal booster locations. The monitoring panel shall provide visual and labeled indication of the following for each signal booster:

1. Normal AC power
2. Signal booster trouble
3. Antenna Failure
4. Loss of normal AC power
5. Failure of battery charger
6. Low battery capacity

M. The vendor shall verify the system monitoring requirements and the required annunciator location with the AHJ prior to system installation. System monitoring shall be fully compliant with the AHJ requirements.

N. Non-OEM External filters, duplexers, power supplies or other non-OEM additions or modifications of the original equipment shall not be allowed.

O. All signal booster components shall be contained in a type-4 approved and UL 50e listed watertight enclosure. All enclosures shall be painted red with external labeling as required by the AHJ.

2.3 INSTALLATION REQUIREMENTS

A. Installation of all components of the Emergency Responder Communication Enhancement System shall comply with all applicable sections of the National Electrical Code NFPA-70, NFPA-72, NFPA 1221, IFC and / or as required by the local AHJ.

B. At least 2 independent and reliable power supplies shall be provided as specified in NFPA 72, NFPA 1221 and IFC.

C. The primary power source shall be supplied from a dedicated twenty (20) ampere branch circuit and comply with NFPA-70 National Electrical Code, NFPA 72 and NFPA 1221 2016 edition.

1. The signal booster shall be equipped with a secondary source of power. The secondary source of power shall be a battery system with a dedicated battery charger powered by a

separate, dedicated twenty (20) ampere branch circuit. The secondary power supply shall power on automatically when the primary power source is lost. The secondary source of power shall be capable of operating the emergency responder radio coverage enhancement system for a period of at least 24 hours. The battery system shall automatically charge in the presence of external power input. Battery charger and all other electronic components must be fully enclosed in a waterproof Type-4 approved enclosure. Batteries shall be enclosed in a separate, vented Type-3R or Type-4 approved enclosure. External UPS (Uninterruptable Power Supplies) are not acceptable.

D. RF Coaxial Cable shall be a listed, CMP plenum. The cable classification shall be clearly marked on the outer surface of the cable regular intervals.

2.4 REMOTE COMMUNICATION

A. Provide remote communication via dedicated fire alarm control panel, Edwards IO64, with cellular dialers.

2.5 MISCELLANEOUS

A. Frequency License Holder approval of the ERCES/BDA installation must be provided in writing to the vendor prior to installation of the ERCES System.

B. Frequency License Holder is Seneca County (Rodger, Kristopher krodger@co.seneca.ny.us)

C. Please note that NYS Fire Code (2020) requires that the ERCES/BDA system include minimum pathway survivability of Level 1 and must also be monitored for integrity per NFPA 1221 Chapter 9, Section 9.6.2.1.1 and 9.6.13.1.

D. ERCES control panel shall include a 2- hour fire rating.

PART 3 - EXECUTION

3.1 GENERAL

A. In the absence of testing before bid time, the bidders should include the cost of providing a code compliant ERCES and fire alarm system with their bids.

B. During construction, if it is determined that an ERCES system is not necessary, the successful contractor will be asked to provide an equitable deduct from the Contract.

C. Contractors should expect to perform a radio signal test before construction to determine existing signal strength, and again during construction to confirm actual signal strength within the building.

3.2 EXAMINATION

A. Examine areas and conditions for compliance with requirements for ventilation, temperature, humidity, and other conditions affecting performance of the Work.

1. Verify that manufacturer's written instructions for environmental conditions have been

permanently established in spaces where equipment and wiring are installed, before installation begins.

B. Examine roughing-in for electrical connections to verify actual locations of connections before installation.

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

3.3 EQUIPMENT INSTALLATION

A. Comply with NFPA 72, NFPA 101, and requirements of authorities having jurisdiction for installation and testing ERCES.

1. Devices placed in service before all other trades have completed cleanup shall be replaced.
2. Devices installed but not yet placed in service shall be protected from construction dust, debris, dirt, moisture, and damage according to manufacturer's written storage instructions.

B. Install wall-mounted equipment, with tops of cabinets not more than 78 inches above the finished floor.

3.4 PATHWAYS

A. Pathways above recessed ceilings and in non-accessible locations may be routed exposed.

1. Exposed pathways located less than 96 inches above the floor shall be installed in EMT.

B. Pathways shall be installed in minimum ¾-inch EMT.

C. Exposed EMT shall be factory painted red enamel.

3.5 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals.

B. Install framed instructions in a location visible from fire-alarm control unit.

3.6 GROUNDING

A. Ground fire-alarm control unit and associated circuits; comply with IEEE 1100.

B. Ground shielded cables at the control panel location only. Insulate shield at device location.

3.7 FIELD QUALITY CONTROL

A. Field tests shall be witnessed by Director.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

C. Perform tests and inspections.

D. Perform the following tests and inspections:

1. Visual Inspection: Conduct visual inspection prior to testing.

a. Inspection shall be based on completed record Drawings and system documentation.

E. Prepare test and inspection reports.

F. Maintenance Test and Inspection: Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.

G. Annual Test and Inspection: One year after date of Substantial Completion, test fire-alarm system complying with visual and testing inspection requirements in NFPA 72. Use forms developed for initial tests and inspections.

3.8 ACCEPTANCE AND TEST PROCEDURES

A. Acceptance testing of an in-building radio system is required upon completion of installation.

B. The coverage testing shall be done in accordance with NFPA 72, NFPA 1221, IFC and as required by the local AHJ.

C. All tests shall be conducted, documented, and signed by a person in possession of a current FCC General Radio Operator License.

D. All test records along with system diagrams, iBWave design, equipment specifications, user manuals, RF link budget calculations, battery backup calculation and other design data shall be submitted upon completion of the project, and as required by the AHJ.

3.9 DEMONSTRATION

A. Engage a factory-authorized service representative to train the Director’s Representatives maintenance personnel to adjust, operate, and maintain the ERCES.

END OF SECTION

SECTION 31 10 00

SITE CLEARING

PART 1 - GENERAL

1.1 DEFINITIONS

A. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.

B. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil," but in disturbed areas such as urban environments, the surface soil can be subsoil.

C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil; the zone where plant roots grow. Its appearance is generally friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects larger than 2 inches in diameter; and free of weeds, roots, toxic materials, or other nonsoil materials.

D. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction and indicated on Drawings.

E. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 MATERIAL OWNERSHIP

A. Except for materials indicated to be stockpiled or otherwise remain Director’s Representative property, cleared materials shall become Contractor's property and shall be removed from Project site. Do not allow cleared material to intermix with stockpiled topsoil.

1.4 INFORMATIONAL SUBMITTALS

A. Existing Conditions: Documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.

1. Use sufficiently detailed photographs or video recordings.
2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plant designated to remain.

B. Topsoil stripping and stockpiling program.

C. Record Drawings: Identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.5 FIELD CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Director's Representative and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed trafficways if required by Director's Representative or authorities having jurisdiction.

B. Salvageable Improvements: Carefully remove items indicated to be salvaged and store on site where indicated or as directed by the Director's Representative. .

C. Utility Locator Service: Notify UDig NY (811) for area where Project is located before site clearing.

D. Do not commence site clearing operations until temporary erosion- and sedimentation-control and plant-protection measures are in place.

E. Tree- and Plant-Protection Zones: Protect according to requirements indicated on the Contract Documents. The following practices are prohibited within plant protection zones:

1. Storage of construction materials, debris or excavated material.
2. Parking vehicles or equipment.
3. Foot traffic.
4. Impoundment of water.
5. Excavation or other digging unless otherwise indicated.
6. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
7. Directing vehicle or equipment exhaust toward plant protection zones.

F. Tree Clearing Schedule: No tree clearing may take place between April 1 and October 31, unless approved by the Director's Representative after NYSOPRHP surveys existing trees for potential endangered species.

G. Soil Stripping, Handling, and Stockpiling: Perform only when the soil is dry or slightly moist.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 31 20 00 "Earth Moving."

1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Verify that trees, shrubs, and other vegetation to remain or to be relocated have been flagged and that protection zones have been identified and enclosed.

C. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to Director's Representative.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to Erosion and Sedimentation Control Drawings and requirements of the project's Storm Water Pollution Prevention Plan (SWPPP).

B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.

D. Upon completion of construction activities, remove erosion and sedimentation-control measures. Restore and stabilize areas disturbed during removal operations.

3.3 TREE AND PLANT PROTECTION

A. Protect trees and plants remaining on-site. Tree protection fencing shall be in accordance with the Contract Drawings.

B. Install protective fencing before any construction activities begin and maintain fence until permanent vegetation has been established.

C. Trees shall be fenced so as to encompass the tree canopy to the greatest extent possible.

D. In no case shall the fencing be less than 2-feet from the edge of the tree.

E. Construction, excavation materials, and topsoil shall not be stockpiled under a tree’s canopy.

F. Vehicles and construction equipment shall not be parked under a tree’s canopy, or left idling under a tree’s canopy.

G. Avoid digging under a tree’s canopy as much as possible.

H. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations in a manner approved by the Director's Representative.

3.4 EXISTING UTILITIES

A. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.

1. Arrange with utility companies to shut off indicated utilities.

B. Locate, identify, and disconnect utilities indicated to be abandoned in place.

C. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by NYSOPRHP or others, unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Director's Representative not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Director's Representative's written permission.

D. Excavate for and remove underground utilities indicated to be removed.

3.5 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.

1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
2. Grind down stumps and remove roots , obstructions, and debris to a depth of 12 inches below exposed subgrade.
3. Use only hand methods or air spade for grubbing within protection zones.
4. Chip removed tree branches and dispose of off-site.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.

1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

3.6 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil to whatever depth encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.

1. Remove subsoil and nonsoil materials from topsoil, including clay lumps, gravel, and other objects larger than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.

C. Stockpile topsoil away from edge of excavations without intermixing with subsoil or other materials. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water or provide temporary seed and mulch. See Section 32 92 00 for temporary seed requirements.

1. Limit height of topsoil stockpiles to 72 inches.
2. Do not stockpile topsoil within protection zones.
3. Dispose of surplus topsoil. Surplus topsoil is that which exceeds quantity indicated to be stockpiled or reused.

3.7 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.

B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.

1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.

3.8 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off NYSOPRHP property.

B. On-site burning will not be permitted.

END OF SECTION

SECTION 31 20 00

EARTH MOVING

PART 1 - GENERAL

1.1 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Director's Representative . Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
2. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.
3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Director's Representative. Unauthorized excavation, as well as remedial work directed by Director's Representative, shall be without additional compensation.

F. Fill: Soil materials used to raise existing grades.

G. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 1 cu. yd. for bulk excavation or 3/4 cu. yd. for footing, trench, and pit excavation that cannot be removed by rock-excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:

1. Equipment for Footing, Trench, and Pit Excavation: Late-model, track-mounted hydraulic excavator; equipped with a 42-inch- maximum-width, short-tip-radius rock bucket; rated at not less than 138-hp flywheel power with bucket-curling force of not less than 28,700 lbf and stick-crowd force of not less than 18,400 lbf with extra-long reach boom.

2. Equipment for Bulk Excavation: Late-model, track-mounted loader; rated at not less than 230-hp flywheel power and developing a minimum of 47,992-lbf breakout force with a general-purpose bare bucket.

H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

I. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

J. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

K. Utilities: On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct preexcavation conference at Project site .

1. Review methods and procedures related to earthmoving, including, but not limited to, the following:
   a. Personnel and equipment needed to make progress and avoid delays.
   b. Coordination of Work with utility locator service.
   c. Coordination of Work and equipment movement with the locations of tree- and plant-protection zones.
   d. Extent of trenching by hand or with air spade.
   e. Field quality control.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of the following manufactured products required:

1. Geotextiles.
2. Warning tapes.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified testing agency.

B. Material Test Reports: For each on-site and borrow soil material proposed for fill and backfill as follows:

1. Classification according to ASTM D2487.
2. Laboratory compaction curve according to ASTM D1557.

C. Preexcavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by earth-moving operations. Submit before earth moving begins.

1.5 QUALITY ASSURANCE

A. Geotechnical Testing Agency Qualifications: Qualified according to ASTM E329 and ASTM D3740 for testing indicated.

1.6 FIELD CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth-moving operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Director's Representative and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by Director's Representative or authorities having jurisdiction.

B. Improvements on Adjoining Property: Authority for performing earth moving indicated on property adjoining Director's Representative property will be obtained by Director's Representative before award of Contract.

1. Do not proceed with work on adjoining property until directed by Director's Representative .

C. Utility Locator Service: Notify UDig NY (811) for area where Project is located before beginning earth-moving operations.

D. Do not commence earth-moving operations until temporary site fencing and erosion- and sedimentation-control measures specified in Section 01 50 00 "Temporary Facilities and Controls" are in place.

E. Do not commence earth-moving operations until plant-protection measures specified in Section 01 56 39 "Temporary Tree and Plant Protection" are in place.

F. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation or other digging unless otherwise indicated.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

G. Do not direct vehicle or equipment exhaust towards protection zones.

H. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, and SM according to ASTM D2487 , or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D2487 , or a combination of these groups.

1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

D. Subbase Material: Suitable material conforming to NYSDOT Item 304.12, Type 2. Comply with the gradation and material requirements specified below:

1. 100% passing a 2-inch sieve, 25-60% passing a 1/4-inch sieve, 5-40% passing a No. 40 sieve and 0-10% passing a No. 20 sieve.

E. Granular Fill: Shall consist of durable sand and gravel or crusher-run stone, free of any organic matter. The placticity index shall be less than 5. Comply with the gradation and material requirements specified below:

1. 100% passing a 3-inch sieve, 20-60% passing the No. 4 sieve and no more than 10% passing the No. 200 sieve.
2. Granular fill shall meet the requirements for NYSDOT Subbase Course Type 1, 2 or 4.

F. Bedding Course: Shall be provided in accordance with the pipe manufacturer's recommendations for backfill around utilities. If the manufacturer does not provide recommendations for pipe bedding material, provide a clean, angular, bedding fill meeting the following gradation:

1. 100% passing a 3/4-inch sieve, 0-70% passing a No. 40 sieve and 0-10% passing a No. 200 sieve.

G. Drainage Fill: Clean, washed NYSDOT #2 stone.

H. Common Fill: Shall consist of durable soil material, free of any organic matter. The plasticity index should be less than 15. Comply with the gradation and material requirements specified below:

1. 100% passing a 6-inch sieve, at least 90% passing a 3-inch sieve, and at least 20% passing a No. 4 sieve.

I. Sand: ASTM C33/C33M; fine aggregate.

J. Rip Rap Stone: Provide Rip-Rap material as shown on the Contract Drawings and in accordance with the following:

1. Rip-Rap shall meet the requirements of NYSDOT Item No. 620.03, Stone Filling (Light).

2.2 GEOTEXTILES

A. Subsurface Drainage Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

1. Survivability: Class 2; AASHTO M 288.
2. Apparent Opening Size: No. 70 sieve, maximum; ASTM D4751.
3. Permittivity: 0.5 per second, minimum; ASTM D4491.
4. UV Stability: 50 percent after 500 hours' exposure; ASTM D4355.

B. Separation Geotextile: Woven geotextile fabric, manufactured for separation applications, made from polyolefins or polyesters; with elongation less than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

1. Survivability: Class 2; AASHTO M 288.
2. Apparent Opening Size: No. 60 sieve, maximum; ASTM D4751.
3. Permittivity: 0.02 per second, minimum; ASTM D4491.
4. UV Stability: 50 percent after 500 hours' exposure; ASTM D4355.

2.3 ACCESSORIES

A. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.

B. Protect and maintain erosion and sedimentation controls during earth-moving operations.

C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 DEWATERING

A. Provide dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of ground water and permit excavation and construction to proceed on dry, stable subgrades.

B. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

C. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

D. Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of work under construction or completed. Dispose of water and sediment in a manner that avoids inconvenience to others.

3.3 EXPLOSIVES

A. Explosives: Do not use explosives.

3.4 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
2. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions:
    a. 24 inches outside of concrete forms other than at footings.
    b. 12 inches outside of concrete forms at footings.
    c. 6 inches outside of minimum required dimensions of concrete cast against grade.
    d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
    e. 6 inches beneath bottom of concrete slabs-on-grade.
    f. 6 inches beneath pipe in trenches and the greater of 24 inches wider than pipe or 42 inches wide.

3.5 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
2. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.

B. Excavations at Edges of Tree- and Plant-Protection Zones:

1. Excavate by hand or with an air spade to indicated lines, cross sections, elevations, and subgrades. If excavating by hand, use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.

3.6 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.7 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.

1. Clearance: 12 inches each side of pipe or conduit.

C. Trench Bottoms: Excavate trenches 4 inches deeper than bottom of pipe and conduit elevations to allow for bedding course. Hand-excavate deeper for bells of pipe.

1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

D. Trenches in Tree- and Plant-Protection Zones:

1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.

2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.

3.8 SUBGRADE INSPECTION

A. Notify Director's Representative and Director’s testing agency when excavations have reached required subgrade.

B. If Director's Representative and the Director’s testing agency determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Proof-roll subgrade below the building slabs and pavements with a pneumatic-tired and loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Director's Representative, and replace with compacted backfill or fill as directed.

D. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.

E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Director's Representative without additional compensation.

3.9 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Director's Representative.

1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Director's Representative.

3.10 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.11 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
2. Surveying locations of underground utilities for Record Documents.
3. Testing and inspecting underground utilities.
4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring, bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.12 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Trenches under Footings: Backfill trenches excavated under footings and within 18 inches of bottom of footings with concrete to elevation of bottom of footings. Concrete is specified in Section 03 30 00 "Cast-in-Place Concrete."

D. Trenches under Roadways: Provide 4-inch- thick, concrete-base slab support for piping or conduit less than 30 inches below surface of roadways. After installing and testing, completely encase piping or conduit in a minimum of 4 inches of concrete before backfilling or placing roadway subbase course. Concrete is specified in Section 03 30 00 "Cast-in-Place Concrete."

E. Backfill voids with satisfactory soil while removing shoring and bracing.

F. Initial Backfill:

1. Soil Backfill: Place and compact initial backfill of bedding course material in any dimension, to a height of 12 inches over the pipe or conduit.
   a. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

G. Final Backfill:

1. Place and compact final backfill using compacted common fill to final subgrade elevation.

H. Warning Tape: Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.13 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use satisfactory soil material.
2. Under walks and pavements, use subbase course material.
3. Under steps and ramps, use subbase course material.
4. Under building slabs, use granular fill.
5. Under footings and foundations, use granular fill.

C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.14 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.15 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D1557:

1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.
2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 95 percent.
3. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 85 percent.
4. For utility trenches, compact each layer of initial and final backfill soil material at 95 percent.

3.16 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.
2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to elevations required to achieve indicated finish elevations, within the following subgrade tolerances:

1. Turf or Unpaved Areas: Plus or minus 1 inch.
2. Walks: Plus or minus 1/2 inch.
3. Pavements: Plus or minus 1/2 inch.

C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.17 SUBSURFACE DRAINAGE

A. Subsurface Drain: Place subsurface drainage geotextile around perimeter of subdrainage trench. Place a 6-inch course of drainage fill material on subsurface drainage geotextile to support subdrainage pipe. Encase subdrainage pipe in a minimum of 12 inches of drainage fill material, placed in compacted layers 6 inches thick, and wrap in subsurface drainage geotextile, overlapping sides and ends at least 6 inches.

1. Compact each drainage fill material layer to 85 percent of maximum dry unit weight according to ASTM D698 with a minimum of two passes of a plate-type vibratory compactor.

3.18 SUBBASE COURSE UNDER PAVEMENTS AND WALKS

A. Place subbase course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place subbase course under pavements and walks as follows:

1. Install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
2. Shape subbase course to required crown elevations and cross-slope grades.
3. Place subbase course 6 inches or less in compacted thickness in a single layer.
4. Place subbase course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
5. Compact subbase course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D1557.

C. Pavement Shoulders: Place shoulders along edges of subbase course to prevent lateral movement. Construct shoulders, at least 12 inches wide, of satisfactory soil materials and compact simultaneously with each subbase layer to not less than 95 percent of maximum dry unit weight according to ASTM D1557.

3.19 FIELD QUALITY CONTROL

A. Testing and Inspections: The Director will engage a qualified special inspector to perform the following special inspections: Coordinate with the testing agency and the NYSOPRHP to facilitate execution of these tests.

1. Determine prior to placement of fill that site has been prepared in compliance with requirements.
2. Determine that fill material classification and maximum lift thickness comply with requirements.
3. Determine, during placement and compaction, that in-place density of compacted fill complies with requirements.

B. Testing Agency: The Director will engage a qualified geotechnical engineering testing agency to perform tests and inspections. Coordinate with the testing agency and the NYSOPRHP to facilitate execution of these tests.

C. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

D. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Director's Representative.

E. Testing agency will test compaction of soils in place according to ASTM D1556, ASTM D2167, ASTM D2937, and ASTM D6938, as applicable. Tests will be performed at the following locations and frequencies:

1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2000 sq. ft. or less of paved area or building slab but in no case fewer than three tests.
2. Foundation Wall Backfill: At each compacted backfill layer, at least one test for every 100 feet or less of wall length but no fewer than two tests.
3. Trench Backfill: At each compacted initial and final backfill layer, at least one test for every 150 feet or less of trench length but no fewer than two tests.

F. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.20 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by Director's Representative; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.21 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off NYSOPRHP property.

END OF SECTION

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ASPHALT PAVING

PART 1 - GENERAL

1.1 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to hot-mix asphalt paving including, but not limited to, the following:
    a. Review proposed sources of paving materials, including capabilities and location of plant that will manufacture hot-mix asphalt.
    b. Review requirements for protecting paving work, including restriction of traffic during installation period and for remainder of construction period.

1.2 ACTION SUBMITTALS

A. Hot-Mix Asphalt Designs:

1. Certification, by NYSDOT, of approval of each hot-mix asphalt design proposed for the Work.
2. For each hot-mix asphalt design proposed for the Work.

B. Product Declarations: Provide current Environmental Product Declarations (EPDs), that include the amount of embodied carbon in asphalt paving.

1. Acceptable EPDs are non-expired, Product-specific, Facility or Plant-specific, or Supply Chain-specific Type III (Third-Party Reviewed), in adherence with ISO 14025 Environmental labels and declarations, ISO 14044 Environmental management – Life cycle assessment, and ISO 21930 Core rules for environmental product declarations of construction products and services.
2. Provide the EPD Material Tracking Form containing the total anticipated quantity/volume/weight (matching the units used in the EPDs) of each product being incorporated into the project.
    a. With each application for payment, provide an updated EPD Material Tracking Form and copies of delivery tickets for each product incorporated into the project for the period covered by the payment application.

1.3 INFORMATIONAL SUBMITTALS

A. Material Certificates:

1. Tack coat.

B. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A paving-mix manufacturer registered with and approved by NYSDOT .

B. Testing Agency Qualifications: Qualified in accordance with ASTM D3666 for testing indicated.

C. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of NYSDOT for asphalt paving work.

1. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:

1. Prime Coat: Minimum surface temperature of 60 deg F.
2. Tack Coat: Minimum surface temperature of 60 deg F.
3. Asphalt Binder Course: Minimum surface temperature of 40 deg F and rising at time of placement.
4. Asphalt Surface Course: Minimum surface temperature of 60 deg F at time of placement.

PART 2 - PRODUCTS

2.1 AGGREGATES

A. General: Use materials and gradations that have performed satisfactorily in previous installations.

B. Coarse Aggregate: ASTM D692/D692M, sound; angular crushed stone, crushed gravel, or cured, crushed blast-furnace slag.

C. Fine Aggregate: ASTM D1073 , sharp-edged natural sand or sand prepared from stone, gravel, cured blast-furnace slag, or combinations thereof.

1. For hot-mix asphalt, limit natural sand to a maximum of 20 percent by weight of the total aggregate mass.

D. Mineral Filler: ASTM D242/D242M , rock or slag dust, hydraulic cement, or other inert material.

2.2 ASPHALT MATERIALS

A. Tack Coat: ASTM D977 emulsified asphalt, or ASTM D2397/D2397M cationic emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.

B. Water: Potable.

2.3 AUXILIARY MATERIALS

A. Joint Sealant: ASTM D6690, Type II or III , hot-applied, single-component, polymer-modified bituminous sealant.

2.4 MIXES

A. Hot-Mix Asphalt: Dense-graded, hot-laid, hot-mix asphalt plant mixes approved by NYSDOT and complying with the following requirements:

1. Provide mixes with a history of satisfactory performance in geographical area where Project is located.
2. Binder Course: Comply with the requirements of NYSDOT, Type 3 Dense Binder, Section 401, Item 403.138902.
3. Surface Course: Comply with the requirements of NYSDT, Type 7 Top Course, Section 401, Item 403.198902.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that subgrade is dry and in suitable condition to begin paving.

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

3.2 PREPARATION

A. Protection: Provide protective materials, procedures, and worker training to prevent asphalt materials from spilling, coating, or building up on curbs, driveway aprons, manholes, and other surfaces adjacent to the Work.

B. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
2. Proof-roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Director’s Representative, and replace with compacted backfill or fill as directed.

3.3 PATCHING

A. Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches into perimeter of adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically.

Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.

B. Tack Coat: Before placing patch material, apply tack coat uniformly to vertical asphalt surfaces abutting the patch. Apply at a rate of 0.05 to 0.15 gal./sq. yd.

1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

C. Placing Single-Course Patch Material: Fill excavated pavement areas with hot-mix asphalt base mix for full thickness of patch and, while still hot, compact flush with adjacent surface.

D. Placing Two-Course Patch Material: Partially fill excavated pavements with hot-mix asphalt base course mix and, while still hot, compact. Cover asphalt base course with compacted layer of hot-mix asphalt surface course, finished flush with adjacent surfaces.

3.4 REPAIRS

A. Crack and Joint Filling: Remove existing joint filler material from cracks or joints to a depth of 1/4 inch.

1. Clean cracks and joints in existing hot-mix asphalt pavement.
2. Use emulsified-asphalt slurry to seal cracks and joints less than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess.
3. Use hot-applied joint sealant to seal cracks and joints more than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess.

3.5 SURFACE PREPARATION

A. Ensure that prepared subgrade has been proof-rolled and is ready to receive paving. Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces.

B. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal./sq. yd.

1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.6 HOT-MIX ASPHALT PLACEMENT

A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand in areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.

1. Place hot-mix asphalt binder course in number of lifts and thicknesses indicated.
2. Place hot-mix asphalt surface course in single lift.

3. Spread mix at a minimum temperature of 250 deg F.
4. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes unless otherwise indicated.
5. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.

B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.

1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Overlap mix placement about 1 to 1-1/2 inches from strip to strip to ensure proper compaction of mix along longitudinal joints.
2. Complete a section of asphalt binder course before placing asphalt surface course.

C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.7 JOINTS

A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.

1. Clean contact surfaces and apply tack coat to joints.
2. Offset longitudinal joints, in successive courses, a minimum of 6 inches.
3. Offset transverse joints, in successive courses, a minimum of 24 inches.
4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints using either "bulkhead" or "papered" method in accordance with AI MS-22, for both "Ending a Lane" and "Resumption of Paving Operations."
5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
6. Compact asphalt at joints to a density within 2 percent of specified course density.

3.8 COMPACTION

A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.

1. Complete compaction before mix temperature cools to 185 deg F.

B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.

C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:

1. Average Density, Marshall Test Method: 96 percent of reference laboratory density in accordance with ASTM D6927, but not less than 94 percent or greater than 100 percent.

D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.

E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.

G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.9 INSTALLATION TOLERANCES

A. Pavement Thickness: Compact each course to produce thickness indicated within the following tolerances:

1. Binder Course: Plus or minus 1/2 inch.
2. Surface Course: Plus 1/4 inch, no minus.

B. Pavement Surface Smoothness: Compact each course to produce surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:

1. Binder Course : 1/4 inch.
2. Surface Course: 1/8 inch.
3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.

3.10 FIELD QUALITY CONTROL

A. Testing Agency: The Director will engage a qualified testing agency to perform tests and inspections. Coordinate with the testing agency and the NYSOPRHP to facilitate execution of these tests.

B. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined in accordance with ASTM D3549/D3549M.

C. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.

D. In-Place Density: Testing agency will take samples of uncompacted paving mixtures and compacted pavement in accordance with ASTM D979/D979M.

1. Reference maximum theoretical density will be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared in accordance with ASTM D2041/D2041M, and compacted in accordance with job-mix specifications.
2. In-place density of compacted pavement will be determined by testing core samples in accordance with ASTM D1188 or ASTM D2726/D2726M.
    a. One core sample will be taken for every 1000 sq. yd. or less of installed pavement, with no fewer than three cores taken.
    b. Field density of in-place compacted pavement may also be determined by nuclear method in accordance with ASTM D2950/D2950M and coordinated with ASTM D1188 or ASTM D2726/D2726M.

E. Replace and compact hot-mix asphalt where core tests were taken.

F. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

3.11 WASTE HANDLING

A. Remove excavated and waste material from project site and legally dispose of them in an EPA-approved landfill.

END OF SECTION

SECTION 32 13 13

CONCRETE PAVING

PART 1 - GENERAL

1.1 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash, slag cement, and other pozzolans.

B. W/C Ratio: The ratio by weight of water to cementitious materials.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to concrete paving, including but not limited to, the following:
   a. Concrete mixture design.
   b. Quality control of concrete materials and concrete paving construction practices.
2. Require representatives of each entity directly concerned with concrete paving to attend, including the following:
   a. Contractor's superintendent.
   b. Independent testing agency responsible for concrete design mixtures.
   c. Ready-mix concrete manufacturer.
   d. Concrete paving Subcontractor.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

C. Product Declarations: Provide current Environmental Product Declarations (EPDs), that include the amount of embodied carbon in concrete paving.

1. Acceptable EPDs are non-expired, Product-specific, Facility or Plant-specific, or Supply Chain-specific Type III (Third-Party Reviewed), in adherence with ISO 14025 Environmental labels and declarations, ISO 14044 Environmental management – Life cycle assessment, and ISO 21930 Core rules for environmental product declarations of construction products and services.
2. Provide the EPD Material Tracking Form containing the total anticipated quantity/volume/weight (matching the units used in the EPDs) of each product being incorporated into the project.

a. With each application for payment, provide an updated EPD Material Tracking Form and copies of delivery tickets for each product incorporated into the project for the period covered by the payment application.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified ready-mix concrete manufacturer and testing agency.

B. Material Certificates: For the following, from manufacturer:

1. Cementitious materials.
2. Steel reinforcement and reinforcement accessories.
3. Admixtures.
4. Curing compounds.
5. Joint fillers.

C. Material Test Reports: For each of the following:

1. Aggregates:

D. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities" (Quality Control Manual - Section 3, "Plant Certification Checklist").

B. Testing Agency Qualifications: Qualified according to ASTM C1077 and ASTM E329 for testing indicated.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.

1.6 FIELD CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

B. Cold-Weather Concrete Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:

1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
2. Do not use frozen materials or materials containing ice or snow.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.

C. Hot-Weather Concrete Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Cover steel reinforcement with water-soaked burlap, so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
3. Fog-spray forms , steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with ACI 301 unless otherwise indicated.

B. Maximum carbon content of concrete shall be in accordance with NY State Buy Clean Concrete Guidelines, including but not limited to the following limits:

1. Compressive strength 0-2500 psi: 275 kg CO_2 per CY
2. Compressive strength 2501-3000 psi: 302 kg CO_2 per CY
3. Compressive strength 3001-4000 psi: 360 kg CO_2 per CY
4. Compressive strength 4001-5000 psi: 434 kg CO_2 per CY

2.2 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.

1. Use flexible or uniformly curved forms for curves with a radius of 100 feet or less. Do not use notched and bent forms.

B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

2.3 STEEL REINFORCEMENT

A. Plain-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, fabricated from steel wire into flat sheets.

B. Reinforcing Bars: ASTM A615/A615M, Grade 60; deformed.

C. Tie Bars: ASTM A615/A615M, Grade 60; deformed.

D. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded-wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified, and as follows:

1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.

2.4 CONCRETE MATERIALS

A. Cementitious Materials: Use the following cementitious materials, of same type, brand, and source throughout Project:

1. Portland Cement: ASTM C150/C150M, gray portland cement Type I Type II Type I/II .

B. Normal-Weight Aggregates: ASTM C33/C33M, Class 4S , uniformly graded. Provide aggregates from a single source with documented service-record data of at least 10 years' satisfactory service in similar paving applications and service conditions using similar aggregates and cementitious materials.

1. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Air-Entraining Admixture: ASTM C260/C260M.

D. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.

1. Water-Reducing Admixture: ASTM C494/C494M, Type A.

E. Water: Potable and complying with ASTM C94/C94M.

2.5 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry or cotton mats.

B. Moisture-Retaining Cover: ASTM C171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

D. Evaporation Retarder: Waterborne, monomolecular, film forming, manufactured for application to fresh concrete.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. Bon Tool Co.
    b. Brickform; a division of Solomon Colors.
    c. ChemMasters, Inc.
    d. Dayton Superior.
    e. Euclid Chemical Company (The); an RPM company.
    f. Kaufman Products, Inc.
    g. Lambert Corporation.
    h. Laticrete International, Inc.
    i. Master Builders Solutions.
    j. Metalcrete Industries.
    k. Nox-Crete Products Group.
    l. Sika Corporation.
    m. SpecChem, LLC.
    n. TK Products.
    o. Vexcon Chemicals Inc.
    p. W.R. Meadows, Inc.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C309, Type 1, Class B, dissipating.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. Anti-Hydro International, Inc.
    b. ChemMasters, Inc.
    c. Dayton Superior.
    d. Euclid Chemical Company (The); an RPM company.
    e. Kaufman Products, Inc.
    f. Lambert Corporation.
    g. Laticrete International, Inc.
    h. Nox-Crete Products Group.
    i. Right Pointe.
    j. SpecChem, LLC.
    k. TK Products.
    l. Unitex by Dayton Superior.
    m. Vexcon Chemicals Inc.
    n. W.R. Meadows, Inc.

2.6 RELATED MATERIALS

A. Joint Fillers: ASTM D1752, cork or self-expanding cork in preformed strips.

B. Rock Salt: Sodium chloride crystals, kiln dried, coarse gradation with 100 percent passing 3/8-inch sieve and 85 percent retained on a No. 8 sieve.

2.7 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.

1. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.
2. When automatic machine placement is used, determine design mixtures and obtain laboratory test results that comply with or exceed requirements.

B. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:

1. Air Content, 3/4-inchNominal Maximum Aggregate Size: 6 percent plus or minus 1-1/2 percent.

C. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing admixture in concrete as required for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

D. Concrete Mixtures: Normal-weight concrete.

1. Compressive Strength (28 Days): 4500 psi .
2. Maximum W/C Ratio at Point of Placement: 0.45 .
3. Slump Limit: 3 inches , plus or minus 1 inch.

2.8 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C94/C94M and ASTM C1116/C1116M. Furnish batch certificates for each batch discharged and used in the Work.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.

B. Proof-roll prepared subbase surface below concrete paving to identify soft pockets and areas of excess yielding.

1. Completely proof-roll subbase in one direction and repeat in perpendicular direction. Limit vehicle speed to 3 mph.
2. Proof-roll with a pneumatic-tired and loaded, 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
3. Correct subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch according to requirements in Section 31 20 00 "Earth Moving."

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

3.2 PREPARATION

A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 INSTALLATION OF STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.

C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

D. Install welded-wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

3.5 JOINTS

A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.

1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.

B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.

1. Continue steel reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of paving strips unless otherwise indicated.
2. Provide tie bars at sides of paving strips where indicated.
3. Butt Joints: Use bonding agent at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.

1. Locate expansion joints at intervals of 30 feet unless otherwise indicated.
2. Extend joint fillers full width and depth of joint.
3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
6. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.

D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 1/4-inch radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate grooving-tool marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.

E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/4-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate edging-tool marks on concrete surfaces.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, inspect and complete formwork installation , steel reinforcement, and items to be embedded or cast-in.

B. Remove snow, ice, or frost from subbase surface and steel reinforcement before placing concrete. Do not place concrete on frozen surfaces.

C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.

E. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.

F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

G. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.

1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement and joint devices.

H. Screed paving surface with a straightedge and strike off.

I. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleedwater appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

3.7 FLOAT FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.

B. Float Finish: Begin the second floating operation when bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.

1. Medium-to-Coarse-Textured Broom Finish: Unless noted otherwise, provide a medium-to-coarse finish by striating float-finished concrete surface 1/16 to 1/8 inch deep with a stiff-bristled broom, perpendicular to line of traffic. Provide visually consistent broom finish full width or length of slab or between expansion joints. Finish in the direction of water drainage or perpendicular to traffic if level.

3.8 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with ACI 306.1 for cold-weather protection.

C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.

D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

E. Curing Methods: Cure concrete by moisture curing moisture-retaining-cover curing curing compound or a combination of these as follows:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
   a. Water.
   b. Continuous water-fog spray.
   c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Immediately repair any holes or tears occurring during installation or curing period, using cover material and waterproof tape.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating, and repair damage during curing period.

3.9 PAVING TOLERANCES

A. Comply with tolerances in ACI 117 and as follows:

1. Elevation: 1/2 inch.
2. Thickness: Plus 3/8 inch, minus 1/4 inch.
3. Surface: Gap below 10-feet- long; unleveled straightedge not to exceed 1/4 inch.
4. Joint Spacing: 3 inches.
5. Contraction Joint Depth: Plus 1/4 inch, no minus.
6. Joint Width: Plus 1/8 inch, no minus.

3.10 FIELD QUALITY CONTROL

A. Testing Agency: the Director will engage a qualified testing agency to perform tests and inspections. Coordinate with the testing agency and the NYSOPRHP to facilitate execution of these tests.

B. Testing Services: Testing and inspecting of composite samples of fresh concrete obtained according to ASTM C172/C172M shall be performed according to the following requirements:

1. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. 5000 sq. ft. or fraction thereof of each concrete mixture placed each day.

a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C143/C143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C231/C231M, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C1064/C1064M; one test hourly when air temperature is 40 deg F and below and when it is 80 deg F and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C31/C31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C39/C39M; test one specimen at seven days and two specimens at 28 days.
   a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.

C. Strength of each concrete mixture will be satisfactory if average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

D. Test results will be reported in writing to Director's Representative, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Director's Representative but will not be used as sole basis for approval or rejection of concrete.

F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Director's Representative.

G. Concrete paving will be considered defective if it does not pass tests and inspections.

H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

I. Prepare test and inspection reports.

3.11 REPAIR AND PROTECTION

A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Director's Representative.

B. Drill test cores, where directed by Director's Representative, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory paving areas with portland cement concrete bonded to paving with epoxy adhesive.

C. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.

D. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION

SECTION 32 92 00

TURF AND GRASSES

PART 1 - GENERAL

1.1 DEFINITIONS

A. Finish Grade: Elevation of finished surface of planting soil.

B. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

C. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. .

D. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

1.2 INFORMATIONAL SUBMITTALS

A. Qualification Data: For landscape Installer.

B. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture, stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.

1. Certification of each seed mixture Include identification of source and name and telephone number of supplier.

C. Product Certificates: For fertilizers, from manufacturer.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: Recommended procedures to be established by Director’s Representative for maintenance of turf and meadows during a calendar year. Submit before expiration of required maintenance periods.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful turf and native seed mix establishment.

1. Professional Membership: Installer shall be a member in good standing of either the National Association of Landscape Professionals or AmericanHort.

2. Experience: Five years' experience in turf installation in addition to requirements in Section 01 40 00 "Quality Requirements."
3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws, as applicable.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials; discharge of soil-bearing water runoff; and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk materials with appropriate certificates.

1.6 FIELD CONDITIONS

A. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of Substantial Completion.

1. Spring Planting: April 1 to June 15.
2. Fall Planting: August 15 to October 15.

B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 TOPSOIL

A. Source: Provide from off site, Director’s Representative approved source, when stripped, stockpiled and amended quantity is inadequate to provide four (4") inches settled depth of topsoil for all lawn areas at no additional cost. If existing topsoil is to be used, the topsoil must be mechanically screened to meet the gradation requirements below.

B. Texture and Content: Provide topsoil conforming to the following:

1. Soil texture and content:
   a. Sandy loam topsoil, well drained homogeneous texture and of uniform grade, without the admixture of subsoil material. Topsoil shall be entirely free of dense material, hardpan, clay, stones over 1/2" in diameter, sod, or any other

objectionable foreign material, including but not limited to, glass, debris, toxins, hazardous wastes and chemicals (such as atrizene or muriatic acid within the past seven (7) years) that may be injurious to humans, animals and plant materials.

b. Organic Matter: Containing not less than 5% or more than 10% organic matter in that portion of a sample passing a 1/4" sieve when determined by the wet combustion method on a sample dried at 105 degrees F.

2. pH Value: Containing a pH value within the range of 6.0 to 7.0 on that portion of the sample which passes a 1/4" sieve.
3. Soluble salt content: Not higher than 500 parts per million.
4. Sieve Analysis: Off-site or on-site topsoil shall be screened to meet the following gradation:
   a. 3/4" sieve 100% passing
   b. 1/4" sieve 97-100% passing
   c. No. 200 sieve 20-65 percent passing

2.2 SEED

A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Rules for Testing Seeds" for purity and germination tolerances.

B. Seed Species:

1. Quality, State Certified: State-certified seed of grass species as listed below for solar exposure.
2. General Lawn Seed Mix: Proportioned by weight as follows:

   a. 40 percent Kentucky bluegrass, 95 percent purity, 85 percent germination
   b. 35 percent perennial ryegrass, 98 percent purity, 90 percent germination
   c. 25 percent creeping red fescue, 97 percent purity, 85 percent germination

3. Kentucky bluegrass blend shall contain no more than 25 percent of any one cultivar and always at least two (2) different cultivars.
4. Perennial rye blend shall contain no more than 30 percent of any one (1) cultivar and always at least three (3) different cultivars.

2.3 NATIVE GRASS SEED

A. Wet Pond/Wet Swale Seed Mix: Fresh, clean, and dry new seed, of mixed species as follows:

1. Detention Basin Seed Mix as prepared by Prairie Moon Nursery, (866) 417-8156, www.prairiemoon.com.
2. Retention Basin Wildlife Mix (ERNMX-127) as prepared by Ernst Conservation Seed, (800) 873-3321, www.ernstseed.com.
3. Approved equal.

B. Native Steep Slope Seed Mix: Fresh, clean, and dry new seed, of mixed species as follows:

1. Native Steep Slope Mix w/ Grain Oats (ERNMX-181-1) as prepared by Ernst Conservation Seed, (800) 873-3321, www.ernstseed.com **and modified by NYSOPRHP**.

Amount by Weight	Botanical Name	Common Name
40.00 %	Elymus canadensis	Canada Wildrye
19.12%	Andropogon gerardii	Big Bluestem
12.00%	Sorghastrum nutans, PA Ecotype	Indiangrass, PA Ecotype
10.72%	Elymus virginicus, Madison-NY Ecotype	Virginia Wildrye, Madison-NY Ecotype
5.28%	Elymus canadensis	Canada Wildrye
4.32%	Panicum virgatum	Switchgrass
3.20%	Agrostis perennans, Albany Pine Bush-NY Ecotype	Autumn Bentgrass, Albany Pine Bush-NY Ecotype
2.24%	Panicum clandestinum, Tioga	Deertongue, Tioga
0.80%	Rudbeckia triloba	Brown-Eyed Susan
0.56%	Chamaecrista fasciculata	Partridge Pea
0.56%	Pycnanthemum tenuifolium	Slender Mountain Mint
0.56%	Heliopsis helianthoides, PA Ecotype	Oxeye Sunflower, PA Ecotype
0.16%	Aster pilosus, PA Ecotype	Heath Aster, PA Ecotype
0.16%	Monarda fistulosa	Wild Bergamot
0.16%	Solidago rugosa, PA Ecotype	Wrinkleleaf Goldenrod, PA Ecotype
0.08%	Apocynum cannabinum, PA Ecotype	Indianhemp, PA Ecotype
0.08%	Asclepias syriaca	Common Milkweed

C. The Contractor is required to consult with the NYSOPRHP Regional Landscape Restoration Specialist, Maxwell McCune at 1-607-387-7041 to review the proposed wet pond/wet swale seed mix, seed sowing recommendations and best practices.

2.4 FERTILIZERS

A. The use and type of fertilizer proposed must be approved by the Director's Representative.

B. For Starter Fertilization: Immediately prior to seeding, fertilize with a commercial starter fertilizer, granular, non-burning product, with not less than 90% organic slow acting, micro nutrients and 1% iron, guaranteed analysis commercial fertilizer.

1. Fertilizer ratio shall be: (1-2-1). Apply at a rate of 0.33 – 0.66 lbs of nitrogen (N) per 1,000 sf.

C. For Subsequent and Final Fertilization: Apply commercial fertilizer, poly coated granular non-burning product with not less than 90% organic slow acting, guaranteed analysis.

1. For Spring and Fall Lawn Work: Fertilizer ratio shall be: (3-0-1). Apply at a rate of 1.5 – 2 lbs nitrogen (N)/1,000sf.

2.5 MULCHES

A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, straw of wheat, rye, oats, or barley,

B. Fiber Mulch: Biodegradable, dyed-wood, cellulose-fiber mulch; nontoxic and free of plant-growth or germination inhibitors; with a maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.

C. Nonasphaltic Tackifier: Colloidal tackifier recommended by fiber-mulch manufacturer for slurry application; nontoxic and free of plant-growth or germination inhibitors.

2.6 PESTICIDES

A. Pesticides are not approved for use.

2.7 EROSION-CONTROL MATERIALS

A. Erosion-Control Blankets: Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended steel wire staples, 6 inches long.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to be planted for compliance with requirements and other conditions affecting installation and performance of the Work.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
2. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
3. Uniformly moisten excessively dry soil that is not workable or which is dusty.

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

C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Director's Representative and replace with new planting soil.

3.2 PREPARATION

A. Protect structures; utilities; sidewalks; pavements; and other facilities, trees, shrubs, and plantings from damage caused by planting operations.

1. Protect adjacent and adjoining areas from hydroseeding and hydromulching overspray.

2. Protect grade stakes set by others until directed to remove them.

B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.3 SPREAD TOPSOIL

A. Limit turf preparation to areas to be planted immediately.

B. Perform topsoil spreading operations only during dry weather.

C. To insure proper bond with the topsoil, disk, harrow or otherwise scarify and loosen subgrade to a minimum settled depth of 4 inches before spreading topsoil.

1. Spread topsoil to a depth of 4 inches but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if topsoil or subgrade is frozen, muddy, or excessively wet.

D. Unchanged Subgrades: If turf is to be planted in areas unaltered or undisturbed by excavating, grading, or surface-soil stripping operations, prepare surface soil as follows:

1. Remove existing grass, vegetation, and turf. Do not mix into surface soil.
2. Loosen surface soil to a depth of at least 6 inches. Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 4 inches of soil. Till soil to a homogeneous mixture of fine texture.
3. Remove stones larger than 1/2-inch in any dimension and sticks, roots, trash, and other extraneous matter.
4. Legally dispose of waste material, including grass, vegetation, and turf, off NYSOPRHP property

3.4 TURF AREA PREPARATION

A. Perform a pH test, sieve, and nutrient analysis of the topsoil and advise the results to the Director’s Representative prior to adding limestone or other soil amendments. Soil amendments shall be uniformly incorporated into the top four (4") inches of topsoil by disking, harrowing or other approved methods.

B. Remove debris and stones 3/4" or larger by handpicking, fine tooth aluminum grading rakes, and mechanized stone picker or screening. When topsoil has hardened, cultivate soil to a four (4") inch depth by plowing, disking, harrowing, or otherwise scarifying and loosening the topsoil.

C. Grade lawn areas to a smooth, free draining even surface with a loose, moderately coarse texture. Scarify, rake, level, and roll with a light static roller 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.

D. Cultivate soil to provide a firm bed of minimum of four (4") inches deep, free of clods, stones, or foreign matter over 3/4" in diameter from the top of soil. 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. Remove stones and all debris greater than one 3/4" in diameter during cultivation. Level undulations and irregularities in the surface.

E. For pH correction, provide adjusted rate of application as recommended in Topsoil Test Report submittal. For low pH correction: Add ground limestone at the rate indicated by the soil test. For high pH correction: Materials and application rates shall be determined by appropriate soil tests.

F. Place starter fertilizer at the rate of 0.33 – 0.66 lbs. of nitrogen (N) per 1,000 sf. and mix into full depth of topsoil.

G. Rake area with fine toothed aluminum grading rake before placing 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.

H. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus ½-inch of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.

I. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

J. Before planting, obtain Director's Representative acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.5 PREPARATION FOR EROSION-CONTROL MATERIALS

A. Prepare area as specified in "Turf Area Preparation" Article.

B. For erosion-control blanket, install from top of slope, working downward, and as recommended by material manufacturer for site conditions. Fasten as recommended by material manufacturer.

C. Moisten prepared area before planting if surface is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

3.6 SEEDING

A. Notify Director’s Representative when seed bed is ready for review as specified in Project Conditions. Obtain Director’s Representative approval of finish grade prior to seeding.

B. Seed lawns immediately after preparation of bed and Director’s Representative approval.

C. Seeding shall be performed as follows: ½ rate and mechanically incorporated into the top 1/2" of topsoil. The remaining ½ rate shall be mechanically spread at 90 degrees to the first application and lightly rolled.

1. Do not use wet seed or seed that is moldy or otherwise damaged.
2. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.

D. Sow General Lawn Seed Mix at a total rate of 5 to 8 lb/1000 sq. ft. or as recommended by the seed supplier .

E. Sow Wet Pond/Wet Swale Seed Mix at a total rate of 1/2 pound per 1,000 sf. with a cover crop. Type of cover crop is determined by the planting season. Confirm application rate and cover crop type with seed supplier and NYSOPRHP regional Landscape Restoration Specialist.

F. Sow Native Steep Slope Seed Mix at a total rate of 75 lb. per acre.

G. Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with fine spray.

H. Protect seeded areas with slopes exceeding 1:4 with erosion-control blankets installed and stapled according to manufacturer's written instructions.

I. Protect seeded areas with slopes not exceeding 1:4 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre to form a continuous blanket 1-1/2 inches in loose thickness over seeded areas. Spread by hand, blower, or other suitable equipment.

1. Anchor straw mulch by crimping into soil with suitable mechanical equipment or by applying tackifier over entire area and watering.

3.7 HYDROSEEDING

A. Hydroseeding: Mix specified seed, commercial fertilizer , and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.

1. Mix slurry with nonasphaltic fiber-mulch manufacturer's recommended tackifier.
2. Spray-apply slurry uniformly to all areas to be seeded in a one-step process. Apply slurry at a rate so that mulch component is deposited at not less than 1500-lb/acre dry weight, and seed component is deposited at not less than the specified seed-sowing rate.

3.8 TURF RENOVATION

A. Renovate turf damaged by Contractor's operations, such as storage of materials or equipment and movement of vehicles.

1. Reestablish turf where settlement or washouts occur or where minor regrading is required.
2. Install new planting soil as required.

B. Remove sod and vegetation from diseased or unsatisfactory turf areas; do not bury in soil.

C. Remove topsoil containing foreign materials, such as oil drippings, fuel spills, stones, gravel, and other construction materials resulting from Contractor's operations, and replace with new planting soil.

D. Mow, dethatch, core aerate, and rake existing turf.

E. Remove weeds before seeding. Where weeds are extensive, apply selective herbicides as required. Do not use pre-emergence herbicides.

F. Remove waste and foreign materials, including weeds, soil cores, grass, vegetation, and turf, and legally dispose of them off Director’s Representative property.

G. Till stripped, bare, and compacted areas thoroughly to a soil depth of 6 inches.

H. Apply initial fertilizer required for establishing new turf and mix thoroughly into top 4 inches of existing soil. Install new planting soil to fill low spots and meet finish grades.

1. Initial Fertilizer: Commercial fertilizer applied according to manufacturer's recommendations.

I. Apply seed and protect with straw mulch as required for new turf.

J. Water newly planted areas and keep moist until new turf is established.

3.9 TURF MAINTENANCE

A. General: Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.

1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence.
2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.
3. Apply treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.

B. Watering: Install and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and to keep turf uniformly moist to a depth of 4 inches.

1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
2. Water turf with fine spray at a minimum rate of 1 inch per week unless rainfall precipitation is adequate.

C. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than one-third of grass height. Remove no more than one-third of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height:

1. Mow lawns and native seed areas to a height of 2 to 2-1/2 inches.

D. Turf Postfertilization: Apply commercial fertilizer after initial mowing and when grass is dry.

1. Use fertilizer that provides actual nitrogen of at least 1 lb/1000 sq. ft. to turf area.

3.10 SATISFACTORY TURF

A. Turf installations shall meet the following criteria as determined by Director's Representative:

1. Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. and bare spots not exceeding 5 by 5 inches .

B. Use specified materials to reestablish turf that does not comply with requirements, and continue maintenance until turf is satisfactory.

3.11 CLEANUP AND PROTECTION

A. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of them off Director’s Representative property.

C. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.

D. Remove nondegradable erosion-control measures after grass establishment period.

3.12 MAINTENANCE SERVICE

A. Turf Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in "Turf Maintenance" Article. Begin maintenance immediately after each area is planted and continue until acceptable turf is established, but for not less than the following periods:

1. Seeded Turf: 90 days from date of Substantial Completion .
    a. When initial maintenance period has not elapsed before end of planting season, or if turf is not fully established, continue maintenance during next planting season.

END OF SECTION

SECTION 33 42 00

STORMWATER CONVEYANCE

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:

1. Manholes: Include plans, elevations, sections, details, frames, and covers.
2. Catch basins and drop inlets. Include plans, elevations, sections, details, frames, covers, and grates.

1.2 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of cast-iron soil pipe and fitting, from manufacturer.

1.3 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

B. Codes and Standards

1. Comply with the provisions of the following codes and standards except where more stringent requirements are shown or specified.
   a. Local Regulations.
   b. New York State Department of Transportation (NYSDOT) Standard Specifications, current edition.
   c. New York State Department of Environmental Conservation (NYSDEC) SPDES General Permit for Stormwater Discharge from Construction Activity, GP-0-20-001.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Do not store plastic manholes, pipe, and fittings in direct sunlight.

B. Protect pipe, pipe fittings, and seals from dirt and damage.

C. Handle manholes in accordance with manufacturer's written rigging instructions.

D. Handle catch basins and drop inlets in accordance with manufacturer's written rigging instructions.

PART 2 - PRODUCTS

2.1 CORRUGATED-PE PIPE AND FITTINGS

A. Source Limitations: Obtain corrugated-PE pipe and fittings from single manufacturer.

B. Corrugated-PE Drainage Pipe and Fittings NPS 3 to NPS 10: AASHTO M 252, Type S, with smooth waterway for coupling joints.

C. Corrugated-PE Silttight Couplings: PE sleeve with ASTM D1056, Type 2, Class A, Grade 2 gasket material that mates with pipe and fittings.

2.2 NONPRESSURE TRANSITION COUPLINGS

A. Comply with ASTM C1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground nonpressure piping. Include ends of same sizes as piping to be joined, and corrosion-resistant-metal tension band and tightening mechanism on each end.

B. Sleeve Materials:

1. For Plastic Pipes: ASTM F477, elastomeric seal or ASTM D5926, PVC.
2. For Dissimilar Pipes: ASTM D5926, PVC or other material compatible with pipe materials being joined.

C. Ring-Type, Flexible Couplings:

1. Source Limitations: Obtain ring-type, flexible couplings from single manufacturer.
2. Description: Elastomeric compression seal with dimensions to fit inside bell of larger pipe and for spigot of smaller pipe to fit inside ring.

2.3 END SECTIONS

A. Unless noted otherwise, pipes 6” diameter or greater shall utilize flared end sections on all inlet and outlet pipes as indicated on the Drawings. End sections shall be as follows:

1. HDPE Pipe: Galvanized steel.

2.4 DOWNSPOUT ADAPTERS

A. Provide metal downspout adapters, size based on dimensions of roof downspout as indicated on the Drawings.

2.5 CLEANOUTS

A. PVC Cleanouts:

1. Source Limitations: Obtain PVC cleanouts from single manufacturer.
2. Description: PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.

3. Cleanout Box Frame and Lid: Subject to compliance with the requirements, provide East Jordan Iron Works, Model # 00156602 cast iron cleanout frame and cover assembly with countersunk stainless-steel bolts, or approved equal.

2.6 MANHOLES

A. Standard Precast Concrete Manholes:

1. Description: ASTM C478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
2. Diameter: 48 inches minimum unless otherwise indicated.
3. Ballast: Increase thickness of precast concrete sections or add concrete to base section as required to prevent flotation.
4. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and separate base slab or base section with integral floor.
5. Riser Sections: 4-inch minimum thickness, and lengths to provide depth indicated.
6. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated, and top of cone of size that matches grade rings.
7. Joint Sealant: ASTM C990, bitumen or butyl rubber.
8. Resilient Pipe Connectors: ASTM C923, cast or fitted into manhole walls, for each pipe connection.
9. Steps: Individual FRP steps; FRP ladder; or ASTM A615/A615M, deformed, 1/2-inch steel reinforcing rods encased in ASTM D4101, PP , wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of manhole to finished grade is less than 60 inches.
10. Grade Rings: Reinforced-concrete rings, 6- to 9-inch total thickness, to match diameter of manhole frame and cover, and height as required to adjust manhole frame and cover to indicated elevation and slope.

B. Manhole Frames and Covers:

1. Description: Ferrous; 24-inch ID by 7- to 9-inch riser with 4-inch- minimum width flange and 26-inch- diameter cover. Include indented top design with lettering cast into cover, using wording equivalent to "STORM SEWER."
2. Material: ASTM A48/A48M, Class 35 gray iron unless otherwise indicated.
3. Basis-of-Design Product: Subject to compliance with requirements, provide or comparable product: East Jordon Iron Works, straight type frame, Model #1207Z1 and Model #1203A (Storm) cover, by www.ejco.com or approved equal.

2.7 CONCRETE

A. General: Cast-in-place concrete in accordance with ACI 318, ACI 350, and the following:

1. Cement: ASTM C150/C150M, Type II.
2. Fine Aggregate: ASTM C33/C33M, sand.
3. Coarse Aggregate: ASTM C33/C33M, crushed gravel.
4. Water: Potable.

B. Portland Cement Design Mix: 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio.

1. Reinforcing Fabric: ASTM A1064/A1064M, steel, welded wire fabric, plain.
2. Reinforcing Bars: ASTM A615/A615M, Grade 60 (420 MPa) deformed steel.

C. Manhole Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio. Include channels and benches in manholes.

1. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.
   a. Invert Slope: 2 percent through manhole.
2. Benches: Concrete, sloped to drain into channel.
   a. Slope: 8 percent.

D. Ballast and Pipe Supports: Portland cement design mix, 3000 psi minimum, with 0.58 maximum water/cementitious materials ratio.

1. Reinforcing Fabric: ASTM A1064/A1064M, steel, welded wire fabric, plain.
2. Reinforcing Bars: ASTM A615/A615M, Grade 60 (420 MPa) deformed steel.

2.8 CATCH BASINS AND DROP INLETS

A. Standard Precast Concrete Catch Basins:

1. Description: ASTM C478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
2. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and separate base slab or base section with integral floor.
3. Riser Sections: 4-inch minimum thickness, 48-inch diameter, and lengths to provide depth indicated.
4. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
5. Joint Sealant: ASTM C990, bitumen or butyl rubber.
6. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch total thickness, that match 24-inch- diameter frame and grate.
7. Drop Inlets shall be 2'-0" x 2'-0" inside dimension, or as indicated on the drawings.
8. Steps: Individual FRP steps; FRP ladder; or ASTM A615/A615M, deformed, 1/2-inch steel reinforcing rods encased in ASTM D4101, PP , wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of catch basin to finished grade is less than 60 inches.
9. Pipe Connectors: ASTM C923, resilient, of size required, for each pipe connecting to base section.

B. Frames and Grates: ASTM A536, Grade 60-40-18, ductile iron designed for A-16 (AASHTO HS20-44), structural loading. Include 24-inch ID by 7- to 9-inch riser with 4-inch-minimum width flange, and 26-inch- diameter flat grate with small square or short-slotted drainage openings.

1. Grate Free Area: Approximately 50 percent unless otherwise indicated.
2. Basis-of-Design Product: Subject to compliance with requirements, provide or comparable product: East Jordon Iron Works, straight type frame, Model #1207Z1 and Model #1203M grate, by www.ejco.com or approved equal.
3. Drop inlet frames and grates shall be in accordance with ASTM A48, Class 30, bicycle proof square frame and grate with 24” minimum clear opening and 3” minimum high frame, Neenah Model R-4810 or approved equal.

2.9 DRAINAGE GEOTEXTILE

A. See Specification Section 31 20 00, EARTH MOVING.

2.10 DRAINAGE STONE

A. See Specification Section 31 20 00, EARTH MOVING.

2.11 RIP-RAP STONE

A. See Specification Section 31 20 00, EARTH MOVING.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavation, trenching, and backfilling are specified in Section 31 20 00 "Earth Moving."

3.2 PIPING INSTALLATION

A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.

B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings in accordance with manufacturer's written instructions for use of lubricants, cements, and other installation requirements.

C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.

D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

E. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling.

F. Install gravity-flow, nonpressure drainage piping in accordance with the following:

1. Install piping pitched down in direction of flow.
2. Install PE corrugated sewer piping in accordance with ASTM D2321.

3.3 PIPE JOINT CONSTRUCTION

A. Join gravity-flow, nonpressure drainage piping in accordance with the following:

1. Join corrugated-PE piping in accordance with ASTM D3212 for push-on joints.

3.4 DOWNSPOUT ADAPTER INSTALLATION

A. Install downspout adapter per manufacturer’s written instructions. Join downspout adapter to building roof downspout and storm drainage system per the Contract Drawings.

3.5 CLEANOUT INSTALLATION

A. Set cleanout frames and covers in earth in cast-in-place concrete block, 18 by 18 by 8 inches deep. Set with tops 1 inch(es) above surrounding earth grade.

B. Set cleanout frames and covers in pavements and roads in cast-in-place concrete block, 18 by 18 by 8 inches deep with tops flush with pavement surface.

3.6 MANHOLE INSTALLATION

A. General: Install manholes, complete with appurtenances and accessories indicated.

B. Install precast concrete manhole sections with sealants in accordance with ASTM C891.

C. Where specific manhole construction is not indicated, follow manhole manufacturer's written instructions.

D. Set tops of frames and covers flush with finished surface of manholes that occur in pavements. Set tops 3 inches above finished surface elsewhere unless otherwise indicated.

3.7 CATCH BASIN INSTALLATION

A. Construct catch basins to sizes and shapes indicated.

B. install precast concrete catch basin sections with sealants in accordance with ASTM C 891.

C. Catch basin bases shall be installed level on a flat, stable base of compacted granular material. Backfill shall be granular material as shown on the Contract Drawings.

D. All pipe openings on the inside and outside of the structures shall be filled with mortar to provide a smooth and continuous surface.

E. Catch basin inverts shall be set so that a minimum 2’-0” sediment trap is provided below the lowest structure invert.

F. Frames and grates shall be set atop grade rings for final grade adjustment in a minimum 1 inch thick bed of cement mortar. Set top of frame and grate flush with finished grade.

3.8 DROP INLET INSTALLATION

A. Construct precast concrete drop inlet to sizes and shapes indicated, complete with appurtenances and accessories.

B. Install precast concrete drop inlet sections with sealants in accordance with ASTM C 891.

C. Drop inlet bases shall be installed level on a flat, stable base of compacted granular material. Backfill shall be granular material as shown on the Contract Drawings.

D. All pipe openings on the inside and outside of the structures shall be filled with mortar to provide a smooth and continuous surface.

E. Drop inlet inverts shall be set so that a minimum 1’-0” sediment trap is provided below the lowest structure invert.

F. Frames and grates shall be set atop grade rings for final grade adjustment in a minimum 1 inch thick bed of cement mortar. Set top of frame and grate flush with finished grade.

3.9 CONCRETE PLACEMENT

A. Place cast-in-place concrete in accordance withACI 318.

3.10 CONNECTIONS

A. Connect nonpressure, gravity-flow drainage piping in building's storm building drains specified in Section 22 14 13 "Facility Storm Drainage Piping."

B. Make connections to existing piping and underground manholes.

1. Protect existing piping, manholes, and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

3.11 CLOSING ABANDONED STORM DRAINAGE SYSTEMS

A. Abandoned Piping: Close open ends of abandoned underground piping indicated to remain in place. Include closures strong enough to withstand hydrostatic and earth pressures that may result after ends of abandoned piping have been closed. Use either procedure below:

1. Close open ends of piping with at least 8- inch- thick, brick masonry bulkheads.
2. Close open ends of piping with threaded metal caps, plastic plugs, or other acceptable methods suitable for size and type of material being closed. Do not use wood plugs.

B. Abandoned Manholes and Structures: Excavate around manholes and structures as required and use one procedure below:

1. Remove manhole or structure and close open ends of remaining piping.
2. Remove top of manhole or structure down to at least 36 inches below final grade. Fill to within 12 inches of top with stone, rubble, gravel, or compacted dirt. Fill to top with concrete.

C. Backfill to grade in accordance with Section 31 20 00 "Earth Moving."

3.12 IDENTIFICATION

A. Materials and their installation are specified in Section 31 20 00 "Earth Moving." Arrange for installation of green warning tape directly over piping and at outside edge of underground structures.

1. Use detectable warning tape over nonferrous piping and over edges of underground structures.

3.13 FIELD QUALITY CONTROL

A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.

1. Submit separate reports for each system inspection.
2. Defects requiring correction include the following:
   a. Alignment: Less than full diameter of inside of pipe is visible between structures.
   b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
   c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
   d. Infiltration: Water leakage into piping.
   e. Exfiltration: Water leakage from or around piping.
3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
4. Reinspect and repeat procedure until results are satisfactory.

3.14 CLEANING

A. Clean interior of piping of dirt and superfluous materials. Flush with water.

END OF SECTION

SECTION 34 71 15

STEEL PIPE BOLLARDS

PART 1 - GENERAL

1.1 REFERENCES

A. Standard: American Concrete Institute, ACI 301-89, for concrete Work of this Section, unless otherwise indicated on the Drawings or specified.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Steel Pipe: Standard weight, Schedule 40, hot-dipped galvanized per ASTM A 53. Size as indicated on the Contract Documents.

B. Concrete: Normal weight 3000 psi, air entrained 6 percent plus or minus 1 percent. Mix in accordance with Method No. 1, 6 bags per cu yd min, allowable slump 2 to 4 inches.

C. Bumper Post Sleeve: Size as indicated on Contract Drawings by Eagle Manufacturing Company, 2400 Charles Street, Wellsburg, WV 26070, (304)737-3171, www.eagle-mfg.com, or comparable product and manufacturer.

1. Color: Per Director's Representative.
2. Finish: Smooth.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Set pipe in center of hole and brace plumb.

B. Fill annular space around pipe with concrete.

C. Fill pipe with concrete. Dome concrete above top edge of pipe to shed water.

D. Remove braces after concrete has set.

E. Install bumper post sleeve in accordance with the manufacturer's printed instructions.

END OF SECTION