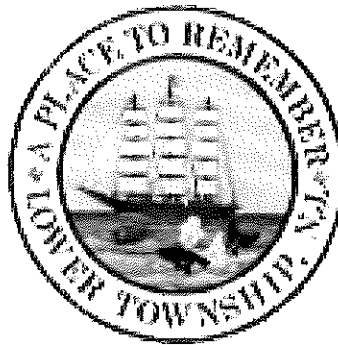


Specifications
For
Public Works Building Replacement
Township of Lower, Cape May County, New Jersey
October, 2025



Prepared by:

**DEBLASIO &
ASSOCIATES**
ENGINEERS, SURVEYORS AND PLANNERS

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Set #: 6

D&A File #: LT-C-048.01

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Township of Lower, Cape May County, New Jersey

Public Works Building Replacement

D&A File # LT-C-048.01

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**NOTICE TO BIDDERS
PUBLIC WORKS BUILDING REPLACEMENT**

Notice is hereby given that sealed proposals will be received by **Margaret Vitelli, Township of Lower Purchasing Agent, Cape May County, New Jersey** for the **Public Works Building Replacement** opened and read in public at the **Township of Lower Municipal Building, 2600 Bayshore Road, Villas, Cape May County, New Jersey** on **November 20, 2025 at 10:00 a.m.** prevailing time for:

PUBLIC WORKS BUILDING REPLACEMENT

Bid Documents and Drawings for the proposed work, which have been prepared by DeBlasio & Associates, P.C., are available at the office of said Engineer at 4701 New Jersey Avenue, Wildwood, New Jersey 08260, and may be inspected by prospective bidders during business hours.

Bidders will be furnished with a copy of the Bid Documents by request upon proper notice and payment of a non-refundable charge of \$75.00 payable to DeBlasio & Associates, P.C., for reproduction and processing.

Proposals must be made on the standard Proposal Forms in the manner designated in the Bid Documents, must be enclosed in sealed envelopes bearing the name and address of the Bidder, and the name of the work on the outside addressed to Purchasing Agent, **Township of Lower**; and must be accompanied by a statement of Consent of Surety from a surety company authorized to do business in the State of New Jersey and acceptable to the Township and either a Bid Bond, Certified or Cashier's Check drawn to the order of the **Township of Lower** for not less than ten percent (10%) of the amount bid, except that the check need not exceed \$20,000.00. The successful bidder is hereby notified that a performance bond for the full amount of the project is required.

One (1) original and two (2) copies of the bid submission are required.

The successful bidder will be required to execute a contract for the performance of the said work or the furnishing of said material or both, as the case may be, and a surety bond to be executed by a reliable surety company in a sum equal to the amount of the contract price for said work and/or material, guaranteeing the performance of the contract, which surety bond and contract shall be approved as to form and execution by the Township Solicitor.

The bidders shall also be required to comply with the following:

- A. Affirmative Action requirements (N.J.S.A. 10:5-31 et. seq. and N.J.A.C. 17:27).
- B. Certification Pursuant to P.L. 2012, C.25 (no investment activities in Iranian financial or energy sectors)
- C. The provisions of the New Jersey Prevailing Wage Act (N.J.S.A. 34:11-56.25 et. seq.)

- D. Americans with Disability Act of 1990, Title II (42 U.S.C. S121 01).
- E. Worker and Community Right-to-Know Act (N.J.S.A. 34:5A-1).
- F. Stockholder Disclosure Certification (P.L. 1977, C.33, N.J.S.A. 52:25-24.2).
- G. Business Registration Certification (N.J.S.A. 52:32-44).
- H. Public Works Contractors Registration (N.J.S.A. 34:11-56.48).
- I. **Consent of Surety** (N.J.S.A. 40A:11-22).
- J. Addendum Acknowledgement (N.J.S.A. 40A:11-23c. 1), 2) &3)).
- K. Subcontractors List (N.J.S.A. 40A:11-16).

The award of the contract for this project will not be made until the necessary funds have been provided by the **Township of Lower** in a lawful manner. The **Township of Lower** reserves the right to consider the bids for sixty (60) days after the receipt of said bids. The **Township of Lower** also reserves the right to reject any or all bids or to waive any informalities in the best interest of the **Township of Lower**.

Each proposal and bid must be submitted in accordance with the terms of the aforesaid specifications, must be made on standard proposal forms contained in the bid documents and shall be delivered to the place and hour mentioned above.

BY ORDER OF the Township of Lower, Cape May County, New Jersey.

Julie Picard, Municipal Clerk
October 29, 2025

Instructions To Bidders

1.0. SUBMISSION OF BIDS

- A. Sealed bids shall be received by the contracting unit, hereinafter referred to as "Owner," in accordance with public advertisement as required by law, with a copy of said notice being attached hereto and made a part of these specifications.
- B. Sealed bids will be received by the designated representative at the time and location as stated in the Notice to Bidders, and at such time and place will be publicly opened and read aloud.
- C. The bid shall be submitted in a sealed envelope: (1) addressed to the Owner, (2) bearing the name and address of the bidder written on the face of the envelope, and (3) clearly marked "BID" with the contract title and/or bid # of the contract being bid.
- D. It is the bidder's responsibility that bids are presented to the Owner at the time and at the place designated. Bids may be hand delivered or mailed; however, the Owner disclaims any responsibility for bids forwarded by regular or overnight mail. If the bid is sent by express mail service, the designation in sub-section C, above, must also appear on the outside of the express mail envelope. Bids received after the designated time and date will be returned unopened.
- E. Sealed bids forwarded to the Owner before the time of opening of bids may be withdrawn upon written application of the bidder who shall be required to produce evidence showing that the individual is or represents the principal or principals involved in the bid. Bids may be withdrawn after the bid date in accordance with N.J.S.A. 40A:11-23.3. Once bids have been opened, they shall remain firm for a period of sixty (60) calendar days.
- F. All prices and amounts must be written in ink or preferably machine-printed. Bids containing any conditions, omissions, unexplained erasures or alterations, items not called for in the bid proposal form, attachment of additive information not required by the specifications, or irregularities of any kind, may be rejected by the Owner. Any changes, whiteouts, strikeouts, etc. in the bid must be initialed in ink by the person signing the bid.
- G. Each bid proposal form must give the full business address, business phone, fax, e-mail if available, the contact person of the bidder, and be signed by an authorized representative as follows:
 - Bids by partnerships must furnish the full name of all partners and must be signed in the partnership name by one of the members of the partnership or by an authorized representative, followed by the signature and designation of the person signing.
 - Bids by corporations must be signed in the legal name of the corporation, followed by the name of the State in which incorporated and must contain the signature and designation of the president, secretary or other person authorized to bind the corporation in the matter.
 - Bids by sole-proprietorship shall be signed by the proprietor.
 - When requested, satisfactory evidence of the authority of the officer signing shall be furnished.
- H. Bidders are responsible for reviewing all the items contained in the bid documents including but not limited to the specifications, plans, reports, attachments, addenda and regulatory permits as applicable and warrants that the submitted bid complies with all the requirements contained in the bid documents. The bidder also warrants that he/she has made themselves fully aware of the nature of the project, has thoroughly read the bid documents, conducted the necessary site inspections to determine the exact nature of the work and the submitted bid accounts for all costs associated with the bid documents.

- I. Bidders shall provide their bid on the Bid Form contained herein. The Owner will not consider conditional bids and will award the contract based on the total bid amount. The total amount bid is defined as the summation of all the quantities for the pay items multiplied by the unit prices in the Bid Form.
- J. Bidder should be aware of the following statutes that represent "Truth in Contracting" laws:
- N.J.S.A. 2C:21-34, et seq. governs false claims and representations by bidders. It is a serious crime for the bidder to knowingly submit a false claim and/or knowingly make material misrepresentation.
 - N.J.S.A. 2C:27-10 provides that a person commits a crime if said person offers a benefit to a public servant for an official act performed or to be performed by a public servant, which is a violation of official duty.
 - N.J.S.A. 2C:27-11 provides that a bidder commits a crime if said person, directly or indirectly, confers or agrees to confer any benefit not allowed by law to a public servant.
 - Bidder should consult the statutes or legal counsel for further information.

2.0. BID SECURITY AND BONDING REQUIREMENTS

A. BID GUARANTEE

Bidder shall submit with the bid a certified check, cashier's check or bid bond in the amount of ten percent (10%) of the total price bid, but not in excess of \$20,000, payable unconditionally to the Owner. When submitting a Bid Bond, it shall contain Power of Attorney for full amount of Bid Bond from a surety company authorized to do business in the State of New Jersey and acceptable to the Owner. The check or bond of the unsuccessful bidder(s) shall be returned pursuant to N.J.S.A. 40A:11-24a. The check or bond of the bidder to whom the contract is awarded shall be retained until a contract is executed and the required performance bond or other security is submitted. The check or bond of the successful bidder shall be forfeited if the bidder fails to enter into a contract pursuant to N.J.S.A. 40A:11-21.

Failure to submit a bid guarantee shall result in rejection of the bid.

B. CONSENT OF SURETY

Bidder shall submit with the bid a Certificate (Consent of Surety) with Power of Attorney for full amount of bid price from a Surety Company authorized to do business in the State of New Jersey and acceptable to the Owner stating that it will provide said bidder with a Performance Bond in the full amount of the bid. This certificate shall be obtained in order to confirm that the bidder to whom the contract is awarded will furnish Performance and Payment Bonds from an acceptable surety company on behalf of said bidder, any or all subcontractors or by each respective subcontractor or by any combination thereof which results in performance security equal to the total amount of the contract, pursuant to N.J.S.A. 40A:11-22.

Failure to submit a consent of surety form shall result in rejection of the bid.

C. PERFORMANCE BOND

Bidder shall simultaneously with the delivery of the executed contract, submit an executed bond in the amount of one hundred percent (100%) of the acceptable bid as security for the faithful performance of this contract.

The performance bond provided shall not be released until final acceptance of the whole work and then only if any liens or claims have been satisfied. The surety on such bond or bonds shall be a duly authorized surety company authorized to do business in the State of New Jersey pursuant to N.J.S.A. 17:31-5.

Failure to submit this with the executed contract shall be cause for declaring the contract null and void pursuant to N.J.S.A. 40A:11-22.

D. LABOR AND MATERIAL (PAYMENT) BOND

Bidder shall with the delivery of the performance bond submit an executed payment bond to guarantee payment to laborers and suppliers for the labor and material used in the work performed under the contract.

Failure to submit a labor and material bond with the performance bond shall be cause for declaring the contract null and void.

E. MAINTENANCE BOND

1. Upon acceptance of the work by the Owner, the contractor shall submit a maintenance bond (N.J.S.A. 40A:11-16.3) in an amount not to exceed 100% of the project costs guaranteeing against defective quality of work or materials for the period of two (2) years.

3.0. INTERPRETATION AND ADDENDA

- A. The bidder understands and agrees that its bid is submitted on the basis of the specifications prepared by the Owner. The bidder accepts the obligation to become familiar with these specifications.
- B. Bidders are expected to examine the specifications and related bid documents with care and observe all their requirements. Ambiguities, errors or omissions noted by bidders should be promptly reported in writing to the appropriate official. Any prospective bidder who wishes to challenge a bid specification shall file such challenges in writing with the contracting agent no less than three business days prior to the opening of the bids. Challenges filed after that time shall be considered void and having no impact on the contracting unit or the award of a contract pursuant to N.J.S.A. 40A:11-13. In the event the bidder fails to notify the Owner of such ambiguities, errors or omissions, the bidder shall be bound by the requirements of the specifications and the bidder's submitted bid.
- C. No oral interpretation and or clarification of the meaning of the specifications for any goods and services will be made to any bidder. Such request shall be in writing, addressed to the Owner's representative stipulated in the specification. In order to be given consideration, a written request must be received at least seven (7) business days prior to the date fixed for the opening of the bid for goods and services.

All interpretations, clarifications and any supplemental instructions will be in the form of written addenda to the specifications and will be distributed to all prospective bidders. All addenda so issued shall become part of the specification and bid documents and shall be acknowledged by the bidder in the bid. The Owner's interpretations or corrections thereof shall be final.

When issuing addenda, the Owner shall provide required notice prior to the official receipt of bids to any person who has submitted a bid or who has received a bid package pursuant to N.J.S.A. 40A:11-23c.1.

D. Discrepancies in Bids

1. If the amount shown in words and its equivalent in figures do not agree, the written words shall be binding. Ditto marks are not considered writing or printing and shall not be used.
2. If there is a discrepancy between the unit prices and the extended totals, the unit prices shall prevail. In the event there is an error of the summation of the extended totals, the computation by the Owner of the extended totals shall govern.

E. Pre-Bid Conference

If stated in the Notice to Bidders, a pre-bid conference for this proposal will be held on the date, time and location as stated in the Notice to Bidders. Attendance is not mandatory but is strongly recommended. Failure to attend does not relieve the bidder of any obligations or requirements.

4.0. BRAND NAMES, STANDARDS OF QUALITY AND PERFORMANCE

- A. Brand names and/or descriptions used in these specifications are to acquaint bidders with the types of goods and services desired and will be used as a standard by which goods and services offered as equivalent will be evaluated.
- B. Variations between the goods and services described and the goods and services offered are to be fully identified and described by the bidder on a separate sheet and submitted with the bid proposal form. Vendor literature WILL NOT suffice in explaining exceptions to these specifications. In the absence of any exceptions by the bidder, it will be presumed and required that the goods and services as described in the bid specification be provided or performed.
- C. It is the responsibility of the bidder to document and/or demonstrate the equivalency of the goods and services offered. The Owner reserves the right to evaluate the equivalency of the goods and services.
- D. In submitting its bid, the bidder certifies that the goods and services to be furnished will not infringe upon any valid patent or trademark and that the successful bidder shall, at its own expense, defend any and all actions or suits charging such infringement, and will save the Owner harmless from any damages resulting from such infringement.
- E. Only manufactured and farm products of the United States, wherever available, shall be used pursuant to N.J.S.A. 40A:11-18.
- F. The contractor shall guarantee any or all goods and services supplied under these specifications. Defective or inferior goods shall be replaced at the expense of the contractor. The contractor will be responsible for return freight or restocking charges.

5.0. INSURANCE AND INDEMNIFICATION

A. INSURANCE REQUIREMENTS

1. Prior to the execution of the contract and before the commencement of the start of work, the contractor shall provide proof of insurance in accordance with the requirements listed below.
2. The insurance certificate shall also provide for the Engineer and Municipal Solicitor be named as additional insured.
3. The contractor's insurance shall also pertain to the contractor's subcontractors and material suppliers unless the contractor provides separate insurance for the subcontractors and suppliers.
4. A sample certificate of insurance is included in this section that lists the types and amount of insurance required by the contract.
5. The following types of insurance are required:
 - a. **Worker's Compensation Insurance**
Workers Compensation insurance shall be maintained in full force during the life of the contract, covering all employees engaged in performance of the contract pursuant to N.J.S.A. 34:15-12(a) and N.J.A.C. 12:235-1.6.
 - b. **General Liability Insurance**
General liability insurance shall be provided with limits shown on the insurance certificate and shall be maintained in full force during the life of the contract.
 - c. **Automotive Liability Insurance**
Automotive liability insurance covering contractor for claims arising from owned, hired and non-owned vehicles with limits shown on the insurance certificate and shall be maintained in full force during the life of the contract.
 - d. **Excess Liability**
Excess liability insurance shall be provided with limits shown on the insurance certificate and shall be maintained in full force during the life of the contract.

B. CERTIFICATES OF THE REQUIRED INSURANCE

Certificates of Insurance for those policies required above shall be submitted with the contract. Such coverage shall be with an insurance company authorized to do business in the State of New Jersey and shall name the Owner as an additional insured.

Self-insured contractors shall submit an affidavit attesting to their self-insured coverage and shall name the Owner, Engineer and Solicitor as an additional insured.

C. INDEMNIFICATION

Bidder shall indemnify and hold harmless the Owner from all claims, suits or actions, and damages or costs of every name and description to which the Owner may be subjected or put by reason of injury to the person or property of another, or the property of the Owner, resulting from negligent acts or omissions on the part of the contractor, the contractor's agents, servants or subcontractors in the delivery of goods and services, or in the performance of the work under the contract.

6.0. PRICING INFORMATION FOR PREPARATION OF BIDS

- A. The Owner is exempt from any local, state or federal sales, use or excise tax.
- B. The bid submitted shall include the entire cost of the specified items for a complete and acceptable installation in accordance with the bid documents. This shall include but is not limited to furnishing materials, installation, proper workmanship, permit compliance, compliance with the plans and specifications and all else for a standard completion.
- C. Contractor shall be responsible for complying with any applicable permits or licenses from any government entity that has jurisdiction to require the same. All bids submitted shall have included this cost for compliance.
- D. Bidders shall insert prices for furnishing goods and services required by these specifications. Prices shall be net, including any charges for packing, crating, containers, etc. All transportation charges shall be fully prepaid by the contractor, F.O.B. destination and placement at locations specified by the Owner.

7.0. STATUTORY AND OTHER REQUIREMENTS

The following are mandatory requirements of this bid and contract:

A. MANDATORY AFFIRMATIVE ACTION CERTIFICATION

No firm may be issued a contract unless it complies with the affirmative action provisions of N.J.S.A. 10:5-31 et seq. and N.J.A.C. 17:27-1 et seq. The following information summarizes the full, required regulatory text, which is included as Exhibit A of this bid specification.

1. Goods and Services (including professional services) Contracts

Each contractor shall submit to the public agency, after notification of award but prior to execution of a goods and services contract, one of the following three documents:

- a. A photocopy of a valid letter that the contractor is operating under an existing Federally approved or sanctioned affirmative action program (good for one year from the date of the letter); or
- b. A photocopy of a Certificate of Employee Information Report approval, issued in accordance with N.J.A.C. 17:27-4; or
- c. A photocopy of an Employee Information Report (Form AA 302) provided by the Division and distributed to the public agency to be completed by the contractor in accordance with N.J.A.C. 17:27-4.

2. Maintenance/Construction Contracts

After notification of award, but prior to signing the contract, the contractor shall submit to the public agency compliance officer and the Division of Contract Compliance and Equal Employment Opportunity in Public Contracts (Division) an initial project workforce report (Form AA201) provided to the public

agency by the Division for distribution to and completion by the contractor, in accordance with N.J.A.C. 17:27-7.

The contractor shall also submit a copy of the Monthly Project Workforce Report once a month thereafter for the duration of the contract to the Division and to the public agency compliance officer. The contractor shall also cooperate with the public agency in the payment of budgeted funds, as is necessary, for on-the job and/or off-the-job programs for outreach and training of minorities and women.

B. AMERICANS WITH DISABILITIES ACT OF 1990

Discrimination on the basis of disability in contracting for the purchase of goods and services is prohibited. Bidders are required to read Americans with Disabilities language that is included as Appendix A of this specification and agree that the provisions of Title II of the Act are made a part of the contract. The contractor is obligated to comply with the Act and to hold the Owner harmless.

C. STOCKHOLDER DISCLOSURE

N.J.S.A. 52:25-24.2 provides that no corporation or partnership shall be awarded any contract for the performance of any work or the furnishing of any goods and services, unless, prior to the receipt of the bid or accompanying the bid of said corporation or partnership, bidders shall submit a statement setting forth the names and addresses of all stockholders in the corporation or partnership who own ten percent or more of its stock of any class, or of all individual partners in the partnership who own a ten percent or greater interest therein. The included Statement of Ownership shall be completed and attached to the bid proposal. This requirement applies to all forms of corporations and partnerships, including, but not limited to, limited partnerships, limited liability corporations, limited liability partnerships and Subchapter S corporations. Failure to submit a stockholder disclosure document shall result in rejection of the bid.

D. PROOF OF BUSINESS REGISTRATION

BUSINESS REGISTRATION Pursuant to N.J.S.A. 52:32-44, _____ ("Contracting Agency") is prohibited from entering into a contract with an entity unless the bidder/proposer/contractor, and each subcontractor that is required by law to be named in a bid/proposal/contract has a valid Business Registration Certificate on file with the Division of Revenue and Enterprise Services within the Department of the Treasury. Prior to contract award or authorization, the contractor shall provide the Contracting Agency with its proof of business registration and that of any named subcontractor(s). Subcontractors named in a bid or other proposal shall provide proof of business registration to the bidder, who in turn, shall provide it to the Contracting Agency prior to the time a contract, purchase order, or other contracting document is awarded or authorized. During the course of contract performance: (1) the contractor shall not enter into a contract with a subcontractor unless the subcontractor first provides the contractor with a valid proof of business registration. (2) the contractor shall maintain and submit to the Contracting Agency a list of subcontractors and their addresses that may be updated from time to time. (3) the contractor and any subcontractor providing goods or performing services under the contract, and each of their affiliates, shall collect and remit to the Director of the Division of Taxation in the Department of the Treasury, the use tax due pursuant to the Sales and Use Tax Act, (N.J.S.A. 54:32B-1 et seq.) on all sales of tangible personal property delivered into the State. Any questions in this regard can be directed to the Division of Taxation at (609)292-6400. Form NJ-REG can be filed online at <http://www.state.nj.us/treasury/revenue/busregcert.shtml>. Before final payment is made under the contract, the contractor shall submit to the Contracting Agency a

complete and accurate list of all subcontractors used and their addresses. Pursuant to N.J.S.A. 54:49-4.1, a business organization that fails to provide a copy of a business registration as required, or that provides false business registration information, shall be liable for a penalty of \$25 for each day of violation, not to exceed \$50,000, for each proof of business registration not properly provided under a contract with a contracting agency.

E. NEW JERSEY WORKER AND COMMUNITY RIGHT TO KNOW ACT

The manufacturer or supplier of chemical substances or mixtures shall label them in accordance with the N.J. Worker and Community Right to Know Law (N.J.S.A. 34:5A-1 et seq., and N.J.A.C 8:59-2 et seq.,). Containers that the law and rules require to be labeled shall show the Chemical Abstracts Service number of all the components and the chemical name. Further, all applicable Material Safety Data Sheets (MSDS) - hazardous substance fact sheet - must be furnished.

F. PREVAILING WAGE ACT

Pursuant to N.J.S.A. 34:11-56.25 et seq., contractors on projects for public work shall adhere to all requirements of the New Jersey Prevailing Wage Act. The contractor shall be required to submit a certified payroll record to the Owner within ten (10) days of the payment of the wages. The contractor is also responsible for obtaining and submitting all subcontractors' certified payroll records within the aforementioned time period. Workers shall be paid not less than prevailing wage rates. In the event it is found that any worker, employed by the contractor or any subcontractor covered by said contract, has been paid a rates of wages less than the prevailing wage required to be paid by such contract, the public body, the lessee to whom the public body is leasing a property or premises or the lessor from whom the public body is leasing or will be leasing a property or premises may terminate the contractor's or subcontractor's right to proceed with the work, or such part of the work as to which there has been a failure to pay required wages and to prosecute the work to completion or otherwise. The contractor shall submit said certified payrolls in the form set forth in N.J.A.C. 12:60-6.1(c). **Starting August 16, 2024, contractors engaged in public work projects must submit their certified payroll records through the New Jersey Wage Hub. Submission of certified payroll records to New Jersey Wage Hub will satisfy the requirement to submit them to a public body if the public body is also using New Jersey Wage Hub.** It is the contractor's responsibility to obtain any additional copies of the certified payroll form to be submitted by contacting the New Jersey Department of Labor and Workforce Development, Division of Workplace Standards. Additional information is available at www.state.nj.us/labor/lisse/lspubcon.html.

G. THE PUBLIC WORKS CONTRACTOR REGISTRATION ACT

N.J.S.A. 34:11-56.48 et seq. requires that a general or prime contractor and any listed subcontractors named in the contractor's bid proposal shall possess a certificate *at the time the bid proposal is submitted*. After bid proposals are received and prior to award of contract, the successful contractor shall submit a copy of the contractor's certification along with those of all listed subcontractors. All non-listed subcontractors and lower tier sub-subcontractors shall be registered prior to starting work on the project. It is the general contractor's responsibility that all non-listed sub-contractors at any tier have their certificate prior to starting work on the job.

Under the law a "contractor" is "a person, partnership, association, joint stock company, trust, corporation or other legal business entity or successor thereof who enters into a contract" which is subject to the provisions of the New Jersey Prevailing Wage Act [N.J.S.A. 34:11-56.25, et seq.] It applies to contractors based in New Jersey or in another state.

The law defines "public works projects" as contracts for "public work" as defined in the Prevailing Wage statute [N.J.S.A. 34:11-56.26(5)]. The term means:

- "Construction, reconstruction, demolition, alteration, or repair work, or maintenance work, including painting and decorating, done under contract and paid for in whole or in part out of the funds of a public body, except work performed under a rehabilitation program.
- "Public work" shall also mean construction, reconstruction, demolition, alteration, or repair work, done on any property or premises, whether or not the work is paid for from public funds..."
- "Maintenance work" means the repair of existing facilities when the size, type or extent of such facilities is not thereby changed or increased. While "maintenance" includes painting and decorating and is covered under the law, it does not include work such as routine landscape maintenance or janitorial services.

To register, a contractor must provide the State Department of Labor with a full and accurately completed application form. The form is available online at www.state.nj.us/labor/lse/lspubcon.html.

N.J.S.A. 34:11-56.55 specifically prohibits accepting applications for registration as a substitute for a certificate of registration.

H. NON-COLLUSION AFFIDAVIT

The Affidavit shall be properly executed and submitted with the bid proposal.

I. PAY TO PLAY

Starting in January 2007, business entities are advised of their responsibility to file an annual disclosure statement of political contributions with the New Jersey Election Law Enforcement Commission (ELEC) pursuant to N.J.S.A. 19:44A-20.27 if they receive contracts in excess of \$50,000 from public entities in a calendar year.

Business entities are responsible for determining if filing is necessary. Additional information on this requirement is available from ELEC at 888-313-3532 or at www.elec.state.nj.us.

8.0. METHOD OF CONTRACT AWARD

- A. The length of the contract shall be stated in the technical specifications. Pursuant to requirements of N.J.A.C. 5:30-5.1 et seq., any contract resulting from this bid shall be subject to the availability and appropriation of sufficient funds annually. Please see Section X, Termination of Contract, Sub-section E, for additional information.

- B. If the award is to be made on the basis of a base bid only, it shall be made to that responsible bidder submitting the lowest base bid.
- C. If the award is to be made on the basis of a combination of a base bid with selected options, it shall be made to that responsible bidder submitting the lowest net bid.
- D. The form of contract shall be submitted by the Owner to the successful bidder. Terms of the specifications/bid package prevail.

9.0. CAUSES FOR REJECTING BIDS

Bids may be rejected for any of the following reasons:

- A. All bids pursuant to N.J.S.A. 40A:11-13.2;
- B. If more than one bid is received from an individual, firm or partnership, corporation or association under the same name;
- C. Multiple bids from an agent representing competing bidders;
- D. The bid is inappropriately unbalanced;
- E. The bidder is determined to possess, pursuant to N.J.S.A. 40A:11-4b, Prior Negative Experience; or,
- F. If the successful bidder fails to enter into a contract within 21 days, Sundays and holidays excepted, or as otherwise agreed upon by the parties to the contract. In this case at its option, the Owner may accept the bid of the next lowest responsible bidder. (N.J.S.A. 40A:11-24b)

10.0. TERMINATION OF CONTRACT

- A. If, through any cause, the contractor shall fail to fulfill in a timely and proper manner obligations under the contract or if the contractor shall violate any of the requirements of the contract, the Owner shall there upon have the right to terminate the contract by giving written notice to the contractor of such termination and specifying the effective date of termination. Such termination shall relieve the Owner of any obligation for balances to the contractor of any sum or sums set forth in the contract. Owner will pay only for goods and services accepted prior to termination.
- B. Notwithstanding the above, the contractor shall not be relieved of liability to the Owner for damages sustained by the Owner by virtue of any breach of the contract by the contractor and the Owner may withhold any payments to the contractor for the purpose of compensation until such time as the exact amount of the damage due the Owner from the contractor is determined.
- C. The contractor agrees to indemnify and hold the Owner harmless from any liability to subcontractors/suppliers concerning payment for work performed or goods supplied arising out of the lawful termination of the contract by the Owner under this provision.
- D. In case of default by the contractor, the Owner may procure the goods or services from other sources and hold the contractor responsible for any excess cost.

- E. Continuation of the terms of the contract beyond the fiscal year is contingent on availability of funds in the following year's budget. In the event of unavailability of such funds, the Owner reserves the right to cancel the contract.

- F. ACQUISITION, MERGER, SALE AND/OR TRANSFER OF BUSINESS, ETC.

It is understood by all parties that if, during the life of the contract, the contractor disposes of his/her business concern by acquisition, merger, sale and or/transfer or by any means convey his/her interest(s) to another party, all obligations are transferred to that new party. In this event, the new Owner(s) will be required to submit all documentation/legal instruments that were required in the original bid/contract. Any change shall be approved by the Owner.

- G. The contractor will not assign any interest in the contract and shall not transfer any interest in the same without the prior written consent of the Owner.

11.0. PAYMENT

- A. No payment will be made unless duly authorized by the Owner's authorized representative and accompanied by proper documentation.
- B. Payment will be made in accordance with the specifications and requirements in the bid documents.

EXHIBIT B
MANDATORY EQUAL EMPLOYMENT OPPORTUNITY LANGUAGE
N.J.S.A. 10:5-31 et seq. (P.L.1975, c.127)
N.J.A.C. 17:27-1.1 et seq.
CONSTRUCTION CONTRACTS

During the performance of this contract, the contractor agrees as follows:

The contractor or subcontractor, where applicable, will not discriminate against any employee or applicant for employment because of age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex. Except with respect to affectional or sexual orientation and gender identity or expression, the contractor will ensure that equal employment opportunity is afforded to such applicants in recruitment and employment, and that employees are treated during employment, without regard to their age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex. Such equal employment opportunity shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Public Agency Compliance Officer setting forth provisions of this nondiscrimination clause.

The contractor or subcontractor, where applicable will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex.

The contractor or subcontractor will send to each labor union, with which it has a collective bar-gaining agreement, a notice, to be provided by the agency contracting officer, advising the labor union or workers' representative of the contractor's commitments under this act and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

The contractor or subcontractor, where applicable, agrees to comply with any regulations promulgated by the Treasurer, pursuant to N.J.S.A. 10:5-31 et seq., as amended and supplemented from time to time and the Americans with Disabilities Act.

When hiring or scheduling workers in each construction trade, the contractor or subcontractor agrees to make good faith efforts to employ minority and women workers in each construction trade consistent with the targeted employment goal prescribed by N.J.A.C. 17:27-7.2; provided, however, that the Dept. of LWD, Construction EEO Monitoring Program, may, in its discretion, exempt a contractor or subcontractor from compliance with the good faith procedures pre-scribed by the following provisions, A, B, and C, as long as the Dept. of LWD, Construction EEO Monitoring Program is satisfied that the contractor or subcontractor is employing workers

EXHIBIT B (Continued)

provided by a union which provides evidence, in accordance with standards prescribed by the Dept. of LWD, Construction EEO Monitoring Program, that its percentage of active "card carrying" members who are minority and women workers is equal to or greater than the targeted employment goal established in accordance with N.J.A.C. 17:27-7.2. The contractor or subcontractor agrees that a good faith effort shall include compliance with the following procedures:

(A) If the contractor or subcontractor has a referral agreement or arrangement with a union for a construction trade, the contractor or subcontractor shall, within three business days of the contract award, seek assurances from the union that it will cooperate with the contractor or subcontractor as it fulfills its affirmative action obligations under this contract and in accordance with the rules promulgated by the Treasurer pursuant to N.J.S.A. 10:5-31 et. seq., as supplemented and amended from time to time and the Americans with Disabilities Act. If the contractor or subcontractor is unable to obtain said assurances from the construction trade union at least five business days prior to the commencement of construction work, the contractor or subcontractor agrees to afford equal employment opportunities minority and women workers directly, consistent with this chapter. If the contractor's or subcontractor's prior experience with a construction trade union, regardless of whether the union has provided said assurances, indicates a significant possibility that the trade union will not refer sufficient minority and women workers consistent with affording equal employment opportunities as specified in this chapter, the contractor or subcontractor agrees to be prepared to provide such opportunities to minority and women workers directly, consistent with this chapter, by complying with the hiring or scheduling procedures prescribed under (B) below; and the contractor or subcontractor further agrees to take said action immediately if it determines that the union is not referring minority and women workers consistent with the equal employment opportunity goals set forth in this chapter.

(B) If good faith efforts to meet targeted employment goals have not or cannot be met for each construction trade by adhering to the procedures of (A) above, or if the contractor does not have a referral agreement or arrangement with a union for a construction trade, the contractor or subcontractor agrees to take the following actions:

(1) To notify the public agency compliance officer, the Dept. of LWD, Construction EEO Monitoring Program, and minority and women referral organizations listed by the Division pursuant to N.J.A.C. 17:27-5.3, of its workforce needs, and request referral of minority and women workers;

(2) To notify any minority and women workers who have been listed with it as awaiting available vacancies;

(3) Prior to commencement of work, to request that the local construction trade union refer minority and women workers to fill job openings, provided the contractor or subcontractor has a referral agreement or arrangement with a union for the construction trade;

EXHIBIT B (Continued)

(4) To leave standing requests for additional referral to minority and women workers with the local construction trade union, provided the contractor or subcontractor has a referral agreement or arrangement with a union for the construction trade, the State Training and Employment Service and other approved referral sources in the area;

(5) If it is necessary to lay off some of the workers in a given trade on the construction site, layoffs shall be conducted in compliance with the equal employment opportunity and non-discrimination standards set forth in this regulation, as well as with applicable Federal and State court decisions;

(6) To adhere to the following procedure when minority and women workers apply or are referred to the contractor or subcontractor:

(i) The contractor or subcontractor shall interview the referred minority or women worker.

(ii) If said individuals have never previously received any document or certification signifying a level of qualification lower than that required in order to perform the work of the construction trade, the contractor or subcontractor shall in good faith determine the qualifications of such individuals. The contractor or subcontractor shall hire or schedule those individuals who satisfy appropriate qualification standards in conformity with the equal employment opportunity and non-discrimination principles set forth in this chapter. However, a contractor or subcontractor shall determine that the individual at least possesses the requisite skills, and experience recognized by a union, apprentice program or a referral agency, provided the referral agency is acceptable to the Dept. of LWD, Construction EEO Monitoring Program. If necessary, the contractor or subcontractor shall hire or schedule minority and women workers who qualify as trainees pursuant to these rules. All of the requirements, however, are limited by the provisions of (C) below.

(iii) The name of any interested women or minority individual shall be maintained on a waiting list and shall be considered for employment as described in (i) above, whenever vacancies occur. At the request of the Dept. of LWD, Construction EEO Monitoring Program, the contractor or subcontractor shall provide evidence of its good faith efforts to employ women and minorities from the list to fill vacancies.

(iv) If, for any reason, said contractor or subcontractor determines that a minority individual or a woman is not qualified or if the individual qualifies as an advanced trainee or apprentice, the contractor or subcontractor shall inform the individual in writing of the reasons for the determination, maintain a copy of the determination in its files, and send a copy to the public agency compliance officer and to the Dept. of LWD, Construction EEO Monitoring Program.

(7) To keep a complete and accurate record of all requests made for the referral of workers in any trade covered by the contract, on forms made available by the Dept. of LWD, Construction EEO Monitoring Program and submitted promptly to the Dept. of LWD, Construction EEO Monitoring Program upon request.

EXHIBIT B (Continued)

(C) The contractor or subcontractor agrees that nothing contained in (B) above shall preclude the contractor or subcontractor from complying with the union hiring hall or apprenticeship policies in any applicable collective bargaining agreement or union hiring hall arrangement, and, where required by custom or agreement, it shall send journeymen and trainees to the union for referral, or to the apprenticeship program for admission, pursuant to such agreement or arrangement. However, where the practices of a union or apprenticeship program will result in the exclusion of minorities and women or the failure to refer minorities and women consistent with the targeted county employment goal, the contractor or subcontractor shall consider for employment persons referred pursuant to (B) above without regard to such agreement or arrangement; provided further, however, that the contractor or subcontractor shall not be required to employ women and minority advanced trainees and trainees in numbers which result in the employment of advanced trainees and trainees as a percentage of the total workforce for the construction trade, which percentage significantly exceeds the apprentice to journey worker ratio specified in the applicable collective bargaining agreement, or in the absence of a collective bargaining agreement, exceeds the ratio established by practice in the area for said construction trade. Also, the contractor or subcontractor agrees that, in implementing the procedures of (B) above, it shall, where applicable, employ minority and women workers residing within the geographical jurisdiction of the union.

After notification of award, but prior to signing a construction contract, the contractor shall submit to the public agency compliance officer and the Dept. of LWD, Construction EEO Monitoring Program an initial project workforce report (Form AA-201) electronically provided to the public agency by the Dept. of LWD, Construction EEO Monitoring Program, through its website, for distribution to and completion by the contractor, in accordance with N.J.A.C. 17:27-7. The contractor also agrees to submit a copy of the Monthly Project Workforce Report once a month thereafter for the duration of this contract to the Dept. of LWD, Construction EEO Monitoring Program, and to the public agency compliance officer.

The contractor agrees to cooperate with the public agency in the payment of budgeted funds, as is necessary, for on the job and/or off the job programs for outreach and training of minorities and women.

(D) The contractor and its subcontractors shall furnish such reports or other documents to the Dept. of LWD, Construction EEO Monitoring Program as may be requested by the Dept. of LWD, Construction EEO Monitoring Program from time to time in order to carry out the purposes of these regulations, and public agencies shall furnish such information as may be requested by the Dept. of LWD, Construction EEO Monitoring Program for conducting a compliance investigation pursuant to N.J.A.C. 17:27-1.1 et seq.

APPENDIX A

AMERICANS WITH DISABILITIES ACT OF 1990 Equal Opportunity for Individuals with Disability

The contractor and the **Township of Lower**, (hereafter "Owner") do hereby agree that the provisions of Title 11 of the Americans With Disabilities Act of 1990 (the "Act") (42 U.S.C. 5121 01 et seq.), which prohibits discrimination on the basis of disability by public entities in all services, programs, and activities provided or made available by public entities, and the rules and regulations promulgated pursuant there unto, are made a part of this contract. In providing any aid, benefit, or service on behalf of the Owner pursuant to this contract, the contractor agrees that the performance shall be in strict compliance with the Act. In the event that the contractor, its agents, servants, employees, or subcontractors violate or are alleged to have violated the Act during the performance of this contract, the contractor shall defend the Owner in any action or administrative proceeding commenced pursuant to this Act. The contractor shall indemnify, protect, and save harmless the Owner, its agents, servants, and employees from and against any and all suits, claims, losses, demands, or damages, of whatever kind or nature arising out of or claimed to arise out of the alleged violation. The contractor shall, at its own expense, appear, defend, and pay any and all charges for legal services and any and all costs and other expenses arising from such action or administrative proceeding or incurred in connection therewith. In any and all complaints brought pursuant to the Owner's grievance procedure, the contractor agrees to abide by any decision of the Owner which is rendered pursuant to said grievance procedure. If any action or administrative proceeding results in an award of damages against the Owner, or if the Owner incurs any expense to cure a violation of the ADA which has been brought pursuant to its grievance procedure, the contractor shall satisfy and discharge the same at its own expense.

The Owner shall, as soon as practicable after a claim has been made against it, give written notice thereof to the contractor along with full and complete particulars of the claim, If any action or administrative proceeding is brought against the Owner or any of its agents, servants, and employees, the *Owner shall* expeditiously forward or have forwarded to the contractor every demand, complaint, notice, summons, pleading, or other process received by the Owner or its representatives.

It is expressly agreed and understood that any approval by the Owner of the services provided by the contractor pursuant to this contract will not relieve the contractor of the obligation to comply with the Act and to defend, indemnify, protect, and save harmless the Owner pursuant to this paragraph.

It is further agreed and understood that the Owner assumes no obligation to indemnify or save harmless the contractor, its agents, servants, employees and subcontractors for any claim which may arise out of their performance of this Agreement. Furthermore, the contractor expressly understands and agrees that the provisions of this indemnification clause shall in no way limit the contractor's obligations assumed in this Agreement, nor shall they be construed to relieve the contractor from any liability, nor preclude the Owner from taking any other actions available to it under any other provisions of the Agreement or otherwise at law.

CERTIFICATE OF INSURANCE

Name & Address of Insured

				Limits of Liability			
Afforded Enter (X)	Required	Type of Insurance	Policy Number and Insuring Company(ies)	Policy Expiration Date	Amounts of Less Than \$1,000,000 Will Not Be Acceptable	Amount Required Each Occurrence	Amount Provided Each Occurrence
☐	☒	General Liability Comprehensive Gen. Form			General Aggregate	\$2,000,000	\$
☐	☒	Premises-Operations			Bodily Injury	\$1,000,000	\$
☐	☒	Explosion & Collapse Hazard			Property Damage	\$1,000,000	
☐	☒	Underground Hazard					
☐	☒	Products/Completed Operations Hazard					
☐	☒	Contractual Ins. (Blanket)			Bodily Injury and Property Damage Combined	\$1,000,000	\$
☐	☒	Broad Form Prop. Damage					
☐	☒	Independent Contractors					
☐	☒	Personal Injury			Personal Injury	\$	\$
☐	☒	Automobile Liability Comprehensive Form			Bodily Injury (Each Person)	\$1,000,000.00	\$
☐	☒	Owned			Bodily Injury (Each Accident)	\$1,000,000.00	\$
☐	☒	Non-Owned				\$	\$
☐	☐	Garagekeepers Insurance (Without regard to legal liability as direct coverage on a primary basis)			Property Damage	\$	\$
☐	☐				Bodily Injury and Property Damage Combined	\$1,000,000	
☐	☒	Excess Liability Umbrella Form			Bodily Injury and Property Damage Combined	\$5,000,000	\$
☐	☐	Other Than Umbrella Form					
☐	☒	Worker's Compensation and Employers' Liability	*All States Endorsement		Statutory NJ Coverage \$100,000/\$500,000		
					Minimum \$100,000	\$100,000	\$

Remarks: Additional Insured: **DeBlasio & Associates, P.C., Owner and Owner's Solicitor**

It is understood and agreed that in the event of any material change in, cancellation of, or expiration of the above policy or policies the undersigned Insurance Company agrees to give a written notice to the Owner, at the above address thirty (30) days in advance of such change or cancellation. This certificate is executed and issued to the Owner on the day and date herein below written certifying that the Insured has been issued the above policy or policies with Limits of Liability of at least the required amounts.

*** PLEASE PUT "X'S" IN AFFORDED COLUMN OR CERTIFICATE WILL BE RETURNED ***

Name of Agency

Signature of Authorized Representative of Insurance Company

Street Address

Address

Date

City, State & Zip Code

Agency Telephone No.

TO: INSURANCE PRODUCER

Your client, as a supplier to the Owner is required to provide a certificate of insurance for the coverages and amounts indicated on the reverse side of this insurance certificate. It is important to your client that you respond quickly since continued business relationships depend upon valid insurance. Additionally, the minimum amount and type of coverage shown on our certificate is not negotiable and is not intended to imply that is all the insurance necessary to protect him/her from all losses or liability. It is the Owner's policy to require all suppliers who make deliveries or perform assembly, repair operations or a service in, on or upon our property/premises or property/premises under our care, custody and control to maintain the insurance coverage described below; such insurance must be obtained prior to the start of any such work the Owner.

A. Comprehensive General Liability (CGL)

This coverage must include: Premises-Operations, Products/Completed Operations Hazard, Contractual Insurance (Blanket Coverage), Broad Form Property Damage, Independent Contractors, and Personal Injury and all others shown on "X" in the required column.

Minimum Coverage

Bodily Injury and Property Damage combined - as shown in the amount required column
AMOUNTS OF LESS THAN \$1,000,000 WILL NOT BE ACCEPTABLE.

Contractual Insurance (Blanket Coverage)

Contractual Indemnification - Save Harmless Agreement which is incorporated into all Vouchers, General Purchase Agreements and Contracts.)

INDEMNIFICATION

Supplier shall defend, indemnify and save harmless, the Owner from and against all losses, costs, damages, expense claims or demands arising out of or caused or alleged to have been caused in any manner by a defect in any equipment or materials supplied hereunder or by doing the work herein provided, including all suits or actions of every kind of description brought against Owner, either individually or jointly with Supplier for or on account of any damage or injury to any person or persons or property, caused or occasioned or alleged to have been caused by or on account of the performance of any work pursuant to or in connection with this contract or through any negligence or alleged negligence in guarding the work or through any act, omission or fault or alleged act, omission or fault of the Supplier, its employees or agents, or others under Supplier's control.

B. Automobile Liability - Comprehensive Form (or as shown on reverse side)

Minimum Coverage

Bodily Injury and Property Damage combined - as shown in the amount required column.

C. Worker's Compensation - As required by New Jersey State Statute

and

Employer's Liability (minimum \$100,000)

D. Excess Liability

Commercial Umbrella Form - \$1,000,000.

General Requirements

1.0 DEFINITIONS

The following words contained in the bid documents and contract shall be defined as follows:

- Owner/Contract Unit: Township of Lower, 2600 Bayshore Road, Villas, New Jersey.
- Contractor: The successful bidder who has entered into agreement with the Township of Lower to perform the necessary work as outlined according to this contract.
- Engineer: DeBlasio & Associates, P.C.
4701 New Jersey Avenue, Wildwood, New Jersey 08260
(Phone: 609-854-3311).
- Addenda: The additional Contract provisions issued in writing by the Engineer prior to the receipt of bids.
- Drawings: Those drawings specifically entitled for this Contract and listed in the Specifications or in the Addenda, or any detailed drawings furnished by the Engineer pertaining or supplemental to the project.
- Calendar Day: All civil days; the time from midnight to midnight.
- Contract: Drawings, specifications, addenda, regulatory permits, bid document attachments.

2.0 GENERAL PROVISIONS

- A. The work performed under this Contract shall comply strictly with all the requirements of the New Jersey Department of Transportation (NJDOT) Standard Specifications for Road and Bridge Construction for 2019 except as amended, modified or supplemented herein and known as the Supplemental Specifications. The Supplementary Specifications Division shall refer to the Paragraphs in the New Jersey Department of Transportation Specifications, 2019. The New Jersey Department of Transportation Standard Construction Details shall govern, except in the drawings prepared for this particular project. The NJDOT Standard Specifications and Standard Construction Details are made part of the Contract by this reference and the Contractor shall be fully familiar with these specifications.
- B. The work performed under this Contract shall comply strictly with all of the requirements of the New Jersey Local Public Contracts Law (N.J.S.A. 40A:11-1 et seq.).
- C. The Contractor shall comply with the United States Department of Labor, Safety and Health Regulations for construction under the Occupational Safety and Health Act of 1970 (P.L. 91-596) and Section 107 of the Contract Work and Safety Standards for Construction (P.L. 91-54).

3.0 NOTICE TO PROCEED

Upon execution of the Contract by the Owner and Contractor, the Contractor will be issued a Notice to Proceed which shall serve as formal authorization to proceed with the project.

4.0 CONTRACTUAL COMPLETION TIME

Upon receipt of the Notice to Proceed from the Engineer, the Contractor shall begin work within ten (10) days and shall complete the contracted work within:

360 Calendar Days

If requested by the Contractor, an extension shall be granted for one day of additional time to complete for each and every day determined by the Engineer to be justifiable. In order for the Engineer to make a determination that an extension is justifiable, the Contractor shall provide the reasons and nature for such an extension and the revised work schedule in writing to the Engineer.

5.0 LIQUIDATED DAMAGES

This Contract includes liquidated damages for the violation of any of the terms and conditions thereof or the failure to perform said contract in accordance with its terms and conditions, or the terms and conditions of P.L.1971, c.198 (C.40A:11-1 et seq.). Both the Owner and Contractor agree upon, fix and determine the following liquidated damages for each calendar day that the Contractor is in default of the Contract Time limits:

- One (1) to thirty (30) days: Five hundred dollars (\$500.00) per calendar day
- Greater than thirty (30) days: One thousand dollars (\$1,000.00) per calendar day

The Owner shall deduct said liquidated damages separately or in combination with the Contractor's payments, surety company or any other legal remedy available to the Owner.

6.0 CONSTRUCTION SCHEDULE AND PERIODICAL ESTIMATES

Immediately after the execution of the Contract, and before the first payment is made, the Contractor shall deliver to the Engineer a construction progress schedule showing the proposed dates of commencement and completion of various sections of work and the anticipated amount of each monthly payment. No change can be made in the approved schedule except with the approval of the Engineer.

The Contractor shall also furnish to the Engineer:

- (1) A detailed estimate giving a complete breakdown of the Contract price in case of lump sum bids.
- (2) Periodical itemized estimates of work done for the purpose of making partial payments thereon.

The values employed in making any of these schedules will be used only for determining the basis of partial payments and will not be considered as fixing a basis for additions to or deductions from the Contract price.

7.0 ENGINEER RESPONSIBILITIES

- A. All measurements, inspections and estimates during the progress of the work described under these specifications will be made by the Engineer, or his duly authorized representative. The work shall be executed to his satisfaction and in conformity with his instructions and in such order and sequence as he may approve or direct; provided, however, that all the requirements of this Contract and of these Specifications be fulfilled subject to the final approval of the Engineer.
- B. The Engineer shall construe and interpret the bid documents as to the intent and meaning of the contract, including but not limited to project drawings, specifications, addenda, regulatory permits and reports. All interpretations and decisions made by the Engineer shall be considered binding and final.
- C. The Engineer shall determine the quality and workmanship of the Contractor's materials and work thru construction observation, testing, review of material shop drawings and any other quantitative measurement means. All binding directions, determinations and requirements will be given by the Engineer in writing.

8.0 ENGINEER'S BENCHMARKS AND STAKES

- A. The stakes and benchmarks given by the Engineer shall be carefully preserved by the Contractor who shall furnish all necessary stakes, grade boards, lines and appurtenances for establishing grades and making measurements. If for any reason the Engineer's benchmarks and/or stakes are destroyed or removed, it shall be the responsibility of the Contractor to have stakes replaced at the Contractor's expense.
- B. Unless otherwise stated in the Contract, the Contractor shall be responsible for survey and layout of the work from the benchmarks and stakes provided by the Engineer. In the event that the proposed work requires the construction of grades, roadways, curbs, gutters and sidewalks, the Contractor shall submit cut sheets to the Engineer for review.

9.0 INSPECTION

- A. The Owner and the Engineer shall have the right to inspect all materials and work done during any phase of construction. The Contractor shall furnish all reasonable facilities and aid to the Engineer for the examination and inspection of any part of the work. No work shall be closed or covered up until it has been duly inspected and approved. Should uncompleted work be covered, the Contractor shall, at his own expense, uncover all such work so that it can be promptly inspected, and after inspection, he shall properly repair and replace all such work if found defective.
- B. The Contractor shall provide the Engineer with forty-eight (48) hour notice in advance of the start of any work and shall provide forty-eight (48) hour notice in advance of stopping work.
- C. The Engineer may provide construction observation services for the project during normal working hours which is 7:30 a.m. to 4:00 p.m., Monday thru Friday. In the event that the Contractor works outside of normal working hours, then the Contractor shall be responsible for reimbursement of inspection costs and such cost will be deducted from the Contractor payments. In the event that the Contractor completes the work in excess of the contract completion time, then the Contractor shall be responsible for reimbursement of inspection costs and such costs will be deducted from the Contractor payments. The method of reimbursement of inspection costs thru deductions is outlined in Section 9.0 Payments.
- D. The Engineer may conduct observation of the project by providing on-site Inspectors to observe the contracted work. The presence and observation of Inspectors does not relieve the Contractor from fulfilling the requirements of the Contract. The Inspector is not authorized to increase or decrease work nor alter the work contained in the Contract.

10.0 PAYMENTS

- A. The quantities of work shown on the contract plans and stated in the Bid Form are only approximate and are given for the purpose of comparing bids. During the progress of the work, the Owner may find it necessary to omit as it sees fit, any portion of the work shown on the plans, or it may also find it necessary to increase or decrease the quantities in accordance with the modifications provided for the foregoing section. Payments will be made for the actual quantity of work satisfactorily completed and accepted by the Engineer at the various unit prices bid. Additionally, The Contractor shall provide the Engineer with a detailed breakdown of the price for lump sum line items and contracts.
- B. As required in the Prompt Payment of Construction Contracts P.L. 2006, c.96 (Prompt Payment Law), the Contractor is advised that the Owner is defined as an Owner that follows the alternate procedure for local units when local policies require Owner approval authorizing the payment of bills as defined in N.J.S.A. 2A:30A-2a.
- C. Any contract, the total price of which exceeds \$100,000.00, entered into by the Owner involving the construction, reconstruction, alteration, repair or maintenance of any building, structure, facility or other improvement to real property, shall provide for partial payments to be made at least once each month as the work progresses, unless the Contractor shall agree to deposit bonds with the Contracting Unit pursuant to P.L.1979, c.152 (C.40A:11-16.1).

D. In addition to ensuring the Contractor has performed in accordance with the contract and that the work has been approved and certified by the Owner or the Owner's "authorized approving agent," the following provisions apply:

- 1.) The 20th calendar day deadline of the default procedure to approve and certify, or decide to withhold full or partial payment is deferred until the public meeting following 20 calendar days of the billing date, at which time the bill must be approved for payment or notice provided as to why the bill or any portion of it will not be approved.
- 2.) If the billing is approved, the 30-day payment requirement of the default is replaced by the requirement that the bill be paid in the payment cycle following the meeting.
- 3.) Upon receipt of the bill from the Contractor, the Contractor shall be given prompt and timely notice of any denial of payment, its deficiency, and what is required to resolve it.
- 4.) The Owner will establish a periodic billing date at the preconstruction meeting, to define the timing of the payment process.

E. Retainage Requirements

- 1.) In accordance with N.J.S.A. 40A:11-16.1, whenever any contract, the total price of which exceeds \$100,000.00, entered into by a Contracting Unit, for the construction, reconstruction, alteration or repair of any building, structure, facility or other improvement to real property, requires the withholding of payment of a percentage of the amount of the contract, the Contractor may agree to the withholding of payments in the manner prescribed in the contract, or may deposit with the Contracting Unit registered book bonds, entry municipal bonds, State bonds or other appropriate bonds of the State of New Jersey, or negotiable bearer bonds or notes of any political subdivision of the State, the value of which is equal to the amount necessary to satisfy the amount that otherwise would be withheld pursuant to the terms of the contract. The nature and amount of the bonds or notes to be deposited shall be subject to approval by the Contracting Unit. For purposes of this section, "value" shall mean par value or current market value, whichever is lower. If the Contractor agrees to the withholding of payments, the amount withheld shall be deposited, with a banking institution or savings and loan association insured by an agency of the Federal government, in an account bearing interest at the rate currently paid by such institutions or associations on time or savings deposits. The amount withheld, or the bonds or notes deposited, and any interest accruing on such bonds or notes, shall be returned to the Contractor upon fulfillment of the terms of the contract relating to such withholding. Any interest accruing on cash payments withheld shall be credited to the Contracting Unit.
- 2.) With respect to any contract entered into by a Contracting Unit pursuant to section 1 of P.L.1979, c.464 (C.40A:11-16.2) for which the Contractor shall agree to the withholding of payments pursuant to P.L.1979, c.152 (C.40A:11-16.1), 2% of the amount due on each partial payment shall be withheld by the Contracting Unit pending completion of the contract. Upon acceptance of the work performed pursuant to the contract for which the Contractor has agreed to the withholding of payments pursuant

to subsection a. of this section, all amounts being withheld by the contracting unit shall be released and paid in full to the Contractor within 45 days of the final acceptance date agreed upon by the Contractor and the Contracting Unit, without further withholding of any amount for any purpose whatsoever, provided that the contract has been completed as indicated. If the Contracting Unit requires maintenance security after acceptance of the work performed pursuant to the contract, such security shall be obtained in the form of a maintenance bond. The maintenance bond shall be no longer than two years and shall be no more than 100% of the project costs.

F. Deduction of Payments

- 1.) The Owner may withhold a payment or partial payment from the Contractor to protect the Owner from defective work, non compliance of regulatory laws, loss due to injury, loss to damage of property, loss due to damage of the work and acts of neglect.
- 2.) The Owner may withhold a payment or partial payment from the Contractor to settle payment claims due to material suppliers, subcontractors and any other person performing services for the Contract.
- 3.) The Owner shall deduct costs for inspection as outlined in Section 9.0 Inspection. The amount deducted shall be calculated at the Engineer's contractual hourly rate with the Owner multiplied by the number of man-hours in excess as defined in Section 9.0 Inspection.
- 4.) The Owner may withhold or deduct a payment or partial payment from the Contractor for liquidated damages as described in Section 5.0 Liquidated Damages.

11.0 VALUE ENGINEERING CHANGE ORDERS

In accordance with N.J.S.A. 40A:11-16.6, the Contractor may submit a Value Engineering Change Order. As such, the following statutory requirements apply to such a submission:

- A. Definitions relative to value engineering change orders; requirement for certain contracts a. For the purpose of this act: "Construction" means the construction, reconstruction, demolition, erection, alteration, or repair of a structure or other improvement to real property, other than the construction, reconstruction, demolition, or renovation of a public building. "Value engineering construction change order" means a change order results in cost reductions to a project or any portion of the work from the original bid specifications after a construction contract is awarded. "Value engineering construction proposal" means a cost reduction proposal based on analysis by a Contractor of the functions, systems, equipment, facilities, services, supplies, means and methods of construction, and any other item needed for the completion of the contract consistent with the required performance, quality, reliability, and safety.
- B. All construction contracts issued by a contracting unit when the total price of the originally awarded contract equals or exceeds \$5,000,000, shall allow for value engineering construction change orders to be approved after the award of the contract.

C. Value engineering construction change orders shall be subject to the following provisions:

- 1.) Value engineering construction change orders shall not be used to impair any of the essential functions, or characteristics of the project, or any portion of the work involved.
- 2.) The Contractor shall submit a value engineering construction proposal that completely describes the changes to the original specifications or proposal, impact on other project components, advantages and disadvantages of the proposed change, cost estimates and calculations on which they are based, any impact on the contract time schedule, and any other relevant information that the contracting unit may require in order to review the value engineering construction proposal. The Contractor's cost for developing the value engineering construction proposal shall not be eligible for reimbursement by the contracting unit.
- 3.) The Contractor shall be liable for all reasonable costs incurred by the contracting unit for the technical evaluation and engineering review of a value engineering construction proposal presented by the Contractor.
- 4.) The contracting unit's engineer shall prepare a written report for the Owner that shall evaluate the value engineering construction proposal, make a recommendation on whether or not it should be accepted, rejected, or modified, and state to the contracting unit and Contractor the amount of any projected cost savings.
- 5.) The proposal shall not be approved unless the engineer reports to the Owner that the proposal appears consistent with the required performance, quality, reliability, and safety of the project and does not impair any of the essential functions, or characteristics of the project, or any portion of the work involved.
- 6.) The contracting unit shall have the sole discretion to approve or disapprove a value engineering construction proposal.
- 7.) The Contractor and the contracting unit shall equally share in the cost savings generated on the contract as a result of an approved value engineering construction change order. Once the project is completed, the contracting unit's engineer shall verify the cost savings to reflect the actual cost of the work, and such verified cost saving shall be the basis for the savings shared equally with the Contractor.
- 8.) The Contractor shall have no claim against the contracting unit as a result of the contracting unit's disapproval of a value engineering construction proposal.
- 9.) A contracting unit shall include in its bid specifications and contract documents procedures to regulate the value engineering construction change order process. Such procedures shall be based on procedures established by the New Jersey Department of Transportation, or any other appropriate State agency, or rules adopted by the director of the Division of Local Government Services.

D. This section shall not invalidate or impair rules regarding change orders adopted by the director of the Division of Local Government Services prior to the effective date of this act. Notwithstanding any provision of P.L.1968, c.410 (C.52:14B-1 et seq.) to the contrary, the director may adopt, immediately upon filing with the Office of Administrative Law, such rules and regulations as the

director deems necessary to implement the provisions of P.L.2005, c.67 (C.40A:11-16.6) which shall be effective for a period not to exceed 12 months. The regulations shall thereafter be amended, adopted or readopted in accordance with the provisions of P.L.1968, c.410 (C.52:14B-1 et seq.).

12. CHANGE ORDERS

- A. No changes in quantities, work performed, services rendered, materials, supplies or equipment delivered or provided shall be authorized, permitted or accepted except by the procedures established herein. All change orders unless otherwise stated in this subchapter shall be subject to the following:
- 1.) Each change order shall be in writing and shall be numbered consecutively (beginning with number one) and attached to the original purchase order or contract for each project.
 - 2.) Change orders which result in payment reduction below the originally contracted price may be made by locally established procedure, provided that any change orders increasing cost on the same contract shall include reference to such reductions.
 - 3.) Quantities of items or work shall not be changed in such a manner as to nullify the effect of the competitive determination of lowest responsible bidder which was made at the time of contract award, if at said time the changes could have been reasonably foreseen.
 - 4.) Responsibility required by these rules to be exercised specifically by the Owner, including authorization of change orders, shall not be delegated except for minor field (site) modifications pursuant to N.J.A.C. 5:30-11.4.
 - 5.) Change orders may be executed by the representative appointed by the Owner but the responsibility for the authorization of change orders shall not be delegated by the Owner except for minor field (site) modifications pursuant to N.J.A.C. 5:30-11.4.
 - 6.) Change orders shall be used to change the number of units or items originally advertised and contracted for, provided that: i. Unit prices or a price methodology were sought in the original specifications and included in the contract; ii. The original specification and the contract included a provision that the unit prices could be so used; and iii. If (a)6i and ii above were not contained in the original specification, a change order shall not be issued.
 - 7.) Change orders shall not be used to substantially change the quality or character of the items or work to be provided, inasmuch as such would have been a determining factor in the original bidding.
 - 8.) Change orders shall not serve the purpose of escalation clauses and, therefore, shall not be utilized to effectuate upward price adjustments.
 - 9.) Total number of change orders executed for a particular contract shall not cause the originally awarded contract price to be exceeded by more than 20 percent unless otherwise authorized by these rules.
 - 10.) If proposed change orders do exceed the 20 percent limitation of (a)9 above, no work shall be performed or purchases made until the procedures of N.J.A.C. 5:30-11.9 have been

completed. If the Owner determines issuance of the change order is not justifiable, a new contract shall be executed in accordance with the Local Public Contracts Law.

- 11.) Before authorizing any change orders resulting in additional expenditures, the availability of funds shall be certified in writing by the chief financial officer or certifying finance officer, as appropriate.
- 12.) The 20 percent limitation of (a)9 above shall not apply to emergency situations as defined within N.J.S.A. 40A:11-6.
13. Change order authorizations shall not be withheld until the completion of the entire project.

13.0 MATERIALS AND WORKMANSHIP

- A. All materials used in the construction shall be new, except where reclaimed materials are indicated, and shall be furnished by the Contractor, and shall be approved by the Engineer. Request for approval of materials shall state the proposed source. All workmanship shall be satisfactory to the Engineer. Materials and workmanship not satisfactory shall be replaced by the Contractor without expense to the Owner. The Contractor shall comply with provisions of the N.J.S.A. 40A:11-18 requiring that preference be given to the use of domestic materials.
- B. Any work, or part of work which, in the opinion of the Engineer has not been done in accordance with these specifications or the instructions of the Engineer, or any material which does not conform to the specifications shall be removed and replaced in a satisfactory manner at the Contractor's expense.
- C. The Contractor shall provide all materials, equipment and supplies free of any mortgages, liens, conditional provisions or any other circumstance that subjects the Owner to a claim by the sellers of such materials, equipment and supplies.
- D. At the request of the Engineer, the Contractor shall provide samples of materials to ascertain compliance with and select items specified in the Contract.
- E. In case the Contractor finds the specifications on the plans are not sufficiently clear or complete, he shall request the Engineer to provide supplementary plans and specifications and the Engineer will provide such additional information as may be necessary. Such request shall be made in writing at least two (2) weeks prior to the time that such drawings or specifications are to be needed and no delay caused by the Engineer in supplying such information, shall be considered as neglect or default. No responsibility, either direct or implied, is assumed by the Engineer for omissions or duplications by the Contractor or his subcontractors, due to real or alleged error in arrangement of matter in these Contract documents.
- F. Before ordering materials, the Contractor shall submit shop drawing, submittals and/or material specifications to the Engineer for review of conformity to the Contract. The Contractor shall provide six (6) copies of the shop drawings, submittals and/or material specifications either in paper or electronic format to the Engineer. If requested by the Engineer, the Contractor shall furnish additional copies, technical information or corrections to the submitted shop drawings, submittals and material specifications.

14.0 PERMITS AND LAWS

The Contractor shall comply with all Federal, State, County, and Local laws, regulations, resolutions and ordinances affecting the work. The Contractor shall obtain and pay for all necessary licenses and permits unless otherwise specified in the Contract. The Contractor shall be solely responsible for any damages resulting from his/her neglect to obey all laws, regulations, rules and ordinances and should he/she perform any work called for by the specifications or drawings, knowing it to be contrary to such laws, regulations, resolutions, rules and ordinances and without notifying the Engineer in writing and obtaining written consent to proceed, he/she shall bear all costs and damages arising therefrom.

15.0. OR EQUAL CLAUSE

The Owner, without invalidating the Contract, may make changes by altering, adding to or deducting from the work the Contract sum being adjusted accordingly. All such work shall be executed in conformity with the terms and conditions of the original Contract unless otherwise provided in the order for same.

Any claim for extension of time caused thereby shall be adjusted at the time of ordering such change.

Each order for changes shall be in the form of an Order on Contract, bearing the signed approval of the Engineer and the signed acceptance of Contractor except in the case of disagreement as to the value of changes when the Contractor's signature to the Order will not be mandatory. The Order on Contract shall describe or enumerate the work to be performed and state the price, if any, to be added to or deducted from the Contract sum. If the nature of the work is such that an Order on Contract, as above, cannot be issued until the work has been advanced sufficiently to obtain exact quantities, said work will be authorized in writing by the Engineer with the accompanying statement that an Order on Contract will be issued when the necessary information is at hand.

Except as provided in the above paragraph, no change shall be made unless in pursuance of an Order on Contract and no claim for an addition to the Contract sum shall be valid unless so ordered. If the Contractor believes that any instructions, by drawings or otherwise, involves extra cost under his Contract, he shall give the Engineer written notice thereof within ten (10) days after receipt of such instructions and await instruction before proceeding to execute such work.

The value of any change shall be determined by one or more of the following methods:

- (a) By acceptance in a lump sum.
- (b) By estimate of the cost of labor and materials plus overhead and profit.
- (c) By cost of labor and materials, plus overhead and profit cost to be determined as the work progresses.

Method (a) will be accepted only for items of work in which an analysis of the cost of labor and materials is impracticable and the Contractor shall submit satisfactory evidence to substantiate the amount of the lump sum.

If the work is done by Method (b), the Contractor shall submit an estimate showing an analysis of the cost of labor and materials.

If the work is done by Method (c), the Contractor shall submit a report of the actual cost of labor and materials.

If the work is done directly by the Contractor, overhead in an amount of ten percent (10%) may be added to the lump sum if Method (a) is accepted, or to the cost of labor and materials if Method (b) or (c) is used, and to the lump sum of labor and materials plus overhead there may be added ten percent (10%) for profit.

If the work is done by a subcontractor, overhead in an amount of five percent (5%) may be added to the lump sum if Method (a) is accepted, or to the cost of labor and materials if Method (b) or (c) is used and to the amount of the lump sum of labor and materials plus overhead there may be added ten percent (10%) for profit.

The Engineer shall determine by which one of the following methods the value of any changes shall be computed.

In case no agreement can be reached between the Engineer and the Contractor as to value of the change, the Contractor shall proceed with the work upon receipt of a written order from the Engineer, which order shall set forth the work to be done and the price allowed by the Owner. The said order may be reviewed before final certificate is issued, if it is deemed that such action is necessary or advisable.

Compliance with the above-mentioned order shall not be regarded as a waiver of the Contractor's right to file and establish a claim in Court.

"Overhead" shall be defined to include only the following items:

- (a) Premium based on Bond.
- (b) Premium on insurance, other than Workmen's Compensation Insurance, Unemployment Insurance or Old Age Security Insurance.
- (c) Transportation and expense of executive officers.
- (d) Communications.
- (e) Executive officers time.
- (f) Expenses of the executive office.
- (g) Advertising and promotion expenses.

16.0 TRAFFIC CONTROL

The Contractor shall be responsible for the maintenance of traffic with a minimum of one lane open at all times for emergency vehicles. Where necessary, steel plates shall be employed to provide for the maintenance of traffic as directed by the Engineer.

Under no circumstances will a street or roadway be completely closed to traffic, without permission from the Engineer, and the Contractor upon receiving permission from the Engineer, shall notify the Police Department in such closing. Traffic control devices shall conform to the Manual on Uniform Traffic Control Devices (MUTCD)- Latest Edition. Access to driveways shall be maintained at all times. No driveways shall remain blocked overnight.

The Contractor shall conduct his operations in such manner as to provide minimum safety for all employees on the work and the public as well. The Contractor shall provide suitable bridges, barricades, railings, or other protection about open trenches on excavations and any necessary traffic directors, detour signs, yellow lights and danger signals for any obstruction to traffic. Hazard warning lights shall be transistorized, double face, flash type.

The Contractor shall notify residents by door-hangers at least forty-eight (48) hours in advance before starting construction work on roadways.

17.0 RESPONSIBILITY AND DAMAGE

The Contractor shall be responsible for all parts of his work, temporary or permanent, until the Contract is acceptable by the Owner and he shall thoroughly protect all work, finished or unfinished, against damage from any cause. The use of part or all of the work by the Owner shall not relieve the Contractor of this responsibility.

In the course of his operations, the Contractor may disturb certain seeded and lawn areas, driveways and parking areas, curbing, fences, hedges, walks, etc. along the site of the project which he will be required to restore to the condition in which he found them. Unless otherwise directed by the Engineer, the Contractor shall dig up, handle, protect and properly reset hedges, small trees and shrubbery along the line of or adjacent to the work, and shall take all reasonable care of this work. All materials shall be in a living condition when reset or the Contractor shall replace them with new stock. Trees, tree branches and roots shall not be mutilated or cut except by permission of the Engineer. When permitted to cut tree roots, the ends shall be cut off smooth. All trees in improved areas and close enough to the work to be in danger of damage by the construction operations shall be effectually boxed and securely braced, if necessary, before construction begins. Tree branches shall be tied back and under no circumstances may they be cut off or damaged. The Contractor shall carefully observe the extent of the above as there will be no extra compensation allowed to him for restoring the same.

The Contractor shall be responsible for damage to life and property due to his operations and shall provide all necessary guards, rails, night lights, etc.

If either party to this Contract should suffer damage in any manner because of any wrongful act of neglect of the other party or if anyone employed by him, they shall be reimbursed by the other party for such damage.

Claims under this clause shall be made in writing to the party liable within two (2) weeks of the first observance of such damage and in no case later than the time of the final payment and shall be adjusted by agreement or arbitration.

18.0 LIENS

Neither the final payment nor any part of the retained percentage shall become due until the Contractor, if required, shall deliver to the Owner a complete release of all liens arising out of this contract or receipts in full in lieu thereof and, if required in either case, an affidavit that so far as he has knowledge or information, the releases and receipts include all labor and material for which a lien could be filed; but the Contractor may if any subcontractor refuses to furnish a release or receipt in full, furnish a bond satisfactory to the Owner, to indemnify him against any lien. If any lien remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all monies that the latter may be compelled to pay in discharging such a lien including all costs and a reasonable attorney's fee.

19.0 INDEMNITY

The Contractor shall indemnify and save harmless the Owner from and against all losses and all claims, demands, payments, suits, actions, recovered against it by reason of any act, or omission of the Contractor, his agents or employees in the execution of the work of the guarding of it and in case any such action is brought against the Owner, the Contractor shall immediately take charge of and defend the same at his own cost and expense. "Indemnity and Hold Harmless Agreement" is incorporated herein by reference.

20.0 ASSIGNMENT OF CONTRACT

Neither party to the Contract shall assign the Contract or sublet it as a whole without the written consent of the other, nor shall the Contractor assign any monies due to him hereunder without the previous consent of the Owner.

21.0 SUBCONTRACTS – NON SPECIALTY

The Contractors shall submit to the Engineer in writing one (1) week prior to the commencement of work or sooner, the names of the subcontractors proposed for the principal parts of the work, if any.

The Contractor agrees that he is fully responsible to the Owner for the acts and omissions of his subcontractors and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by him.

Nothing contained in the Contract documents shall create any contractual relation between any subcontractor and the Owner.

22.0 PROVISIONS REQUIRED BY LAW DEEMED INSERTED

Each and every provision of law, regulations and clauses required by law applicable to the Contract shall be deemed to be inserted herein and the Contract shall be read and enforced as it were included herein.

23.0 MATERIAL TESTING

The Engineer, may, at his discretion, require materials to be used in performing the work under this Contract to be tested. Whenever so instructed by the Engineer, the Contractor shall furnish representative samples of materials and shall forward them to the office of the Engineer. The entire cost of sampling and testing such materials shall be borne by the Contractor.

24.0 PERMITS

The Contractor shall obtain all permits and licenses, as required by the Owner or other authorities having jurisdiction.

25.0 REMOVAL OF RUBBISH

As the work progresses, all rubbish, refuse and unused materials and tools shall be left in a neat and orderly condition ready for use. All ditches, pits and other excavation made by the Contractor for his convenience in prosecuting the work, shall be filled up, and all embankments, temporary spoil banks and similar deposits not shown on the plans, shall be removed prior to the completion of the Contract, in such manner and to such extent as the Engineer may direct.

26.0 WATER, ELECTRIC, UTILITIES, ETC.

The Contractor must arrange for his own water supply, electric service, and other utilities, paying for all permits, connections, piping meters, consumption, etc., as required.

27.0 SUBSURFACE STRUCTURES AND UTILITIES

The location of existing substructures and utilities shown on the drawings and contained in the Contract have been secured from various sources and is not guaranteed to be accurate. The Contractor is advised to determine the exact location of all subsurface structures and utilities.

In the event that the subsurface structure and utilities locations deviate from what is shown on the drawings and Contract documents, the Contractor shall notify the Engineer immediately.

The Contractor shall be responsible for any damage to existing subsurface structures and utility facilities as a result of the work contained in the Contract. In the event that the Contractor damages any existing subsurface structures and utility facilities, the Contractor shall notify the affected utility authority and Engineer immediately.

28.0 DISPOSAL OF EXCAVATED MATERIALS

The Contractor shall dispose of excavated material, such as rock, earth, pavement, etc., when in the opinion of the Engineer, said material is deemed unusable for use in the Contract.

Disposal sites of unusable materials shall be at the Contractor's option, but will conform to State, County and Local laws.

29.0 FINAL CLEAN-UP

Before the final acceptance of the project, the Contractor shall remove all equipment, temporary work, unused and useless materials, rubbish and temporary buildings, repair or replace in an acceptable manner fences or other private or public property which may have been damaged or destroyed on account of the prosecution of the work, fill all depressions and water pockets on public and private property caused by his operations, remove all obstructions from waterways caused by his work, clean all inlets and manholes within and adjacent to the site of the project which have been obstructed by his operations, and leave the site of the project and adjacent public and private property in a neat and presentable condition wherever his operations have disturbed conditions existing at the time of starting work.

The Contractor shall procure and submit to the Engineer signed statements from property owners affected that he has fulfilled his obligations in the matters enumerated above with regard to their respective properties.

30.0 NO DAMAGE FOR DELAY OR EXPENSE TO CONTRACTOR, SUBCONTRACTOR, MATERIAL SUPPLIERS, THEIR AGENTS OR EMPLOYEES DURING PERIODS OF DELAY.

The terms, as set forth below, supercede any inconsistent provisions of the Specifications and or Contract and are limited only by N.J.S.A. 40A:11-19 and 18A:18A-41 as applicable.

In the event that the Contractor, Subcontractor, Material Supplier, their agents and employees (hereinafter, collectively, referred to as the "Contractor") are delayed in the performance and/or completion of the work by any act then and in all such cases where there has been delays, suspensions or other impacts caused to the Contractor, as a result of said delay the parties hereto agree that the only remedy of the Contractor shall be limited to an extension of time for the completion of the Contract.

The only limitation to this provision shall be as limited by N.J.S.A. 40A:11-19 and 18A:18A-41 as may be applicable. The Owner and Contractor specifically agree that the inability to obtain permits and the like, or by changes ordered in the work, strikes, lockouts, fire weather conditions, acts of God, and unusual delays by common carriers are contemplated by the parties in setting a completion date under the contract and as envisioned by N.J.S.A. 40A:11-19 and 18A:18A-41.

The decision as to the amount of time permitted by way of extension caused by delay shall be solely that of the Engineer. The Contractor agrees that this provision shall be part of any Contract or any Subcontract relative to the scope of the work to be conducted. The parties agree that they shall not seek any damages for delay impacts caused by delays of any nature, sort or type. The sole remedy under these circumstances is an extension to the time to perform, except as permitted by N.J.S.A. 40:11-19 and 18A:18A-41. In the event that a Contractor asserts in an Arbitration, lawsuit or proceeding of any type, an entitlement to money damages or other damages other than an extension of time in violation of this provision, the Owner and Engineer shall be entitled to reasonable attorney's fees and costs incurred in the defense of the matter, in the event it is determined that the Contractor was only entitled to an extension of time to perform.

No such extensions of time shall be made for any one or more delays unless within seven (7) days after the beginning of such delay a written request for additional time shall be filed with the Engineer.

No claim for damages or any claim other than for an extension of time, as herein provided, shall be made or asserted against the Owner or any of their agents or employees, with the exception of the limitations provided by N.J.S.A. 40A:11-19 and 18A:18A-41.

Anything contained in the Specifications, the Contract, the drawings or any other document to the contrary notwithstanding, the Contractor shall not be entitled to the damages or to extra compensation by reason of delays occasioned by the proceedings to review the awarding of the Contract to the Contractor or to review the awarding of any other Contract to any other Contractor.

31.0 DISPUTE RESOLUTION

The Owner and Contractor agree to submit to forms of alternative dispute resolution (ADR) prior to submitting to a Court of adjudication in the event that a dispute arises under the Contract. Forms of ADR may include mediation, arbitration and non-binding arbitration and shall be conducted in accordance with State Law, industry standards and American Arbitration Association (AAA) guidelines.

ADR shall not be applicable to statutory items contained in the New Jersey Local Public Contracts Law, N.J.S.A. 40A:11-1 et seq.

32.0 LABOR STANDARDS

The Contractor and any hired subcontractors shall comply with all of the State of New Jersey Labor Laws, including but not limited to New Jersey Department of Labor Laws, N.J.S.A. 10:2-1 to 10:2-4 inclusive and the New Jersey Prevailing Wage Act (N.J.S.A. 34:11-56.25 et seq as amended).

A copy of the prevailing wage determination applicable to the contract and issued by the New Jersey Department of Labor is on file at the Engineer's office and are attached to this Contract.

Starting August 16, 2024, contractors engaged in public work projects must submit their certified payroll records through the New Jersey Wage Hub. Submission of certified payroll records to New Jersey Wage Hub will satisfy the requirement to submit them to a public body if the public body is also using New Jersey Wage Hub.

Prior to final acceptance of the work completed in the Contract and final payment to the Contractor, the Contractor shall complete the Prevailing Wage Certification which is enclosed in the Contract for use by the Contractor.

Prior to final acceptance of the work completed in the Contract and final payment to the Contractor, the Contractor shall submit certified payrolls to the Owner with a copy to the Engineer in compliance with N.J.A.C. 12:60.

33.0 SITE SAFETY

The Contractor is responsible for site safety both in the Owner's right-of-way and private property for the duration of the Contract. The Contractor shall provide a Site Safety Form to the Engineer or

Inspector on a daily basis for the duration of the Contract. A copy of the Site Safety Form is enclosed in the Contract for use by the Contractor.

The Contractor shall not be approved for payment unless the Site Safety Form for each day in the payment request period has been furnished by the Contractor to the Engineer or Inspector.

34.0 FINAL PAYMENT AND PROJECT CLOSE OUT

Final acceptance of the project and the issuance of the final payment made by the Owner shall release the Owner from any claims and liabilities pertaining to the Contractor. Final payment and project close out does not relieve the Contractor or its agents of any obligations contained in the Contract.

Prior to final payment and project close out, the Contractor shall submit the following items:

1. Maintenance Bond.
2. As-Built Plans (if applicable).
3. Prevailing Wage Certification.
4. All Monthly Manning Project Reports.
5. All Certified Payrolls Reports.
6. All Site Safety Forms.
7. Full Release and Waiver of Lien Certification.
8. Any other documentation required and included in the Contract.

LOWEST BIDDER PREVAILING WAGE CERTIFICATION

Town: **Township of Lower**

Project Name: **Public Works Building Replacement**

County: **Cape May**

D&A Project Number: **LT-C-048.01**

Certification of Lowest Bidder _____, of full age and under oath, duly provides the following sworn statement:

- (1) I am the owner and/or highest-ranking official or officer of a company or firm named _____, which holds a currently valid public works contractor registration pursuant to the New Jersey Public Works Contractor Registration Act, N.J.S.A. 34:11-56.48 et seq., certificate number _____.
- (2) I submitted a bid for a contract award in the above identified project and the public body has informed me that I am the lowest bidder by 10 percent or more as compared to the next lowest bid submitted.
- (3) The amount of my bid does include paying the prevailing wage rate to all workers who perform work on the project at rates of pay, including both base wage and fringe benefits, set forth in applicable Wage Determinations, (1) for the appropriate locality, (2) for the appropriate work classification (e.g. carpenter, electrician, mason, plumber), and (3) for the appropriate job title (e.g. Apprentice, Journeyman, Foreman), published by the New Jersey Department of Labor and Workforce Development (NJDOL) pursuant to the New Jersey Prevailing Wage Act (NJPWA), N.J.S.A. 34:11-56.25 et seq., and corresponding NJDOL rules, N.J.A.C. 12:60.

I certify under penalty of perjury that the foregoing statements made by me are true. I am aware that if any of the foregoing statements made by me are false, I am subject to punishment. See N.J.S.A. 2C:28-1 et seq., specifically N.J.S.A. 2C:28-3, within the New Jersey Code of Criminal Justice.

Dated: _____

Signature: _____

Title: _____

SITE SAFETY FORM

Town: **Township of Lower**

Project Name: **Public Works Building Replacement**

County: **Cape May**

D&A Project Number: **LT-C-048.01**

I hereby certify that I understand and acknowledge all Federal, State and Local laws regulating construction work and safety requirements for the progression of the work in this Contract.

On this day, I also certify that all Federal, State and Local laws regulating site safety have been followed and are in accordance with the Contract, except as noted:

☐ Trench Conditions

☐ Entry to Subsurface Structures

☐ Traffic Control

☐ Properly Maintained Equipment

☐ Fall Protection

☐ Work in Proximity to Electric Lines

☐ Other _____

☐ None

Comments/Resolutions _____

Contractor: _____

By: _____

Authorized Representative

I executed this form at _____ on _____
Time Date

NEW JERSEY PREVAILING WAGE PAYMENT CERTIFICATION

Town: **Township of Lower**

Project Name: **Public Works Building Replacement**

County: **Cape May**

D&A Project Number: **LT-C-048.01**

I hereby certify that all workmen employed by my company (Contractor) and subcontractors have been paid in full and all payments have been made in accordance with the New Jersey Department of Labor requirements and New Jersey Prevailing Wage Act (Chapter 150 of Laws of 1963). I also hereby certify that all suppliers, vendors and any other applicable entities that were utilized for this Contract have been paid in full and that all claims, liens, contingencies and mortgages are not remaining. Lastly, I acknowledge that this form must be fully executed and submitted to the Engineer and Owner to receive final payment.

Contractor: _____

By: _____

Authorized Representative

Authorized Representative Title

I executed this form at _____ on _____
Time Date

Sworn and subscribed before me this _____ day of _____ 2025,

Notary Public of New Jersey

Full Release and Waiver of Liens Certification

WHEREAS, the undersigned is a subcontractor, supplier or other person furnishing work, services, materials or equipment upon real estate owned by (OWNER) in (MUNICIPALITY), State of New Jersey in furtherance of that certain (PROJECT NAME) sponsored by the (OWNER) (hereinafter referred to as "Owner").

Receipt is acknowledged of \$ _____, which represents full payment, for work, services, materials and/or equipment furnished and installed by us at the above referenced project, the undersigned does hereby waive, release and relinquish the Owner and the Building/Land from any and all claims and/or construction liens pursuant to N.J.S.A. 2A:44A-1 *et seq.* relating to this Project, to the extent of \$_____.

We agree to hold the Owner and the Building/Land harmless against any claim made or lien filed by any of our material suppliers and subcontractors who performed work or supplied materials for the Project to-date.

In addition, the undersigned warrants: (a) that any claims for payment for work, services, materials and/or equipment furnished in the construction or repair of the aforesaid real estate and improvements have not been assigned; (b) that all laborers, subcontractors and suppliers of the undersigned who have furnished work, services, materials and/or equipment in the construction or repair of the aforesaid real estate and improvements have been fully paid and that none of such laborers, subcontractors or suppliers have or will have any claim, demand or lien against the aforesaid real estate and improvements; and (c) that no financing statement, chattel mortgage, security interest, conditional bill of sale or retention of title agreement has been given or executed or will be given or executed for or in connection with any materials, appliances, machinery, fixtures or furnishings placed upon or installed, or to be placed upon or installed, in the aforesaid real estate and improvements by the undersigned.

IN WITNESS WHEREOF, the undersigned has executed and sealed this Full Release and Waiver of Liens this _____ day of _____, 20__.

Paid to date: \$ _____

NAME OF SUBCONTRACTOR/SUPPLIER: _____

By: _____

Title: _____

Sworn and subscribed to
before me this _____ day of _____, 20__.

Notary Public of New Jersey

PROPOSAL SECTION

BID DOCUMENT CHECKLIST

Township of Lower, Cape May County, New Jersey
Public Works Building Replacement

D&A File # LT-C-048.01

Required by Owner	Submission Requirement	Statutory Reference	Initial each required entry and if required submit the item
☒	Stockholder Disclosure Certification*	N.J.S.A. 52:25-24.2	
☒	Bid Guarantee* (with Power of Attorney for full amount of Bid Bond)	N.J.S.A. 40A:11-21	
☒	Consent of Surety* (with Power of Attorney for full amount of Bid Price)	N.J.S.A. 40A:11-22	
☒	Acknowledgement of Receipt of Addenda*	N.J.S.A. 40A:11-23 c.1),2),3)	
☒	Subcontractors List*	N.J.S.A. 40A:11-16	
☒	Equipment Certification	N.J.S.A. 40A:11-20	
☒	Non-Collusion Affidavit	N.J.S.A. 52:34-15	
☒	Public Works Contractor Registration Form	N.J.S.A. 34A:11-56.48	
☒	Background Questionnaire and References	N.J.S.A. 40A:11-23.1b.	
☒	Mandatory Affirmative Action Language Compliance Notice	N.J.S.A. 10:5-31	

☒	Certification of Non-Debarment	N.J.S.A.52:32-44.1	
☒	Status of Present Contracts	N.J.S.A. 40A:11-23.1b.	
☒	W-9 Request for Taxpayer Identification Number and Certification	N.J.S.A. 40A:11-23.1b.	
☒	Bid Proposal Form	N.J.S.A. 40A:11-23.1b.	

**Failure to submit any one of these mandatory items shall be deemed a fatal defect that shall render the bid proposal unresponsive and that cannot be cured by the Township of Lower (N.J.S.A. 40A:11-23.2.).*

The undersigned hereby acknowledges and submits the above listed items.

Name of Bidder: _____

Name of Authorized Representative: _____

Title of Authorized Representative: _____

Signature: _____

Date: _____

Mailing Address: _____

Phone Number: _____

Fax Number: _____

Email Address: _____

STATEMENT OF OWNERSHIP DISCLOSURE

N.J.S.A. 52:25-24.2 (P.L. 1977, c.33, as amended by P.L. 2016, c.43)

This statement shall be completed, certified to, and included with all bid and proposal submissions. Failure to submit the required information is cause for automatic rejection of the bid or proposal.

Name of Organization: _____

Organization Address: _____

Part I Check the box that represents the type of business organization:

- ☐ Sole Proprietorship (skip Parts II and III, execute certification in Part IV)
- ☐ Non-Profit Corporation (skip Parts II and III, execute certification in Part IV)
- ☐ For-Profit Corporation (any type) ☐ Limited Liability Company (LLC)
- ☐ Partnership ☐ Limited Partnership ☐ Limited Liability Partnership (LLP)
- ☐ Other (be specific): _____

Part II

- ☐ The list below contains the names and addresses of all stockholders in the corporation who own 10 percent or more of its stock, of any class, or of all individual partners in the partnership who own a 10 percent or greater interest therein, or of all members in the limited liability company who own a 10 percent or greater interest therein, as the case may be. **(COMPLETE THE LIST BELOW IN THIS SECTION)**

OR

- ☐ No one stockholder in the corporation owns 10 percent or more of its stock, of any class, or no individual partner in the partnership owns a 10 percent or greater interest therein, or no member in the limited liability company owns a 10 percent or greater interest therein, as the case may be. **(SKIP TO PART IV)**

(Please attach additional sheets if more space is needed):

Name of Individual or Business Entity	Home Address (for Individuals) or Business Address

Part III DISCLOSURE OF 10% OR GREATER TOWNSHIP OF LOWERSHIP IN THE STOCKHOLDERS, PARTNERS OR LLC MEMBERS LISTED IN PART II

If a bidder has a direct or indirect parent entity which is publicly traded, and any person holds a 10 percent or greater beneficial interest in the publicly traded parent entity as of the last annual federal Security and Exchange Commission (SEC) or foreign equivalent filing, ownership disclosure can be met by providing links to the website(s) containing the last annual filing(s) with the federal Securities and Exchange Commission (or foreign equivalent) that contain the name and address of each person holding a 10% or greater beneficial interest in the publicly traded parent entity, along with the relevant page numbers of the filing(s) that contain the information on each such person. **Attach additional sheets if more space is needed.**

Website (URL) containing the last annual SEC (or foreign equivalent) filing	Page #'s

Please list the names and addresses of each stockholder, partner or member owning a 10 percent or greater interest in any corresponding corporation, partnership and/or limited liability company (LLC) listed in Part II **other than for any publicly traded parent entities referenced above.** The disclosure shall be continued until names and addresses of every noncorporate stockholder, and individual partner, and member exceeding the 10 percent ownership criteria established pursuant to N.J.S.A. 52:25-24.2 has been listed. **Attach additional sheets if more space is needed.**

Stockholder/Partner/Member and Corresponding Entity Listed in Part II	Home Address (for Individuals) or Business Address

Part IV Certification

I, being duly sworn upon my oath, hereby represent that the foregoing information and any attachments thereto to the best of my knowledge are true and complete. I acknowledge: that I am authorized to execute this certification on behalf of the bidder/proposer; that the Township of Lower is relying on the information contained herein and that I am under a continuing obligation from the date of this certification through the completion of any contracts with the Township of Lower to notify the Township of Lower in writing of any changes to the information contained herein; that I am aware that it is a criminal offense to make a false statement or misrepresentation in this certification, and if I do so, I am subject to criminal prosecution under the law and that it will constitute a material breach of my agreement(s) with the, permitting the Township of Lower to declare any contract(s) resulting from this certification void and unenforceable.

Full Name (Print):		Title:	
Signature:		Date:	

BID GUARANTEE

A person bidding on a contract for the erection, alteration or repair of a public building, structure, facility or other improvement to real property, the total price of which exceeds \$100,000, shall furnish a guarantee as provided for herein.

The guarantee shall be payable to the Township of Lower so that if the contract is awarded to the bidder, the bidder will enter into a contract therefore and will furnish any performance bond or other security required as a guarantee or indemnification.

The guarantee shall be in the amount of 10% of the bid, but not in excess of \$20,000.00, except as otherwise provided herein, and may be given, at the option of the bidder, by certified check, cashier's check or bid bond. In the event that any law or regulation of the United States imposes any condition upon the awarding of a monetary grant to any Township of Lower, which condition requires the depositing of a guarantee in an amount other than 10% of the bid or in excess of \$20,000.00 the provisions of this section shall not apply and the requirements of the law or regulation of the United States shall govern.

CONSENT OF SURETY

A performance bond will be required from the successful contractor on this project, and consequently, all bidders shall submit, with their bid, a consent of surety in substantially the following form:

To: _____
(Township of Lower)

Re: _____
(Contractor)

(Project Description)

This is to certify that the _____
(Surety Company)

will provide to _____ a performance bond in
(Township of Lower)

the full amount of awarded contract in the event that said contractor is awarded a contract for the above project.

(CONTRACTOR)

(Authorized Agent of Surety Company)

Date: _____

**CONSENT OF SURETY MUST BE SIGNED BY AN AUTHORIZED AGENT
OR REPRESENTATIVE OF A SURETY COMPANY AND NOT BY THE
INDIVIDUAL OR COMPANY REPRESENTATIVE SUBMITTING THE BID**

Township of Lower, Cape May County, New Jersey
Public Works Building Replacement

D&A File #LT-C-048.01

ACKNOWLEDGMENT OF RECEIPT OF ADDENDA

The undersigned Bidder hereby acknowledges receipt of the following Addenda:

<u>Addendum Number</u>	<u>Dated</u>	<u>Acknowledge Receipt</u> (initial)
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

☐ **No addenda were received:**

Acknowledged for: _____
(Name of Bidder)

By: _____
(Signature of Authorized Representative)

Name: _____
(Print or Type)

Title: _____

Date: _____

SUBCONTRACTORS LIST

In accordance with N.J.S.A. 40A:11-16, the bidder shall be set forth in the bid the name or names of all subcontractors to whom the general contractor will subcontract for branches of work in the following categories:

- (1) The plumbing and gas fitting and all kindred work;
- (2) Steam power plants, steam and hot water heating and ventilating and refrigeration apparatus and all kindred work;
- (3) Electrical work, including any electrical power plants, tele-data, fire alarm, or security system;
- (4) Structural steel and ornamental iron work;

Whenever a bid sets forth more than one subcontractor for any of the categories (1) through (4) listed above, the bidder shall submit to the Township of Lower a certificate signed by the bidder listing each subcontractor named in the bid for that category. The certificate shall set forth the scope of work, goods and services for which the subcontractor has submitted a price quote and which the bidder has agreed to award to each subcontractor should the bidder be awarded the contract. The certificate shall be submitted to the Township of Lower simultaneously with the list of the subcontractors. The certificate may take the form of a single certificate listing all subcontractors or, alternatively, a separate certificate may be submitted for each subcontractor. If a bidder does not submit a certificate or certificates to the Township of Lower, the Township of Lower shall award the contract to the next lowest responsible bidder.

The Township of Lower shall require evidence of performance security to be submitted simultaneously with the bid. Evidence of performance security may be supplied by the bidder on behalf of himself and any or all subcontractors, or by each respective subcontractor, or by any combination thereof which results in evidence of performance security equaling, but in no event exceeding, the total amount bid.

If the work of the types of the branches listed above will be performed by the bidder and will not be provided by a subcontractor, then the bidder shall indicate **"To Be Performed by Bidder"** below. In this case the bidder shall list the employees name and the applicable licenses covering these trade categories.

If the work of the types of the branches listed above are not involved in this contract, then the bidder shall indicate **"Not Applicable"**.

- (1) The plumbing and gas fitting and all kindred work;

Indicate if the bidder intends to use a subcontractor or if the work will be performed by the bidder: _____

Name: _____

Address: _____

License Number: _____

(2) Steam power plants, steam and hot water heating and ventilating and refrigeration apparatus and all kindred work;

Indicate if the bidder intends to use a subcontractor or if the work will be performed by the bidder: _____

Name: _____

Address: _____

License Number: _____

(3) Electrical work, including any electrical power plants, tele-data, fire alarm, or security system;

Indicate if the bidder intends to use a subcontractor or if the work will be performed by the bidder: _____

Name: _____

Address: _____

License Number: _____

(4) Structural steel and ornamental iron work;

Indicate if the bidder intends to use a subcontractor or if the work will be performed by the bidder: _____

Name: _____

Address: _____

License Number: _____

EQUIPMENT CERTIFICATION

The undersigned Bidder hereby certifies as follows:

The bidder owns or controls all the necessary equipment required to accomplish the work described in the specifications.

Name of Bidder: _____

By: _____
(Signature)

Name of above: _____
(Print)

Title: _____

Date: _____

NON-COLLUSION AFFIDAVIT

State of New Jersey

County of _____

ss:

I, _____ residing in _____
(name of affiant) (name of municipality)

in the County of _____ and State of _____ of full

age, being duly sworn according to law on my oath depose and say that:

I am _____ of the firm of _____
(title or position) (name of firm)

_____ the bidder making this Proposal for the bid

entitled _____, and that I executed the said proposal with
(title of bid proposal)

full authority to do so that said bidder has not, directly or indirectly entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free, competitive bidding in connection with the above-named project; and that all statements contained in said proposal and in this affidavit are true and correct, and made with full knowledge that the _____ relies upon the truth of the

(Township of Lower)

statements contained in said Proposal and in the statements contained in this affidavit in awarding the contract for the said project.

I further warrant that no person or selling agency has been employed or retained to solicit or secure such contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, except bona fide employees or bona fide established commercial or selling agencies maintained by _____.

Subscribed and sworn to
before me this day

Signature

_____, 2 _____

(Type or print name of affiant under signature)

Notary public of
My Commission expires _____
(Seal)

PUBLIC WORKS CONTRACTOR REGISTRATION FORM

The Public Works Contractor Registration Act (PWCRA) requires that all contractors, including named subcontractors, to register with the Department of Labor prior to submitting price proposals or engaging on certain public works contracts that exceed the prevailing wage threshold.

Under the law a *contractor* is a "person, partnership, association, joint stock company, trust, corporation, or other legal business entity or successor thereof who enters into a contract" which is subject to the provisions of the New Jersey Prevailing Wage Act [N.J.S.A. 34:11-56.25 et seq.]. It applies to contractors based in New Jersey or in another state.

The PWCRA defines "public works projects" as contracts for "public work" as defined in the Prevailing Wage Act [N.J.S.A. 34:11-56.26(5)]. The term means:

- "Construction, reconstruction, demolition, alteration, or repair work, or maintenance work, including painting and decorating, done under contract and paid for in whole or in part out of the funds of a public body, except work performed under a rehabilitation program.
- "Public work" shall also mean construction, reconstruction, demolition, alteration, or repair work, done on any property or premises, whether or not the work is paid for from public funds,..."
- "Maintenance work" means the repair of existing facilities when the size, type or extent of such facilities is not thereby changed or increased. While "maintenance" includes painting and decorating and is covered under the law, it does not include work such as routine landscape maintenance or janitorial services.

In order to provide guidance to the Township of Lower on implementing the law, the following have been identified in the law:

1. All named contractors in a bid proposal (including out-of-state contractors) must be registered with the Department of Labor's Division of Wage and Hour Compliance at the time proposals are **received** by the public entity.
2. The law requires contractors to submit certificates after a bid proposal is received and prior to awarding the contract. (N.J.S.A. 34:11-56.55)
3. After bid proposals are received, and prior to contract award, the contractor most likely to receive the contract award must submit to the public entity copies of certifications of all listed subcontractors.
4. The Township of Lower must review the certificates to be sure they were in effect at the time the bid proposals were received.
5. Non-listed subcontractors do not have to be registered until they physically start the public work assigned to them.

6. Bid proposal documents need to inform those submitting proposals of these requirements.

Name

Registration Number

Bidder: _____

Subcontractor: _____

Subcontractor: _____

Subcontractor: _____

Subcontractor: _____

BACKGROUND REFERENCES AND QUESTIONNAIRE

1. General Identification

Business Entity Name (the "Company") _____

D/B/A ("Doing Business As"), if any _____

Street Address _____

City/State/Zip _____

Phone No. _____ Fax No. _____

Email: _____

2. Business Organization and History

Type of Business Entity: _____

List the Partners and Officers Below:

Partner / Officer Name	% of Ownership

Date the Company was formed or incorporated _____

State in which the Company was formed or incorporated _____

How many years' experience has the Company had regarding the proposed work in the contract? _____

Has the Company failed to complete any work within the last five years? If so, please list the project, the location and an explanation.

Has the Company or any of its AFFILIATE FIRMS ever been the subject of any of the following actions by any government agency (Note: Matters under appeal must be disclosed.):

- a) been suspended, debarred, disqualified, declared non-responsible, or had its prequalification revoked?

☐ No
☐ Yes

- b) been prevented, or barred, or agreed to a voluntary exclusion, from bidding/contracting for any integrity related reason?

☐ No
☐ Yes

- c) been denied a contract despite being the low bidder for any integrity related reason?

☐ No
☐ Yes

- d) had a contract terminated for "cause"?

☐ No
☐ Yes

List the projects your company has completed in the last three (3) years:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____

8. _____

9. _____

10. _____

**Attach additional sheets if necessary.*

3. References

Please list the names, addresses and telephone numbers of references for the projects listed above:

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

**Attach additional sheets if necessary.*

**AFFIRMATIVE ACTION CERTIFICATION
(CONSTRUCTION CONTRACTS)**

- A. This contract is subject to and all bidders are required to comply with the requirements of N.J.S.A. 10:5-31 et seq. and N.J.A.C. 17:27 : Affirmative Action Regulations.
- B. For any violations of this law in addition to all other penalties allowable by law, the violator shall be subject to a fine up to \$1,000.00 for each violation for each day during which the violation continue, as delineated in N.J.A.C. 17:27-10.6, with said fine to be collected in a summary manner pursuant to the "Penalty Enforcement Law of 1999" (N.J.S.A 2A:58-10 et seq.) (P.L. 1975, C127, Para. 5b) (N.J.A.C. 17:27).
- C. ALL CONTRACTORS
1. All contractors shall complete and submit the Initial Project Workforce Report Form AA-201 and AA-202 (https://www.nj.gov/treasury/contract_compliance/) upon notification of award. Proper completion and submission of this report shall constitute evidence of the contractor's compliance with the regulations.
 2. Failure to submit this form may result in the contract being terminated.
 3. The contractor also agrees to submit a copy of the Monthly Project Workforce Report Form AA-202, once a month thereafter for the duration of the contract to the Division of Contract Compliance and to the Public Agency Compliance Officer.

The undersigned contractor certifies that he/she is aware of the commitment to comply with the requirements of N.J.S.A. 10:5-31 et seq. and N.J.A.C. 17:27 and agrees to furnish the required documentation pursuant to the Law.

COMPANY: _____

SIGNATURE: _____

TITLE: _____

NOTE: A contractor's bid must be rejected as non-responsive if a contractor fails to comply with the requirements of N.J.S.A. 10:5-31 et seq. and N.J.A.C. 17:27.

**CERTIFICATION OF NON-DEBARMENT
FOR FEDERAL GOVERNMENT CONTRACTS**

N.J.S.A. 52:32-44.1 (P.L. 2019, c.406)

This certification shall be completed, certified to, and submitted to the contracting unit prior to contract award, except for emergency contracts where submission is required prior to payment.

PART I: VENDOR INFORMATION	
Individual or Organization Name	
Address of Individual or Organization	
DUNS Code (if applicable)	
CAGE Code (if applicable)	
Check the box that represents the type of business organization:	

☐ Sole Proprietorship (skip Parts III and IV) ☐ Non-Profit Corporation (skip Parts III and IV)

☐ For-Profit Corporation (any type) ☐ Limited Liability Company (LLC) ☐ Partnership

☐ Limited Partnership ☐ Limited Liability Partnership (LLP)

☐ Other (be specific): _____

PART II – CERTIFICATION OF NON-DEBARMENT: Individual or Organization			
I hereby certify that the individual or organization listed above in Part I is not debarred by the federal government from contracting with a federal agency. I further acknowledge: that I am authorized to execute this certification on behalf of the above-named organization; that the Township of Lower is relying on the information contained herein and that I am under a continuing obligation from the date of this certification through the date of contract award by Township of Lower to notify the Township of Lower in writing of any changes to the information contained herein; that I am aware that it is a criminal offense to make a false statement or misrepresentation in this certification, and if I do so, I am subject to criminal prosecution under the law and that it will constitute a material breach of my agreement(s) with the Township of Lower, permitting the Township of Lower to declare any contract(s) resulting from this certification void and unenforceable.			
Full Name (Print):		Title:	
Signature:		Date:	

PART III – CERTIFICATION OF NON-DEBARMENT: Individual or Entity Owning Greater than 50 Percent of Organization

Section A (Check the Box that applies)

☐	Below is the name and address of the stockholder in the corporation who owns more than 50 percent of its voting stock, or of the partner in the partnership who owns more than 50 percent interest therein, or of the member of the limited liability company owning more than 50 percent interest therein, as the case may be.
Name of Individual or Organization	
Home Address (for Individual) or Business Address	

OR

☐	No one stockholder in the corporation owns more than 50 percent of its voting stock, or no partner in the partnership owns more than 50 percent interest therein, or no member in the limited liability company owns more than 50 percent interest therein, as the case may be.

Section B (Skip if no Business entity is listed in Section A above)

☐	Below is the name and address of the stockholder in the corporation who owns more than 50 percent of the voting stock of the organization's parent entity, or of the partner in the partnership who owns more than 50 percent interest in the organization's parent entity, or of the member of the limited liability company owning more than 50 percent interest in organization's parent entity, as the case may be.
Stockholder/Partner/Member Owning Greater Than 50 Percent of Parent Entity	
Home Address (for Individual) or Business Address	

OR

☐	No one stockholder in the parent entity corporation owns more than 50 percent of its voting stock, no partner in the parent entity partnership owns more than 50 percent interest therein, or no member in the parent entity limited liability company owns more than 50 percent interest therein, as the case may be.

Section C – Part III Certification			
I hereby certify that no individual or organization that is debarred by the federal government from contracting with a federal agency owns greater than 50 percent of the Organization listed above in Part I or, if applicable, owns greater than 50 percent of a parent entity of <name of organization>. I further acknowledge: that I am authorized to execute this certification on behalf of the above-named organization; that the Township of Lower is relying on the information contained herein and that I am under a continuing obligation from the date of this certification through the date of contract award with the Township of Lower to notify the Township of Lower in writing of any changes to the information contained herein; that I am aware that it is a criminal offense to make a false statement or misrepresentation in this certification, and if I do so, I am subject to criminal prosecution under the law and that it will constitute a material breach of my agreement(s) with the Township of Lower, permitting the Township of Lower to declare any contract(s) resulting from this certification void and unenforceable.			
Full Name (Print):		Title:	
Signature:		Date:	

Part IV – CERTIFICATION OF NON-DEBARMENT: Contractor – Controlled Entities	
Section A	
☐	Below is the name and address of the corporation(s) in which the Organization listed in Part I owns more than 50 percent of voting stock, or of the partnership(s) in which the Organization listed in Part I owns more than 50 percent interest therein, or of the limited liability company or companies in which the Organization listed above in Part I owns more than 50 percent interest therein, as the case may be.
Name of Business Entity	Business Address
Add additional sheets if necessary	
OR	
☐	The Organization listed above in Part I does not own greater than 50 percent of the voting stock in any corporation and does not own greater than 50 percent interest in any partnership or any limited liability company.

Section B (skip if no business entities are listed in Section A of Part IV)			
☐		Below are the names and addresses of any entities in which an entity listed in Part III A owns greater than 50 percent of the voting stock (corporation) or owns greater than 50 percent interest (partnership or limited liability company).	
Name of Business Entity Controlled by Entity Listed in Section A of Part IV		Business Address	
Add additional Sheets if necessary			
OR			
☐		No entity listed in Part III A owns greater than 50 percent of the voting stock in any corporation or owns greater than 50 percent interest in any partnership or limited liability company.	
Section C – Part IV Certification			
I hereby certify that the Organization listed above in Part I does not own greater than 50 percent of any entity that that is debarred by the federal government from contracting with a federal agency and, if applicable, does not own greater than 50 percent of any entity that in turns owns greater than 50 percent of any entity debarred by the federal government from contracting with a federal agency. I further acknowledge: that I am authorized to execute this certification on behalf of the above-named organization; that the Township of Lower is relying on the information contained herein and that I am under a continuing obligation from the date of this certification through the date of contract award by the Township of Lower to notify the Township of Lower in writing of any changes to the information contained herein; that I am aware that it is a criminal offense to make a false statement or misrepresentation in this certification, and if I do so, I am subject to criminal prosecution under the law and that it will constitute a material breach of my agreement(s) with the Township of Lower, permitting the Township of Lower to declare any contract(s) resulting from this certification void and unenforceable.			
Full Name (Print):		Title:	
Signature:		Date:	

STATUS OF PRESENT CONTRACTS

The undersigned Bidder hereby certifies as follows:

The bidder currently has the following uncompleted contracts at the time of submission of this bid:

<u>Name of Contract and Contracting Entity</u>	<u>Amount of Contract</u>
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____
6. _____	_____

Please attach additional sheets if more space is needed.

Name of Bidder: _____

By: _____
(Signature)

Name of Above: _____
(Print)

Title: _____

Date: _____

BUSINESS REGISTRATION CERTIFICATION

In accordance with N.J.S.A. 52:32-44, Business Organizations are required to be registered with the New Jersey Department of Treasury, Division of Revenue.

Definitions relative to registration of certain businesses; registration requirements.

1. a. For the purposes of this section:

"Business organization" means an individual, partnership, association, joint stock company, trust, corporation, or other legal business entity or successor thereof;

"Business registration" means a business registration certificate issued by the Department of the Treasury or such other form or verification that a contractor or subcontractor is registered with the Department of the Treasury;

"Contractor" means a business organization that seeks to enter, or has entered into, a contract to provide goods or services or to construct a construction project with a contracting agency;

"Contracting agency" means the principal departments in the Executive Branch of the State Government, and any division, board, bureau, office, commission or other instrumentality within or created by such department, or any independent State authority, commission, instrumentality or agency, or any State college or university, any county college, or any local unit;

"Local unit" means any contracting unit as defined pursuant to section 2 of P.L.1971, c.198 (C.40A:11-2), any board of education as defined pursuant to N.J.S.18A:18A-2, a private firm that has entered into a contract with a public entity for the provision of water supply services pursuant to P.L.1995, c.101 (C.58:26-19 et al.), a private firm or public authority that has entered into a contract with a public entity for the provision of wastewater treatment service pursuant to P.L.1995, c.216 (C.58:27-19 et al.), and a duly incorporated nonprofit association that entered into a contract with the governing body of a city of the first class for the provision of wastewater treatment services pursuant to P.L.1995, c.216 (C.58:27-19 et al.);

"Subcontractor" means any business organization that is not a contractor that knowingly provides goods or performs services for a contractor or another subcontractor in the fulfillment of a contract issued by a contracting agency.

b. No contract shall be entered into by any contracting agency unless the contractor provides a copy of its business registration in accordance with the following schedule:

(1) In response to a request for bids or a request for proposals, at the time a bid or proposal is submitted; or

(2) For all other transactions, before the issuance of a purchase order or other contracting document. In its sole discretion, the contracting unit may waive this requirement if a business registration has been previously provided to the contracting agency.

c. A subcontractor shall provide a copy of its business registration to any contractor who shall forward it to the contracting agency. No contract with a subcontractor shall be entered into by any contractor under any contract with a contracting agency unless the subcontractor first provides proof of

valid business registration. The contracting agency shall file all business registrations received by the contracting agency with other procurement documents related to the contract.

d. A contract entered into by a contracting agency with a contractor shall include provisions under subsection b. of this section and this subsection for the contractor to comply with, and for the contractor to notify subcontractors by written notice to comply with subsection c. of this section. A contracting agency shall not be responsible for a contractor's failure to comply with this section. The contractor shall maintain and submit to the contracting agency a list of subcontractors and their addresses that may be updated from time to time during the course of the contract performance. A complete and accurate list shall be submitted before final payment is made for goods provided or services rendered or for construction of a construction project under the contract.

e. Notice of the provisions of this section shall be included by the contracting agency in any bid specification, requests for proposals, or other documents notifying potential contractors of opportunities to provide goods or perform services for a contracting agency.

f. Nothing in this section shall in any way alter the provisions or change the responsibilities or obligations of casino industry licensees as set forth in section 92 of P.L.1977, c.110 (C.5:12-92).

g. (1) A contractor or a contractor with a subcontractor that has entered into a contract with a contracting agency, and each of their affiliates, shall collect and remit to the Director of the Division of Taxation in the Department of the Treasury the use tax due pursuant to the "Sales and Use Tax Act," P.L.1966, c.30 (C.54:32B-1 et seq.) on all their sales of tangible personal property delivered into this State.

(2) A contracting agency entering into a contract with a contractor, or a contractor with a subcontractor, shall include in its contract to provide goods or perform services or to construct a construction project with that contractor, or a contractor with a subcontractor, for the term of the contract, a requirement that the contractor or subcontractor and each of their affiliates shall collect and remit to the Director of the Division of Taxation in the Department of the Treasury the use tax due pursuant to the "Sales and Use Tax Act," P.L.1966, c.30 (C.54:32B-1 et seq.) on all their sales of tangible personal property delivered into this State.

(3) For the purposes of this subsection, "affiliate" means any entity that (1) directly, indirectly, or constructively controls another entity, (2) is directly, indirectly, or constructively controlled by another entity, or (3) is subject to the control of a common entity. For purposes of this subsection an entity controls another entity if it owns, directly or individually, more than 50% of the Township of Lowership interest in that entity.

<u>Name</u>	<u>Not Registered</u>	<u>Registration Number</u>
1. Bidder: _____	_____	_____
2. Subcontractor: _____	_____	_____
3. Subcontractor: _____	_____	_____
4. Subcontractor: _____	_____	_____
5. Subcontractor: _____	_____	_____

Subscribed and sworn to
before me this day _____, 2_____

Signature

(Type or print name of affiant under signature)

Notary public of My Commission expires _____
(Seal)

Request for Taxpayer Identification Number and Certification

► Go to www.irs.gov/FormW9 for instructions and the latest information.

Give Form to the
requester. Do not
send to the IRS.

Print or type.
See Specific Instructions on page 3.

1	Name (as shown on your income tax return). Name is required on this line; do not leave this line blank.		
2	Business name/disregarded entity name, if different from above		
3	Check appropriate box for federal tax classification of the person whose name is entered on line 1. Check only one of the following seven boxes.		4
	☐ Individual/sole proprietor or single-member LLC ☐ Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=Partnership) ► _____ Note: Check the appropriate box in the line above for the tax classification of the single-member owner. Do not check LLC if the LLC is classified as a single-member LLC that is disregarded from the owner unless the owner of the LLC is another LLC that is not disregarded from the owner for U.S. federal tax purposes. Otherwise, a single-member LLC that is disregarded from the owner should check the appropriate box for the tax classification of its owner. ☐ Other (see instructions) ► _____		Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3): Exempt payee code (if any) _____ Exemption from FATCA reporting code (if any) _____ <i>(Applies to accounts maintained outside the U.S.)</i>
5	Address (number, street, and apt. or suite no.) See instructions.		Requester's name and address (optional)
6	City, state, and ZIP code		
7	List account number(s) here (optional)		

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the instructions for Part I, later. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN*, later.

Note: If the account is in more than one name, see the instructions for line 1. Also see *What Name and Number To Give the Requester* for guidelines on whose number to enter.

Social security number									
				-			-		
or									
Employer identification number									
				-					

Part II Certification

Under penalties of perjury, I certify that:

- The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and
- I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and
- I am a U.S. citizen or other U.S. person (defined below); and
- The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions for Part II, later.

Sign Here

Signature of
U.S. person ►

Date ►

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. For the latest information about developments related to Form W-9 and its instructions, such as legislation enacted after they were published, go to www.irs.gov/FormW9.

Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amount reportable on an information return. Examples of information returns include, but are not limited to, the following.

- Form 1099-INT (interest earned or paid)

- Form 1099-DIV (dividends, including those from stocks or mutual funds)
- Form 1099-MISC (various types of income, prizes, awards, or gross proceeds)
- Form 1099-B (stock or mutual fund sales and certain other transactions by brokers)
- Form 1099-S (proceeds from real estate transactions)
- Form 1099-K (merchant card and third party network transactions)
- Form 1098 (home mortgage interest), 1098-E (student loan interest), 1098-T (tuition)
- Form 1099-C (canceled debt)
- Form 1099-A (acquisition or abandonment of secured property)

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.

If you do not return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See *What is backup withholding*, later.

BID FORM

The UNDERSIGNED, as bidder, declares that the only persons or parties interested in this proposal as principals are named herein; that this proposal is in all respects fair and without collusion or fraud; that no officer or employee of the Owner is directly or indirectly interested in this bid or the work of this contract or in any portions of the profits thereof; that he/she has carefully examined the annexed proposed Bid Documents and Instructions to Bidders, the Notice to Bidders, the Special Provisions, and the General Requirements; that he/she or his/her representative has made a personal inspection of the site of the proposed work; and that he/she proposes and agrees that if this proposal is accepted, he/she will contract with the **Township of Lower**, in the form of contract hereto annexed, and to provide the necessary machinery, tools, apparatus, and other means of construction, and to furnish all the materials, equipment and labor specified in the contract in the manner and time therein specified, and according to the requirements of the Engineer as therein specified, and according to the requirements of the Engineer as therein set forth, and that he will take in full payment therefore the following prices:

Contract Completion Time: **360 Calendar Days**

LOWER TOWNSHIP PUBLIC WORKS BUILDING REPLACEMENT

Item	Quantity	Units	Description	Unit Price	Amount
1	LUMP SUM	LUMP SUM	EXISTING CONDITIONS (DIVISION 2): PRICE INCLUDES ALL WORK INCLUDED IN SECTION 024116, AND AS DETAILED IN THE CONSTRUCTION DOCUMENTS.	\$ _____	\$ _____
2	LUMP SUM	LUMP SUM	CONCRETE (DIVISION 3): PRICE INCLUDES ALL WORK INCLUDED IN SECTION 031000, 032000, 033000, AND AS DETAILED IN THE CONSTRUCTION DOCUMENTS.	\$ _____	\$ _____
3	LUMP SUM	LUMP SUM	MASONRY (DIVISION 4): PRICE INCLUDES ALL WORK INCLUDED IN SECTION 040110, 042200, 047200, AND AS DETAILED IN THE CONSTRUCTION DOCUMENTS.	\$ _____	\$ _____
4	LUMP SUM	LUMP SUM	METALS (DIVISION 5): PRICE INCLUDES ALL WORK INCLUDED IN SECTION 051200, 055000, AND AS DETAILED IN THE CONSTRUCTION DOCUMENTS.	\$ _____	\$ _____
5	LUMP SUM	LUMP SUM	WOOD, PLASTICS, AND COMPOSITES (DIVISION 6): PRICE INCLUDES ALL WORK INCLUDED IN SECTIONS 061000, 061600, 061753, 064116, 066400, AND AS DETAILED IN THE CONSTRUCTION DOCUMENTS.	\$ _____	\$ _____
6	LUMP SUM	LUMP SUM	THERMAL AND MOISTURE PROTECTION (DIVISION 7): PRICE INCLUDES ALL WORK INCLUDED IN SECTIONS 071900, 072100, 072119, 072715, 073113, 074293, 074646, 076200, 077100, 079200, AND AS DETAILED IN THE CONSTRUCTION DOCUMENTS.	\$ _____	\$ _____
7	LUMP SUM	LUMP SUM	OPENINGS (DIVISION 8): PRICE INCLUDES ALL WORK INCLUDED IN SECTIONS 081113, 081416, 083613, 084113, 085113, 087100, 088000, AND AS DETAILED IN THE CONSTRUCTION DOCUMENTS.	\$ _____	\$ _____
8	LUMP SUM	LUMP SUM	FINISHES (DIVISION 9): PRICE INCLUDES ALL WORK INCLUDED IN SECTIONS 092216, 092900, 093013, 095113, 096513, 096519, 096813, 099114, 099124, AND AS DETAILED IN THE CONSTRUCTION DOCUMENTS.	\$ _____	\$ _____
9	LUMP SUM	LUMP SUM	SPECIALTIES (DIVISION 10, 11 AND 12): PRICE INCLUDES ALL WORK INCLUDED IN SECTIONS 101419, 101423.16, 102113.14, 102600, 102800, 104313, 104413, 104416, 105113, 122413, 123661.16, 124813, AND AS DETAILED IN THE CONSTRUCTION DOCUMENTS.	\$ _____	\$ _____
10	LUMP SUM	LUMP SUM	PLUMBING (DIVISION 22): PRICE INCLUDES ALL WORK INCLUDED IN SECTION 220000 AND AS DETAILED IN THE CONSTRUCTION DOCUMENTS.	\$ _____	\$ _____
11	LUMP SUM	LUMP SUM	HEATING, VENTILATION, AND AIR CONDITIONING (HVAC) (DIVISION 23): PRICE INCLUDES ALL WORK INCLUDED IN SECTION 230000 AND AS DETAILED IN THE CONSTRUCTION DOCUMENTS.	\$ _____	\$ _____

BIDDER

BIDDER'S SIGNATURE

LOWER TOWNSHIP PUBLIC WORKS BUILDING REPLACEMENT

Item	Quantity	Units	Description	Unit Price	Amount
12	LUMP SUM	LUMP SUM	ELECTRICAL (DIVISION 26 AND 27): PRICE INCLUDES ALL WORK INCLUDED IN SECTION 260000, 263600, 270528, AND AS DETAILED IN THE CONSTRUCTION DOCUMENTS.	\$ _____	\$ _____
13	LUMP SUM	LUMP SUM	EARTHWORK (DIVISION 31): PRICE INCLUDES ALL WORK INCLUDED IN SECTION 311000, 312000, 312319, 313116, 316219, AND AS DETAILED IN THE CONSTRUCTION DOCUMENTS.	\$ _____	\$ _____
14	\$50,000.00	ALLOWANCE	ALLOWANCE: UNFORESEEN CONDITIONS AND DEDICATED FOR ADDITIONAL CONSTRUCTION WORK REQUESTED BY THE OWNER.	\$75,000.00	\$75,000.00
15	LUMP SUM	LUMP SUM	SEPTIC SYSTEM	\$ _____	\$ _____
16	5	UNIT	PRECAST CONCRETE WHEEL STOP	\$ _____	\$ _____
17	30	L.F.	VINYL FENCE, 6' HIGH	\$ _____	\$ _____
18	9,500	S.Y.	HMA MILLING, VARIABLE DEPTH	\$ _____	\$ _____
19	1,200	TON	HOT MIX ASPHALT SURFACE COURSE, MIX 9.5M64, 2" THICK	\$ _____	\$ _____
20	1	UNIT	INLETS, TYPE "A"	\$ _____	\$ _____
21	1	UNIT	INLETS, TYPE "E"	\$ _____	\$ _____
22	425	L.F.	CHAIN LINK FENCE, 8' HIGH	\$ _____	\$ _____
23	100	L.F.	10" DUCTILE IRON CULVERT PIPE, CLASS 52	\$ _____	\$ _____
24	160	S.Y.	CONCRETE SIDEWALK, 4" THICK	\$ _____	\$ _____
25	270	L.F.	8" x 18" CONCRETE VERTICAL CURB	\$ _____	\$ _____
26	315	S.Y.	REINFORCED CONCRETE APRON, 9" THICK	\$ _____	\$ _____
27	40	S.Y.	REINFORCED CONCRETE PAD, 8" THICK	\$ _____	\$ _____
28	200	L.F.	BEAM GUIDE RAIL	\$ _____	\$ _____
29	60	L.F.	TRAFFIC MARKINGS LINES, THERMOPLASTIC - 24"	\$ _____	\$ _____
30	2,875	L.F.	TRAFFIC MARKINGS LINES, EPOXY RESIN - 4"	\$ _____	\$ _____
31	7	UNIT	TRAFFIC MARKINGS, THERMOPLASTIC ARROW PAVEMENT MARKING	\$ _____	\$ _____
32	3	UNIT	TRAFFIC MARKINGS, THERMOPLASTIC ADA PAVEMENT SYMBOL	\$ _____	\$ _____
33	6	UNIT	SIGNS	\$ _____	\$ _____
34	30	UNIT	BOLLARDS	\$ _____	\$ _____
35	340	S.Y.	TOPSOIL, SEEDING AND FERTILIZER, 5" THICK	\$ _____	\$ _____
36	1	UNIT	CONNECT TO EXISTING INLET	\$ _____	\$ _____
37	1	UNIT	DETECTABLE WARNING SURFACES	\$ _____	\$ _____
38	1	UNIT	TRAFFIC MARKINGS, PAVEMENT WORD SYMBOL	\$ _____	\$ _____

BIDDER

BIDDER'S SIGNATURE

LOWER TOWNSHIP PUBLIC WORKS BUILDING REPLACEMENT

Item	Quantity	Units	Description	Unit Price	Amount
39	1,400	S.Y.	DENSE GRADED AGGREGATE BASE COURSE, 6" THICK	\$ _____	\$ _____
40	350	TON	HOT MIX ASPHALT BASE COURSE, MIX 19M64, 4" THICK	\$ _____	\$ _____
41	320	S.Y.	STONE MULCHING, 6" THICK	\$ _____	\$ _____
42	1	UNIT	WATER SERVICE, 2" COMPLETE	\$ _____	\$ _____
43	1	UNIT	WATER SERVICE, 3/4" COMPLETE	\$ _____	\$ _____

Total Amount Bid Based on Bid Estimated Quantities 1 to 43, Inclusive

\$ _____

Total Amount Bid Based on Bid Estimated Quantities 1 to 43, Inclusive (Written):

_____ DOLLARS

_____ BIDDER

_____ BIDDER'S SIGNATURE

_____ DATE

CONTRACT

THIS AGREEMENT, made this **DATE 2025** between **The Township of Lower, 2900 Bayshore Road, Villas, New Jersey 08251 (OWNER)** and (CONTRACTOR).

WITNESSETH, that CONTRACTOR, for and in consideration of the payment of **\$000, 000.00** money hereinafter mentioned, hereby covenants and agrees to with the OWNER the following:

1. That the CONTRACTOR shall and will provide and furnish all materials, equipment, tools and apparatus, and perform all of the work and labor required for the **Public Works Building Replacement, Township of Lower, Cape May County, New Jersey - D&A Project Number: LT-C-048.01** in strict accordance with and in all respect conforming to the Plans and Specifications prepared therefore by DeBlasio & Associates, P.C., 4701 New Jersey Avenue, Wildwood, New Jersey (ENGINEER), which Plans and Specifications are made part thereof to the same effect as though they were herein particularly set forth in detail.
2. The CONTRACTOR shall carry on the work with such force at such times and seasons as may be agreed to by the ENGINEER. The CONTRACTOR shall, unless otherwise directed as hereinafter provided, proceed promptly upon the signing of the Contract and approval of the surety bond and Contract as to form and execution by the Municipal Solicitor of the OWNER, to execute all work in every respect in a thorough and workmanlike manner and shall fully and entirely complete all the work embraced in this Contract within the contract completion time. It is, however, provided that additional time shall be allowed by way of extension of the period for the completion of such work equal to the total period for the completion of such work equal to the total period of delay caused by injunction or other legal proceeding, insofar as such proceedings and delays shall

necessarily prevent the CONTRACTOR from proceeding with such work, but no delay shall be allowed for unless such legal proceedings shall be diligently prosecuted by the said CONTRACTOR, and provided further that, in no case shall such delay be deemed to begin until the CONTRACTOR shall have given written notice to the OWNER of the injunction or other order and the papers which the same shall have been granted.

3. In the event the CONTRACTOR shall fail to complete the work within the Contractual Completion Time or in accordance with the terms and conditions of this Contract, the OWNER shall be entitled to liquidated damages as prescribed in the Contract Documents.
4. The OWNER may suspend the whole or any part of the work herein contained to be done, if it shall deem it for the best interest of the OWNER to do so, without compensation to the CONTRACTOR for such suspension, other than extending the time for completion of the work as much as it may have been delayed by such suspension. The only limitation to this provision shall be as limited by N.J.S.A. 40A:11-19 and 18A:18A-41 as may be applicable. The parties specifically agree that the inability to obtain permits and the like, or by changes ordered in the work, strikes, lockouts, fire, weather conditions, acts of God, and unusual delays by common carriers are contemplated by the parties in setting a completion date under the Contract as envisioned by N.J.S.A. 40A:11-19 and 18A:18A-41. During such suspension all materials delivered upon, but not placed in the work, shall be neatly piled by the CONTRACTOR so as not to obstruct public travel, or shall be removed from the line of the work at the direction of the OWNER, and unless the materials be moved by the CONTRACTOR, upon such direction, the materials shall be removed by the OWNER and expense thereof will be charged to the CONTRACTOR.

5. Neither an extension of time for any reason beyond the time fixed herein for the completion of the Contract, nor the delivery or acceptance of any articles or materials called for by the Contract, shall be deemed to be a waiver by the OWNER of the right to abrogate this Contract for abandonment or delay in the manner herein provided.
6. If the work to be done under this agreement shall be abandoned by the CONTRACTOR, or if at any time the ENGINEER employed by the OWNER shall be of the opinion and shall so certify in writing to the OWNER that the Contract is being unnecessarily and unreasonably delayed, or that the CONTRACTOR is willfully violating any of the conditions or covenants of this Contract or Specifications or is executing the same in bad faith, or not in accord with the terms hereof, or if the work is not fully completed within the time named in the Contract for its completion, the OWNER may notify the CONTRACTOR to discontinue all work, or any part thereof, under this Contract, by a written notice to be served upon the CONTRACTOR as above provided, and thereupon the CONTRACTOR shall discontinue said work, or such part thereof and the said OWNER shall thereupon have the power to contract for the completion of the Contract, or to place such and so many persons as it may deem advisable, by contract or otherwise, to work at and complete the work herein described or such part thereof, and to use such materials as said OWNER may find upon the line of work, and to procure such other materials for the completion of same, and to charge the expense of said labor and materials to the CONTRACTOR and the expense so charged shall be deducted and paid by the OWNER of the moneys as may be due, or any at any time thereafter to grow due to the CONTRACTOR under and by virtue of this Contract, or any part thereof; and in case such expense shall exceed the amount which would have been payable under the Contract, if the same had been completed by the CONTRACTOR, said CONTRACTOR, shall pay the amount of the excess to the OWNER; and in case such expense is less than said amount, said

CONTRACTOR shall forfeit all claim to the difference; and when any particular part of the work is being carried on by the OWNER by the Contract or otherwise, under the provisions of this clause of the Contract, the CONTRACTOR shall continue the remainder of the work in conformity with the terms of this Contract, and in such manner as to in no way hinder or interfere with the persons or workmen employed as above provided by the party of the first part by contract or otherwise to do any part of the work or to complete the same under the provisions of this article of the contract.

7. At all times during the performance of the work hereunder, the CONTRACTOR shall place proper guards upon and around the same for the prevention of accidents, and at night shall keep and maintain suitable and sufficient light reflective barricades and barrels, and shall save harmless the OWNER against and from all suits and actions of every name, kind and description, brought against it or them, and all costs and damages to which they may be put on account, or by reason of any injury to the person or property of another, resulting from negligence or carelessness in the performance of the work, or in guarding the same, or from any improper materials used in the prosecution of the work or by or on account of any act or omission of the CONTRACTOR or his agents.
8. In case any injury is done to property of the OWNER or others in the vicinity of the work, including adjoining lands, or to any sidewalks or curbs in consequence of its employees or agents in carrying out any of the provisions or requirements of this Contract, or caused by surface water runoff onto lands of others, the CONTRACTOR shall make such repairs or replacements as are necessary in consequence thereof at CONTRACTOR's own expense and to the satisfaction of the OWNER, or other landowners, and in case of failure on the part of the CONTRACTOR to promptly make such repairs or replacements, they may be made by the OWNER, and the expense thereof shall be deducted out of the money due

or to grow due to the CONTRACTOR under this Contract. CONTRACTOR shall indemnify and hold harmless the OWNER, its agents and employees from any and all claims of personal injury or property damage as provided in the "Indemnity & Hold Harmless Agreement" which is part of the Bid Documents, which is hereby incorporated by reference herein as if set forth in its entirety.

9. The CONTRACTOR shall be held responsible for any claim made against the OWNER for any infringements of patents, by use of patented articles in the construction and completion of the work, or any process connected with the work agreed to be performed under the said Contract or of any materials used upon said work and will save harmless and indemnify the OWNER and ENGINEER of all costs, expenses, and damages which the OWNER shall be obligated to pay by reason of any infringements of patents used in the construction and completion of the work.
10. If at any time during the period of two (2) years from the date of the acceptance of the whole work under this agreement as evidenced by the final certificate of the ENGINEERS, and the resolution duly passed by the OWNER accepting the whole of said work, any part or parts of the work may show any movement, deficiency or defect other than caused by ordinary wear and tear or ordinary action of the elements, the same shall be repaired and made whole and secure by the CONTRACTOR to the satisfaction of the OWNER, and in case the CONTRACTOR shall neglect or refuse to correct any such defect or make such repair within ten (10) days from the date of service of notice requiring the same to be done, served upon the CONTRACTOR, with the agent in charge of the work or by certified mail, or by serving the same upon the designated agent in this State, the OWNER shall have the right to purchase such materials as it shall deem necessary and to employ such persons as it may deem proper to undertake and complete said repairs and to charge to expense thereof to the CONTRACTOR and Surety, and the said

CONTRACTOR or the Surety shall pay out all such expense to which the OWNER may be part by reason of the neglect or refusal of said CONTRACTOR or Surety to make such repairs.

11. Just previous to the expiration of the respective guarantee periods, the entire work shall be inspected by the OWNER or its representative, and if any defect or movement is found or any repairs are needed beyond those naturally resultant from wear and tear or the action of the elements a notice shall be issued requiring such defects to be corrected and such repairs to be made in conformity with this agreement and said CONTRACTOR and the Surety shall not be relieved from their bond until the required work has been satisfactorily done, or until the OWNER shall have been reimbursed for the total expense of any and all repairs which have been made by the OWNER because of the neglect or refusal of said CONTRACTOR or Surety to comply with the notices issued as herein provided, during said guarantee period.
12. It is further agreed by and between the OWNER and CONTRACTOR hereto that all requirements and terms set forth in the Contract Documents, defined in Attachment "A" for each of the various divisions of the work applying shall be and form an integral part of this Contract and be made part hereof as though the same were herein fully set forth. To prevent all disputes and litigations the ENGINEER shall determine all questions in relation to the work and materials and construction hereof, and in all cases decide every question which may arise relative to the execution and performance of this Contract on the part of the CONTRACTOR and the said ENGINEER's Estimate and decision shall be final and conclusive and such estimate and decision, in case any question shall arise, shall be a condition precedent to the right of the CONTRACTOR to receive any money under this Contract. Any doubt as to the meaning of the Specifications, or any obscurity as to the wording of them will be explained by the ENGINEER, and all

directions and explanations requisite or necessary to complete, explain or make more definite any of the provisions of the Specifications and give them due effect, will be given by the ENGINEER.

13. The CONTRACTOR agrees to obtain and pay for all necessary permits as indicated in the Contract documents and conform to and abide by all rules and regulations of the OWNER, all rules, regulations and ordinances of the OWNER in which the work is being carried on, and all statutes of the State of New Jersey, all rules, regulations and directive orders and laws of the Federal Government or any branch or Bureau thereof, particularly those pertaining to the maximum hours and the minimum and maximum wages of workmen employed in the performance of this Contract and as provided in R.S. 34:10-1 et. seq.
14. In the event that during the progress of the work under the Contract, any materials to be used or being used by the CONTRACTOR in the work are deemed unsuitable, improper or not in conformity with the Specifications and this Contract, the ENGINEER of the OWNER may enter upon the said work and prohibit the further progress of the work or the use of said faulty materials pending the final decision of the ENGINEER, and if the ENGINEER shall condemn said materials or any part thereof, the same shall at once be removed from said construction and materials approved by the ENGINEER substituted in lieu and place thereof.
15. No claim shall be submitted by the CONTRACTOR for extra work performed or materials furnished hereunder by the CONTRACTOR to the OWNER of by the ENGINEER certified for payment, unless there shall have been executed and delivered an agreement in writing therefore between the parties hereto prior to the performance of said extra work or furnishings of said extra material, providing for the payment of the cost thereof by the OWNER.

16. (a) This Contract may be cancelled or terminated by the OWNER, and all money due or to become due hereunder may be forfeited, for a second or any subsequent violation of the terms and conditions of this section of the Contract, in pursuance of Chapter 171 of the Laws of 1945 of the State of New Jersey.

17. It is further agreed between the parties hereto that only domestic materials produced and manufactured in the United States of America shall be used in the work.

IN WITNESS WHEREOF, the parties hereto have caused these presents to be sealed with their seals and executed by their duly authorized officers, the day and year first aforesaid.

OWNER: _____

ATTEST: _____

Clerk

CONTRACTOR: _____

ATTEST: _____

ATTACHMENT 'A' TO CONTRACT

- 1) The term "CONTRACT DOCUMENTS" means and includes the following:
 - A) Notice to Bidders
 - B) Instruction to Bidders
 - C) Proposal Section
 - D) General Requirements
 - E) Contract Form
 - F) Specifications prepared by DeBlasio & Associates, P.C.
 - G) Specifications prepared by OSK Design Partners
 - H) Specifications prepared by BD Engineering, LLC
 - I) Prevailing Wage Determinations
 - J) Drawings prepared by DeBlasio & Associates, P.C.
 - K) Drawings prepared by OSK Design Partners
 - L) Drawings prepared by BD Engineering, LLC
 - M) All Addenda.

Technical Specifications

Table of Contents

Township of Lower
Public Works Building Replacement
D&A File # LT-C-048

Description	Page Color	Section
Scope of Work	White	Scope of Work
Cape May County Department of Health Septic Permit #2489-M	White	n/a
Submittals	White	013000
As-Built Plans	White	017839
Chain Link Fence	White	028310
Cast in Place Concrete	White	033000
HMA Milling	White	312299
Trench Excavation, Back Fill and Compaction	White	312301
Dewatering	White	312319
Soil Erosion and Sediment Control	White	312500
Dense Grade Aggregate Base Course	White	321123
Hot Mix Asphalt (HMA) Courses	White	321216
Concrete Vertical Curb	White	321614
Concrete Sidewalks	White	321615
Stone Mulching	White	321626
Detectable Warning Surface	White	321640
Concrete Wheelstop	White	321713
Traffic Stripes and Markings	White	321723
Signs	White	321724
Water Distribution System	White	331112
Septic System	White	333200
Septic Pump System	White	333920
Ductile Iron Pipe	White	334101
Drainage Structures	White	334923

Topsoil, Fertilizer and Seeding	White	340101
Beam Guide Rail	White	347113
Vinyl Fence System	White	350103
Bollards	White	500300

** NJDOT Standard Specifications for Roadway and Bridge Construction, 2019 can be viewed at the Engineer's office or obtained from:*

<http://www.state.nj.us/transportation/eng/specs/index.shtml#StandardSpecifications>

SCOPE OF WORK

The proposed work for the project shall include, but is not limited to, the construction of a new public works building, a septic system, and various site improvements, including a concrete sidewalk, curb, parking areas, signage, striping, milling, paving, utility installation, and the restoration of disturbed areas, as specified herein and shown on the plans. The plans, entitled "**Public Works Building Replacement, Township of Lower, Cape May County, New Jersey,**" are appended hereto and are part of these specifications. Other miscellaneous items of work shall be included as shown on the plans and as directed by the Engineer.

The construction of a new public works building will necessitate the demolition of the former one-story building located at the center of the property. The demolition of this building and the surrounding site improvements will be completed by the Lower Township Department of Public Works (DPW) prior to the contractor starting construction on the proposed building. Furthermore, the existing office building attached to the Public Works Garage will be demolished by the Lower Township DPW once the proposed building is completed, a certificate of occupancy has been issued, and the office staff has relocated its operations to the new building. The area where the current office building exists will need to be paved by the contractor upon completion of the building demolition by Lower Township DPW. The demolition of the office building and the requirement to pave the area it occupies shall not preclude the contractor from paving the remainder of the site upon completion of the proposed public works building and various other site improvements. The paving of the rest of the site must be completed to facilitate the Lower Township DPW's relocation to the proposed building. The contractor is hereby made aware that multiple paving mobilizations might be required, and no separate payment shall be made for mobilization of equipment. Payment for this item shall be included in various items in the bid form.

The contractor should be aware that the site serves as the designated Lower Township recycling facility. The Township plans to have the site open to the public throughout the construction of the proposed public works building. The proposed site work is being completed to eliminate public entry via the southern entrance and redirect the public to enter the facility through the northern entrance. There are many site elements that need to be completed to allow for the public to safely enter the site through the northern entrance. All site work relevant to this part of the project, including but not limited to paving, striping, regrading, signage, and fencing, must be completed before the Northern entrance can be opened to the public and the Southern Entrance is eliminated. To ensure all these items are completed prior to eliminating the southern entrance, Lower Township will close the site to public access for a period of 21 contract days to provide the contractor with sufficient time to complete the necessary site work. The contractor shall coordinate with the Engineer and the Township to select a suitable time within the contract period to perform this work.

The contractor shall install a 6-ft-high temporary construction fence around the perimeter of the building to protect and shield the public and the Lower Township DPW staff from the construction project. The temporary fencing shall remain in place from the start of construction through the duration of the contract. The fence shall be stabilized on above-grade supports. No separate payment shall be made for this work. Payment shall be included in various items in the bid form.

The Scope of Work outlines the general items and distribution of work and shall not be construed as all-inclusive.

Subject to change by the Township, the timeline for this project is as follows:

October 29, 2025	Advertise Project for Public Bidding
November 1, 2025	Bid Opening @ 10:00 am
December 1, 2025	Lower Township May Award the Contract to the Apparent Low Bidder Contingent upon Approval.
December 15, 2025	Contracts Completed and Executed; Pre-Construction Meeting; Demolition by Township; Permitting
January 5, 2025	Notice to Proceed
December 30, 2026	Construction Complete

The project bid documents were completed by the following professionals and consist of the following items:

- a) Plans prepared by DeBlasio & Associates, P.C. entitled **Lower Township Public Works Building Replacement** dated 10/29/2025 signed and sealed by Marc DeBlasio, PE.
- b) Specifications prepared by DeBlasio & Associates, P.C. entitled **Lower Township Public Works Building Replacement** dated 10/2025 signed and sealed by Marc DeBlasio, PE.
- c) Plans prepared by OSK Design Partners, PC entitled **Lower Township Public Works Building Replacement** dated 10/28/2025 signed and sealed by Jerry Blackman, AIA.
- d) Specifications prepared by prepared by OSK Design Partners, PC entitled **Lower Township Public Works Building Replacement** dated 10/28/2025 signed and sealed by Jerry Blackman, AIA.
- e) Plans prepared by BD Engineering entitled **Lower Township Public Works Building Replacement** dated 10/29/2025 signed by Brian D. Tannenhaus, PE.
- f) Specifications prepared by BD Engineering entitled **Lower Township Public Works Building Replacement** dated 10/29/2025 signed by Brian D. Tannenhaus, PE.

The Township of Lower is proceeding with this work in strict compliance with the Cape May County Department of Health Septic Permit #2489-M. The plans and specifications conform to the regulations set forth, and the Permit is made part of this Contract and the contractor shall be fully familiar with the permit requirements.

At the end of each day's work, store all of tools, equipment, and materials and clean debris from the job. Upon completing the job, immediately remove all tools, equipment, and any surplus materials and all debris caused by this work.

The Contractor shall be responsible for conducting a site inspection to determine the exact nature and extent of work.

All bidders shall visit the site prior to bidding and ascertain for themselves the existing conditions, determine the difficulties which will be encountered for a complete job, and include all costs within the various related bid items outlined in this Proposal.

The General Contractor shall provide, coordinate, and direct all required subcontracting services necessary to provide a turnkey construction project.

The General Contractor shall limit the onsite storage of construction materials and equipment to as minimal as possible to prevent any disruption or accessibility to the surrounding operations.

Submittals – The contractor shall submit all product submittals prior to construction of any work related to the submittals. All product submittals shall be provided by the contractor no later than 30 days after the contract award (NO EXCEPTIONS). To aid in expediting submittals the following will apply:

- a.) Should a delay occur due to rejections of incomplete shop drawing submittals, the Contractor is still bound to the project completion date.

The Contractor shall be responsible for the location and preservation of underground and surface utilities and structures, at or adjacent to the site of construction, and shall repair or replace anything that is damaged at no additional cost to the Owner.

Separate payment will not be made for dust control, soil erosion control methods, final cleaning, restoration and construction layout.

The Contractor shall obtain all utility mark outs, verify the locations of all utilities both horizontally and vertically prior to the start of construction and notify the engineer of any conflicts. The Contractor shall also be responsible for coordinating all utility relocation that may be necessary. There will be no separate payment for this work.

The Contractor is responsible for obtaining all construction permits related or necessary to complete the work of this Proposal. It is the Contractor's responsibility to ensure that all work complies with Federal, State and Local laws, ordinances, regulations, building codes, etc.

The Contractor shall verify all dimensions, elevations and existing conditions in the field prior to the start of construction. Any errors and/or discrepancies shall be brought to the attention of the Engineer immediately.

The Contractor shall be responsible for removing and disposing excess unwanted material from the project site in an approved manner. Should the Township of Lower want any excess material, the material shall be delivered to the Township's site at no additional charge.

The Contractor shall complete all work under the contract time frame set forth as outlined above and in the General Requirements. The Contractor shall ensure that adequate workmen and equipment are on site for this to be accomplished, also accounting for adverse weather conditions and the availability of the materials necessary to perform the work.

The Contractor is to obtain a Work and Storage Area acceptable to the Township of Lower. The Work and Storage Area shall be a suitable staging area for equipment and delivered materials. The cost of securing and monitoring the Work and Storage Area shall be included in the various items of work appearing on the Bid Form.

The Work consists of the following:

The Contractor is responsible and obligated to successfully complete the entire project and to complete each and every necessary detail of every item specified and/or shown on the Contract Drawings and in the Specifications regardless of whether or not a particular detail is specifically mentioned. Any detail of work called out on the Drawings but not called out in the Specifications, or any item of work or detail not called out on the Drawings, but called out in the Specifications, shall be considered the same as if it was called out in both the Specifications and the Drawings. The scope of work shall include the following:

- a. The Contractor is responsible for providing all Site, Structural and Architectural features and finishes including, but not limited to; demolition, interior walls, masonry, structural steel, miscellaneous steel, walls, floors, roof, finishes and ceiling systems as listed within the specifications and shown on the contract drawings and as required to complete the new work.
- b. The contractor shall provide all Mechanical, Plumbing, Electrical, and all Structural components and Systems.
 - 1) The furnishing and installation of all other appurtenances as shown on the drawings, unless noted otherwise.
 - 2) The furnishing of all materials specified herein required for a complete installation.
 - 3) All work shall be in accordance with accepted manufacturers and construction standards, applicable codes and directives of officials having jurisdiction over the project.
 - 4) All demolition materials, construction debris and scrap shall be disposed of in a legal manner and in accordance with all local, State and Federal or other agencies having jurisdiction unless noted otherwise for reuse or salvage.
 - 5) The Contractor shall include all materials and work for the completed project as detailed within the contract documents.
 - 6) The above Scope of Work outlines the general items and distribution of work and shall not be construed as being all-inclusive.
 - 7) The Contractor shall be responsible for applying for and obtaining any and all permits required to satisfactorily complete this construction project.
 - 8) Codes and Standards: The work as specified and performed for this project shall comply with all applicable New Construction Sections of the State of New Jersey, Building Code. Said work shall comply with the latest revision of the NEC, NESC, LSC, UL, IBC, NSPC, IMC, IFGC, NFPA, ASME, ANSI or other applicable codes.

Project will be constructed under a single prime general construction contract.

Coordination of Work:

- a. The Contractor is responsible for the overall coordination of the construction work of the project. At the beginning of the project the Contractor shall prepare a Construction Progress Schedule in a form acceptable to the Engineer and Owner, indicating the phasing of all Subcontractors' work and the work of his own forces. This submission is required on or before the Pre-construction Conference Meeting (No Exception).
- b. The Contractor is responsible for the distribution and delegation to his sub-contractors and suppliers of the construction funds provided within the contract. At the beginning of the project the Contractor shall prepare a complete detailed "Schedule of Values" in a form acceptable to the Engineer and owner. This submission is required on or before the Pre-construction Conference Meeting (No Exception).
- c. Construction progress meetings will be held as needed by the Engineer/Architect after the pre-construction meeting. The progress schedule shall then be reviewed at the project meetings with the Engineer, Architect, Township Personnel, the Contractors, and the

Subcontractors. At these meetings adjustments will be made to the schedule which are agreeable to all and deemed appropriate for the timely completion of the project.

- d. The Engineer will monitor the progress of the project and review the status of the completion of work at the regular project meetings. If one or more of the Subcontractors is delaying the progress of the project, it shall be the responsibility of the Contractor to take necessary action to bring that portion of the project back on schedule.

All costs related to project coordination shall be included by the Contractor. In addition, the Contractor shall be responsible to provide clear, safe, unobstructed access to the existing public works facilities. The Contractor shall provide the necessary material and labor to accommodate access. Cost for all materials and labor, including premium time if necessary, shall be included in the bid.

The above Scope of Work outlines the general items and distribution of work and shall not be construed as being all inclusive.

END OF SECTION

BOBBY BARR
Commissioner

KEVIN L. THOMAS, M.A.
Public Health Coordinator

ALOYSIUS ONWUKA, M.D.
Medical Director

CAPE MAY COUNTY DEPARTMENT of HEALTH

4 Moore Road
Cape May Court House, N.J. 08210-1601
(609) 465-1209 after hours (609) 465-1190
Fax: (609) 465-6564



SEPTIC PERMIT

PERMISSION HAS BEEN GIVEN TO:

THIS PERMIT IS VALID FOR TWO YEARS

Township Of Lower

4/14/2025-4/14/2027

771 Seashore Road
Cape May, NJ 08204

Account #: 2489-M

To construct a sewage disposal system as described in engineering data submitted and approved by this department in accordance with the provisions of N.J.A.C. 7:9A-1.1 et seq and/or the provisions of N.J.A.C. 7:10-12.1 et seq
To construct a water supply system as described in well data submitted and approved by this department in accordance with the provisions of N.J.A.C. 7:10 12.1 et seq

DESCRIPTION OF FACILITY

Commercial Building

787.50 Gallons Per Day

ADDRESS OF FACILITY

771 Seashore Road

Dwelling Type: COMMERCIAL

Well Permit #: Public Water

BLOCK	LOT
505	27, 28 & 14.01

BOARD OF HEALTH: LOWER TOWNSHIP

BY:

Heather Carr-Johnson, Chief Registered Environmental Health Specialist

THIS PERMIT MUST BE POSTED IN PLAIN VIEW

Prior to commencement of any work under this permit, the recipient herein, is responsible for obtaining all other applicable approvals which may include but not be limited to federal, state, or local permits.

BOBBY BARR
County Commissioner

KEVIN L. THOMAS
Public Health Coordinator

ALOYSIUS ONWUKA, M.D.
Medical Director

**CAPE MAY COUNTY
DEPARTMENT OF HEALTH**

4 Moore Road, Cape May Court House, N.J. 08210-1601
(609) 465-1209 after hours (609) 465-1190
Fax: (609) 465-6564



PERMIT ATTACHMENT

Review Date: 04/14/2025

Site Address: 771 Seashore Rd, Erma

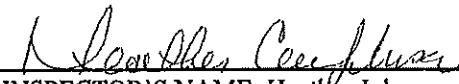
Owner: Township Of Lower
771 Seashore Road
Cape May, NJ 08204

Inspector: Heather Johnson

Program Element: 8503-Witness Soil Boring & Perc Test

Attached hereto is your Permit # 2489-M to construct a sewage disposal system as described in engineering data submitted on 01/21/2025.

- ☒ Copy of plans to be retained by you.
- ☒ Your engineer must submit a letter prior to the final inspection of the septic system that required fill meets level of infiltration elevation and that the fill will not cause a drainage problem to adjoining properties.
- ☒ Your engineer must submit a letter to certify K-4 soils prior to issuance of 'Certificate of Compliance'.
- ☒ The Construction Official has been notified so that your building permit can be issued.


INSPECTOR'S NAME: Heather Johnson

SUBMITTALS
SECTION 013000

013000.01 DESCRIPTION

The Contractor shall provide submittals and material cut sheets for all items proposed to be used in the contract. The Contractor shall provide submittals and product information either by traditional, paper copy means or electronic media (email, external drives, etc.).

013000.02 MATERIALS

Not applicable.

013000.03 CONSTRUCTION

PROCESS

Coordinate submittal preparation with performance of construction activities, and with purchasing or fabrication, delivery and related activities. Transmit in an expeditious manner and in advance of ordering materials to avoid delays. Allow two weeks for review. Allow more time if processing must be delayed for coordination with other submittals. The Engineer will advise the Contractor when a submittal must be delayed for coordination. Allow two weeks for reprocessing each submittal. No extension of time will be authorized because of failure to transmit submittals sufficiently in advance of the Work to Permit processing.

CONTRACTOR SCHEDULE

Submit a fully developed, bar-chart type construction schedule at the preconstruction meeting. Provide a separate bar for each construction activity and a vertical line to identify the first working day of each week. Coordinate the construction schedule with the list of subcontracts, submittal schedule, progress reports, payment requests and other schedules. Indicate completion in advance of the date established for substantial completion. Indicate substantial completion on the schedule to allow time for the Engineer's procedures necessary for certification of substantial completion. Revise each schedule after each meeting or activity, where revisions have been made. Issue the updated schedules concurrently with report of each meeting. The revised schedule must be approved by the engineer.

DAILY REPORTS

Prepare a daily construction report, recording information concerning events at the site. Submit duplicate copies to the Engineer at weekly intervals. Include the following information:

- List of subcontractors at the site.
- High and low temperatures, general weather conditions.
- Accidents, stoppages, delays, shortages, losses.
- Emergency procedures.
- Change orders received, implemented.
- Partial completions, occupancies.
- Substantial completions authorized.

SHOP DRAWINGS AND PRODUCT INFORMATION

Submit new information, drawn to accurate scale. Indicate deviations from contract documents. Do not reproduce contract documents or copy standard information as the basis of shop drawings. Include the following information:

Dimensions

Identification of products and materials included.
Notation of coordination requirements.
Notation of dimensions established by field measurement.

Collect product data into a single submittal for each element or system. Mark each copy to show applicable choices and options. Where product data includes information on several products, some of which are not required, mark copies to indicate the applicable information. Include the following information:

Manufacturer's printed recommendations.
Compliance with recognized trade association standards.
Compliance with recognized testing agency standards.
Application of testing agency labels and seals.
Notation of dimensions verified by field measurement.
Notation of coordination requirements.

Submit six (6) copies of each required submittal. The Engineer will retain four (4) copies and return the others marked with action taken and corrections or modifications required.

SAMPLES

Submit full-size samples cured and finished as specified and identical to the product proposed. Mount, display or package samples to facilitate review. Prepare samples to match the Engineer's sample. Include the following:

Generic description
Compliance with recognized standards
Source
Availability and delivery time
Product name or name of manufacturer

Submit samples for review of kind, color, pattern and texture for a final check of these characteristics and a comparison of these characteristics between the final submittal and the component as delivered and installed. Where variations are inherent in the product, submit multiple units that show limits of the variations. Refer to other sections for samples that illustrate details of assembly, fabrication techniques, workmanship, connections, operation and similar characteristics. Refer to other sections for samples to be returned for incorporation in the work. Such samples must be undamaged at the time of use. On the transmittal indicate special requests regarding disposition of sample submittals.

ENGINEER'S ROLE

Except for submittals for record, information or similar purposes, where action and return are required, the Engineer will review each submittal, mark to indicate action taken and return. Compliance with specified characteristics is the contractor's responsibility. The Engineer will stamp each submittal with a self-explanatory stamp marked to indicate either approval, rejection, conditional approval and comments.

013000.04 MEASUREMENT AND PAYMENT

No separate payment shall be made for submittals and the cost incurred shall be included in the various items in the proposal for which the submittals are made.

END OF SECTION

AS-BUILT PLANS
SECTION 017839

017839.01 DESCRIPTION

The contractor shall provide a set of reproducible as-built plans prior to final payment. Final payment will not be made until such time the As-Built Plans have been submitted to and approved by the Engineer.

017839.02 MATERIALS

As-builts shall be a reproducible of the original contract plans including any additional sheets required. All deviations from the original contract plans shall be on the as-builts. The plans shall be legible, neat, and of a quality acceptable to the Engineer.

The Engineer shall provide a set of reproducibles at the beginning of the project.

017839.03 CONSTRUCTION

The contractor shall be responsible for keeping the as-built up-to-date as the project progresses.

This section is intended to provide a minimum level of acceptance. Any section with more stringent requirements shall have precedence over this section.

CONSTRUCTION

Actual installation with all items clearly identified shall be indicated. Location of installed items and any deviations from contract documents shall be so shown with boxes around the as-built numbers or labels.

017839.04 MEASUREMENT AND PAYMENT

No separate payment shall be made for work performed under this section and the cost incurred shall be included in the various items in the proposal for which the submittals are made.

END OF SECTION

CHAIN LINK FENCE AND GATES
SECTION 028310

028310.01 DESCRIPTION

Poly Vinyl Chloride (PVC) coated chain link fabric with galvanized steel framework and accessories for commercial or industrial applications.

REFERENCES

- A. ASTM A36 Standard Specification for Carbon Structural Steel
- B. ASTM A780 Standard Practice for Repair of Damaged and Uncoated Areas of Hot-dip Galvanized Coatings
- C. ASTM B221 Standard Specification for Aluminum and Aluminum Alloy Bars, Rods, Wire Profiles and Tubes
- D. ASTM F552 Standard Terminology Relating to Chain Link Fencing
- E. ASTM F567 Standard Practice for Installation of Chain Link Fence
- F. ASTM F626 Standard Specification for Fence Fittings
- G. ASTM F668 Standard Specification for Polyvinyl Chloride (PVC) and Other Organic Polymer-Coated Steel Chain Link Fence Fabric
- H. ASTM F900 Standard Specification for Industrial and Commercial Swing Gates
- I. ASTM F934 Standard Specification for Standard Colors for Polymer-Coated Chain Link Fence Materials
- J. ASTM F1043 Standard Specification for Strength and Protective Coatings on Steel Industrial Chain Link Fence Framework
- K. ASTM F1083 Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures
- L. ASTM F1184 Standard Specification for Industrial and Commercial Horizontal Slide Gates
- M. ASTM F1664 Standard Specification for Polyvinyl Chloride (PVC) and Other Conforming Organic Polymer-Coated Steel Tension Wire Used With Chain Link Fence
- N. ASTM F1665 Standard Specification for Polyvinyl Chloride (PVC) and Other Conforming Organic Polymer-Coated Steel Barbed Wire Used With Chain Link Fence
- O. WLG2445 Chain Link Fence Manufacturers Institute, Chain Link Fence Wind Load Guide for the Selection of Line Posts and Line Post Spacing

SUBMITTALS

- A. Changes in specifications may not be made after the bid date.
- B. Shop drawings: Layout of fences and gates with dimensions, details, and finishes of components, accessories, and post foundations.
- C. Product data: Manufacturer's catalog cuts indicating material compliance and specified options.
- D. Samples: If requested, samples of materials (e.g., fabric, wires, color, and accessories).

QUALITY ASSURANCE

- A. Manufacturer: Company having manufacturing facilities in the United States with 5 years experience specializing in manufacturing of chain link fence products.
- B. Fence contractor: Contractor having 5 years experience installing similar projects in accordance with ASTM F567.
- C. Tolerances: ASTM current specification and tolerances apply and supersede any conflicting tolerance.
- D. Substitutions: Alternate chain link products may be acceptable by the architect as equal if approved in writing ten days prior to bidding provided that the items submitted meet the specifications contained in this document.
- E. Single source: To ensure system integrity obtain the chain link system, framework, fabric, fittings, gates and accessories from a single source.

028310.02 MATERIALS

MANUFACTURER

Fence:

Approved Manufacturer: Master Halco, Inc.

One City Blvd., Suite 900

Orange, CA 92868

Phone (800) 229-5615 Fax (714) 385-0107

www.masterhalco.com, E-mail: spec@fenceonline.com

or approved equal.

CHAIN LINK FENCE FABRIC

- A. Poly Vinyl Chloride (PVC) color coated steel chain link fabric per ASTM F668 Class 2b (Fused and adhered to metallic coated steel wire)
- B. Size and height: Chain link fabric 1-3/4 in mesh, 9 gauge, 0.148in diameter steel core wire having a break load of 1290 lbf, height as shown on the plans

- C. Selvage of fabric knuckled at top and knuckled at bottom.
- D. Color of chain link fabric per ASTM F934 - Black. Color to be verified by owner prior to installation.

STEEL FENCE FRAMEWORK

- A. Steel pipe Type I: ASTM F1043 Group IA, ASTM F1083 standard weight schedule 40 hot-dip galvanized pipe having a zinc coating of 1.8 oz/ft² (550 g/m²) on the outside and 1.8 oz/ft² (550 g/m²) on the inside surface. Exterior of pipe to have F1043 PVC thermally fused color coating, minimum thickness 10 mils (0.254 mm). Color to be Black
Regular Grade: Minimum steel yield strength of 30,000 psi

For 8' fence -

1. Pipe End and Corner Post	3-1/2 OD; Schedule 40
2. Pipe Line Post	2-7/8 OD; Schedule 40
3. Pipe Rail and Braces,	1-5/8 in; Schedule 40

FITTINGS

- A. All fittings to be PVC thermally fused color coated having a minimum thickness of 6 mils (0.152 mm) per ASTM F626. PVC color to match fabric and framework. Moveable parts, nuts and bolts to be field coated with PVC liquid touch up after installation.
- B. Post caps: ASTM F626 galvanized pressed steel, malleable iron, or aluminum alloy weather tight closure cap for tubular posts. Provide one cap for each post. Provide line post loop tops to secure top rail.
- C. Rail ends: Galvanized pressed steel per ASTM F626, for connection of rails to post using a brace band.
- D. Top rail sleeves: 7" (178 mm) galvanized steel sleeve per ASTM F626.
- E. Wire ties: 9 gauge (0.148") (3.76 mm) galvanized steel wire for attachment of fabric to line posts and rails. Pre-formed hog ring ties to be 9 gauge (0.148") (3.76 mm) galvanized steel or aluminum for attachment of fabric to tension wire. Tie wire and hog rings PVC coated and in compliance with ASTM F626. Color to match fabric color.
- F. Brace and tension (stretcher bar) bands: ASTM F626 galvanized 12 gauge (0.105") (2.67mm) pressed steel by 3/4" (19mm) formed to a minimum 300 degree profile curvature for post attachment. Secure bands using minimum 5/16" (7.94 mm) galvanized carriage bolt and nut.
- G. Tension (stretcher) galvanized steel bars: One piece lengths equal to 2 inches (50 mm) less than full height of fabric with a minimum cross-section of 3/16" x 3/4" (4.76 mm x 19 mm) per ASTM F626. Provide tension (stretcher) bars where chain link fabric is secured to the terminal post.
- H. Truss rod assembly: Galvanized steel minimum 5/16" (7.9mm) diameter truss rod with pressed steel tightener, in accordance with ASTM F626

- I. Carriage bolts and nuts: Galvanized of commercial quality

TENSION WIRE

- A. Tension wire: Poly Vinyl Chloride (PVC) coated metallic coated steel tension wire per ASTM F 1664 7 gauge steel core wire, 0.177" PVC coating class and color to match chain link fabric

POST SETTING MATERIALS

- A. Concrete: N.J.D.O.T. Class "B" Concrete.

028310.03 CONSTRUCTION

SITE EXAMINATION

- A. Ensure property lines and legal boundaries of work are clearly established.
- B. Survey of fence location to be provided by contractor
- C. Verify areas to receive fencing are completed to final grade.

CHAIN LINK FRAMEWORK INSTALLATION

- A. Install chain link fence system in accordance with ASTM F567 and manufacturer's instructions.
- B. Locate terminal post at each fence termination and change in horizontal or vertical direction of 30° or more.
- C. Space line posts uniformly at a maximum of 10' (3048 mm) on center.
- D. Concrete set posts: Dig holes in firm, undisturbed or compacted soil. Holes shall have diameter 4 times greater than outside dimension of post, and depths approximately 6" (152 mm) deeper than post bottom. Excavate deeper as required for adequate support in soft and loose soils, and for posts with heavy lateral loads. Set post bottom 36" (914 mm) below surface when in firm, undisturbed soil. Place concrete around posts in a continuous pour. Trowel finish around post and slope to direct water away from posts.
- E. Check each post for vertical and top alignment, and maintain in position during placement and finishing operations.
- F. Bracing: Install horizontal brace and truss assembly at mid-height or above for fences 6' (1829 mm) and over at each fabric connection to the terminal post. The diagonal truss rod is installed at the point where the brace rail is attached to the terminal post and diagonally down to the bottom of the adjacent line post. Place the truss rod in tension by adjusting the turnbuckle.
- G. Tension wire: Install tension wires so that it will be located 4" (101.6 mm) up from bottom the fabric. If top rail is not specified, install the tension wire so that it will be located 4" (101.6 mm)

down from the top of the fabric. Stretch and Install tension wire before installing the chain link fabric and attach it to each post using wire ties.

- H. Top rail: Install in lengths of 21' (6.4 m). Connect ends with sleeves forming a rigid connection, allow for expansion and contraction.
- I. Center Rails: Install mid rails between line posts and attach to post using rail end or line rail clamps.
- J. Bottom Rails: Install bottom rails between posts and attach to post using rail end or line rail clamps.
- K. Touch up any nicks or scratches of PVC color coating with liquid PVC paint.

CHAIN LINK FABRIC INSTALLATION

- A. Fabric: Install fabric on security side, pull fabric taut; thread the tension bar through fabric and attach to terminal posts with tension bands spaced maximum of 15" (381 mm) on center and attach so that fabric remains in tension after pulling force is released. Install fabric so that it is 2" (50 mm) +/- 1" (25 mm) above finish grade.
- B. Secure fabric using wire ties to line posts at 15" (381 mm) on center and to rails and braces 24" (610 mm) on center, and to the tension wire using hog rings 24" (610 mm) on center. Tie wire shall be secured to the fabric by wrapping it two 360 degree turns around the chain link wire pickets. Cut off any excess wire and bend back so as not to protrude so as to avoid injury if a pedestrian may come in contact with the fence.

ELECTRICAL GROUNDING

- A. Grounding shall be installed by a licensed electrical contractor.

CLEAN UP

- A. The area of the fence line shall be left neat and free of any debris caused by the installation of the fence.

028310.04 MEASUREMENT AND PAYMENT

Payment will be measured by the actual quantities installed and accepted by the Engineer as follows:

<u>Pay Item</u>	<u>Pay Unit</u>
Chain Link Fence, 8' High	Linear Foot

Payment for "Chain Link Fence" shall include all labor, materials, foundations, fence posts, rails, truss rods, ties, equipment, gates, and all else necessary therefore and all other work in connection therewith and incidental thereto for a complete and functioning installation.

END OF SECTION

CAST-IN-PLACE CONCRETE
SECTION 033000

033000.01 DESCRIPTION

Related Documents

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

Summary

- A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mix design, placement procedures, and finishes.

Definitions

- A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume.

Submittals

- A. Product Data: For each type of manufactured material and product indicated.
- B. Design Mixes: For each concrete mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.
 - 1. Indicate amounts of mix water to be withheld for later addition at Project site.
- C. Steel Reinforcement Shop Drawings: Details of fabrication, bending, and placement, prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement." Include material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports of concrete reinforcement. Include special reinforcement required for openings through concrete structures.
- D. Construction, Expansion and Control Joint Shop Drawings: Indicate locations of all joints in concrete slabs.
- E. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork. Design and engineering of formwork are Contractor's responsibility.
 - 1. Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and installing and removing reshoring.
- F. Welding Certificates: Copies of certificates for welding procedures and personnel.

- G. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials:
- H. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:
 - 1. Cementitious materials and aggregates.
 - 2. Steel reinforcement and reinforcement accessories.
 - 3. Admixtures.
 - 4. Waterstops.
 - 5. Curing materials.
 - 6. Floor and slab treatments.
 - 7. Bonding agents.
 - 8. Vapor retarders.
 - 9. Joint-filler strips.

Quality Assurance

- A. Installer Qualifications: An experienced installer who has completed concrete Work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for formwork and shoring and reshoring installations that are similar to those indicated for this Project in material, design, and extent.
- C. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
 - 1. Manufacturer must be certified according to the National Ready Mixed Concrete Association's Certification of Ready Mixed Concrete Production Facilities.
- D. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.
 - 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.
- E. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.
- F. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code-Reinforcing Steel."

G. ACI Publications: Comply with the following, unless more stringent provisions are indicated:

1. ACI 301, "Specification for Structural Concrete."
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

Delivery, Storage, and Handling

A. Deliver, store, and handle steel reinforcement to prevent bending and damage.

033000.02 MATERIALS

Form-Facing Materials

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
1. Plywood, metal, or other approved panel materials.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.
- D. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
1. Furnish units that will leave no corrodible metal closer than 1 inch (25 mm) to the plane of the exposed concrete surface.

Steel Reinforcement

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
- B. Plain-Steel Welded Wire Fabric: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.

Reinforcement Accessories

- A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete or fiber-reinforced concrete of greater compressive strength than concrete.

- B. Joint Dowel Bars: Plain-steel bars, ASTM A 615/A 615M, Grade 60 (Grade 420). Cut bars true to length with ends square and free of burrs.

Concrete Materials

- A. Portland Cement: ASTM C 150, Type I or II.
- B. Normal-Weight Aggregate: ASTM C 33, uniformly graded, and as follows:
 - 1. Class: Severe weathering region, but not less than 3S.
 - 2. Nominal Maximum Aggregate Size: 3/4 inch (19 mm).
- C. Water: Potable and complying with ASTM C 94.

Admixtures

- A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material and to be compatible with other admixtures and cementitious materials. Do not use admixtures containing calcium chloride.
- B. Air-Entraining Admixture: ASTM C 260.
- C. Water-Reducing Admixture: ASTM C 494, Type A.
- D. High-Range Water-Reducing Admixture: ASTM C 494, Type F.
- E. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E.
- F. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.

Waterstops

- A. Flexible Rubber Waterstops: CE CRD-C 513, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.
 - 1. Profile: Ribbed with center bulb.
- B. Manufacturers: Subject to compliance with requirements, provide the following products or equal:
 - 1. Greenstreak
 - 2. Progress Unlimited, Inc.
 - 3. Williams Products, Inc.

Vapor Retarders

- A. Vapor Retarder: polyethylene sheet, not less than 6 mils (0.15 mm) thick.

Floor and Slab Treatments

- A. Slip-Resistive Aggregate Finish: Factory-graded, packaged, rustproof, non-glazing, abrasive aggregate of fused aluminum-oxide granules or crushed emery with emery aggregate containing not less than 50 percent aluminum oxide and not less than 25 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials.
- B. Penetrating Liquid Floor Treatment: Chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; colorless; that penetrates, hardens, and densifies concrete surfaces.
- C. Products: Subject to compliance with requirements, provide the following penetrating liquid floor treatment products or equal:
 - 1. Day-Chem Sure Hard; Dayton Superior Corporation
 - 2. Euco Diamond Hard; Euclid Chemical Co.
 - 3. Seal Hard; L&M Construction Chemicals, Inc.

Curing Materials

- D. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
- E. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound:
 - a. Klear-Kote Cure-Sealer-Hardener, 30 percent solids; Burke Group, LLC (The).
 - b. Polyseal WB; ChemMasters.
 - c. UV Safe Seal; Lambert Corporation.
 - d. Lumiseal WB Plus; L&M Construction Chemicals, Inc.

Related Materials

- F. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.
- G. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- H. Epoxy-Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class and grade to suit requirements, and as follows:
 - 1. Type II, non-load bearing, for bonding freshly mixed concrete to hardened concrete.
 - 2. Type I and II, non-load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
 - 3. Type IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

Repair Materials

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.
 - 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3 to 6 mm) or coarse sand as recommended by underlayment manufacturer.
 - 4. Compressive Strength: Not less than 4100 psi (29 MPa) at 28 days when tested according to ASTM C 109/C 109M.

Concrete Mixes

- A. Prepare design mixes for each type and strength of concrete determined by either laboratory trial mix or field test data bases, as follows:
 - 1. Proportion normal-weight concrete according to ACI 211.1 and ACI 301.
- B. Use a qualified independent testing agency for preparing and reporting proposed mix designs for the laboratory trial mix basis.
- C. Footings and Foundation Walls: Proportion normal-weight concrete mix as follows:
 - 1. Compressive Strength (28 Days): 4000 psi (27.6 MPa).
 - 2. Maximum Slump: 4 inches (100 mm).
- D. Slab-on-Grade: Proportion normal-weight concrete mix as follows:
 - 1. Compressive Strength (28 Days): 4000 psi (27.6 MPa).
 - 2. Maximum Slump: 4 inches (100 mm).
- E. Cementitious Materials: For concrete exposed to deicers, limit percentage, by weight, of cementitious materials other than portland cement according to ACI 301 requirements.
- F. Air Content: Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content of 5 percent +/- 1 percent, unless otherwise indicated.
- G. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
- H. Admixtures: Use admixtures according to manufacturer's written instructions.
 - 1. Use water-reducing admixture, 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.

Fabricating Reinforcement

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

Concrete Mixing

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94, and furnish batch ticket information.

033000.03 CONSTRUCTION

Formwork

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until concrete structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Construct forms tight enough to prevent loss of concrete mortar.
- D. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal.
 - 1. Do not use rust-stained steel form-facing material.
- E. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- F. Chamfer exterior corners and edges of permanently exposed concrete.
- G. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- H. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- I. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- J. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

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. Use Setting Drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 1. Install anchor bolts, accurately located, to elevations required.

Removing and Reusing Forms

- A. Leave formwork, for beam soffits, joists, slabs, and other structural elements, that supports weight of concrete in place until concrete has achieved the following:
 - 1. 28-day design compressive strength.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

Shores and Reshores

- A. Comply with ACI 318 (ACI 318M), ACI 301, and recommendations in ACI 347R for design, installation, and removal of shoring and reshoring.
- 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.

Vapor Retarders

- A. Vapor Retarder: Place, protect, and repair vapor-retarder sheets according to ASTM E 1643 and manufacturer's written instructions.

Steel Reinforcement

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
 - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials.

- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire fabric in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

Joints

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. 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. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
 - 2. Form from preformed galvanized steel, plastic keyway-section forms, or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
 - 3. Use a bonding agent or epoxy-bonding adhesive, as required, at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness, as follows:
 - 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch (3 mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groove 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- (3-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- D. Isolation Joints in Slabs-on-Grade: 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.
- E. Dowel Joints: Install dowel sleeves and dowels or dowel bar and support assemblies at joints where indicated.

1. Use dowel sleeves or lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.

Concrete Placement

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Before placing concrete, water may be added at Project site, subject to limitations of ACI 301.
- C. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation.
- D. Deposit concrete in forms in horizontal layers no deeper than 24 inches (600 mm) and in a manner to avoid inclined construction joints. Place each layer while preceding layer is still plastic, to avoid cold joints.
 1. Consolidate placed concrete with mechanical vibrating equipment. Use equipment and procedures for consolidating concrete recommended by ACI 309R.
 2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the vibrator. Place vibrators to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix 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. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 2. Maintain reinforcement in position on chairs during concrete placement.
 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 4. Slope surfaces uniformly to drains where required.
 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, free of humps or hollows, before excess moisture or bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- F. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 1. When air temperature has fallen to or is expected to fall below 40 deg F (4.4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.

2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mix designs.
- G. Hot-Weather Placement: Place concrete according to recommendations in ACI 305R and as follows, when hot-weather conditions exist:
1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to 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.

Finishing Formed Surfaces

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defective areas repaired and patched. Remove fins and other projections exceeding ACI 347R limits for class of surface specified.

Finishing Floors and Slabs

- A. General: Comply with recommendations in ACI 302.1R for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes.
1. Apply scratch finish to surfaces indicated and to surfaces to receive concrete floor topping or mortar setting beds for ceramic or quarry tile, portland cement terrazzo, and other bonded cementitious floor finishes.
- C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraighening until surface is left with a uniform, smooth, granular texture.
1. Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.
- D. Trowel Finish: After applying float finish, apply first trowel finish and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces indicated and to floor and slab 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
 2. Finish surfaces to the following tolerances, measured within 24 hours according to ASTM E 1155/E 1155M for a randomly trafficked floor surface:
 - a. Specified overall values of flatness, F(F) 35; and levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and levelness, F(L) 17; for slabs-on-grade.
- E. Trowel and Fine-Broom Finish: Apply a partial trowel finish, stopping after second troweling, to surfaces indicated and to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method. Immediately after second troweling, and when concrete is still plastic, slightly scarify surface with a fine broom.
- F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.
- G. Slip-Resistant Aggregate finish: Before final floating, apply slip-resistive aggregate finish where indicated and to concrete stair treads, platforms, and ramps. Apply according to manufacturer's written instructions and as follows:
1. Uniformly spread 25 pounds per 100 square feet of dampened slip-resistive aggregate over surface in one or two applications. Tamp aggregate flush with surface, but do not force below surface.
 2. After broadcasting and tamping, apply float finish.
 3. after curing, lightly work surface with a steel wire brush or an abrasive stone, and water to expose slip-resistive aggregate.

Miscellaneous Concrete Items

- A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete 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: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.
- D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on drawings. Screed, tamp, and trowel-finish concrete surfaces.

Concrete Protection and Curing

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with recommendations in ACI 305R for hot-weather protection during curing.
- B. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces, as follows:
 - 1. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a 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. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

Liquid Floor Treatments

- A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions. Penetrating liquid floor treatment shall be applied to all exposed interior concrete floor slabs.
 - 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 seven days old.
 - 3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.

Joint Filling

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
 - 1. Defer joint filling until concrete has aged at least six months. 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 joint clean and dry.
- C. Install semirigid epoxy joint filler full depth in saw-cut joints and at least 2 inches (50 mm) deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

Concrete Surface Repairs

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting portland cement to two and one-half parts fine aggregate passing of one part a No. 16 (1.2-mm) 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 (13 mm) in any dimension in solid concrete but not less than 1 inch (25 mm) in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. 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 will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 2. After concrete has cured at least 14 days, correct high areas by grinding.
 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
 5. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least 3/4 inch (19 mm) clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mix as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
 6. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

Field Quality Control

- A. Testing Agency: Engage a qualified testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement according to requirements specified in this Article. The scheduling and costs for all testing shall be the responsibility of the contractor.
- B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
 - 1. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. (76 cu. m) or fraction thereof of each concrete mix placed each day.
 - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mix, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 - 2. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
 - 3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
 - 4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
 - 5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of four standard cylinder specimens for each composite sample.
 - a. Cast and field cure one set of four standard cylinder specimens for each composite sample.
 - 6. Compressive-Strength Tests: ASTM C 39; test two laboratory-cured specimens at 7 days and two at 28 days.
 - a. Test two field-cured specimens at 7 days and two at 28 days.
 - b. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at age indicated.
- C. 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.

- D. Strength of each concrete mix 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 (3.4 MPa).
- E. Test results shall be reported in writing to Architect, 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 mix proportions and materials, compressive breaking strength, and type of break for both 7-and 28-day tests.
- F. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
- G. 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 Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Architect.

033000.04 MEASUREMENT AND PAYMENT

Payment will be measured by the actual quantities installed and accepted by the Engineer.

- a) All costs for furnishing and installing the structural slab for the Public Works Building shall be included in the lump sum price under the pay item "CONCRETE (DIVISION 3): PRICE INCLUDES ALL WORK INCLUDED IN SECTION 031000, 033000, AND AS DETAILED IN THE CONSTRUCTION DOCUMENTS."
- b) Payment for the reinforced concrete apron will be measured by the actual quantities installed and accepted by the Engineer as follows:

<u>Pay Item</u>	<u>Pay Unit</u>
Reinforced Concrete Apron, 9" Thick	Square Yard
Reinforced Concrete Pad, 8" Thick	Square Yard

Payment for this item shall include all labor, materials, forms, rebar, and all else necessary therefore and all other work in connection therewith and incidental thereto for a complete and functioning installation.

END OF SECTION

HMA MILLING
SECTION 312299

312299.01 DESCRIPTION

This section describes the requirements for the milling of the various asphalt roadway areas to the depth as specified and as shown on the plans.

312299.02 MATERIALS

Refer to Section 401.02.01 and 401.02.2 of the N.J.D.O.T Standard Specifications.

312299.03 CONSTRUCTION

Refer to Section 401.03.01A of the N.J.D.O.T. Standard Specifications.

312299.04 MEASUREMENT AND PAYMENT

Payment shall be measured by the actual quantities milled and accepted by the Engineer as follows:

<u>Pay Item</u>	<u>Pay Unit</u>
HMA Milling, Variable Depth	Square Yard

Payment for "HMA Milling, Variable Depth" shall include milling, removal and disposal of millings, removal and replacement of dislodged or delaminated underlying HMA below the specified milling depth, clearing and all other labor, material, equipment all else necessary therefore and all other work in connection therewith and incidental thereto.

END OF SECTION

TRENCH EXCAVATION, BACKFILL AND COMPACTION
SECTION 312301

312301.01 DESCRIPTION

Trench Excavation, Backfill and Compaction shall include trench excavation, backfilling for all utilities, and all appurtenances at the required locations, as shown on the plans and specifications for all materials of whatsoever nature encountered.

312301.02 MATERIALS

- A. The Contractor shall, at his expense, make such test pits and borings along the line and site of the work to satisfy himself regarding the character of the various strata of sub-surface materials and the amount of ground water that may be encountered in the course of construction and shall bid accordingly and the unit lump sum prices bid for the various pipes or structures requiring excavation shall include the difficulties to be encountered in excavation. Excavation shall include all materials excavated, encountered, including but not limited to rock, earth, shale, quicksand, gravel, sand, cinders, broken stone, concrete, paving, filled material, etc., and all miscellaneous excavation not herein specified and classified.

- B. Backfill material from on-site excavation:

All on-site backfill materials shall be subject to the approval of the Engineer, and to the following requirements.

1. Free from deleterious substances, stumps, brush, weeds, roots, sod, rubbish, garbage and matter that may decay.
2. Backfill to a height of two (2) feet above the top of the pipes, culverts and other structures with material free from stones or rock fragments larger than two inches (2") in greatest dimension, or as directed by Engineer.
3. Free of large rocks or lumps that, in the opinion of the Engineer, may create voids or prevent proper compaction.

- C. Stone for trench stabilization and bedding:

Trench stabilization material for bedding under pipes and structures shall be broken stone conforming to Section 901.03 of the N.J.D.O.T. Standard Specifications, and meeting the gradation specified in Table 901.03-1. Size shall be No. 57.

- D. Select backfill (if and where directed) for pipes shall be designated as I-13 and meet all the requirements of Section 901.11 of the N.J.D.O.T. Standard Specifications and meeting the gradation specified in Table 901.11-1.

312301.02.01 QUALITY ASSURANCE

In the course of backfilling trenches for utility installations, the Engineer may require "Field Density Determinations" or compaction tests. When compaction tests are called for, the Engineer will determine the location of the tests and the Owner shall engage a qualified testing firm to perform the test. Field density determinations shall be performed in accordance with AASHTO T191, T205, and T214, modified to include material sizes used in the laboratory determination of density with nuclear field density testing device or by other approved methods. The Engineer will observe tests and a copy of the test results and inspection report will be submitted by the testing firm directly to the Engineer. When the test results indicate that the density is less than the percent specified, the Contractor shall excavate and re-compact the areas that have failed at no expense to the Owner. Payment for failed compaction test shall be made by the Contractor by deducting the cost from the forthcoming retainage.

Minimum Compaction Limits	
Location	Density
Areas under roadway pavement surfaces, shoulders, sidewalks, and curb and gutter	95% of the maximum dry density by ASTM D 698 (Standard Proctor), AASHTO T-99.
Under turf, sodded, planted, or seeded non-traffic areas	90% of the maximum dry density by ASTM D 698 (Standard Proctor), AASHTO T-99.

312301.03 CONSTRUCTION

General Excavation - Excavation of all materials of whatsoever nature encountered shall be made to the lines and grades shown on the drawings, or as may be necessary to fully carry out the intent of the drawings, and of these specifications, where no grades are indicated or described. Surfaces of excavations in earth, exposed in the finished work, both level and sloped, shall be excavated in planes four inches lower than the finished surfaces, measured perpendicularly to the plans, and shall be brought up to the finished surfaces with 4" top soil as specified elsewhere. Finished surfaces shall be true to line and grade and shall be dressed to even planes. Unless otherwise shown or stated on the drawings, all exposed slopes excavated in earth shall be in accordance with OSHA regulations.

Slopes shall be kept true to line and grade during the progress of the work, and should any slope be scoured by storm water, or disturbed or should any excavation be scoured or disturbed before final payment is made, the Contractor shall promptly restore the slope or excavation so scoured, gullied or otherwise disturbed to line and grade before final payment is made. No additional compensation will be paid the Contractor by reason of the encountering of any unusual or unexpected subsoil conditions.

Where required, the Contractor shall provide sheathing and shoring to maintain the stability of side slopes or limit the width of excavation so not to disturb adjacent structures paving or utilities at no additional cost to the Owner.

Excavating Trenches, etc.

1. To insure uniformity of support and proper alignment of the pipe, the trench shall be excavated to a minimum depth of six (6) inches below the pipe. The Bedding shall be shaped so the bottom quadrant of the pipe rests on the bed. Bell holes and depressions as required of the joint shall be dug after the bedding has been graded and shaped, and shall be only of such length, depth and width as required for properly making the particular type of joint.

Contractor shall place bedding material over a flat trench foundation. The middle bedding equal to 1/3 of the outside diameter of the pipe shall be loosely placed uncompacted, the remaining trench bedding shall be compacted to 90% standard proctor density.

2. In excavating for all pipes, inlets and manholes, the trenches between the lines of sheathing, if sheathing is used, must be of sufficient width to permit the work to be constructed in the manner and of the size specified. All excavating shall be confined within the narrowest possible limit and made as nearly as possible in a vertical line, and any sheathing, shoring, bracing or timbering which is necessary to obtain this result shall be done as hereinafter specified. Sloped banks will not be permitted except where permitted by the Engineer.

The maximum width of trench at top of pipe measured to undisturbed earth shall be:

<u>I.D. of Pipe</u>	<u>Width</u>
6"	1'-2"
8"	2'-3"
12"	2'-7"
15"	2'-9"
18"	3'-0"
21"	3'-3"
24"	3'-6"
30"	4'-0"
36"	4'-6"
42"	5'-6"
48"	6'-0"

Should sloped banks be permitted, contractor shall, at no extra charge to Owner, provide temporary surface over width of disturbed area of street to provide for the unrestricted use of traffic immediately upon completion of backfill. Such temporary surfacing shall be stone, gravel or as required to permit traffic immediately.

All trenches shall be excavated on the lines designated by the Engineer and to the grades and depths necessary for the laying of pipes at the grades given by him. The lines and grades given by the Engineer shall, in general, consist of a benchmark for elevation control and a baseline and from this point on, contractor shall lay out his own work and build. Where, in the opinion of the Engineer, the original depth is sufficiently compact and solid for the foundation of the work, the bottom of the trench shall be excavated to conform to the external form of the pipe and under each bell or joint, unless the pipe is laid on a plank foundation, the trench shall be so hollowed out as to allow the body of the pipe to have a bearing throughout on the trench bottom and to provide ample room for the making of joint. In case a trench be excavated at any place below given grade excepting at pipe joints, it shall be refilled to the proper grades in the manner hereinafter specified. Unless otherwise specified, all excavation shall be performed by the open cut method.

Unauthorized Excavation - Special care shall be taken to prevent the movement of disturbances of earth under the foundation of the pipelines, manholes and other structures by providing adequate sheathing and bracing. Where the excavation is carried beyond or below the lines and grades given by the Engineer, or

wherever the Engineer shall determine that any material has been loosened or disturbed sufficiently to reduce its supporting power, remove all such loosened material and refill all such excavated space to grade with sand or loam thoroughly rammed, in such manner as may be directed by the Engineer in order to ensure the adequate support and stability of the pipeline and other structures.

All excavation and any other operation shall be confined to the width of the rights-of-way available.

Additional Excavation - If material satisfactory for foundations is not found at the elevation of grade, or in case it is found undesirable or necessary to excavate to additional depth, the excavation shall be carried to such additional depth as the Engineer may direct, and refill with broken stone conforming to Section 901.03.01 of the N.J.D.O.T. Standard Specifications meeting the gradation for No. 5 as specified in Table 901.03-1, by the Contractor at no extra cost to the Owner.

Tunnelling - No tunnelling will be allowed except by permit from the Engineer. When tunnelling, excavate the materials to cross sections as may be designated by the Engineer.

Amount of Trench to be Opened - The Engineer shall have the right to limit the amount of trench which shall be opened in advance of the completed pipeline and also the amount of trench left unfilled. Unless otherwise specified, not more than three hundred feet of trench shall be opened or partly opened at any one time in one operation. Adequate provisions shall be made for the use of cross walks and driveways. Provide and maintain all necessary barricades and lights.

Materials Excavated - The materials excavated shall be laid compactly on the side of the trench or excavation and kept trimmed as to be of as little inconvenience as possible to traveling public and to adjoining tenants. Where the streets are paved, the paving materials shall be kept separate from the other materials excavated. All streets shall be kept open for travel unless otherwise directed by the Engineer.

Removal of Excavated Materials - The Contractor shall not, without permission from the Engineer, remove from the line of the work any excavated materials. All excess excavation shall remain the property of the Owner and shall be disposed of at the location so designated by the Owner within the limits of the site at the Contractor's expense. However, if the Owner has no real need for this excess excavation, or if the material is unsuitable, it shall be the Contractor's responsibility to dispose of said material at no expense to the Owner. The disposal site shall be one approved by the NJDEP.

Shoring and Sheathing - All faces of excavation shall be properly sheathed, timbered and braced where necessary to furnish suitable dry and safe working conditions acceptable to the Engineer, to preserve the load carrying capacity of the soil, to keep the excavation within the narrowest possible limit to protect any structure or paving adjacent to or close to the trenches, or work of excavation from damages. Bracing shall be so arranged so as not to place any stress on portions of the completed work until the general construction thereof has proceeded far enough to provide the necessary strength as determined by the Engineer.

Any damage to the pipelines or structures occurring through settlement, water or earth pressure, slides, caves or other causes shall be repaired by the Contractor at no cost to the Owner.

The Contractor shall include in the unit prices bid for the various items the cost involved in the shoring, sheathing, bracing and timbering and the maintenance, etc. of the trenches and other excavation during construction. The Contractor shall be held responsible for the protection of all subsurface and above-ground utilities, adjacent structures, buildings, curbs, sidewalks and street pavement from any settlement, destruction, or damage and for the maintenance of same during construction and for any repair,

replacement or restoration of same without cost to the Owner, resulting from the installation of the water mains or other structures under this contract from the time of completion for a period of one year thereafter to the satisfaction of the Owner.

The Contractor shall be held responsible for the protection of the foregoing described adjacent structures and he alone shall decide upon the advisability of removing any of the sheathing, shoring, bracing or timbering. The Contractor shall, however, notify the Engineer of the removal of any of the sheathing, shoring, bracing or timbering, but such notification is not to be construed as relieving the Contractor of his obligation and responsibility to adequately safeguard said adjacent structure, nor shall it relieve the Contractor of the liability for claims for damage incidental thereto.

All sheathing and shoring left permanently in the excavation shall be cut out at a point 18" below the ground. There shall be no payment for sheathing or shoring left in place, but the cost of same shall be included in the unit price bid for the various sewer lines.

Removal of Water - Maintain and provide at all times during construction ample means and device which shall promptly remove and properly dispose of all water or sewage entering the excavation and structures, until all work to be built therein is completed.

Dispose of the water from the trenches and excavation in a suitable manner, without damage to adjacent property and in no case unless by special permission of the Engineer, shall water be allowed to run through the new pipes. Furnish all necessary machinery, power and labor to pump, bail or otherwise remove any water which may be found or shall accumulate in the trenches or other excavation and shall perform all work necessary to keep them clear of water while the work is under construction.

If the ground water and subsoil conditions along the line of the work are such that the Contractor cannot successfully handle the ditch water and provide a stable, hard trench bottom by ordinary trench pumping and bailing, the Contractor shall furnish and provide the necessary equipment, power and labor to employ the well point method of trench dewatering without additional compensation. All pipe, joint and concrete must be installed under absolutely dry conditions.

Backfilling: The backfilling of the trench will be filled by using properly compacted, common earth material. If sufficient earth cannot be obtained to completely fill the trenches, small pieces of rock may be used under the condition that the space between the walls of the trench and the outside of the pipe to a height one foot above the top of the pipe, be filled with loose, fine earth, free from stone and hand-tamped, and placed in separate layers of not more than one foot in depth and each layer covered with from six to ten inches of earth.

Should excavated material be clay that will not consolidate by ordinary methods of backfilling, it shall be removed from site and replaced with granular material capable of quick compaction.

During the backfill procedure, the soil compaction shall conform to not less than the following percentage of the maximum dry density:

1. Structures & Building Areas - 95%
2. Lawns & Unpaved Areas - 90%
3. Pavement, driveways & walkway area - 95%
4. Utility Trenches - 95%

Select Backfill - Should there be insufficient material (only if and where directed by the Engineer) to provide suitable material for backfilling and embankment, the Contractor, if and where directed by the Engineer, shall obtain such material elsewhere, transport it to the work site and deposit it therein as described in these specifications and shown on the drawings. Select Backfill shall be subject to approval of the Engineer. Select Backfill shall be in accordance with Section 312301.02(D).

During the backfill procedure, the soil compaction shall conform to not less than the following percentage of the maximum dry density:

1. Structures & Building Areas - 95%
2. Lawns & Unpaved Areas - 90%
3. Pavement, driveways & walkway area - 95%
4. Utility Trenches - 95%

Temporary Trench Finish - In completing work of backfilling the trench, the material shall be carefully placed to conform to the adjacent street surfaces, allowing, however, a slight crown over the trench area to allow for settlement but not sufficient to prevent the use of the street across the trench area by traffic. As settlement occurs, refill and regrade the temporary trench finish with suitable hard material and continue to maintain the surface until such time as the permanent repaving shall be allowed by the Engineer.

Allowance repaving by Engineer shall not relieve Contractor of his responsibility for settlement. The maintenance of trenches shall be continuous by Contractor in such a manner as to keep all streets passable for both pedestrians and vehicular traffic. Cleanup shall be continuous as work progresses. Contractor shall control any dirt or dust by calcium chloride, etc. as necessary and required at Contractor's expense.

Foundations - Use every precaution in the excavation for the pipelines, manholes and other structures to protect the natural foundations upon which the work is to be built. Special care must be taken so as not to disturb the finished grade any more than is absolutely necessary. If and where required and directed by the Engineer, support the pipelines by concrete cradle in accordance with the general design and dimensions to be furnished by the Engineer or upon plank foundation.

Interference with Existing Structure or Utilities - In excavating or backfilling, care must be taken not to injure any gas, water, sewer, electric or telephone conduits or other pipes, conduits or structures. The locations will be made by the Engineer and in locating, he shall avoid interference with existing utilities as far as possible. Contractor shall, at his expense, sling, shore-up and secure and maintain a continuous flow in utilities and shall repair any damage done to them and shall keep them in repair until final acceptance of completed work, leaving them in as good a condition as when uncovered. Where it is either necessary or advisable to locate existing substructures in advance of or during actual construction of the work, the Contractor shall cooperate with the Engineer and furnish without cost to the Owner such labor and equipment as may be required to locate any existing subsurface utilities or structures. No payment will be made for delays to Contractors due to interference with utilities. The Contractor shall, in advance of construction, obtain all available information as to location of existing underground utilities, service, etc. and will be held responsible for damage done by him to underground structures injured in construction.

Protection of Street Surfaces - The Contractor shall carefully plank, or otherwise protect all street surfaces, gutters, curbs, and sidewalks before moving any heavy equipment, machinery, tractor or truck over the same. He will be held fully responsible for all damage of every kind which may be incurred by the various surfaces and the Contractor shall repair or rebuild the surfaces as specified for the various surfaces elsewhere herein the specifications except that no payment will be made by the Owner to the Contractor

for repair or rebuilding of the surfaces outside the trench areas. The surfaces repaired shall be equal to or superior to the surfaces damaged.

Restoration of Rights-of-Ways, etc. - Where pipelines are constructed along the rights-of-ways, etc., the same shall be restored to their original condition. Sod, topsoil, flowers and shrubbery, if any, shall be carefully removed and replaced or, if damaged, shall be carefully removed and replaced. Trees shall be protected and suffer no damage. Utility poles shall be adequately braced in accordance with the utilities regulations.

Detours, etc. - Contractor shall, where necessary, provide and erect all detour signs and maintain necessary barricades and lights. He shall confer with the local police chief and fire chief before blocking any street.

Contractor shall construct temporary bridges in order to provide access to driveways, etc. when required.

State Highways - Contractor shall fully comply with all regulations of the New Jersey Department of Transportation covering street openings when any work within right-of-way lines of any State Highway right-of-ways or property. Permit shall be secured by the Owner.

County Roads - Contractor shall investigate and conform with all regulations of County Department having jurisdiction over street opening when performing any work in County roads. Permits for road opening shall be secured by Contractor and any inspection services required by County shall be paid for by Contractor.

Railroad Crossings - Contractor shall fully comply with all regulations of the Railroad Company when performing any work within Railroad right-of-ways. Permits shall be secured by Owner.

Access to Business and Residential Building Access Points - Contractor shall construct temporary bridges in order to provide access to all businesses, and residential building access doorways and driveways, etc. when and where required or as directed by the Engineer.

Excavated Material – Unacceptable for reuse of trench backfill shall be removed and spoiled to a site in accordance with the requirements of N.J.A.C. 7:26-1 for solid or hazardous waste.

312301.04 MEASUREMENT AND PAYMENT

No separate payment shall be made for "Trench Excavation, Backfilling and Compaction." The cost thereof for any and all trench excavation, backfilling and compaction associated with the proposed utility work shall be included in the prices bid for the various items for which the excavation is made.

END OF SECTION

DEWATERING
SECTION 312319

312319.01 DESCRIPTION

Installation of a dewatering system in order to construct the various sections of the project where the water table is not workable under ordinary methods and make necessary arrangements to by-pass stormwater and groundwater around the proposed improvement during excavation and trenching.

312319.02 MATERIALS

The Contractor shall be responsible for the type and design of the dewatering system and the methods to by-pass storm and ground water.

312319.03 CONSTRUCTION

Provide and maintain ample means and devices (including spare units for use in case of breakdown) to promptly remove and dispose of water or sewage entering excavations or trenches.

Keep excavations and structures dry until all work is completed, and pipe joints are satisfactorily installed, and to extent that introduction of water in system will not damage either new or existing structures.

Contractor shall install dewatering system and be responsible for its strength, stability and safety throughout the project.

By-pass or dispose of the water in suitable manner without damage to work site or adjacent property. The contractor shall also be responsible to repair any damages to the existing structures due to his construction.

Provide and maintain ample means and devices (including spare units for use in case of breakdown) to promptly remove and dispose of water or sewage entering excavations or trenches.

Where directed by Engineer the Contractor shall provide equipment, power, labor to employ Well Point method of trench dewatering without additional compensation, if groundwater and subsoil conditions along line of work are such that a stable, hard trench or excavation bottom for the pipe or structure cannot be achieved by trench pump, bailing or other methods.

Methods of dewatering shall be in accordance with the requirements of Section 158 Soil Erosion and Sediment Control and Water Quality Control of the NJDOT Standard Specifications.

312319.04 MEASUREMENT AND PAYMENT

There shall be no separate payment for "Dewatering" but the costs shall be included in the price bid for various related items of work listed in the proposal, which price shall include pumping, bailing, well point system if directed by the engineer, or any other method required to achieve results specified. All labor, equipment and materials for all dewatering methods used, including stone pipe bedding, trench stabilization stone, and all else necessary therefore and all other work in connection therewith and incidental thereto.

END OF SECTION

SOIL EROSION AND SEDIMENT CONTROL
SECTION 312500

312500.01 DESCRIPTION

Refer to Section 158.01 of the N.J.D.O.T. Standard Specifications.

312500.02 MATERIALS

Refer to Section 158.02 of the N.J.D.O.T. Standard Specifications.

312500.03 CONSTRUCTION

Refer to Section 158.03 of the N.J.D.O.T. Standard Specifications.

312500.04 MEASUREMENT AND PAYMENT

Refer to Section 158.04 of the N.J.D.O.T. Standard Specifications.

No separate payment will be made for "Soil Erosion and Sediment Control". The cost shall be included in the cost of the Site Clearing.

END OF SECTION

**DENSE GRADED AGGREGATE BASE COURSE
SECTION 321123**

321123.01 DESCRIPTION

Refer to Section 302 of the N.J.D.O.T. Standard Specifications.

321123.02 MATERIALS

Refer to Section 302.02 of the N.J.D.O.T. Standard Specifications.

321123.03 CONSTRUCTION

Refer to Section 302.03 of the N.J.D.O.T. Standard Specifications.

321123.04 MEASUREMENT AND PAYMENT

Refer to Section 302.04 of the N.J.D.O.T. Standard Specifications.

Payment will be measured by the actual quantities installed and accepted by the Engineer as follows:

<u>Pay Item</u>	<u>Pay Unit</u>
Dense Graded Aggregate Base Course, 6" Thick	Square Yard

Payment for "Dense Graded Aggregate" for the depth indicated shall include preparation of the subgrade, compaction and all materials, labor, equipment and all else necessary therefore and all other work in connection therewith and incidental thereto unless otherwise noted on the contract documents.

END OF SECTION

HOT MIX ASPHALT (HMA) COURSES
SECTION 321216

321216.01 DESCRIPTION

The work includes the furnishing and placement of Hot Mix Asphalt (HMA) courses.

Refer to Section 401.01 of the N.J.D.O.T. Standard Specifications.

321216.02 MATERIALS

Refer to Section 401.02 of the N.J.D.O.T. Standard Specifications.

321216.03 CONSTRUCTION

Placement of HMA shall conform to Section 401.03.03 of the N.J.D.O.T. Standard Specifications.

Placement of tack coat shall conform to Section 401.03.02 of the N.J.D.O.T. Standard Specifications.

321216.04 MEASUREMENT AND PAYMENT

No separate payment shall be made for tack coat. All costs shall be included in the price for other bid items in this section.

Refer to Section 401.04 of the N.J.D.O.T. Standard Specifications.

Payment will be measured by the actual quantities installed and accepted by the Engineer as follows:

<u>Pay Item</u>	<u>Pay Unit</u>
Hot Mix Asphalt Base Course, Mix 19M64, 4" Thick	TON
Hot Mix Asphalt Surface Course, Mix 9.5M64, 2" Thick	TON

END OF SECTION

**CONCRETE VERTICAL CURB
SECTION 321614**

321614.01 DESCRIPTION

Refer to Section 607.01 of the N.J.D.O.T. Standard Specifications.

321614.02 MATERIALS

Refer to Section 607.02 of the N.J.D.O.T. Standard Specifications.

321614.03 CONSTRUCTION

The Contractor is required to submit cut sheets to the Engineer a minimum of 10 calendar days prior to the installation of the curbing and/or sidewalk. If any curb and/or sidewalk, constructed without approved cut sheets, is determined to be improperly installed, the curbing and/or sidewalk shall be removed and replaced at no additional cost to the Owner.

Refer to Section 607.03 of the N.J.D.O.T. Standard Specifications.

321614.04 MEASUREMENT AND PAYMENT

Refer to Section 607.04 of the N.J.D.O.T. Standard Specifications.

Payment will be measured by the actual quantities installed and accepted by the Engineer as follows:

<u>Pay Item</u>	<u>Pay Unit</u>
8" x 18" Concrete Vertical Curb	Linear Foot

Payment for "Concrete Vertical Curb" shall include excavation, preparation of subgrade, shaping and compacting the underlying material, forming, concrete, finishing, curbing, curing compound, sealer, joint materials and all materials, labor, equipment and all else necessary therefore and all other work in connection therewith and incidental thereto and incidental work.

END OF SECTION

CONCRETE SIDEWALKS
SECTION 321615

321615.01 DESCRIPTION

This work shall include installation of concrete sidewalks where indicated on the plans or as directed by the Engineer.

Refer to Section 606.01 "Sidewalks, Driveways and Islands" of the N.J.D.O.T. Standard Specifications and the construction drawings.

321615.02 MATERIALS

Refer to Section 606.02 of the N.J.D.O.T. Standard Specifications.

321615.03 CONSTRUCTION

Refer to Section 606.03 of the N.J.D.O.T. Standard Specifications and the construction drawings.

321615.03 PAYMENT

Payment will be measured by the actual quantities installed and accepted by the Engineer as follows:

<u>Pay Item</u>	<u>Pay Unit</u>
Concrete Sidewalk, 4" Thick	Square Yard

Payment for this items shall include all labor, materials, forms, rebar, and all else necessary therefore and all other work in connection therewith and incidental thereto for a complete and functioning installation.

END OF SECTION

STONE MULCHING
SECTION 321626

321625.01 DESCRIPTION

The work includes the furnishing and placement of stone mulching at the locations indicated and in accordance with the details shown on the plans.

321625.02 MATERIALS

For stone mulch, the contractor shall furnish the material for proposed area. Before use, submit a sample for the Owner's approval of size and color. With each shipment, provide a delivery ticket indicating source and weight of the stone mulch.

The landscape fabric shall be a commercial grade weed barrier:

DeWitt Wood Barrier-20 yr.
Easy Gardener Landmaster-25 yr
Or approved equal

Delaware Valley River Stones

Stone Type: River
Size: 1"-3"
Ace Stone Supply or equal
www.acestonesupply.com
TEL: (609) 587-9195

321625.03 CONSTRUCTION

The Contractor shall remove exiting material and install stone mulch level and true to finished grade.

The subgrade shall be leveled prior to placement of the commercial grade weed barrier.

Prior to placement of the stone mulch, the weed barrier shall be staked down per the manufacturer's recommendations.

321626.04 MEASUREMENT AND PAYMENT

Payment will be measured by the actual quantities installed and accepted by the Engineer as follows:

<u>Pay Item</u>	<u>Pay Unit</u>
Stone Mulching	Square Yard

Payment for "Stone Mulching" shall include excavation, preparation of subgrade, shaping and compacting the underlying material, weed barrier, stakes, and all materials, labor, equipment and all else necessary therefore and all other work in connection therewith and incidental thereto and incidental work.

END OF SECTION

DETECTABLE WARNING SURFACE
SECTION 321640

321640.01 DESCRIPTION

This work includes the furnishing and installing detectable warning surfaces at locations and according to the details as shown on the plans.

321640.02 MATERIALS

Materials shall be cast-in-place Armor Tile ADA-C-2448 safety Red Color Coating or approved equal.

321640.03 CONSTRUCTION

The method of construction shall conform with the requirements of the manufacturer and as directed by the Engineer.

Refer to Section 606.03.03 of the N.J.D.O.T. Standard Specifications.

321640.04 MEASUREMENT AND PAYMENT

Refer to Section 606.04 of the N.J.D.O.T. Standard Specifications.

Payment will be measured by the actual quantities installed and accepted by the Engineer as follows:

<u>Pay Item</u>	<u>Pay Unit</u>
Detectable Warning Surfaces	Unit

Payment for " Detectable Warning Surfaces" shall include the cost of surface preparation, detectable warning surface, and all materials, labor, equipment and all else necessary therefore and all other work in conjunction therewith and incidental thereto.

END OF SECTION

**PRECAST CONCRETE WHEEL STOP
SECTION 321713**

321713.01 DESCRIPTION

The contractor shall furnish and install precast concrete wheel stops in the parking area as described in the following specification and within the plan details.

SUBMITTALS

- A. Comply with Section 01 33 00 – Submittal Procedure
- B. Product Data – submit the following information:
 - 1. Product literature
 - 2. Made in the USA Statement
 - 3. Proprietary information
- C. Samples – submit manufacturer's color sample, standard or custom
- D. Warranty – submit manufacturer's standard warranty

QUALITY ASSURANCE

- A. The precast concrete parking block shall be designed and manufactured in accordance N.J.D.O.T. Standard Specifications.
- B. The parking block shall be made of high-quality, durable concrete with suitable reinforcement to withstand vehicular impacts and environmental conditions.
- C. The dimensions, shape, and color of the parking block shall conform to the specified requirements.

DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver products to site in manufacturer's clearly-marked original, unopened containers and packaging. Upon delivery, examine packages immediately to ensure all products are complete and undamaged.
- B. Storage: Store products in a protected, dry area in manufacturer's unopened containers and packaging until installation.
- C. Handling: Protect product's finish from damage during handling and installation.

WARRANTY

- A. Provide manufacturer's warranty.

321713.02 MATERIALS

Manufacturer: Curbo Concrete Solutions

Model: CCSC1 or approved equal

Dimensions:

- Length: 72"
- Height: 5"
- Width: 8"

Material:

- Concrete: 5500 PSI Air Entrained Concrete
- Rebar: #4 Rebar Grade 60

Color: wheel stop shall be grey and have a uniform color throughout its entire volume.

Shape: The wheel stop shall have a rectangular shape with chamfered or rounded edges to minimize the risk of tripping and tire damage.

Surface Finish: The wheel stop shall have a smooth and slip-resistant surface finish to provide traction for vehicles and pedestrians.

321713.03 CONSTRUCTION

INSTALLATION

- A. The parking blocks shall be installed securely and level on a properly prepared and compacted base.
- B. The parking blocks shall be anchored to the ground using suitable methods, such as adhesive, spikes, or bolts.
- C. The spacing between parking blocks shall be determined by the drawings within.

321713.04 MEASUREMENT AND PAYMENT

Payment will be measured by the actual quantities installed and accepted by the Engineer as follows:

<u>Pay Item</u>	<u>Pay Unit</u>
Concrete Wheel Stop	Unit

Payment for "CONCRETE WHEEL STOP" shall include the pre-cast concrete parking block, rebar, preparation of subgrade, installing the wheel stop and all else necessary therefore and all other work in connection therewith and incidental thereto and incidental work.

END OF SECTION

TRAFFIC STRIPES AND MARKINGS
SECTION 321723

321723.01 DESCRIPTION

Refer to Section 610.01 of the N.J.D.O.T. Standard Specifications.

321723.02 MATERIALS

Refer to Section 610.02 of the N.J.D.O.T. Standard Specifications.

321723.03 CONSTRUCTION

Refer to Section 610.03.01 and 610.03.02 of the N.J.D.O.T. Standard Specifications.

321723.04 MEASUREMENT AND PAYMENT

Refer to Section 610.04 of the N.J.D.O.T. Standard Specifications.

Payment will be measured by the actual quantities installed and accepted by the Engineer as follows:

<u>Pay Item</u>	<u>Pay Unit</u>
Traffic Markings Lines, Epoxy Resin - 4"	Linear Foot
Traffic Markings Lines, Thermoplastic - 24"	Linear Foot
Traffic Markings, Thermoplastic Arrow Pavement Marking	Unit
Traffic Markings, Thermoplastic ADA Pavement Symbol	Unit
Traffic Markings, Pavement Word Symbol	Unit

Payment for "Traffic Markings and Stripes" shall include surface preparation, applying striping and symbols, and the removal of existing conflicting traffic stripes and markings and all materials, labor, equipment and all else necessary therefore and all other work in connection therewith and incidental thereto.

END OF SECTION

SIGNS
SECTION 321724

321724.01 DESCRIPTION

This work includes the furnishing and installation of signs and sign supports at the locations and to the details as shown on the plans or as directed by the Engineer.

Refer to Section 612.01 of the N.J.D.O.T. Standard Specifications.

321724.02 MATERIALS

Refer to Section 612.02 and Section 911 - Signs, Sign Supports, and Delineators of the N.J.D.O.T. Standard Specifications.

321724.03 CONSTRUCTION

Refer to Section 612.03.01 of the N.J.D.O.T. Standard Specifications.

Installation shall be at the locations and mounting heights as required by MUTCD, latest edition.

321724.04 MEASUREMENT AND PAYMENT

Payment will be measured by the actual quantities installed and accepted by the Engineer as follows:

<u>Pay Item</u>	<u>Pay Unit</u>
Signs	Unit

Payment for "Signs" shall include surface preparation, sign panels, sign supports, concrete, mounting material, and all materials, labor, equipment and all else necessary therefore and all other work in connection therewith and incidental thereto.

END OF SECTION

**WATER DISTRIBUTION SYSTEM
SECTION 331112**

331112.01 DESCRIPTION

The installation of PVC pressure pipe for proposed potable water distribution system and related components as shown on the plans for the following:

1. Water Services
 - a. Polyethylene
2. Fittings
3. Water Meters

331112.01.01 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Coordination Drawings: For piping and specialties including relation to other services in same area, drawn to scale. Show piping and specialty sizes and valves, meter and specialty locations, and elevations.
- C. Field quality-control test reports.
- D. Operation and Maintenance Data: For water valves and specialties to include in emergency, operation, and maintenance manuals.

331112.01.02 QUALITY ASSURANCE

- A. Regulatory Requirements:
 1. Comply with requirements of utility company supplying water. Include tapping of water mains and backflow prevention.
 2. Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.
 3. Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.
- B. Performance Requirements:
 1. The Contractor shall verify all piping geometry in the field and shall be responsible for insuring proper alignment and fit of all piping consistent with the intent of the Contract Drawings.
- C. Piping materials shall bear label, stamp, or other markings of specified testing agency.

331112.01.03 DELIVERY, STORAGE AND HANDLING

- A. Preparation for Transport: Prepare valves, including fire hydrants, 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, including fire hydrants, 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 and fire hydrants 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.

331112.01.04 PROJECT CONDITIONS

- A. Interruption of Existing Water-Distribution 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 water-distribution service according to requirements indicated:
1. Notify Owner or Owner's representative no fewer than two days in advance of proposed interruption of service.
 2. Do not proceed with interruption of water-distribution service without Owner or Owner's representative's written permission.
- B. The Contractor shall provide adequate protection and maintenance of all utility structures, drains, sewers and other obstruction encountered during the progress of the work. The Contractor shall permanently support, relocate, remove, reconstruct or bypass the obstruction in cooperation with the owners of such utility structures.

331112.01 MATERIALS

POLYETHYLENE TUBE WATER SERVICE, OR APPROVED EQUAL

- A. Polyethylene Water Tube: Polyethylene connection pipe shall be ultra high molecular weight 200 psi, Type PE 3306, SDR 7 iron size polyethylene tubing for ¾", 1 and 2" services. Polyethylene pipe shall conform to the requirements of ASTM D-1248-65T, ASTM D-2239-65, USDCCS 255-63 and be approved by the National Sanitation Foundation for potable water use. Tube size insert stiffeners shall be used with the plastic pipe.

331112.03 CONSTRUCTION

Refer Section 312301 Excavation and Backfill for excavating, trenching, and backfilling.

PIPING APPLICATIONS

- A. General: Use pipe, fittings, and joining methods for piping systems according to the following applications and in accordance with the manufactures recommendations.
- 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 flanges or unions for underground piping.
- D. Underground water-service piping shall be the following:
 - 1. Water Services: Polyethylene
 - 2. Or Approved Equal.

PIPING INSTALLATION

- A. Install PVC, AWWA pipe according to ASTM F 645 and AWWA M23.
- B. Piping shall be laid and maintained to the required lines and depths shown on the plans.
- C. Install piping by tunneling or jacking, or combination of both, under streets and other obstructions.
- D. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.
- E. Make pipe joints according to the following:
 - 1. PVC Piping Gasketed Joints: Use joining materials according to AWWA C900. Construct joints with elastomeric seals and lubricant according to ASTM D 2774 or ASTM D 3139 and pipe manufacturer's written instructions.

IDENTIFICATION

- A. Install continuous underground detectable warning tape during backfilling of trench for underground water-distribution piping. Locate below finished grade, directly over piping.

331112.04 MEASUREMENT AND PAYMENT

Payment will be measured by the actual quantities installed and accepted by the Engineer as follows:

<u>Pay Item</u>	<u>Pay Unit</u>
Water Service, 2" Complete	Unit
Water Service, ¾" Complete	Unit

Payment for "Water Services" shall include all labor, material and equipment;; installation of new polyethylene service line from the meter pit to the building; insert stiffeners, installation of tracer wire and the preparation. This item of work shall also include all excavation, compaction, and any utility adjustments necessary to make a complete connection and as required to complete the installation of the service line as described above.

END OF SECTION

SEPTIC SYSTEM
SECTION 333200

333200.01 DESCRIPTION

The work under this section shall consist of furnishing and installing a complete septic system as specified in this section and shown on the plans to provide a sufficient system for the population of the facility.

Septic system must comply with N.J.A.C. 7:9A Standards for Individual Subsurface Sewage Disposal Systems.

333200.01.01 Definitions.

For the purposes of this section, the following words and phrases shall have the meanings respectively ascribed to them by this section:

- A. "Approved" or "Approval." The approval of the health officer, or approval means meeting the approval of the health officer as the result of investigation or tests conducted by the health officer or by reason of accepted principles or tests by national authorities, technical or scientific organizations, or a research laboratory of recognized authority.
- B. "Building" includes all structures.
- C. "Drainage system" or "drainage piping" means all the piping within public or private premises which conveys sewage or other liquid wastes to a legal point of disposal, but such terms shall not include the mains or laterals of a public sewer system.
- D. "Plumbing" means all drainage systems, both direct and indirect, and all vent piping, water piping and other piping in any building or within the boundaries of any property through which sewage, water, waste water or any other substance or liquid is conveyed.

The type of sewage disposal system required shall be determined on the basis of location, area, soil porosity, the ground water level and the density of population in the area. The system shall be designed to receive and dispose of all sewage and liquid waste from the property served.

333200.02 MATERIALS

Any sewage collection tank for which a permit is issued shall be constructed of watertight concrete and shall have a capacity of not less than one thousand gallons

Any subsurface sewage disposal unit or system or part thereof constructed or installed shall be so situated that it will be a safe distance from any source of water supply as determined by the health officer.

Minimum distance between systems and water supplies.

Under no circumstances shall any part of a subsurface sewage disposal unit or system, except the house sewer line, be located closer than one hundred feet from any water supply.

Minimum distance between systems and buildings or property lines.

No part of any subsurface sewage disposal unit or system, except the house sewer line, shall be located less than five feet from every building or structure, or less than five feet from every property line.

Any subsurface sewage disposal unit or system constructed or installed in the township shall consist of a septic tank, with effluent discharging into a distribution box connected to a subsurface tile system consisting of at least two lateral absorption lines.

The length of the tank shall not exceed three times the width.

The inlet and outlet of the tank shall have a vertical four-inch tee extending two feet below and six inches above the liquid level of the tank.

The tank shall be watertight and shall be constructed of reinforced concrete. Precast concrete tanks shall have (ACI) Certification displayed on the tank.

The top of the tank shall be constructed of reinforced concrete, at least four inches thick.

The side walls of the tank shall be adequately reinforced with steel or other approved material so as to withstand any inside or outside pressure.

Concrete septic tank influent baffle shall extend below the liquid level 25%-33% of liquid depth.

Tank inspection ports shall extend to finish grade and have a bolted cap.

Distribution boxes shall be watertight and constructed of concrete. Distribution box shall have a removable lid for access.

Connecting and delivery pipes shall be schedule 40 PVC (ASTM D-2665).

Joint Material: Elastomeric ring rubber gasket, ASTM D-3212.

Joint Material Primer/Adhesive: As provided or specified by pipe manufacturer.

Contractor shall provide manhole access risers as required.

333200.03 CONSTRUCTION

Specifications for construction of distribution boxes.

Any distribution box constructed or installed in the Township shall meet the following minimum specifications:

The distribution box shall be watertight and shall be constructed of the same materials authorized for the construction of a septic tank.

All outlets from a distribution box shall have exactly the same elevation.

The inlet to the distribution box shall be one inch above the elevation of the outlets.

Lines to lateral absorption lines—Watertight joints required.

All lines leading from the distribution box to the lateral absorption lines shall be constructed with watertight joints.

Adequate measurements shall be taken to ensure bottom of distribution bed is level.

No opening shall be provided in any drainage system or in any septic tank, settling tank, or other subsurface disposal unit or system for the purpose of receiving the surface drainage from any yard or building.

The area designated for the construction of the disposal bed shall be staked out prior to construction. No heavy equipment or grading machinery shall be allowed on the disposal bed area.

Approval of systems by health officer prerequisite to covering septic tanks.

No person shall cover or cause to be covered any septic tank, settling tank, or other subsurface disposal system prior to its approval by the Cape May County health officer as provided in this section.

Connection of house sewer—Approval by health officer required.

No person shall connect any house sewer line or other plumbing to a septic tank, settling tank, or other subsurface sewage disposal unit or system installed, constructed or reconstructed, unless such septic tank, settling tank, or other subsurface sewage disposal unit or system has been approved by the health officer as provided in this section.

It shall be the duty of the Cape May County health officer to see that there is compliance with the provisions of this section.

333200.04 MEASUREMENT AND PAYMENT

Payment will be measured by the actual quantities installed and accepted by the Engineer as follows:

<u>Pay Item</u>	<u>Pay Unit</u>
Septic System	Lump Sum

Payment for "Septic System" shall include excavation, pipe system, septic tank, distribution box, disposal field, and all materials, labor, equipment and all else necessary therefore and all other work in connection therewith and incidental thereto and incidental work.

END OF SECTION

SEPTIC PUMP SYSTEM
SECTION 333920

333920.01 DESCRIPTION

The work under this section shall consist of furnishing and installing a complete sewer pump system as specified in this section and shown on the plans to provide a sufficient system for the population of the facility.

Septic pump must comply with N.J.A.C. 7:9A Standards for Individual Subsurface Sewage Disposal Systems.

333920.02 MATERIALS

The pump models covered in this specification are single phase pumps. The pump furnished for this application shall be model FL51M-2 as manufactured by Liberty Pumps or approved equal.

333920.02.01 OPERATING CONDITIONS

Each submersible pump shall be rated at 1/2 hp 115 volts single phase 60 Hz. 3450 RPM. The unit shall produce 93 G.P.M. at 55 feet of total dynamic head.

The submersible pump shall be capable of handling sewage effluent with 3/4" solid handling capability. The submersible pump shall have a shut-off head of 55 feet and a maximum flow of 76 GPM @ 15 feet of total dynamic head.

The pump shall be controlled with SXL24=3 NEMA 4X simplex control panel manufactured by Liberty Pumps or approved equal. It shall include three floats, aux. contacts and integral audio/visual high level alarm.

333920.03 CONSTRUCTION

The castings shall be constructed of class 25 cast iron. The motor housing shall be oil filled to dissipate heat. All fasteners exposed to the liquid shall be stainless steel. The motor shall be protected on the top side with sealed cord entry plate with molded pins to conduct electricity eliminating the ability of water to enter internally through the cord. The motor shall be protected on the lower side with a unitized ceramic/carbon seal with stainless steel housings and spring. The pump shall be furnished with stainless steel handle.

ELECTRICAL POWER CORD

The submersible pump shall be supplied with a multiconductor power cord. It shall be capable of continued exposure to the pumped liquid. The power cord shall be sized for the rated full load amps of the pump in accordance with the National Electric Code. The power cable shall not enter the motor housing directly but will conduct electricity to the motor by means of a water tight compression fitting cord plate assembly, with molded pins to conduct electricity.

MOTORS

Single phase motors shall be oil filled, permanent split capacitor, class B insulated NEMA B design, rated for continuous duty. At maximum load the winding temperature shall not exceed 130 degrees C unsubsmerged. The pump motor shall have an integral thermal overload switch in the windings for protecting the motor. The capacitor circuit shall be mounted internally in the pump.

BEARINGS AND SHAFT

Upper and lower ball bearings shall be required. The bearings shall be a single ball / race type bearing. Both bearings shall be permanently lubricated by the oil, which fills the motor housing. The motor shaft shall be made of 17-4 PH stainless steel.

IMPELLER

The impeller shall be a class 25 iron. It shall be threaded to the motor shaft.

CONTROLS

All units can be supplied with automatic wide angle tilt float switches. The switches shall be equipped with piggy back style plug that allows the pump to be operated manually without the removal of the pump in the event that a switch becomes inoperable. Manual Pumps are operable by means of a pump control panel.

PAINT

The exterior of the casting shall be protected with Powder Coat paint.

FACTORY ASSEMBLED TANK SYSTEMS WITH GUIDE RAIL AND QUICK DISCONNECT DISCHARGE

Factory mounted rail system with pump suspended by means of bolt on quick disconnect which is sealed by means of nitrile grommets or o-rings. The Discharge piping shall be schedule 80 PVC and furnished with a PVC check valve and shut-off ball valve. The Tank shall be wound fiberglass or roto-molded plastic. An inlet hub shall be provided with the fiberglass systems. The guide rail assembly shall be galvanized steel rails with stainless steel lifting chain.

TESTING

The pump shall have a ground continuity check and the motor chamber shall be Hi-potted to test for electrical integrity, moisture content and insulation defects. The motor and volute housing shall be pressurized, and an air leak decay test is performed to ensure integrity of the motor housing. The pump shall be run, voltage current monitored, and the tester checks for noise or other malfunction.

333920.04 MEASUREMENT AND PAYMENT

There will be no separate payment for the Sewer Pump System. All costs shall be included in the lump sum bid item "Septic System."

The price shall include excavation, tank, pump, dosing tank controls, electrical connection, testing, and all materials, labor, equipment and all else necessary therefore and all other work in connection therewith and incidental thereto and incidental work.

END OF SECTION

DUCTILE IRON CULVERT PIPE
SECTION 334101

334101.01 DESCRIPTION

Furnish and install Ductile Iron Gravity Storm Sewer Piping for proposed storm sewer system complete specified herein.

SUBMITTALS

Contractor shall supply six copies of shop drawings for all pipe and fittings for approval prior to installation.

Submit six (6) copies of manufacturer's certified letter stating that the pipe or joint materials ordered meets the requirements of this specification. Letter shall indicate compliance with appropriate reference standards listed.

QUALITY ASSURANCE

Testing of Pipe - All Ductile Iron Pipe shall be tested by the manufacturer in accordance with ANSI A21.51 and shall have Underwriters Laboratory approval. Manufacturer shall validate other than certification, the ductility of each length of pipe by an Underwriters Laboratory approved method.

334101.02 MATERIALS

- A. Ductile Iron Pipe and Fittings - Below Grade
 - 1. Pipe shall be bitumastic lined Class 52 as specified on plans, Ductile Iron Pipe with push on joints conforming to AWWA C151.
- B. Bitumastic lining for pipe and fittings shall conform to AWWA C104.
- C. Specials
 - 1. Pipe Adapters: Where necessary to join pipe of different types, Contractor shall provide necessary adapters. Ends shall conform to the specifications for the appropriate type of joint.
- D. Identification: All pipeline materials shall be stamped, marked or identified with the following:
 - 1. Name of Manufacturer
 - 2. Pipe Size
 - 3. Pipe Material
 - 4. Wall Thickness
 - 5. Pipe Rating

334101.03 CONSTRUCTION

- A. General - All ductile iron pipe shall be installed in accordance with the details shown on the drawings unless otherwise hereinafter specified and all excavation and backfill shall conform to the requirements herein specified.

- B. Handling Ductile Iron Pipe & Accessories - All ductile iron pipe and accessories shall be new material which has at no time previously been used for any purpose whatsoever. Pipe and accessories shall be handled in such a manner to ensure delivery on the work in sound, undamaged condition and conforming in all respects to these specifications. Particular care shall be taken not to injure the pipe coating. No other pipe or material of any kind shall be placed inside of any pipe or fittings at any time after the coating has been applied.
- C. Placing Pipe in Trench - The interior of all pipe shall be thoroughly cleaned of all foreign matter before being lowered into the trench and shall be kept clean during laying operations by means of plugs or other approved methods. No trench water shall be allowed to enter the pipe or fittings. At all times when work is not in progress, all open ends of pipes and fittings shall be securely closed to the satisfaction of the Engineer.
- D. Laying Pipe - The spigot shall be centered in the bell, the pipe centered home and brought into true and specified alignment.

Except where necessary in making connection with other lines and as authorized by the Engineer, pipe shall be laid with the bells facing in the direction of laying, and for lines on the appreciable slope bells shall, at the direction of the Engineer, face upgrade.

Under no circumstances will pipe be laid in water and no pipe shall be laid when trench conditions or the weather is unsuitable for such work, except by permission of the Engineer.

- E. Cutting Pipe - Cutting the pipe for closure pieces or for other reasons shall be by a method which will not damage the pipe lining. Unless otherwise authorized by the Engineer, all cutting of pipes shall be done by means of mechanical cutters of an approved type or types. Wheel cutters shall be used wherever practicable.
- F. Pipe Supports - All exposed piping shall be provided with a minimum of two supports per full pipe length.

334101.04 MEASUREMENT AND PAYMENT

Payment will be measured by the actual quantities installed and accepted by the Engineer as follows:

<u>Pay Item</u>	<u>Pay Unit</u>
10" Ductile Iron Culvert Pipe, Class 52	Linear Foot

Payment for ductile iron pipe of the type and sized specified shall be made for the length of each size as determined above, measured in linear feet at the price per linear foot bid for the various items of ductile iron pipe respectfully in the bid form, which price shall include the cost of excavation, dewatering, furnishing, laying, assembling and jointing pipe complete, testing, broken stone trench stabilization, flushing, inspection, connections to existing pipes, connections to existing and proposed manholes and inlets, core drilling manholes and inlets, structures, shoring, sheathing, timbering, bracing, pumping, blocking, shoring and sheathing left in place, all labor and materials, equipment and all else necessary therefore and all other work in connection therewith and incidental thereto.

END OF SECTION

DRAINAGE STRUCTURES
SECTION 334923

334923.01 DESCRIPTION

This work includes the reconstruction of existing inlets.

Refer to Section 602.01 of the N.J.D.O.T. Standard Specifications.

334923.02 MATERIALS

Refer to Section 602.02 of the N.J.D.O.T. Standard Specifications and the appropriate construction detail as shown on the plans.

334923.03 CONSTRUCTION

Refer to Section 602.03 of the N.J.D.O.T. Standard Specifications.

Reconstructing inlets shall conform to Section 602.03.03 of the N.J.D.O.T. Standard Specifications.

Construction of bicycle safe grates shall conform to Section 602.03.06 of the N.J.D.O.T. Standard Specifications.

334923.04 MEASUREMENT AND PAYMENT

Payment will be measured by the actual quantities installed and accepted by the Engineer as follows:

<u>Pay Item</u>	<u>Pay Unit</u>
Inlets, Type "A"	Unit
Inlets, Type "E"	Unit
Connect to Existing Inlet	Unit

Payment for "Drainage Structures" of the size and type specified shall include the cost of excavating, backfilling, compaction, dewatering, connecting to existing or proposed pipes, bedding, frame and bicycle safe grates and all materials, labor, equipment and all else necessary therefore and all other work in connection therewith and incidental thereto.

END OF SECTION

TOPSOIL, FERTILIZING AND SEEDING
SECTION 340101

340101.01 DESCRIPTION

This work includes the furnishing and placing of topsoil, fertilizer, seed and mulch in the project area.

Refer to Sections 804.01, 806.01 and 809.01 of the N.J.D.O.T. Standard Specifications.

340101.02 MATERIALS

Topsoil shall conform with the requirements of Section 917.01 of the N.J.D.O.T. Standard Specifications.

Seeding and Fertilizer shall conform with the requirements of Section 806.02 of the N.J.D.O.T. Standard Specifications. Seeding shall be Type A-3 grass seed mixture conforming to table 917.05.01-2 of the N.J.D.O.T. Standard Specifications.

Mulching shall conform with the requirements of Section 917.04.01 of the N.J.D.O.T. Standard Specifications.

340101.03 CONSTRUCTION

The method of construction shall conform with the requirements of Sections 804.03.01, 806.03.01 and 809.03.01 of the N.J.D.O.T. Standard Specifications.

The Contractor shall be responsible for watering these areas until a firm root system is established.

340101.04 MEASUREMENT AND PAYMENT

Payment shall be measured by the actual quantities installed and accepted by the Engineer as follows:

<u>Pay Item</u>	<u>Pay Unit</u>
Topsoil, Seeding and Fertilizer, 5" Thick	Square Yard

Payment for "Topsoil, Seeding and Fertilizer, 5" Thick" shall include the cost of removal and disposal of existing lawn materials, preparation of subbase, installation of topsoil at the specified thickness, the placing of seed, fertilizer, straw mulch, watering, mowing and all materials, labor, equipment and all else necessary therefore and all other work in conjunction therewith and incidental thereto.

END OF SECTION

BEAM GUIDE RAIL
SECTION 347113

347113.01 DESCRIPTION

This work includes the the installation of new beam guide at the locations shown on the plans or as directed by the engineer.

Refer to Section 609.01 of the N.J.D.O.T. Standard Specifications.

347113.02 MATERIALS

Refer to Section 609.02 of the N.J.D.O.T. Standard Specifications.

347113.03 CONSTRUCTION

Refer to Section 609.03 of the N.J.D.O.T. Standard Specifications.

Refer to Section 609.03.06 of the N.J.D.O.T. Standard Specifications for the removal of beam guide rail.

347113.04 MEASUREMENT AND PAYMENT

Refer to Section 609.04 of the N.J.D.O.T. Standard Specifications.

Payment will be measured by the actual quantities installed and accepted by the Engineer as follows:

<u>Pay Item</u>	<u>Pay Unit</u>
Beam Guide Rail	Linear Foot

Payment for "Beam Guide Rail" shall include furnishing and installing beam guide rail, posts, end terminals and necessary accessories and all materials, labor, equipment and all else necessary therefore and all other work in connection therewith and incidental thereto.

END OF SECTION

VINYL FENCE SYSTEM
SECTION 350103

350103.01 DESCRIPTION

The contractor shall provide all labor, materials and appurtenances necessary for installation of the vinyl fence system defined herein.

350103.01.01 REFERENCES

- A. ASTM D4216 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Related Plastic Building Product Compounds
- B. ASTM F964-09 - Standard Specification for Rigid Poly (PVC) Exterior Profiles Used for Fencing and Railing.

350103.01.02 SUBMITTALS

- A. Shop Drawings: Showing fence design, style and colors, layout of fence and gates with dimensions and specified options, including details and finishes of component accessories and post foundations.
- B. Product Data: Submit manufacturer's product data, including style, installation instructions and certification of compliance with material specifications.

350103.01.03 WARRANTY

- A. Provide manufacturer's 20 year non-prorated warranty.

350103.01.04 QUALITY INSURANCE

- A. Engage an experienced installer who has at least three years experience and has completed at least five PVC fence projects with the same material and similar scope to that indicated for this project with a successful construction record of in-service performance.
- B. Obtain PVC fences and gates, including accessories, fittings and fastenings, from a single source.

350103.01.05 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation in a secure and dry place.

350103.02 MATERIALS

- A. Products from qualified manufacturers having a minimum of 5 years experience manufacturing PVC fencing will be acceptable by the Engineer as equal if they meet the following specifications for design, fabrication, and color and/or woodgrain. PVC Profiles, lineals & extrusions used as components must "meet or exceed" the minimum performance guidelines laid out in ASTM F964-09.
- B. Pickets, rails, and posts prefabricated sections using Rigid Poly Vinyl Chloride (PVC) compounds for exterior-profile extrusions with cell classification of 1-32333-3 as defined by ASTM D4216, that meets or exceeds the following properties:

- i. Color/Consistency Testing – The PVC compound in extruded section shall maintain uniform color and be free of any visual surface or structural changes, such as peeling, chipping, cracking, flaking, or pitting after weathering at intervals of six months and one year for white and for six months, one year, and two years for all other colors in a hot, dry climate such as Phoenix, AZ; a hot humid climate such as Miami, FL; and a temperate northern climate, when tested in accordance with ASTM Performance Weathering Requirements.
- ii. Weathering Testing – The PVC compound shall have a minimum impact resistance of 0.6in.-lb/mil (2670 J/m) after weathering six months and one year in a hot, dry climate such as Phoenix, AZ; a hot, humid climate such as Miami, FL; and a temperate northern climate, when tested in accordance with ASTM Performance Weathering Requirements. The PVC compound shall have successfully met the weathering requirements prescribed for six months at each climatic testing site prior to use in production of exterior-profile extrusions, when tested in accordance with ASTM Performance Weathering Requirements.
- iii. ASTM Specifications Met:
 - D256** – To determine Izod impact properties
 - D618** – Practice for Conditioning Plastics for Testing
 - D635** – Test Method for Rate of Burning and/or Extent and Time of Burning Plastics in a Horizontal Position
 - D638** – To determine tensile properties
 - D648** – To determine heat distortion temperature
 - D696** – Test Method for Coefficient of Linear Thermal Expansion of Plastics between $\varnothing 30^{\circ}\text{C}$ and 30°C with a Vitreous Silica Dilatometer
 - D790** – To determine flexural properties
 - D792** – To determine specific gravity
 - D883** – Terminology Relating to Plastics
 - D1435** – Practice for Outdoor Weathering of Plastics
 - D1600** – Terminology for Abbreviated Terms Relating to Plastics
 - D1784** – Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
 - D1898** – Practice for Sampling of Plastics
 - D2240** – To determine Shore hardness values
 - D2244** – Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates
 - D2565** – Practice for Xenon-Arc Exposure of Plastics Intended for Outdoor Applications
 - D4216** – Material Class Number 1-32333-3. To establish Cell Classification of PVC Material.
 - D4226** – Test Methods for Impact Resistance of Rigid Poly (Vinyl Chloride) (PVC) Building Products
 - D4726** – Specification for Rigid Poly (Vinyl Chloride)

350103.02.01 PVC VINYL FENCE PREFABRICATED SECTIONS

1. Style:
 - a. **Privacy**
 - b. Semi-Privacy
 - c. Contemporary Picket
 - d. Traditional Picket
 - e. Ornamental Picket
 - f. Classic Victorian Picket
2. Height:
 - a. 3 feet
 - b. 4 feet
 - c. 5 feet
 - d. **6 feet**
 - e. 7 feet
 - f. 8 feet
3. Width, Nominal Center to Center of Posts:
 - a. **8 feet – See drawing for exact measurement of each style section.**
4. Base Vertical Color:
 - a. Classic Series: **[White - C101]** [Beige -C102] [Gray - C103]
 - b. Color Spectrum (* Flat Matte Finish)
 - i. Landscape Series*: [Patio White - L101] [Tan - L102] [Seacoast Gray - L103] [Eastern Green - L104] [Black - L105] [Brown - L106] [Barn Red - L107] [Adobe - L108]
 - ii. Estate Series*: [Autumn Orange - E101] [Federal Blue - E102] [Colonial Yellow - E103] [Millennium Gray - E104] [Slate Gray E105] [Evergreen - E106] [Sahara - E107] [Brick Red - E108] [Olive - E109] [Burgundy - E110] [Antique White - E111] [Brownstone - E112] [Prairie Dust - E113] [Sky Blue - E114] [Sage - E115] [Midnight Blue - E116] [Hunter Green - E117] [Atlantic Blue - E118] [Bordeaux - E119] [Forest Green - E120] [Seafoam Green - E121] [Vintage Wine - E122] [Desert Sand - E123] [Dark Royal Blue - E124]
 - iii. Designer Series : Color Matching
 - c. Vinyl WoodBond*: [Mahogany - W101] [Cherry - W102] [Walnut - W103] [Rosewood - W104] [Eastern White Cedar - W105]
5. Post Options:
 - a. 5" x 5" - .140 wall
 - b. **5" x 5" H.D., - .250 wall**
 - c. Majestic™ 8 x 8 - .250 wall

6. Post Color:

- a. Classic Series: **[White - C101]** [Beige -C102] [Gray - C103]
- b. Color Spectrum (* Flat Matte Finish)
 - i.Landscape Series*: [Patio White - L101] [Tan - L102] [Seacoast Gray - L103] [Eastern Green - L104] [Black - L105] [Brown - L106] [Barn Red - L107] [Adobe - L108]
 - ii.Estate Series*: [Autumn Orange - E101] [Federal Blue - E102] [Colonial Yellow - E103] [Millennium Gray - E104] [Slate Gray E105] [Evergreen - E106] [Sahara - E107] [Brick Red - E108] [Olive - E109] [Burgundy - E110] [Antique White - E111] [Brownstone - E112] [Prairie Dust - E113] [Sky Blue - E114] [Sage - E115] [Midnight Blue - E116] [Hunter Green - E117] [Atlantic Blue - E118] [Bordeaux - E119] [Forest Green - E120] [Seafoam Green - E121] [Vintage Wine - E122] [Desert Sand - E123] [Dark Royal Blue - E124]
 - iii.Designer Series : Color Matching
- c. Vinyl WoodBond*: [Mahogany - W101] [Cherry - W102] [Walnut - W103] [Rosewood - W104] [Eastern White Cedar - W105]

7. Post Cap Style:

- a. New England V55NE
- b. **Flat V55FO**
- c. French Gothic V55FG
- d. Ball V55BC
- e. Coachman V55CM
- f. Teardrop V55TD
- g. Solar V55SO
- h. Palace Solar V55P

8. Post Cap Color:

- a. Classic Series: **[White - C101]** [Beige -C102] [Gray - C103]
- b. Color Spectrum (* Flat Matte Finish)
 - iv.Landscape Series*: [Patio White - L101] [Tan - L102] [Seacoast Gray - L103] [Eastern Green - L104] [Black - L105] [Brown - L106] [Barn Red - L107] [Adobe - L108]
 - v.Estate Series*: [Autumn Orange - E101] [Federal Blue - E102] [Colonial Yellow - E103] [Millennium Gray - E104] [Slate Gray E105] [Evergreen - E106] [Sahara - E107] [Brick Red - E108] [Olive - E109] [Burgundy - E110] [Antique White - E111] [Brownstone - E112] [Prairie Dust - E113] [Sky Blue - E114] [Sage - E115] [Midnight Blue - E116] [Hunter Green - E117] [Atlantic Blue - E118] [Bordeaux - E119] [Forest Green - E120] [Seafoam Green - E121] [Vintage Wine - E122] [Desert Sand - E123] [Dark Royal Blue - E124]
 - vi.Designer Series : Color Matching
- c. Vinyl WoodBond*: [Mahogany - W101] [Cherry - W102] [Walnut - W103] [Rosewood - W104] [Eastern White Cedar - W105]

350103.02.02 GATE HARDWARE AND ACCESSORIES

- A. General: Provide hardware and accessories for each gate according to the following requirements:
- B. Hinges: Size and material to suit gate size, non lift-off type. Provide three hinges for each gate. Use extra strong hinges.
 - a. Color: Black
- C. Latch: Manufacturer's standard self-latching, stainless steel composition single or dual access gravity latch. Provide one latch per gate. (#HLSS)
 - a. Finish: Match gate hinge finish.
- D. Hardware: Stainless Steel. Provide sizes as recommended by fence manufacturer.
 - a. Finish: Match gate hinge finish.
- E. Accessory Items:
 - a. Use one drop rod set per gate leaf.
 - b. Use one gate stop per gate set up.
 - c. Use one gate handle per gate.

350103.03 CONSTRUCTION

- A. Consult local code officials for compliance to building code requirements.
- B. Verify areas to receive fencing are completed to final grades and elevations.
- C. Ensure property lines and legal boundaries of work are clearly established.

350103.03.01 FENCE INSTALLATION

- A. Excavation: Drill or hand-excavate (using post hole digger) holes for posts to diameters and spacings indicated, in firm, undisturbed or compacted soil.
 - 1. Excavate holes for each post to a minimum diameter 12"
 - 2. Unless otherwise indicated, excavate hold depths not less than 30 inches or to frost line.
- B. Posts: Install posts in one piece per prefabricated section, plumb and in line. Installation method is one post and one section at a time for proper spacing.
 - 1. Protect portion of posts above ground from concrete splatter. Place concrete around posts and vibrate or tamp for consolidation. Check each post for vertical and top alignment and hold in position during placement and finishing operations.
 - a. Unless otherwise indicated, terminate top of concrete footings 3 inches below adjacent grade and trowel to a crown to shed water.
 - b. Secure posts in position with prefabricated section with manufacturer's recommendations until concrete sets.
 - c. Install post caps
 - d. Remove concrete splatters from PVC fence materials with care to avoid scratching.

- C. Fence Installation at Sloping Terrain: At sloping terrain, rails may be racked (sloped) or stepped to comply with manufacturer's recommendations.

350103.03.02 GATE INSTALLATION

- A. Use heavy duty gate posts (.250 wall) 5" x 5" or 8" x 8" per manufacturer's recommendations. Bottom rail should include minimum (2) 1/4" drainage holes.
- B. Install gates plumb, level, and secure for full opening without interference according to manufacturer's instructions.
- C. Gate Latch Installation. Install gate latch according to manufacturer's instructions. Adjust for smooth, trouble-free operation. Use extra strength hinges.
- D. Allow minimum 72 hours to let concrete set-up before opening gates.

350103.03.03 CLEANING

- A. Clean up all debris and unused material and remove from the site.

350103.04 MEASUREMENT AND PAYMENT

Payment will be measured by the actual quantities installed and accepted by the Engineer as follows:

<u>Pay Item</u>	<u>Pay Unit</u>
Vinyl Fence, 6' High	Linear Foot

Payment for "Vinyl Fence, 6' High" shall include all labor, materials, foundations, fence posts, rails, truss rods, ties, caps, equipment, gate and all else necessary therefore and all other work in connection therewith and incidental thereto for a complete and functioning installation.

END OF SECTION

BOLLARDS
500300

500300.01 Description

1.01 Summary

A. Section Includes:

1. Bollards are constructed of H.S. steel tube.

1.02 Submittals

A. Provide submittals in accordance with Section 013300 – Submittal Procedures.

B. Product Data:

1. Maintenance Instructions.
2. Storage and handling requirements and recommendations.
3. Installation instructions.

C. Shop Drawings

D. Samples:

1. Submit powdercoat finish samples.

1.03 Quality Assurance

A. Manufacturer Qualifications:

1. Manufacturing of site furnishings since 1983.

B. Product Support:

1. Products are supported with CAD drawings.
2. Warranty documentation is provided.

1.04 Delivery, Storage and Handling

- A. Deliver materials to site in manufacturer's original packaging, with order information and shipping documents.
- B. Store products in manufacturer's original packaging in a clean, dry environment until ready to be installed.
- C. Handle products in accordance with manufacturer's instructions.

1.05 Warranty

A. Provide manufacturer's standard warranty.

1. Products will be free from defects in components, standard finishes or workmanship for a period of five (5) years from date of manufacture.

500300.02 Materials

2.01 Manufacturer

- A. Maglin Site Furniture Inc., 3-468 Innovation Way, Woodstock, Ontario N4V 0B9 Canada. Toll Free: (800) 716.5506. Phone: (519) 539.6776. Fax: (877) 260.9393. Website: www.maglin.com. E-mail: sales@maglin.com or approved equal.**

2.02 Bollards

A. Model:

- MBO-0500-00001 Bollard

- B. Dimensions:
 - 1. Height: 34.5" (87.6 cm)
 - 2. Diameter: 4.5" (11.4 cm)
- C. Weight:
 - 47.44lbs (21.52kg.)

2.03 Materials

- A. MBO-0500-00001 Bollard is constructed of H.S. steel tube.
- B. Finishes
 - 1. All steel components are protected with Maglin's automotive-grade electrocoating for superior corrosion protection.
 - 2. Maglin Powdercoat System provides a durable finish on all metal surfaces.
 - 3. Maglin standard paint colors:
 - Fine Textured (Preferred for all cast aluminum products)
 - Silver14 FineTex
 - Gloss
 - Silver14

500300.03 Construction

3.01 Examination

- A. Do not begin installation until substrates are properly prepared.
- B. Verify that substrates are stable and capable of supporting the weight of the product.

3.02 Installation

- A. Install bollards in accordance with manufacturer's installation guidelines.
- B. MBO-0500-00001 bollards are delivered pre-assembled.
- C. It is available in four different removable and fixed installation types.

3.03 Adjusting

- A. Any loose or missing hardware should be tightened or replaced immediately.
- B. If any part is found to be cracked or broken it is recommended that the product be taken out of service until the appropriate repairs can be made.

3.04 Cleaning

- A. Metal Components
 - 1. Should dirt from the environment build-up on this surface a wipe with a soft cloth and mild detergent will do the trick.
 - 2. Abrasive cleaners, brushes and steel wool should be avoided.
 - 3. If the finish is marred by a sharp object and the steel is exposed take a fine abrasive material to the area to improve the adhesion of the primer and touch-up paint. A quality grade exterior metal primer and top coat of matching color enamel should then be applied over the prepared surface.

3.05 Protection

- A. Protect installed bollards until completion of project.

500300.04 Measurement and Payment

Payment will be measured by the actual quantities installed and accepted by the Engineer as follows:

<u>Pay Item</u>	<u>Pay Unit</u>
Bollards	Unit

Payment for "Bollards" shall include steel tube, all footings, site preparation, layout, bollard installation and all materials, labor, equipment and all else necessary therefore and all other work in connection therewith and incidental thereto.

END OF SECTION



STATE OF NEW JERSEY
Department of Labor and Workforce Development
Division of Wage and Hour Compliance - Public Contracts Section
PO Box 389
Trenton, NJ 08625-0389

PREVAILING WAGE RATE DETERMINATION

The New Jersey Prevailing Wage Act (N.J.S.A. 34:11-56.25 et seq.) requires that the Department of Labor and Workforce Development establish and enforce a prevailing wage level for workers engaged in public works in order to safeguard their efficiency and general well being and to protect them as well as their employers from the effects of serious and unfair competition.

Prevailing wage rates are wage and fringe benefit rates based on the collective bargaining agreements established for a particular craft or trade in the locality in which the public work is performed. In New Jersey, these rates vary by county and by the type of work performed.

Applicable prevailing wage rates are those wages and fringe benefits in effect on the date the contract is awarded. All pre-determined rate increases listed at the time the contract is awarded must also be paid, beginning on the dates specified. Rates that have expired will remain in effect until new rates are posted.

Prevailing Wage Rate

The prevailing wage rate for each craft will list the effective date of the rate and the following information :

W = Wage Rate per Hour

B = Fringe Benefit Rate per Hour*

T = Total Rate per Hour

- * Fringe benefits are an integral part of the prevailing wage rate. Employers not providing such benefits must pay the fringe benefit amount directly to the employee each payday. Employers providing benefits worth less than the fringe benefit amount must pay the balance directly to the employee each payday.

Unless otherwise stated in the Prevailing Wage Rate Determination, the fringe benefit rate for overtime hours remains at the straight time rate.

When the Overtime Notes in the Prevailing Wage Rate Determination state that the overtime rates are "inclusive of benefits," the benefit rate is increased by the same factor as the wage rate (i.e. multiplied by 1.5 for time and one-half, multiplied by 2 for double time, etc.).

Apprentice Rate Schedule

An "apprentice" is an individual who is registered with the United States Department of Labor - Office of Apprenticeship and enrolled in a certified apprenticeship program during the period in which they are working on the public works project.

The apprentice wage rate is a percentage of the journeyman wage rate, unless otherwise indicated. The apprentice benefit rate is the full journeyman benefit rate, unless otherwise indicated.

If there is no apprentice rate schedule listed, the individual must be paid at least the journeyman rate even if that individual is in a certified apprentice program for that trade.

If there is no ratio of apprentices to journeymen listed for a particular craft, then the ratio shall be one (1) apprentice to every four (4) journeymen.

Comments/Notes

For each craft listed there will be comments/notes that cover the definition of the regular workday, shift differentials, overtime, recognized holidays, and any other relevant information.

Public Works Contractor Registration

The Public Works Contractor Registration Act (N.J.S.A. 34:11-56.48, et seq.) requires that **all** contractors, subcontractors, or lower tier subcontractors who are working on or who bid on public works projects register with the Department of Labor and Workforce Development. Applications are available at www.nj.gov/labor (click on Wage & Hour and then go to Registration & Permits).

Pursuant to N.J.S.A. 34:11-56.51:

No contractor shall bid on any contract for public work as defined in section 2 of P.L.1963, c. 150 (C.34:11-56.26) unless the contractor is registered pursuant to this act. No contractor shall list a subcontractor in a bid proposal for the contract unless the subcontractor is registered pursuant to P.L.1999, c.238 (C.34:11-56.48 et seq.) at the time the bid is made. No contractor or subcontractor, including a subcontractor not listed in the bid proposal, shall engage in the performance of any public work subject to the contract, unless the contractor or subcontractor is registered pursuant to that act.

Snow Plowing

Snow plowing contracts are not subject to the New Jersey Prevailing Wage Act or the Public Works Contractor Registration Act.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Air Conditioning & Refrigeration - Service and Repair

PREVAILING WAGE RATE

	03/07/25
Journeyman (Mechanic)	W46.23 B31.42 T77.65

Craft: Air Conditioning & Refrigeration - Service and Repair

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
As Shown	1st Year	2nd Year	3rd Year	4th Year	5th Year	Wage = %	of Jnymn	Wage		
Wage and Bene	40%	50%	60%	70%	80%	Bene = %	of Jnymn	Bene		

Ratio of Apprentices to Journeymen - 1:4

Craft: Air Conditioning & Refrigeration - Service and Repair

COMMENTS/NOTES

THESE RATES MAY BE USED FOR THE FOLLOWING:

- Service/Repair/Maintenance Work to EXISTING facilities.
- Replacement or Installation of air conditioning and refrigeration equipment when the combined tonnage does not exceed 15 tons for refrigeration, or 25 tons for air conditioning.
- Replacement or Installation of "packaged" or "unitary" rooftop-type units when the combined tonnage of the units does not exceed 75 tons.

NOTE: These rates may NOT be used for any work in new construction (including work on new additions).

The regular workday shall consist of 8 hours, starting between 6:00 AM and 10:00 AM, Monday through Friday.

SHIFT DIFFERENTIALS:

- The second and third shifts shall be paid an additional 15% of the hourly rate.
- All shifts must run for a minimum of 5 consecutive days.

OVERTIME:

Hours worked in excess of 8 per day or before or after the regular workday, that are not shift work, and all hours on Saturday shall be paid at time and one-half the hourly rate, inclusive of benefits. All hours on Sunday and holidays shall be paid at double the hourly rate, inclusive of benefits.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Veterans' Day, Thanksgiving Day, Christmas Day.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Boilermaker

PREVAILING WAGE RATE

	01/12/24
Foreman	W54.11 B47.08 T101.19
General Foreman	W56.11 B48.14 T104.25
Journeyman	W49.11 B45.31 T94.42

Craft: Boilermaker

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
1000 Hours	65%	70%	75%	80%	85%	90%	95%			
Benefit =	38.33	39.30	40.32	41.31	42.32	43.32	44.30			

Ratio of Apprentices to Journeymen - *

* 1 apprentice will be allowed for the first 5 journeymen, 1 apprentice for the next 10 journeymen and 1 apprentice for each succeeding 20 journeymen up to a maximum of 5 apprentices per contractor on any job.

Craft: Boilermaker

COMMENTS/NOTES

HIGH WORK: All apprentices working on the erection, repair, or dismantling of smoke stacks, standpipes, or water towers shall be paid the Journeyman rate.

The regular workday shall consist of 8 hours, between 8:00 AM and 4:30 PM.

SHIFT DIFFERENTIALS:

- The second shift shall work 7.5 hours and receive 8 hours pay, at a rate equal to the regular hourly rate plus 10%.
- The third shift shall work 7 hours and receive 8 hours pay, at a rate equal to the regular hourly rate plus 20%.
- For "Municipal Water Works" projects only, the following shall apply: Two, four day, 10 hour shifts may be worked at straight time Monday through Thursday. The day shift shall work four days, at 10 hours, for 10 hours pay. The second shift shall work four days, at nine and a half hours, for 10 hours pay, plus 10% the hourly rate for new work and .25 cents on repair work. Friday may be used as a make-up day at straight time, due to weather conditions, holiday or any other circumstances beyond the employer's control.

OVERTIME:

- Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the hourly rate. All hours on Sundays and holidays (except Labor Day) shall be paid at double the hourly rate. All hours on Labor Day shall be paid at four times the hourly rate.
- If any other craft employed by the same contractor, or a subcontractor thereof, receives double time in lieu of time and one-half, then the Boilermaker shall receive double time in lieu of time and one-half.
- For "Municipal Water Works" projects only, the following shall apply: Four 10 hour days may be worked Monday through Thursday at straight time. Friday may be used as a make-up day for a day lost to inclement weather, holiday or other conditions beyond the control of the employer. Overtime shall be paid for any hours that exceed 10 hours per day or 40 hours per week.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

RECOGNIZED HOLIDAYS: New Year's Day, Washington's Birthday, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Boilermaker - Minor Repairs

PREVAILING WAGE RATE

	01/12/24
Foreman	W35.88 B17.89 T53.77
General Foreman	W36.38 B17.89 T54.27
Mechanic	W34.38 B17.89 T52.27

Craft: Boilermaker - Minor Repairs

COMMENTS/NOTES

NOTE: These rates apply to MINOR REPAIR WORK ONLY (repair work in the field for which the contract amount does not exceed \$125,000.00), for boilers that do not produce electric or are not used in the heating of petroleum products.

OVERTIME:

Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the hourly rate. All hours on Sundays and holidays (except Labor Day) shall be paid at double the hourly rate. All hours on Labor Day shall be paid at four times the hourly rate.

RECOGNIZED HOLIDAYS: New Year's Day, Washington's Birthday, Good Friday, Memorial Day, July 4th, Labor Day, Presidential Election Day, Thanksgiving Day, day after Thanksgiving, Christmas Day. Saturday holidays observed the preceding Friday, Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Bricklayer, Stone Mason

PREVAILING WAGE RATE

	05/13/25
Deputy Foreman	W52.60 B38.68 T91.28
Foreman	W57.35 B38.68 T96.03
Journeyman	W49.60 B38.68 T88.28

Craft: Bricklayer, Stone Mason

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
6 Months	40%	50%	55%	60%	65%	70%	75%	80%		
Benefits	4.66	5.83	6.41	6.99	25.90	27.73	29.57	31.38		

Ratio of Apprentices to Journeymen - 1:5

Craft: Bricklayer, Stone Mason

COMMENTS/NOTES

The regular workday shall consist of 8 hours, between 6:00 AM and 4:30 PM.

SHIFT DIFFERENTIALS:

- When a 2 shift schedule (including a day shift) is established, the first, or day shift, shall be established on an 8 hour basis. The second shift shall be established on an 8 hour basis, and receive the regular rate plus 10%, inclusive of benefits.
- When a three shift schedule is established, the first shift shall be established on an 8 hour basis, the second shift on a 7.5 hour basis, and the third shift on a 7 hour basis. The first shift shall receive the regular hourly rate, the second shift shall receive the regular rate plus 10%, inclusive of benefits, and the third shift shall receive the regular rate plus 15%, inclusive of benefits.
- When there is no day shift, and a second or third shift is established, it shall be established on an 8 hour basis. The second shift shall receive the regular rate plus 10%, inclusive of benefits, and the third shift shall receive the regular rate plus 15%, inclusive of benefits.
- When an irregular shift must be established, this shift shall receive the regular rate plus 10%, inclusive of benefits.

OVERTIME:

- The first 2 hours in excess of 8 per day, or before or after the regular workday that are not shift work, Monday through Friday, shall be paid at time and one-half the regular rate, inclusive of benefits. Any additional overtime shall be paid at double the regular rate, inclusive of benefits. The first 10 hours on Saturday shall be paid at time and one-half the regular rate, inclusive of benefits. Any additional overtime shall be paid at double the regular rate, inclusive of benefits. All hours on Sundays and holidays shall be paid at double the regular rate, inclusive of benefits.
- Saturday may be used as a make-up day for hours lost to inclement weather.
- When Bricklayers/Stone Masons work on Saturday with Laborers, and no other crafts are working on the project for the day, benefits may be paid at straight time. If other crafts are present, the applicable overtime rate for benefits shall be paid.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

RECOGNIZED HOLIDAYS: New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Carpenter

PREVAILING WAGE RATE

	06/03/25
Foreman	W66.03 B39.70 T105.73
General Foreman	W74.65 B44.81 T119.46
Journeyman	W57.42 B34.60 T92.02

Craft: Carpenter

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
Yearly	40%	55%	65%	80%	90%					
Benefit	59.25% of	Appren	tice	Wage Rate	for all	intervals	+ \$0.58			

Ratio of Apprentices to Journeymen - 1:3

For Solar installation- all work on solar projects that fall under the jurisdiction of the carpenters, and does not require an electrician, the ratio of Apprentices to Journeymen shall be 1:1.

Craft: Carpenter

COMMENTS/NOTES

APPRENTICE RATE SCHEDULE FOR THOSE APPRENTICES REGISTERED AS OF 5-1-19:

INTERVAL PERIOD AND RATES

Yearly 40% 55% 65% 80%

Benefits 59.25% of apprentice wage rate for all intervals + \$0.58

FOREMAN REQUIREMENTS:

- When there are 2 or more Carpenters on a job, 1 shall be designated as a Foreman.
- When there are 21 or more Carpenters on a job, 2 shall be designated as Foremen.
- When there are 36 or more Carpenters on a job, there shall be 1 General Foreman and 2 Foremen. Thereafter, an additional Foreman shall be required for each additional 10 Carpenters on a job.

The regular workday shall consist of 8 hours, starting between 6:00 AM and 9:00 AM.

SHIFT DIFFERENTIALS:

- When a 2 shift schedule (including a day shift) is established, the day shift shall be established on an 8 hour basis. The second shift shall be established on an 8 hour basis, and receive the regular rate plus 10%, inclusive of benefits.
- When a three shift schedule is established, the first shift shall be established on an 8 hour basis, the second shift on a 7.5 hour basis, and the third shift on a 7 hour basis. The first shift shall receive the regular hourly rate, the second shift shall receive the regular rate plus 10% and the third shift shall receive the regular rate plus 15%, inclusive of benefits.
- When there is no day shift, and a second or third shift is established, it shall be established on an 8 hour basis. The second shift shall receive the regular rate plus 10% and the third shift shall receive the regular rate plus 15%, inclusive of benefits.
- When an irregular shift must be established, this shift shall receive the regular rate plus 15%, inclusive of benefits.
- All time worked before and after a regularly established shift shall be paid at the applicable overtime rate. When a portion

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT

PREVAILING WAGE RATE DETERMINATION

County - CAPE MAY

of the regularly established shift works into Saturday, Sunday or a holiday, that time worked shall be paid at the established shift rate.

OVERTIME:

- All hours in excess of 8 per day, or before or after an established shift that are not shift work, and all hours on Saturdays shall be paid at time and one-half the hourly rate, inclusive of benefits. All hours on Sundays and holidays shall be paid at double the hourly rate, inclusive of benefits.
- Four 10-hour days may be worked, Monday to Thursday, at straight time. Friday may be used as a make-up day for a day lost due to inclement weather. If Friday is not a make-up day, all hours on Friday shall be paid at time and one-half the hourly rate, inclusive of benefits.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays observed the following Monday. Veterans' Day may be substituted for the day after Thanksgiving.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Carpenter - Resilient Flooring

PREVAILING WAGE RATE

	05/01/25
Foreman	W66.03 B39.62 T105.65
Journeyman	W57.42 B34.52 T91.94

Craft: Carpenter - Resilient Flooring

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
Yearly	40%	55%	65%	80%	90%					
Benefits	59.25% of	Appren	tice	Wage	for all	intervals	+ \$0.50			

Ratio of Apprentices to Journeymen - *

* Ratio is 1 apprentice to 2 journeymen. No more than 3 apprentices may be on any 1 project.

Craft: Carpenter - Resilient Flooring

COMMENTS/NOTES

APPRENTICE RATE SCHEDULE FOR THOSE APPRENTICES REGISTERED AS OF 5-1-19:

INTERVAL PERIOD AND RATES

Yearly 40% 55% 65% 80%

Benefits 59.25% of apprentice wage rate for all intervals + \$0.50.

FOREMAN REQUIREMENTS:

- On any job where there are 4 or more Carpenters of Resilient Flooring, 1 must be designated a Foreman.

FOR SYNTHETIC TURF INSTALLATION ONLY:

- The rate shall be 90% of the wage and benefit rate.

The regular workday consists of 8 hours, starting between 6:00 AM and 9:00 AM.

SHIFT DIFFERENTIALS:

- When a 2 shift schedule (including a day shift) is established, the day shift, shall be established on an 8 hour basis. The second shift shall be established on an 8 hour basis, and receive the regular wage rate plus 10%.
- When a three shift schedule is established, the first shift shall be established on an 8 hour basis, the second shift on a 7.5 hour basis, and the third shift on a 7 hour basis. The first shift shall receive the regular wage rate, the second shift shall receive the regular wage rate plus 10% and the third shift shall receive the regular wage rate plus 15%.
- When there is no day shift, and a second or third shift is established, it shall be established on an 8 hour basis. The second shift shall receive the regular wage rate plus 10% and the third shift shall receive the regular wage rate plus 15%.
- When an irregular shift must be established, this shift shall receive the regular rate plus 15%, inclusive of benefits.

OVERTIME:

- Hours in excess of 8 per day or 40 per week, or before or after the regular workday, Monday through Friday, shall be paid at time and one-half the wage rate. Saturday may be used as a make-up day, at straight time, up to 8 hours, for hours lost to reasons beyond the control of the employer, up to a total of 40 hours per week; hours in excess of 8 on Saturday shall then be paid at time and one-half the wage rate. If Saturday is not a make-up day, all hours on Saturday shall be paid at

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

time and one-half the wage rate. All hours on Sundays and holidays shall be paid at double the wage rate.

- Four 10-hour days may be worked, Monday to Thursday, at straight time. Friday may be used as a make-up day for hours lost to reasons beyond the control of the employer. If Friday is not a make-up day, all hours on Friday shall be paid at time and one-half the wage rate.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays will be observed the following Monday. Veterans' Day may be substituted for the day after Thanksgiving.

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

County - CAPE MAY

Craft: Cement Mason

PREVAILING WAGE RATE

See " Bricklayer, Stone Mason" Rates

Craft: Cement Mason

COMMENTS/NOTES

***See " Bricklayer, Stone Mason" Rates

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Commercial Painter

PREVAILING WAGE RATE

	05/01/25
Foreman	W50.11 B31.61 T81.72
General Foreman	W54.66 B31.61 T86.27
Journeyman	W45.55 B31.61 T77.16

Craft: Commercial Painter

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
6 Months	40%	45%	55%	65%	70%	75%	80%	80%		
Benefits	9.84	9.84	12.55	12.55	13.65	13.65	16.55	16.55		

Ratio of Apprentices to Journeymen - 1:4

Craft: Commercial Painter

COMMENTS/NOTES

* Commercial Painters perform work on all commercial structures such as offices, schools, hotels, shopping malls, restaurants, condominiums, etc.

Spraying, sandblasting, lead abatement work on commercial buildings, work performed above 3 stories or 30 feet in height, or using swing scaffolds requires an additional 10% of the wage rate.

FOREMEN REQUIREMENTS:

- When there are 4 or more Painters on a job, 1 shall be designated a Foreman.
- When there are 15 or more Painters on a job, 1 shall be designated a General Foreman.

The regular workday shall consist of 8 hours between 7:00 AM and 5:30 PM.

SHIFT DIFFERENTIALS:

- The second shift shall receive an additional 10% of the hourly rate, per hour, and the third shift shall receive an additional 15% of the hourly rate, per hour.

OVERTIME:

- Hours in excess of 8 per day, or before or after the regular workday, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the regular rate. All hours on Sundays and holidays shall be paid at double the regular rate.
- Saturday or Sunday may be used to make up a day lost to inclement weather, at straight time.
- Four 10-hour days may be worked, at straight time, Monday through Friday.

RECOGNIZED HOLIDAYS: New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, General Election Day,

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Veterans' Day, Thanksgiving Day, Christmas Day.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Diver

PREVAILING WAGE RATE

	05/01/25
Diver	W60.31 B45.12 T105.43
Tender	W48.25 B45.12 T93.37

Craft: Diver

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
1500 hours	70%	75%	80%	85%						
Benefits	32.48	33.60	34.72	35.85						

Ratio of Apprentices to Journeymen - 1:4

Craft: Diver

COMMENTS/NOTES

NOTE: All dive crews must consist of a Tender, a Diver, and a Standby Diver (Standby Diver is the same rate as a Diver).

- Diver- will perform all Dive related tasks at hand.
- Tender- will provide Tending support to the in water Diver and who may also be designated as a Standby Diver .

Diving in Contaminated Water (including, but not limited to, radioactively contaminated water, sewer effluent combined sanitary and storm sewers, or any environment known to be harmful to those with skin contact): Shall receive an additional 20% of the hourly rate.

OVERTIME:

- The first 2 hours in excess of 8 per day (9th and 10th hours), Monday through Friday, and the first 8 hours on Saturdays shall be paid at time and one-half the hourly rate. Hours in excess of 10 per day, Monday through Friday, hours in excess of 8 per day on Saturdays, and all hours on Sundays and holidays shall be paid at double the hourly rate.
- Employees may work four 10-hour days, Monday through Thursday, at straight time, with Friday used as a make-up day for a day lost to inclement weather. If Friday is not a make-up day, the first 10 hours on Friday shall be paid at time and one-half the hourly rate. Hours in excess of 10 per day shall be paid at double the hourly rate.

RECOGNIZED HOLIDAYS: New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day, Christmas Day. Saturday holidays will be observed the preceeding Friday and Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Dockbuilder/Pile Driver

PREVAILING WAGE RATE

	05/01/25
Foreman	W57.90 B45.12 T103.02
Journeyman	W48.25 B45.12 T93.37

Craft: Dockbuilder/Pile Driver

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
1500 hours	40%	50%	65%	80%						
Benefits	26.02	28.27	31.46	34.78						

Ratio of Apprentices to Journeymen - 1:3

Craft: Dockbuilder/Pile Driver

COMMENTS/NOTES

NOTE: The following shall be required for type of work indicated-

- There shall be one foreman and four journeymen on all land pile driving rigs. As part of the crew, one may be an apprentice.
- There shall be one foreman and two journeymen on self-contained hydraulic driving rigs. As part of the crew, one may be an apprentice.
- There shall be one foreman and two journeymen when driving sheeting with an excavator. As part of the crew, one may be an apprentice.
- When utilizing a drill rig to install Auger cast piles there shall be one foreman and two journeymen. As part of the crew, one may be an apprentice.
- There shall be one journeyman on drilled or bored soldier piles.
- There shall be not less than one journeyman per rig on all drilled shaft and caissons.
- There shall be not less than one journeyman per rig on all earth retention tie-back and anchors.

Creosote Handling:

- May 1st to Sept. 30th: + \$0.50 above hourly rate
- Oct. 1st to April 30th: + \$0.25 above hourly rate

Hazardous Material Work:

- On hazardous material work on a state or federally designated hazardous work site where the worker is required to wear Level A, B or C personal protection, the worker shall receive an additional 20% of the hourly rate, per hour.
- A Dockbuilder/Pile Driver working on a hazardous waste removal project, or site requiring hazardous waste related certification, but who is not working in a zone requiring level A, B or C personal protection, shall receive the hourly rate plus an additional \$1.00 per hour. This type of work does not include the handling of creosote or CCA materials; coated materials such as bitumastic, or galvanized; painted materials or any products designed to be used in the industry.

FOREMAN REQUIREMENTS:

- When there are 3 or more Dockbuilders/Pile Drivers on a job, 1 shall be designated as a Foreman.

SHIFT WORK:

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

- Shift work pertains to both land and water work.
- When a 2 shift schedule (including a day shift) is established, the first shift shall start between 5:00 am and 8:00 am and work for 7 and one-half hours and receive 8 hours pay. The second shift shall start when the first shift ends and shall work for 7 and one-half hours and receive 8 hours pay.
- When a three shift schedule is established, all shifts shall work 7 and one-half hours and receive 8 hours pay.
- When there is no day shift, and a second or third shift is established, a worker shall be paid at time and one-half of the hourly rate.

OVERTIME:

- The first 2 hours in excess of 8 per day (9th and 10th hours), Monday through Friday, and the first 8 hours on Saturdays shall be paid at time and one-half the hourly rate. Hours in excess of 10 per day, Monday through Friday, hours in excess of 8 per day on Saturdays, and all hours on Sundays and holidays shall be paid at double the hourly rate.
- Employees may work four 10-hour days, Monday through Thursday, at straight time, with Friday used as a make-up day for a day lost to inclement weather. If Friday is not a make-up day, the first 10 hours on Friday shall be paid at time and one-half the hourly rate. Hours in excess of 10 per day shall be paid at double the hourly rate.

RECOGNIZED HOLIDAYS: New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day, Christmas Day. Saturday holidays will be observed the preceeding Friday and Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Drywall Finisher

PREVAILING WAGE RATE

	05/13/25
Foreman	W49.36 B31.65 T81.01
General Foreman	W51.60 B31.65 T83.25
Journeyman	W44.87 B31.65 T76.52

Craft: Drywall Finisher

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
Yearly	22.44	29.17	35.90	40.38						
Benefits	17.98	17.98	17.98	17.98						

Ratio of Apprentices to Journeymen - 1:4

Craft: Drywall Finisher

COMMENTS/NOTES

The regular workday shall consist of 8 hours between 7:00 AM and 5:30 PM.

SHIFT DIFFERENTIALS:

- The second shift shall receive an additional 10% of the hourly rate, per hour, and the third shift shall receive an additional 15% of the hourly rate, per hour.
- When 3 shifts are worked, the second shift shall receive 8 hours pay for 7.5 hours of work, and the third shift shall receive 8 hours pay for 7 hours of work.
- Shift work must run for a minimum of 5 consecutive workdays.

OVERTIME:

- Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the regular rate, inclusive of benefits. All hours on Sundays and holidays shall be paid at double the regular rate, inclusive of benefits.
- Saturday or Sunday may be used to make up a day lost to inclement weather, at straight time.

RECOGNIZED HOLIDAYS: New Year's Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Saturday holiday observed the preceding Friday. Sunday holiday observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Electrician

PREVAILING WAGE RATE

	09/29/25
Asst. General Foreman	W68.80 B60.51 T129.31
Foreman	W64.21 B56.93 T121.14
General Foreman	W74.53 B65.00 T139.53
Journeyman, Cable Splicer	W57.33 B51.54 T108.87
Lead Foreman	W65.93 B58.28 T124.21
Working Foreman, Welder, Crane Operator (all types)	W60.20 B52.29 T112.49

Craft: Electrician

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
Yearly	16.30	20.70	23.40	27.63	31.87					
Benefits	8.14	9.39	10.15	11.36	12.56					

Ratio of Apprentices to Journeymen - 2:3

Craft: Electrician

COMMENTS/NOTES

APPRENTICE RATE SCHEDULE AS OF 9-29-25:

INTERVAL	PERIOD AND RATES				
Yearly	17.20	21.70	24.40	28.63	32.87
Benefits	8.39	9.67	10.44	11.65	12.84

THESE RATES ALSO APPLY TO THE FOLLOWING:

- All fire and burglar alarm work.
- All fiber optic work.
- Teledata work in new construction (including additions).
- Teledata work involving 16 or more instruments or voice/data lines.
- All camera installations.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Height Work: 40 feet above ground/floor: +10% of the wage and benefit amount.

FOREMAN REQUIREMENTS (number of Electricians on site):

(2 to 10) - a Working Foreman; (11 to 22) - a Foreman; (23 to 44) - a Lead

Foreman; (35 to 48) - an Assistant General Foreman; (49 or more) - a General Foreman.

The regular workday consists of 8 hours, between 7:00 AM and 4:30 PM.

SHIFT DIFFERENTIALS:

- Shift work must run for a minimum of 5 consecutive workdays
- 2nd Shift (4:30 PM to 12:30 AM): 8 hrs. pay for 7.5 hrs. work + an additional 10% of the wage rate, inclusive of benefits.
- 3rd Shift (12:30 AM to 8:00 AM): 8 hrs. pay for 7 hrs. work + an additional 15% of the wage rate, inclusive of benefits.

OVERTIME:

The first 4 hours in excess of 8 per day, or before or after the regular workday, Monday through Friday, and the first 8 hours on Saturdays, shall be paid at time and one-half the regular rate, inclusive of benefits. Hours in excess of 12 per day, Monday through Friday, in excess of 8 on Saturdays, and all hours on Sundays and holidays shall be paid at double the regular rate, inclusive of benefits.

RECOGNIZED HOLIDAYS: New Year's Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Electrician - Teledata (15 Voice/Data Lines & Less)

PREVAILING WAGE RATE

	09/18/24
Master Technician/Gen. Foreman (31+ Workers on Job)	W52.80 B39.65 T92.45
Senior Technician/Lead Foreman (21-30 Workers on Job)	W48.25 B38.15 T86.40
Technician A/Foreman (11-20 Workers on Job)	W46.14 B37.46 T83.60
Technician B/Working Foreman (4-10 Workers on Job)	W44.89 B36.05 T80.94
Technician C/Journeyman (1-3 Workers on Job)	W41.00 B33.77 T74.77

Craft: Electrician - Teledata (15 Voice/Data Lines & Less)

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
6 Months	17.26	17.26	20.54	20.54	25.48	25.48	30.02	30.02		
Benefits	9.85	9.85	10.82	10.82	12.77	12.77	15.12	15.12		

Ratio of Apprentices to Journeymen - 2:3

Craft: Electrician - Teledata (15 Voice/Data Lines & Less)

COMMENTS/NOTES

NOTES: These rates are for service, maintenance, moves and/or changes affecting 15 voice/data lines or less. These rates may NOT be used for any new construction or fiber optic work.

FOREMAN REQUIREMENTS:

The number of workers on the jobsite is the determining factor for which Foreman category applies.

HIGH WORK: Any work performed 40 feet above ground or floor: +10% of the wage and benefit amount.

SHIFT DIFFERENTIAL:

- 2nd Shift (4:30 PM to 12:30 AM) - 8 hrs. pay for 7.5 hrs. work + an additional 10% of the wage rate, inclusive of benefits.
- 3rd Shift (12:30 AM to 8:00 AM) - 8 hrs. pay for 7 hrs. work + an additional 15% of the wage rate, inclusive of benefits.

OVERTIME:

Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the regular rate, inclusive of benefits. All hours on Sundays and holidays shall be paid at double the regular rate, inclusive of benefits.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

RECOGNIZED HOLIDAYS: New Year's Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans Day, Thanksgiving Day, Christmas Day. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Electrician - Teledata (16 Instruments & More)

PREVAILING WAGE RATE

See "Electrician" Rates

Craft: Electrician - Teledata (16 Instruments & More)

COMMENTS/NOTES

See ELECTRICIAN Rates

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Electrician- Outside Commercial

PREVAILING WAGE RATE

	09/29/25
Assistant General Foreman	W68.80 B60.48 T129.28
Foreman	W64.21 B56.86 T121.07
General Foreman	W74.53 B65.01 T139.54
Groundhand, Truck Driver, Conduit Installer (1 year or more experience)	W28.67 B28.62 T57.29
Groundhand, Truck Driver, Conduit Installer (2 years or more experience)	W40.13 B37.61 T77.74
Groundhand, Truck Driver, Conduit Installer (3 years or more experience)	W48.73 B43.78 T92.51
Groundhand, Truck Driver, Conduit Installer (less than 1 year exp.)	W22.93 B1.57 T24.50
Journeyman Lineman	W57.33 B51.42 T108.75
Lead Foreman	W65.93 B58.21 T124.14
Working Foreman	W60.20 B52.19 T112.39

Craft: Electrician- Outside Commercial

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
6 Months	25.52	27.63	29.75	31.87	33.99	36.11	38.22			
Benefits	10.55	11.17	11.77	12.40	13.01	13.63	14.25			

Craft: Electrician- Outside Commercial

COMMENTS/NOTES

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

APPRENTICE RATE SCHEDULE AS OF 9-29-25:

INTERVAL		PERIOD AND RATES						
6 Months	26.52	28.63	30.75	32.87	34.99	37.11	39.22	
Benefits	12.07	12.77	13.49	14.21	14.92	15.63	16.35	

* FOR UTILITY WORK PLEASE SEE STATEWIDE RATES

FOREMAN REQUIREMENTS (number of Electricians on site):

(1 to 10)- one Working Foreman.

(11 to 20)- one Working Foreman and one Foreman.

(21 to 30)- one Working Foreman, one Foreman and one Lead Foreman.

(31 to 40) - one Working Foreman, two (2) Foremen and one Lead Foreman.

(41 to 50)- one Working Foreman, four (4) Foremen, one Assistant General Foreman (runs 5 foremen), and one General Foreman.

(51 to 60)- one Working Foreman, five (5) Foremen, one Assistant General Foreman (runs 5 foremen), and one General Foreman

(runs one foreman).

(61 to 70)- one Working Foreman, six (6) Foremen, one Assistant General Foreman (runs 5 foremen), and one General Foreman

(runs two foremen).

(71 to 80)- one Working Foreman, seven (7) Foremen, two (2) Assistant General Foremen and one General Foreman.

(81 to 90)- one Working Foreman, eight (8) Foremen, two (2) Assistant General Foremen, and one General Foreman.

(91 to 100)- one Working Foreman, nine (9) Foremen, two (2) Assistant General Foremen and one General Foreman.

The regular workday consists of 8 hours, between 7:00 AM and 4:30 PM.

SHIFT DIFFERENTIALS:

Shift work must run for a minimum of 5 consecutive workdays.

2nd Shift (4:30 PM to 12:30 AM): 8 hrs. pay for 7.5 hrs. work + an additional 10% of the wage rate, inclusive of benefits.

3rd Shift (12:30 AM to 8:00 AM): 8 hrs. pay for 7 hrs. work + an additional 15% of the wage rate, inclusive of benefits.

OVERTIME:

All hours in excess of 8 per day, Monday through Friday, that are not shift work, and all hours on Saturday shall be paid at time and one-half the regular rate, inclusive of benefits. All hours on Sundays and Holidays shall be paid at double the regular rate, inclusive of benefits.

RECOGNIZED HOLIDAYS:

New Year's Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Electrician-Utility Work (North)

PREVAILING WAGE RATE

Rates are located in the "Statewide" rate package

Craft: Electrician-Utility Work (North)

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
* 6 Months	60%	65%	70%	75%	80%	85%	90%			
Benefits	69% of	Appren	tice	Wage	Rate	for all	Intervals			

Craft: Electrician-Utility Work (North)

COMMENTS/NOTES

Electrician-Utility Work (North) rates are located in the "Statewide" rate package.

* The apprentice wage rate is paid at the percentage of the Journeyman Lineman wage rate located in the "Statewide" rate package.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Electrician-Utility Work (South)

PREVAILING WAGE RATE

Rates are located in the "Statewide" rate package

Craft: Electrician-Utility Work (South)

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
6 Months	33.69	36.50	39.31	42.11	44.92	47.73	50.54			
Benefits	29.97	31.72	33.46	35.21	36.96	38.71	40.45			

Craft: Electrician-Utility Work (South)

COMMENTS/NOTES

Electrician-Utility Work (South) rates are located in the "Statewide" rate package.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Elevator Constructor

PREVAILING WAGE RATE

	01/01/25
Helper-Over 5 Years	W50.30 B44.05 T94.35
Helper-Under 5 Years	W50.30 B43.05 T93.35
Mechanic (Journeyman) over 5 years	W71.85 B45.78 T117.63
Mechanic (Journeyman) under 5 years	W71.85 B44.37 T116.22
Mechanic in Charge (Foreman) over 5 years	W80.83 B46.50 T127.33
Mechanic in Charge (Foreman) under 5 years	W80.83 B44.88 T125.71
Probationary Helper (1st 6 months)	W35.93 B42.19 T78.12

Craft: Elevator Constructor

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
Yearly	55%	65%	70%	80%						
Benefits	full	journeyma n	benefit	rate for	all	intervals				

Ratio of Apprentices to Journeymen - *

* Total number of helpers and apprentices shall not exceed the number of mechanics on the job , except where 2 teams are working, 1 additional helper or apprentice may be employed for first 2 teams and an extra helper or apprentice for each additional 3 teams. Further, the employer may use as many helpers or apprentices as needed under the direction of a mechanic in wrecking of old plants, handling and hoisting material, and on foundation work. When replacing cables on existing elevators, employer may use 2 helpers or apprentices to 1 mechanic.

Craft: Elevator Constructor

COMMENTS/NOTES

SHIFT DIFFERENTIALS:

- 2nd Shift (4:30 PM to 12:30 AM) shall be established on the basis of 7.5 hours of work for 8 hours of pay, plus an additional 10% per hour.
- 3rd Shift (12:30 AM to 8:00 AM) shall be established on the basis of 7 hours of work for 8 hours of pay, plus an additional 15% per hour.

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT

PREVAILING WAGE RATE DETERMINATION

County - CAPE MAY

OVERTIME:

- Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays, Sundays, and holidays shall be paid at double the hourly rate.
- Four 10-hour days may be worked, Monday to Thursday or Tuesday to Friday, at straight time. When working a 4-10 hour day schedule, all hours worked on a day other than the days established for the 4-10 hour schedule shall be paid at double the hourly rate.

RECOGNIZED HOLIDAYS: New Year's Day, Memorial Day, July 4th, Labor Day, Veterans' Day, Thanksgiving Day and day after, Christmas Day. Saturday holidays observed the preceding Friday, Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Glazier

PREVAILING WAGE RATE

	05/01/25
Foreman	W53.96 B38.34 T92.30
Journeyman	W49.96 B38.34 T88.30

Craft: Glazier

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
Yearly	23.48	24.98	27.97	31.47						
Benefits	20.41	23.18	24.66	27.10						

Ratio of Apprentices to Journeymen - 1:3

Craft: Glazier

COMMENTS/NOTES

HIGH WORK (30 feet above ground /floor or using a swing stage): +\$1.00/hr

FOREMAN REQUIREMENT:

- When 4 or more Glaziers are working on a job that runs for 10 days or more, 1 shall be designated a Foreman.

The regular workday shall be 8 hours, between 6:00 AM and 4:30 PM.

SHIFT DIFFERENTIALS:

- Second and Third shift shall receive the regular hourly rate, plus 15% per hour.

OVERTIME:

- The first 2 hours in excess of 8 per day (9th and 10th hours), or outside the regular workday, Monday through Friday, that are not shift work, and the first 8 hours on Saturdays shall be paid at time and one-half the regular rate. All other daily overtime, and all hours on Sundays and holidays shall be paid at double the regular rate.

- Four 10-hour days may be worked at straight time, Monday through Friday. The 11th and 12th hours on the 4 days worked, and the first 12 hours on the fifth day shall be paid at time and one-half the regular rate. All other daily overtime, and all hours on Saturdays, Sundays, and holidays shall be paid at double the regular rate.

- Benefits on overtime hours are as follows:

Time and one-half = \$47.44/hr.

Double time = \$56.54/hr.

RECOGNIZED HOLIDAYS: New Year's Day, Memorial Day, July 4th, Thanksgiving Day, Christmas Day.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Heat & Frost Insulator

PREVAILING WAGE RATE

	07/01/25
Foreman	W57.30 B40.95 T98.25
Journeyman	W55.80 B40.95 T96.75

Craft: Heat & Frost Insulator

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
Yearly	45%	55%	65%	75%	80%					
Benefit	37.20	for	all	intervals						

Ratio of Apprentices to Journeymen - *

* Ratio = 1:4 on a "company-wide" basis (i.e. the total number of apprentices and journeymen employed by the company). There is no limit to the number of apprentices allowed on any one job, provided there is at least 1 journeyman on the job.

Craft: Heat & Frost Insulator

COMMENTS/NOTES

FOREMAN REQUIREMENTS:

- If there is only 1 Insulator on the job, he must be designated a Foreman.
- If there are 2 to 10 Insulators on the job, 1 must be designated a Foreman.
- If there are 11 or more Insulators on the job, 1 must be designated a General Foreman and receive the following additional pay (% above Journeyman wage rate):
 - 11 - 20 Insulators on site: 10%; 21 - 30 Insulators on site: 15%;
 - 31 - 40 Insulators on site: 20%; 41 - 50 Insulators on site: 25%

The regular workday shall be 8 hours between 7:00 AM and 3:30 PM.

SHIFT DIFFERENTIALS:

- Shift work must run for a minimum of two (2) consecutive days and a minimum of two (2) shifts per day must be worked. Additionally, no less than two (2) employees may work on any one (1) shift. If these requirements are not met then shift work would not apply and the applicable overtime rate shall be paid.
- 1st Shift- Monday through Friday (7:00 AM- 3:00 PM).
- 2nd Shift- Monday through Friday (3:00 PM -11:00 PM): additional 15% of the regular rate, inclusive of benefits.
- 3rd Shift- Monday through Friday (11:00 PM -7:00 AM): additional 20% of the regular rate, inclusive of benefits.
- When a single night shift is established by the project owner for work not accessible during the day (due to the building being occupied), Monday through Friday, work performed during a second shift (3:00 PM-11:00 PM) shall be paid an additional 20% of the regular rate, inclusive of benefits, and work performed during a third shift (11:00 PM- 7:00 AM) shall be paid an additional 25% of the regular rate, inclusive of benefits.

OVERTIME:

- Hours in excess of 8 per day, or before or after the regular workday Monday through Friday, that are not shift work, and all hours on Saturday, shall be paid at time and one-half the regular rate, inclusive of benefits. All hours on Sunday and holidays (except Labor Day) shall be paid at double the regular rate, inclusive of benefits. All hours on Labor Day shall be paid at triple the regular rate, inclusive of benefits.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

RECOGNIZED HOLIDAYS: New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, Veteran's Day, Presidential Election Day, Thanksgiving Day, Christmas Day. Saturday holidays observed the preceding Friday, Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Heat & Frost Insulator - Asbestos Worker

PREVAILING WAGE RATE

	07/01/25
Foreman	W57.30 B40.95 T98.25
Journeyman	W55.80 B40.95 T96.75

Craft: Heat & Frost Insulator - Asbestos Worker

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
	SEE	Heat &	Frost	Insulator						

Craft: Heat & Frost Insulator - Asbestos Worker

COMMENTS/NOTES

NOTE: These rates apply only to the REMOVAL of insulation materials/asbestos from mechanical systems, including containment erection and demolition, and placing material in appropriate containers.

FOREMAN REQUIREMENTS:

- If there is only 1 Asbestos Worker on the job, he must be designated an Abatement Foreman.
- If there are 2 to 10 Asbestos Workers on the job, 1 must be designated an Abatement Foreman.
- If there are 11 or more Asbestos Workers on the job, 1 must be designated a General Foreman and receive the following additional pay (% above Abatement Mechanic wage rate):
 - 11 - 20 Insulators on site: 10%; 21 - 30 Insulators on site: 15%;
 - 31 - 40 Insulators on site: 20%; 41 - 50 Insulators on site: 25%

MECHANIC-TO-APPRENTICE RATIO:

- Maximum of 5 Apprentices for each Abatement Mechanic on the job.

OVERTIME:

- Hours in excess of 8 per day, and all hours on Saturday, shall be paid at time and one-half the regular rate, inclusive of benefits. All hours on Sunday and holidays (except Labor Day) shall be paid at double the regular rate, inclusive of benefits. All hours on Labor Day shall be paid at triple the regular rate, inclusive of benefits.

RECOGNIZED HOLIDAYS: New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, Veteran's Day, Presidential Election Day, Thanksgiving Day, Christmas Day. Saturday holidays observed the preceding Friday, Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Industrial Painter- Bridges

PREVAILING WAGE RATE

	02/07/25	02/01/26
Foreman	W64.80 B37.40 T102.20	W0.00 B0.00 T104.20
General Foreman	W67.30 B37.40 T104.70	W0.00 B0.00 T106.70
Journeyman	W59.80 B37.40 T97.20	W0.00 B0.00 T99.20

Craft: Industrial Painter- Bridges

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
6 Months	50%	70%	90%							
Benefits	14.62	21.61	28.11							

Ratio of Apprentices to Journeymen - 1:3

Craft: Industrial Painter- Bridges

COMMENTS/NOTES

* Industrial Painters perform work on all industrial structures, such as bridges.

These rates apply to: All bridges that span waterways, roadways, railways and canyons. All tunnels, overpasses, viaducts and all appurtenances.

FOREMEN REQUIREMENTS:

- When there are 4 or more Painters on a job, 1 shall be designated a Foreman.
- When there are 15 or more Painters on a job, 1 shall be designated a General Foreman.

The regular workday shall consist of 8 hours between 7:00 AM and 5:30 PM.

SHIFT DIFFERENTIALS:

- The second shift shall receive an additional 10% of the hourly rate, per hour, and the third shift shall receive an additional 15% of the hourly rate, per hour.

OVERTIME:

- Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays and Sundays shall be paid at time and one-half the regular rate. All hours on holidays shall be paid at double the regular rate, except Veterans Day, which shall be paid at time and one-half the regular rate.
- During a regular work week schedule, Saturday may be used as a make-up day lost to inclement weather, paid at the regular rate.

Four 10-hour days may be worked, at the regular rate, Monday through Thursday. When the four 10-hour day schedule is used, the 11th and 12th hours shall be paid at time and one-half the regular rate. After the 12th hour, a worker shall be paid at double the regular rate. Friday may be used as a make-up day lost to inclement weather, paid at the regular rate.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

RECOGNIZED HOLIDAYS: New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans Day, Thanksgiving Day, Christmas Day. Saturday holiday observed the preceding Friday. Sunday holiday observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Industrial Painter- Structural Steel

PREVAILING WAGE RATE

	02/07/25	02/01/26
Foreman	W53.54 B35.05 T88.59	W0.00 B0.00 T90.59
General Foreman	W56.04 B35.05 T91.09	W0.00 B0.00 T93.09
Journeyman	W48.54 B35.05 T83.59	W0.00 B0.00 T85.59

Craft: Industrial Painter- Structural Steel

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
	SEE	INDUST	RIAL	PAINTER	BRIDGES					

Ratio of Apprentices to Journeymen - 1:3

Craft: Industrial Painter- Structural Steel

COMMENTS/NOTES

* Industrial Painters perform work on all industrial structures, such as water tanks, waste water facilities, refineries, any structural steel work, etc.

These rates apply to: All work in power plants (any aspect). On steeples, on dams, on hangers, transformers, substations, on all open steel, in refineries, tank farms, water/sewerage treatment facilities and on pipelines.

FOREMEN REQUIREMENTS:

- When there are 4 or more Painters on a job, 1 shall be designated a Foreman.
- When there are 15 or more Painters on a job, 1 shall be designated a General Foreman.

The regular workday shall consist of 8 hours between 7:00 AM and 5:30 PM.

SHIFT DIFFERENTIALS:

- The second shift shall receive an additional 10% of the hourly rate, per hour, and the third shift shall receive an additional 15% of the hourly rate, per hour.

OVERTIME:

- Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays and Sundays shall be paid at time and one-half the regular rate. All hours on holidays shall be paid at double the regular rate, except for Veterans Day, which shall be paid at time and one-half the regular rate.
- During the regular work week schedule, Saturday may be used to make-up a day lost to inclement weather, paid at the regular rate.
- Four 10-hour days may be worked, at the regular rate, Monday through Thursday. When the four 10-hour day schedule is used, the 11th and 12th hours shall be paid at time and one-half the regular rate. After the 12th hour, a worker shall be paid at double the regular rate. Friday may be used as a make-up day lost to inclement weather, paid at the regular rate.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

RECOGNIZED HOLIDAYS: New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans Day, Thanksgiving Day, Christmas Day. Saturday holiday observed the preceding Friday. Sunday holiday observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Industrial Painter- Water Tanks

PREVAILING WAGE RATE

	02/07/25	02/01/26
Foreman	W54.59 B34.70 T89.29	W0.00 B0.00 T91.29
General Foreman	W57.09 B34.70 T91.79	W0.00 B0.00 T93.79
Journeyman	W49.59 B34.70 T84.29	W0.00 B0.00 T86.29

Craft: Industrial Painter- Water Tanks

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
6 Months	50%	70%	90%							
Benefits	14.62	21.61	28.11							

Ratio of Apprentices to Journeymen - 1:3

Craft: Industrial Painter- Water Tanks

COMMENTS/NOTES

* Industrial Painters perform work on all industrial structures, such as water tanks, waste water facilities, refineries, any structural steel work, etc.

These rates apply to: All new and repaint water tanks (interior and exterior).

FOREMEN REQUIREMENTS:

- When there are 4 or more Painters on a job, 1 shall be designated a Foreman.
- When there are 15 or more Painters on a job, 1 shall be designated a General Foreman.

The regular workday shall consist of 8 hours between 7:00 AM and 5:30 PM.

SHIFT DIFFERENTIALS:

- The second shift shall receive an additional 10% of the hourly rate, per hour, and the third shift shall receive an additional 15% of the hourly rate, per hour.

OVERTIME:

- Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays and Sundays shall be paid at time and one-half the regular rate. All hours on holidays shall be paid at double the regular rate, except Veterans Day, which shall be paid at time and one-half the regular rate.
- During a regular work week schedule, Saturday may be used to make-up a day lost to inclement weather, paid at the regular rate.
- Four 10-hour days may be worked, at the regular rate, Monday through Thursday. When the four 10-hour day schedule is used, the 11th and 12th hours shall be paid at time and one-half the regular rate. After the 12th hour, a worker shall be paid at double the regular rate. Friday may be used as a make-up day lost to inclement weather, paid at the regular rate.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

RECOGNIZED HOLIDAYS: New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans Day, Thanksgiving Day, Christmas Day. Saturday holiday observed the preceding Friday. Sunday holiday observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Ironworker

PREVAILING WAGE RATE

	07/01/25
Foreman- Fence and Guardrail	W55.91 B40.19 T96.10
Foreman-Rod/Mesh	W61.23 B40.97 T102.20
Foreman-Structural	W62.38 B40.97 T103.35
Journeyman- Fence and Guardrail	W51.77 B40.19 T91.96
Journeyman-Rod/Mesh	W53.24 B40.97 T94.21
Journeyman-Structural	W54.24 B40.97 T95.21

Craft: Ironworker

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
Yearly	66%	79%	88%							

Ratio of Apprentices to Journeymen - *

* On all work EXCEPT Ornamental Iron and Bridge Cable Spinning Work 1:4; On Ornamental Iron and Bridge Cable Spinning Work 1:1.

Craft: Ironworker

COMMENTS/NOTES

ROD/MESH (REINFORCING): All work performed in connection with bending, burning, cutting, field fabrication, handling, hoisting, placing, racking, sorting, tying and welding of all materials, including composites used in reinforced concrete construction, all realigning of reinforcing steel and wire mesh and the placement of reinforcing dowels.

The installation, fabrication and distribution of all materials associated with post tensioning and pre-stressing procedures on reinforced concrete jobs.

All prefabricated mates, caissons, columns, beams and walls.

The installation of reinforcing dowels into pre-drilled holes by any means necessary, including epoxy, glue, compounds or tying.

STRUCTURAL: All work performed in connection with bending, burning, cutting, field fabrication, handling, hoisting, placing, racking, sorting, tying and welding of all materials, including composites and mass timbers used in structural frame construction, and realigning of structural framing members.

The installation, fabrication and distribution of all materials associated with structural framework, regardless of material composition, including mass timbers.

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT

PREVAILING WAGE RATE DETERMINATION

County - CAPE MAY

All prefabricated columns, beams and walls.

When precast, prestressed or reinforced concrete structural members (beams, columns, girders, slabs, etc.) are used in construction of bridges, buildings and other structures, and power equipment such as cranes, derricks, jacks and/or rigging used, the work of loading, unloading, moving, and placing to complete erection.

Solar canopy erection, ground mounted installation and erection of photovoltaic array assemblies.

Unitized curtain wall systems, including erection and rigging of such, regardless of material composition.

Pro engineered metal building systems.

Steel decking and siding for building structures and canopy systems.

Offshore wind erection, fabrication, and rigging of all related components.

FENCE AND GUARDRAIL: All work performed in connection with bending, burning, cutting, field fabrication, handling, hoisting, placing, racking, digging and anchoring, sorting, tying, welding and installation of all materials, including composites, security style fencing, regardless of materials used.

Installation, fabrication and distribution of all materials associated with Fence and Guardrail work scope, regardless of material composition.

All prefabricated fencing, permanent, temporary or otherwise.

Note: For work on hazardous waste sites, workers shall receive an additional \$3.00 per hour.

The regular workday shall consist of 8 hours between 6:00 AM and 5:00 PM.

SHIFT DIFFERENTIALS:

- Second shift shall receive an additional 10% per hour.
- Third shift shall receive an additional 15% per hour.
- An irregular shift (shift starting after 6:00 PM) shall receive an additional 15% per hour.

OVERTIME:

- Time and one-half the wage rate for hours in excess of 8 per day, or before or after the regular workday, Monday through Friday, and for all hours on Saturdays. Double the wage rate for all hours on Sundays and holidays.
- Employees may work four 10-hour days, Monday to Thursday, at straight time. Friday may be used as a make-up day for a day lost to inclement weather. If Friday is not a make-up day, all hours worked on Friday shall be paid at time and one-half the wage rate.
- Benefits on overtime hours shall be paid at the following rates:
 - For Rod/Mesh and Structural-
 - When wages are time and one-half, benefits = \$47.68.
 - When wages are double, benefits = \$54.39.
 - For Fence and Guardrail-
 - When wages are time and one-half, benefits = \$46.51.
 - When wages are double, benefits = \$52.83.

RECOGNIZED HOLIDAYS: New Year's Day, Memorial Day, July 4th, Labor Day, General and Presidential Election Day, Veterans Day, Thanksgiving Day, Christmas Day. Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Laborer - Asbestos & Hazardous Waste Removal

PREVAILING WAGE RATE

	08/01/25
Foreman	W46.44 B26.21 T72.65
Journeyman (Handler)	W41.28 B26.21 T67.49

Craft: Laborer - Asbestos & Hazardous Waste Removal

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
Yearly	24.47	28.55	32.62	36.70						
Benefit	22.31	for	all	intervals						

Ratio of Apprentices to Journeymen - *

* Ratio of apprentices to journeymen shall not be more than one apprentice for the first journeyman and no more than one (1) apprentice for each additional three (3) journeymen.

Craft: Laborer - Asbestos & Hazardous Waste Removal

COMMENTS/NOTES

NOTE: These rates apply to work in connection with Asbestos, Radiation, Hazardous Waste, Lead, Chemical, Biological, Mold Remediation and Abatement.

The regular workday shall be 8 hours.

OVERTIME:

- Hours in excess of 8 per day, Monday through Saturday, and all hours on Sunday and holidays shall be paid at time and one-half the regular rate.
- Benefits on ALL overtime hours shall be paid at straight time.

RECOGNIZED HOLIDAYS: New Year's Day, President's Day, Easter, Memorial Day, July 4th, Labor Day, Veterans Day, Thanksgiving Day, Christmas Day. (Holidays start at 12:00 am).

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Laborer - Building

PREVAILING WAGE RATE

	06/18/25
Class A Journeyman	W40.25 B33.87 T74.12
Class B Journeyman	W39.25 B33.87 T73.12
Class C Journeyman	W33.36 B33.87 T67.23
Foreman	W45.28 B33.87 T79.15
General Foreman	W50.31 B33.87 T84.18

Craft: Laborer - Building

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
6 Months	60%	70%	80%	90%	of Class B	wage rate				
Benefit	30.62	30.62	30.62	30.62						

Ratio of Apprentices to Journeymen - *

* Ratio of apprentices to journeymen shall not be more than one apprentice for the first journeyman and no more than one (1) apprentice for each additional three (3) journeymen.

Craft: Laborer - Building

COMMENTS/NOTES

CLASS A: Specialist laborer including mason tender or concrete pour crew; scaffold builder (scaffolds up to 14 feet in height); operator of forklifts, Bobcats (or equivalent machinery), jack hammers, tampers, motorized tampers and compactors, vibrators, street cleaning machines, hydro demolition equipment, riding motor buggies, conveyors, burners; and nozzlemen on gunite work.

CLASS B: Basic laborer - includes all laborer work not listed in Class A or Class C.

CLASS C: Janitorial-type light clean-up work associated with the TURNOVER of a project, or part of a project, to the owner. All other clean-up work is Class B.

The regular workday shall be 8 hours between 6:00 AM and 6:00 PM.

SHIFT DIFFERENTIALS:

- Shift work must run for a minimum of 5 consecutive workdays.
- When a 2-shift schedule is worked, including a day shift, both shifts shall be established on the basis of 8 hours pay for 8 hours worked. The second shift shall receive the regular rate plus an additional 10%.
- When a 3-shift schedule is worked, the day shift shall be established on the basis of 8 hours pay for 8 hours worked, the second shift shall be established on the basis of 8 hours pay for 7.5 hours worked, and the third shift shall be established

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

on the basis of 8 hours pay for 7 hours worked. The day shift shall receive the regular rate, the second shift shall receive the regular rate plus an additional 10%, and the third shift shall receive the regular rate plus an additional 15%.

- When a second or third shift is worked with no day shift, the second or third shift shall be established on the basis of 8 hours pay for 8 hours worked. The second shift shall receive the regular rate plus an additional 10%, and the third shift shall receive the regular rate plus an additional 15%.

- When an irregular shift must be established this shift shall receive the regular rate plus an additional 10%.

OVERTIME:

- Hours in excess of 8 per day, or outside the regular workday that are not shift work, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the regular rate. Saturday may be used as a make-up day (paid at straight time) for a day lost to inclement weather, or for a holiday that is observed during the work week, Monday through Friday. All hours on Sundays and holidays shall be paid at double the regular rate.

- Four 10-hour days may be worked Monday to Thursday, at straight time, with Friday used a make-up day for a day lost to inclement weather. If Friday is not a make-up day, all hours on Friday shall be paid at time and one-half the regular rate.

- Benefits on ALL overtime hours shall be paid at time and one-half.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Veterans Day, Thanksgiving Day, Christmas Day. Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Laborer - Heavy & General

PREVAILING WAGE RATE

Rates are located in the
"Statewide" rate package

Craft: Laborer - Heavy & General

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
1000 Hours	60%	70%	80%	90%						
Benefit	25.08	for	all	Intervals						

Ratio of Apprentices to Journeymen - *

* No more than 1 apprentice for the first journeyman and no more than 1 apprentice for each additional 3 journeymen.

As of 3-1-25, benefits shall be 26.13.

As of 3-1-26, benefits shall be 27.13.

Craft: Laborer - Heavy & General

COMMENTS/NOTES

Heavy & General Laborer rates are located in the "Statewide" rate package.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Laborer-Residential and Modular Construction

PREVAILING WAGE RATE

	04/01/25	04/01/26	04/01/27
* Skilled Tradesman (only applies to Modular Construction)	W36.00 B5.45 T41.45	W36.50 B5.45 T41.95	W37.00 B5.45 T42.45
Foreman (person directing crew, regardless of his skill classification)	W38.00 B5.45 T43.45	W38.50 B5.45 T43.95	W39.00 B5.45 T44.45
Residential and Modular Construction Laborer	W32.00 B5.45 T37.45	W32.50 B5.45 T37.95	W33.00 B5.45 T38.45

Craft: Laborer-Residential and Modular Construction

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
As shown	800 hours	600 hours	600 hours							
wage & benefits	70%	80%	90%							

Ratio of Apprentices to Journeymen-

One (1) apprentice shall be allowed for the first journeyman on site and no more than one (1) additional apprentice for each additional three (3) journeymen on site.

Craft: Laborer-Residential and Modular Construction

COMMENTS/NOTES

*** SKILLED TRADESMAN-**

any worker doing work not typically done by a Building Laborer. Some examples are installing interior doors, sheet rock, hooking up appliances, installing light fixtures, installing railing systems, etc. Please note where local building codes require that certain work be performed under the supervision of a licensed tradesman (i.e. Plumber, Electrician, etc.) Laborers shall work under such supervision.

RESIDENTIAL CONSTRUCTION- All residential construction (not commercial), single-family, stand-alone duplex houses, townhouses and multi-family buildings of not more than four (4) floors. Each housing unit must be fully and independently functional; each housing unit must have its own kitchen and bathroom. The definition includes all incidental items such as site work, parking areas, utilities, streets and sidewalks. Please note the construction must be Residential in nature. A First Floor at or below grade may contain commercial space not to exceed 50% square footage of the floor; at least 50% of the First Floor must contain living accommodations or related nonresidential uses (e.g. laundry space, recreation/hobby rooms, and/or corridor space). Basement stories below grade used for storage, parking, mechanical systems/equipment, etc., are considered basement stories which are not used in determining the building's height. An attic is an unfinished space located immediately below the roof. Such space is not used in determining a building's height even if used for storage purposes. In addition, barracks and dormitories are not considered residential projects.

MODULAR RESIDENTIAL CONSTRUCTION- all aspects of modular residential construction (not commercial) at the site of installation of structures of no more than four (4) stories, including all excavation and site preparation, footings and foundation systems whether poured on-site or prefabricated, all underground waterproofing, underground utilities, concrete slabs, sidewalks, driveways, paving, hardscape and landscaping. Please note the construction must be Residential as defined above. All work performed by the Set Crew (the crew of workers who set the modular boxes on the foundation), including the rigging, setting, attaching and assembly of all modules and structural members, preparation of the foundation

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

to accept modules, such as sill plates, connection of all in-module and under-module connections including, but not limited to, plumbing, electrical, HVAC, fire suppression, CAT5, telephone, television/internet, and fiber optic, the building or installation of any porches or decks regardless of material or method of construction, the on-site installation of, or completion of any roof system, doors, windows and fenestrations, including flashing, gutter and soffit systems, waterproofing, insulation and interior and exterior trim work, and painting. Please note that modular construction does not include on-site stick built construction, tip up construction or panel built construction.

The regular workday shall be 8 hours between 6:00 AM and 6:00 PM.

OVERTIME:

Hours worked in excess of 8 per day/40 per week, Monday through Saturday, and all hours worked on Sunday and holidays shall be paid at time and one-half the hourly rate.

RECOGNIZED HOLIDAYS:

New Year's Day, Martin Luther King Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day and Christmas Day.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Millwright

PREVAILING WAGE RATE

	05/01/25
Foreman	W67.67 B40.72 T108.39
Journeyman	W58.84 B35.49 T94.33

Craft: Millwright

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
6 Months	40%	55%	65%	80%	90%					
Benefits	59.25% of	Appren	tice	Wage	Rate	for all	intervals	+ \$0.63		

Ratio of Apprentices to Journeymen - 1:3

Craft: Millwright

COMMENTS/NOTES

FOREMAN REQUIREMENTS:

- When there are 2 or more Millwrights on a job, 1 shall be designated as a Foreman.

The regular workday shall consist of 8 hours, starting between 6:00 AM and 9:00 AM.

SHIFT DIFFERENTIALS:

- When a 2 shift schedule (including a day shift) is established, the day shift shall be established on an 8 hour basis. The second shift shall be established on an 8 hour basis, and receive the regular rate plus 15%, inclusive of benefits.
- When a three shift schedule is established, the first shift shall be established on an 8 hour basis, the second shift on a 7.5 hour basis, and the third shift on a 7 hour basis. The first shift shall receive the regular hourly rate, the second shift shall receive the regular rate plus 15% and the third shift shall receive the regular rate plus 20%, inclusive of benefits.
- When there is no day shift, and a second or third shift is established, it shall be established on an 8 hour basis. The second shift shall receive the regular rate plus 15% and the third shift shall receive the regular rate plus 20%, inclusive of benefits.
- When an irregular shift must be established, this shift shall receive the regular rate plus 15%, inclusive of benefits.

OVERTIME:

- All hours in excess of 8 per day, or before or after an established shift that are not shift work, and all hours on Saturdays shall be paid at time and one-half the hourly rate, inclusive of benefits. All hours on Sundays and holidays shall be paid at double the hourly rate, inclusive of benefits.
- Four 10-hour days may be worked, Monday to Thursday, at straight time. Friday may be used as a make-up day for a day lost due to inclement weather. If Friday is not a make-up day, all hours on Friday shall be paid at time and one-half the hourly rate, inclusive of benefits.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays will be observed the following Monday. Veterans' Day may be substituted for the day after Thanksgiving.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Operating Engineer

PREVAILING WAGE RATE

Rates are located in the
"Statewide" rate package

Craft: Operating Engineer

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
Yearly	60%	70%	80%	90%						

Ratio of Apprentices to Journeymen - *

* 1 apprentice for each piece of heavy equipment. At least 10 pieces of heavy equipment or a minimum of 5 Operating Engineers must be on site.

Craft: Operating Engineer

COMMENTS/NOTES

Operating Engineer rates are located in the "Statewide" rate package.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Operating Engineer - Field Engineer

PREVAILING WAGE RATE

Rates are located in the
"Statewide" rate package

Craft: Operating Engineer - Field Engineer

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
Yearly	70%	75%	of Rod/	Chainman	Wage					
Yearly			80%	90%	Transit/	Instrument	man	Wage		

Ratio of Apprentices to Journeymen - *

* No more than 1 Field Engineer Apprentice per Survey Crew.

Craft: Operating Engineer - Field Engineer

COMMENTS/NOTES

Operating Engineer - Field Engineer rates are located in the "Statewide" rate package.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Painter - Line Striping

PREVAILING WAGE RATE

	12/03/24
Apprentice (1st year)	W31.33 B16.18 T47.51
Apprentice (2nd year)	W35.74 B27.13 T62.87
Foreman (Charge Person)	W45.12 B27.91 T73.03
Journeyman 1 (at least 1 year of working exp. as a journeyman)	W40.35 B27.91 T68.26
Journeyman 2 (at least 2 years of working exp. as a journeyman)	W44.12 B27.91 T72.03

Craft: Painter - Line Striping

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									

Ratio of Apprentices to Journeymen - 1:1

Craft: Painter - Line Striping

COMMENTS/NOTES

OVERTIME:

Hours in excess of 8 per day, Monday through Saturday, and all hours on
Sundays and holidays shall be paid at time and one-half the hourly rate.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Veterans Day,
Thanksgiving Day and Christmas Day. Veterans Day may be substituted for the day after Thanksgiving.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Paperhanger

PREVAILING WAGE RATE

	05/01/25
Foreman	W55.12 B31.61 T86.73
Journeyman	W50.11 B31.61 T81.72

Craft: Paperhanger

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
	SEE	COMMER	CIAL	PAINTER						

Craft: Paperhanger

COMMENTS/NOTES

FOREMEN REQUIREMENTS:

When there are 4 or more Paperhangers on a job, 1 shall be designated a Foreman.

The regular workday shall consist of 8 hours between 7:00 AM and 5:30 PM.

SHIFT DIFFERENTIALS:

- The second shift shall receive an additional 10% of the hourly rate, per hour, and the third shift shall receive an additional 15% of the hourly rate, per hour.

OVERTIME:

- Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the regular rate. All hours on Sundays and holidays shall be paid at double the regular rate.
 - Saturday or Sunday may be used to make up a day lost to inclement weather, at straight time.
 - Four 10-hour days may be worked, at straight time, Monday through Friday.

RECOGNIZED HOLIDAYS: New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, General Election Day, Veterans Day, Thanksgiving Day, Christmas Day

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

County - CAPE MAY

Craft: Pipefitter	PREVAILING WAGE RATE

See "Plumber" Rates

Craft: Pipefitter	COMMENTS/NOTES

*** See PLUMBER Rates***

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

County - CAPE MAY

Craft: Plasterer

PREVAILING WAGE RATE

See "Cement Mason" Rates

Craft: Plasterer

COMMENTS/NOTES

See CEMENT MASON Rates

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Plumber

PREVAILING WAGE RATE

	05/06/25
Foreman	W61.68 B51.06 T112.74
Journeyman	W56.30 B51.06 T107.36

Craft: Plumber

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
6 Months	35%	40%	45%	50%	55%	60%	65%	70%	75%	80%
Benefits	33.90	35.22	36.54	37.86	39.18	40.49	41.82	43.13	44.46	45.78

Ratio of Apprentices to Journeymen - 1:4

Craft: Plumber

COMMENTS/NOTES

FOREMAN REQUIREMENTS:

- On any job having 2 or more Journeyman Plumbers, 1 must be designated a Foreman.
- There must be 1 additional Foreman for every 10 Plumbers on the job.

The regular workday is 8 hours, between 7:00 AM and 4:30 PM.

SHIFT DIFFERENTIALS:

- Shift work must run for a minimum of 5 consecutive workdays.
- When 2 shifts are worked, the second shift shall receive 8 hours pay for 8 hours of work.
- When 3 shifts are worked, the second shift shall receive 8 hours pay for 7.5 hours of work, and the third shift shall receive 8 hours pay for 7 hours of work.
- The rate of pay for all shift work shall be an additional 15% of the hourly rate, per hour.

OVERTIME:

The first 4 hours in excess of 8 per day, or before or after the regular workday that are not shift work, Monday through Friday, and the first 12 hours on Saturdays shall be paid at time and one-half the regular rate, inclusive of benefits. Hours in excess of 12 per day, and all hours on Sundays and holidays shall be paid at double the regular rate, inclusive of benefits.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Roofer

PREVAILING WAGE RATE

	05/08/25
Foreman (5 workers or less)	W48.03 B34.77 T82.80
Foreman (6 workers or more)	W48.53 B34.77 T83.30
Journeyman	W46.03 B34.77 T80.80

Craft: Roofer

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
Yearly	55%	60%	65%	75%						
Benefits	23.39	28.04	34.77	34.77						

Ratio of Apprentices to Journeymen - *

* 1:2, 2:4, 3:6, 4:8, 5:10, 6:12, 7:14

Craft: Roofer

COMMENTS/NOTES

NOTE: Mopper, Operator of Felt Laying Machine or Slag Dispenser shall receive an additional \$.50 per hour.

FOREMAN REQUIREMENTS:

- There must be a Foreman on all jobs.
- Foreman rate depends on the number of Roofers on the job, as indicated.

The regular workday is 8 hours between 5:00 AM and 4:30 PM.

OVERTIME:

Hours in excess of 8 per day, or before or after the regular workday, Monday through Friday, and all hours on Saturdays, Sundays, and holidays shall be paid at time and one-half the wage rate.

RECOGNIZED HOLIDAYS: New Year's Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day, Christmas Day. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Roofer - Shingle, Slate & Tile

PREVAILING WAGE RATE

	05/08/25
Foreman (3 workers or less)	W36.45 B22.20 T58.65
Foreman (4 workers or more)	W36.95 B22.20 T59.15
Helper	W17.98 B22.20 T40.18
Journeyman (shingle work)	W35.95 B22.20 T58.15

Craft: Roofer - Shingle, Slate & Tile

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
Yearly	60%	70%	80%							
Benefits	22.20	22.20	22.20							

Ratio of Apprentices to Journeymen - *

* 1:2, 2:4, 3:6, 4:8, 5:10, 6:12, 7:14

Craft: Roofer - Shingle, Slate & Tile

COMMENTS/NOTES

NOTE: Above rates are for Shingle work only. Slate and Tile work rates are an additional \$3.00 per hour.

HELPER RATIO: 1 Helper to 1 Journeyman

FOREMAN REQUIREMENTS:

- There must be a Foreman on all jobs.
- Foreman rate depends on the number of Roofers on the job, as indicated.

OVERTIME:

Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays, Sundays, and holidays shall be paid at time and one-half the wage rate.

RECOGNIZED HOLIDAYS: New Year's Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day, Christmas Day. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Sheet Metal Sign Installation

PREVAILING WAGE RATE

	07/25/25
Foreman	W35.48 B26.41 T61.89
Journeyman	W33.48 B26.41 T59.89

Craft: Sheet Metal Sign Installation

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
1000 Hours	50%	55%	60%	65%	70%	75%	80%	90%		
Benefits	23.54	23.63	23.71	23.79	24.89	24.97	25.05	25.21		

Ratio of Apprentices to Journeymen - 1:2

Craft: Sheet Metal Sign Installation

COMMENTS/NOTES

HAZARDOUS DUTY:

Sign Installers working from a bosun's chair or outside swinging scaffold at a height of 60 feet or more: + \$5.00 per hour.

FOREMAN REQUIREMENTS:

When there are 3 or more Sign Installers on a job, one must be designated a Foreman.

The regular workday shall be 8 hours, between 8:00 AM and 5:00 PM.

OVERTIME:

Hours in excess of 8 per day, or outside the regular workday, Monday through Friday, and all hours on Saturdays and Sundays shall be paid at time and one-half the regular rate. All hours on holidays shall be paid at time and one-half the regular rate.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Good Friday, Memorial Day, July 4th, Labor Day, Veterans' Day, Thanksgiving Day, day after Thanksgiving, Christmas Day. Saturday holidays will be observed the preceding Friday, Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Sheet Metal Worker

PREVAILING WAGE RATE

	06/01/25
Foreman	W66.32 B48.33 T114.65
Journeyman	W62.27 B48.33 T110.60

Craft: Sheet Metal Worker

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
6 months	40%	45%	50%	55%	60%	65%	70%	75%	80%	85%
Benefits	15.03	16.78	18.55	20.29	22.04	30.95	33.26	35.56	37.86	40.14

Ratio of Apprentices to Journeymen- 1:3, except for the following types of work where the ratio shall be 1:1 (architectural metal work, testing and balancing, lockers, shelving and toilet partitions).*

* For work performed in a fabrication shop, the ratio will be applied on a "company-wide" basis (i.e. the total number of apprentices and journeymen employed by the company).

Craft: Sheet Metal Worker

COMMENTS/NOTES

JOB SITE FOREMAN REQUIREMENTS:

- When there are 2 to 9 Sheet Metal Workers on a jobsite, 1 must be designated a Foreman.
- When there are 10 to 16 Sheet Metal Workers on a job site, 2 must be designated Foremen.
- When there are 17 to 23 Sheet Metal Workers on a job site, 3 must be designated Foremen.
- For every 7 additional Sheet Metal Workers on a job site, there shall be 1 additional Foreman.

SHOP FOREMAN REQUIREMENTS (For custom fabrication):

- When there are 1 to 10 Sheet Metal Workers in the shop, 1 must be designated a Foreman.
- For every 10 additional Sheet Metal Workers in the shop, 1 must be designated a Foreman.

The regular workday consists of 8 hours, between 6:00 AM and 4:30 PM.

SHIFT DIFFERENTIALS:

- Shift work must run for a minimum of 5 consecutive workdays.
- There must be a day shift worked in order to have a 2nd and/or 3rd Shift.
- Shop work does not satisfy shift requirements.
- 2nd Shift (4:30 PM-12:30 AM) shall be paid an additional 15% of the regular rate per hour inclusive of benefits, and receive 8 hours pay for 7.5 hours of work.
- 3rd Shift (12:30 AM-8:00 AM) shall be paid an additional 25% of the regular rate per hour inclusive of benefits, and receive 8 hours pay for 7 hours of work.

OVERTIME:

Hours in excess of 8 per day, or before or after the regular workday, Monday through Friday, that are not shift work, and all

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

hours on Saturday, shall be paid at time and one-half the regular rate. All hours on Sundays and holidays shall be paid at double the regular rate.

- Benefits on overtime hours are as follows:

Time and one-half = 55.77

Double-time = 63.22

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Good Friday, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Saturday holidays will be observed the preceding Friday, Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Sprinkler Fitter

PREVAILING WAGE RATE

	10/02/25	01/01/26	01/01/27
Foreman	W62.44 B36.51 T98.95	W66.64 B37.81 T104.45	W70.86 B38.81 T109.67
General Foreman	W64.69 B36.51 T101.20	W68.89 B37.81 T106.70	W73.11 B38.81 T111.92
Journeyman	W59.19 B36.51 T95.70	W63.14 B37.81 T100.95	W67.11 B38.81 T105.92
Master Foreman	W66.94 B36.51 T103.45	W71.14 B37.81 T108.95	W75.36 B38.81 T114.17

Craft: Sprinkler Fitter

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
1000 Hours	43%	48%	52%	56%	59%	64%	68%	72%	76%	80%
Benefits	9.57	9.57	21.49	21.49	21.74	21.74	21.74	21.74	21.74	21.74

Ratio of Apprentices to Journeymen - 1:1

Craft: Sprinkler Fitter

COMMENTS/NOTES

APPRENTICE RATE SCHEDULE AS OF 1-1-26:

INTERVAL	PERIOD AND RATES									
1000 Hours	43%	48%	52%	56%	59%	64%	68%	72%	76%	80%
Benefits	10.23	10.23	22.79	22.79	23.04	23.04	23.04	23.04	23.04	23.04

APPRENTICE RATE SCHEDULE AS OF 1-1-27:

INTERVAL	PERIOD AND RATES									
1000 Hours	43%	48%	52%	56%	59%	64%	68%	72%	76%	80%
Benefits	11.23	11.23	23.79	23.79	24.04	24.04	24.04	24.04	24.04	24.04

FOREMAN REQUIREMENTS:

- There must be a Foreman on all projects. If there is only 1 Sprinkler Fitter on the project, he shall be designated a Foreman.
- On any job with 15 to 25 Sprinkler Fitters 1 shall be designated a General Foreman.
- On any job with over 25 Sprinkler Fitters 1 shall be designated a Master Foreman.

The regular workday consists of 8 hours, between 6:00 AM and 6:00 PM.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

SHIFT DIFFERENTIALS:

- Shift work must run for a minimum of 5 consecutive workdays.
- 2nd and/or 3rd shift shall receive an additional 15% of the hourly rate, per hour.

OVERTIME:

- Hours in excess of 8 per day, or before or after the regular workday that are not shift work, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the hourly rate. All hours on Sundays and holidays shall be paid at double the hourly rate.
- Four 10-hour days may be worked at straight time, Monday through Friday.

RECOGNIZED HOLIDAYS: New Year's Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day, Christmas Day. Saturday holidays will be observed the preceding Friday, Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Tile Worker

PREVAILING WAGE RATE

	06/19/25
Finisher	W43.63 B32.12 T75.75
Setter	W52.31 B38.01 T90.32

Craft: Tile Worker

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
750 Hours	40%	45%	50%	55%	60%	65%	70%	75%	80%	90%

Ratio of Apprentices to Journeymen - 1:4

Craft: Tile Worker

COMMENTS/NOTES

NOTE: These rates also apply to Terrazzo and Marble work.

OVERTIME:

Hours in excess of 8 per day, Monday through Friday, and the first 10 hours on Saturdays shall be paid at time and one half the regular rate, inclusive of benefits. Hours in excess of 10 on Saturdays, and all hours on Sundays and holidays shall be paid at double the regular rate, inclusive of benefits.

RECOGNIZED HOLIDAYS:

New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Veterans' Day, Thanksgiving Day and Christmas Day. Sunday holidays shall be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Truck Driver

PREVAILING WAGE RATE

	05/08/25
Bucket, Seeding/Fertilizing/ Mulching trucks	W45.91 B27.04 T72.95
Concrete mobile unit; Tack Spreader, Transit Mix trucks	W45.91 B27.04 T72.95
Dump, Tank, Pick-up, Vacuum or Vac-All trucks	W45.91 B27.04 T72.95
Helper on Straight 3-axle truck, Mechanic's helper	W45.71 B27.04 T72.75
Mechanic	W46.41 B27.04 T73.45
Shop Steward, Large Off-Road Dump Truck, Winch Truck	W46.36 B27.04 T73.40
Straight 3-axle truck	W45.91 B27.04 T72.95
Tow Truck	W46.06 B27.04 T73.10
Tractor Trailer, Fuel, and Asphalt Oil Distributor Trucks	W46.26 B27.04 T73.30
Water Truck	W45.91 B27.04 T72.95

Craft: Truck Driver

COMMENTS/NOTES

HAZARDOUS WASTE WORK:

- On hazardous waste removal work on a State-designated hazardous waste site where the driver is in direct contact with hazardous materials and when personal protective equipment is required for respiratory, skin, and eye protection: + \$3.00 per hour.
- All other designated hazardous waste sites: + \$1.00 per hour.

SHIFT DIFFERENTIAL:

- Second shift shall receive an additional \$1.00 per hour.

OVERTIME:

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

- Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the hourly rate. All hours on Sundays and holidays shall be paid at double the hourly rate.
- Employees may work four 10-hour days at straight time, Monday through Thursday, with Friday used as a make-up day. If Friday is not a make-up day, then all hours on Friday shall be paid at time and one-half the hourly rate.

RECOGNIZED HOLIDAYS: New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. When all trades agree, the day after Thanksgiving may be substituted for Veterans' Day. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Truck Driver-Material Delivery Driver

PREVAILING WAGE RATE

	05/08/25
Driver	W45.91 B27.04 T72.95

Craft: Truck Driver-Material Delivery Driver

COMMENTS/NOTES

HAZARDOUS WASTE WORK:

- All designated hazardous waste sites: + \$1.00 per hour.

SHIFT DIFFERENTIAL:

- Second shift shall receive an additional \$1.00 per hour.

OVERTIME:

- Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the hourly rate. All hours on Sundays and holidays shall be paid at double the hourly rate.

- Employees may work four 10-hour days at straight time, Monday through Thursday, with Friday used as a make-up day. Friday is not a make-up day, then all hours on Friday shall be paid at time and one-half the hourly rate.

RECOGNIZED HOLIDAYS: New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. When all trades agree, the day after Thanksgiving may be substituted for Veterans' Day. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION**

County - CAPE MAY

Craft: Welder

PREVAILING WAGE RATE

Welder

Craft: Welder

COMMENTS/NOTES

Welders rate is the same as the craft to which the welding is incidental.

STATEWIDE RATES

OPERATING ENGINEERS **Rates Expiration Date :**

{For apprentice rates refer to "Operating Engineers" apprentice rates in any county rate package}

The regular workday consists of 8 hours, Monday to Friday, between 6:00 AM and 5:30 PM.

SHIFT DIFFERENTIALS:

- Shift work must be established for 5 consecutive workdays.
- Any work started outside of the allowed start time, 6:00 AM to 9:00 AM, except for * tidal work, shall be considered an irregular shift and paid at straight time, plus 15% for the first eight hours, inclusive of benefits.
- * FOR TIDAL WORK- a contractor can start their job according to tide schedules (tide schedules are the various high and low tides related to this work), providing the eight hour shift is completed between the hours of 5:00 AM and 6:30 PM.
- All time worked in excess of an established shift (an established shift is a shift that is determined at the time of the bid) shall be paid at the applicable overtime rate. When a portion of an established shift works into Saturday, Sunday or a holiday, that time worked shall be paid at the established shift rate.
- When working with other trades who receive a higher irregular shift differential, these employees shall also receive the higher differential rate.

OVERTIME:

- Hours in excess of 8 per day, or outside of the regular workday, Monday through Friday, that are not shift work, and all hours on Saturday shall be paid at time and one-half the regular rate, inclusive of benefits. All hours on Sunday and holidays shall be paid at double the regular rate, inclusive of benefits.
- Four 10-hour days may be worked, Monday through Thursday, at straight time, with all hours on Friday paid at time and one-half the regular rate, inclusive of benefits.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans Day, Thanksgiving Day, Christmas Day. Sunday holidays observed the following Monday. When all trades on a particular job site agree, the day after Thanksgiving may be substituted for Veterans Day.

For projects bid after April 1, 2020, on hazardous waste removal work of any kind, including a state or federally designated site, where the operating engineer is required to wear level A, B, or C personal protection, the operating engineer shall receive an hourly wage rate of his regular hourly wage plus \$5.00 per hour.

- An operating engineer working at a hazardous waste removal project or site at a task requiring hazardous waste related certification, but who is not working in a zone requiring level A, B, or C personal protection, shall receive an hourly wage rate of his regular rate plus \$1.00 per hour.

TERRITORY
ENTIRE STATE

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

OPERATING ENGINEERS Rates Expiration Date :

Effective Dates:

07/01/2025

Rate	Fringe	Total
60.13	40.40	100.53

CLASSIFICATIONS:

A-Frame

Backhoe (combination)

Boom Attachment on loaders (Except pipehook)

Boring & Drilling Machine

Brush Chopper, Brush Shredder, Tree Shredder, Tree Shearer

Bulldozer, finish grade

Cableway

Carryall

Concrete Pump

Concrete Pumping System (Pumpcrete & similar types)

Conveyor, 125 feet or longer

Drill Doctor (Duties include dust collector and maintenance)

Front End Loader (2 cu. yds. but less than 5 cu. yds.)

Grader, finish

Groove Cutting Machine (ride-on type)

Heater Planer

Hoist: Outside Material Tower Hoist (all types including steam, gas, diesel, electric, air hydraulic, single and double drum, concrete, brick shaft caisson, snorkle roof, and other similar types, Except Chicago-boom type) * receives an additional \$1.00 per hour on 100 ft. up to 199 ft. total height, and an additional \$2.00 per hour on 200 ft. and over total height.

Hydraulic Crane (10 tons & under)

Hydraulic Dredge

Hydro-Axe

Hydro-Blaster

TERRITORY
ENTIRE STATE

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

OPERATING ENGINEERS **Rates Expiration Date :**

Effective Dates:

07/01/2025

Rate	Fringe	Total
60.13	40.40	100.53

CLASSIFICATIONS:

Jack (screw, air hydraulic, power-operated unit, or
console type, Except hand jack or pile load test type)

Log Skidder

Pan

Paver, concrete

Plate & Frame Filter Press

Pumpcrete (unit type)

Pumpcrete, Squeezecrete, or Concrete Pumping machine
(regardless of size)

Scraper

Side Boom

Straddle Carrier (Ross and similar types)

Whiphammer

Winch Truck (hoisting)

OPERATING ENGINEERS Rates Expiration Date :

Effective Dates:

07/01/2025

Rate	Fringe	Total
58.22	40.40	98.62

CLASSIFICATIONS:

Asphalt Curbing Machine

Asphalt Plant Engineer

Asphalt Spreader

Autograde Curb Trimmer & Sidewalk Shoulder Slipform (CMI & similar types)

Autograde Curecrete Machine (CMI & similar types)

Autograde Tube Finisher & Texturing Machine (CMI & similar types)

Bar Bending Machines (Power)

Batcher, Batching Plant, & Crusher [On Site]

Belt Conveyor System

Boom-Type Skimmer Machine

Bridge Deck Finisher

Bulldozer (all sizes)

Captain (Power Boats)

Car Dumper (railroad)

Compressor & Blower unit for loading/unloading of concrete,
cement, fly ash, or similar type materials (used independently
or truck-mounted)

Compressor (2 or 3 battery)

Concrete Breaking Machine

Concrete Cleaning/Decontamination Machine

Concrete Finishing Machine

Concrete Saw or Cutter (ride-on type)

Concrete Spreader (Hetzel, Rexomatic & similar types)

Concrete Vibrator

TERRITORY
ENTIRE STATE

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

OPERATING ENGINEERS **Rates Expiration Date :**

Effective Dates:

07/01/2025

Rate	Fringe	Total
58.22	40.40	98.62

CLASSIFICATIONS:

Conveyors - under 125 feet

Crane Signalman

Crushing Machine

Directional Boring Machine

Ditching Machine - Small (Ditchwitch, Vermeer or similar types)

Dope Pot - Mechanical (with or without pump)

Dumpster

Elevator

Fireman

Fork Lift (Economobile, Lull & similar types)

Front End Loader (1 cu. yd. and over but less than 2 cu. yds.)

Generator (2 or 3 battery)

Giraffe Grinder

Goldhofer/Hydraulic Jacking Trailer

Grader & Motor Patrols

Grout Pump

Gunnite Machine (Excluding nozzle)

Hammer - Vibratory (in conjunction with generator)

Heavy Equipment Robotics - Operator/Technician

Hoist (roof, tugger, aerial platform hoist, house car)

Hopper

Hopper Doors (power operated)

Ladder (motorized)

OPERATING ENGINEERS Rates Expiration Date :

Effective Dates:

07/01/2025

Rate	Fringe	Total
58.22	40.40	98.62

CLASSIFICATIONS:

Laddervator

Locomotive (Dinky-type)

Maintenance Utility Man

Master Environmental Maintenance Technician

Mechanic

Mixer (Except paving mixers)

Pavement Breaker (truck-mounted or small self-propelled
ride-on type)

Pavement Breaker - maintenance of compressor or hydraulic unit

Pipe Bending Machine (power)

Pitch Pump

Plaster Pump (regardless of size)

Post Hole Digger (post pounder, auger)

Rod Bending Machines

Roller (black top)

Scale (power)

Seamen Pulverizing Mixer

Shoulder Widener

Silo

Skimmer Machine (boom type)

Steel Cutting Machine (service & maintenance)

Tamrock Drill

Tractor

Transfer Machines

TERRITORY
ENTIRE STATE

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

OPERATING ENGINEERS **Rates Expiration Date :**

Effective Dates:

07/01/2025

Rate	Fringe	Total
58.22	40.40	98.62

CLASSIFICATIONS:

Tug Captains

Tug Master (Power Boats)

Ultra High Pressure Waterjet Cutting Tool System -
Operator/Maintenance Technician

Vacuum Blasting Machine - Operator/Maintenance Technician

Vibrating Plant (used with unloading)

Welder & Repair Mechanic

Effective Dates:

07/01/2025

Rate	Fringe	Total
52.88	40.40	93.28

CLASSIFICATIONS:

Assistant Engineer/Oiler

Driller's Helper

Field Engineer - Transit man or Instrument man

Maintenance Apprentice (Deckhand)

Maintenance Apprentice (Oiler)

Mechanic's Helper

Off Road Back Dump

Tire Repair & Maintenance

Effective Dates:

07/01/2025

Rate	Fringe	Total
50.30	40.40	90.70

CLASSIFICATIONS:

Field Engineer - Rodman or Chainman

TERRITORY
ENTIRE STATE

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

OPERATING ENGINEERS Rates Expiration Date :

Effective Dates:

07/01/2025

Rate	Fringe	Total
60.46	40.40	100.86

CLASSIFICATIONS:

Lead Engineer, Foreman Engineer, Safety Engineer (minimum)

OPERATING ENGINEERS Rates Expiration Date :

Effective Dates:

07/01/2025

Rate	Fringe	Total
61.72	40.40	102.12

CLASSIFICATIONS:

Autograde Pavement Profiler (CMI & similar types)

Autograde Pavement Profiler - Recycle Type (CMI & similar types)

Autograde Placer/Trimmer/Spreader Combination (CMI & similar types)

Autograde Slipform Paver (CMI & similar types)

Backhoe (Excavator)

Central Power Plant

Concrete Paving Machine

Cranes, Derricks, Pile Drivers (all types), under 100 tons with a boom (including jib and/or leads) under 100 ft.

Draglines

Drill, Bauer, AMI and similar types

Drillmaster, Quarrymaster

Drillmaster/Quarrymaster (down-the-hole drill), rotary drill, self-propelled hydraulic drill, self-powered drill

Elevator Grader

Field Engineer-Chief of Party

Front End Loader (5 cu. yards or larger)

Gradall

Grader, Rago

Helicopter Co-Pilot

Helicopter Communications Engineer

Juntann Pile Driver

Locomotive (large)

Mucking Machine

TERRITORY
ENTIRE STATE

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

OPERATING ENGINEERS Rates Expiration Date :

Effective Dates:

07/01/2025

Rate	Fringe	Total
61.72	40.40	102.12

CLASSIFICATIONS:

Pavement & Concrete Breaker (Superhammer & Hoe Ram)

Pile Driver

Prentice Truck

Roadway Surface Grinder

Scooper (loader & shovel)

Shovel (Excavator)

Trackhoe (Excavator)

Tree Chopper with boom

Trenching Machine (cable plow)

Tunnel Boring Machine

Vacuum Truck

TERRITORY
ENTIRE STATE

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

OPERATING ENGINEERS **Rates Expiration Date :**

Effective Dates:

07/01/2025

Rate	Fringe	Total
56.59	40.40	96.99

CLASSIFICATIONS:

Chipper

Compressor (single)

Concrete Spreader (small type)

Conveyor Loader (Except elevator graders)

Engines, Large Diesel (1620 HP) & Staging Pump

Farm Tractor

Fertilizing Equipment (operation & maintenance)

Fine Grade Machine (small type)

Form Line Grader (small type)

Front End Loader (under 1 cubic yard)

Generator (single)

Grease, Gas, Fuel, & Oil Supply Trucks

Heaters (Nelson or other type)

Lights - portable generating light plant

Mixer, Concrete (small)

Mulching Equipment (operation & maintenance)

Power Broom or Sweeper

Pump (diesel engine & hydraulic - regardless of power)

Pump (larger than 2 inch suction, including submersible pumps)

Road Finishing Machine (small type)

Roller - grade, fill, or stone base

Seeding Equipment (operation & maintenance)

Sprinkler & Water Pump Trucks

OPERATING ENGINEERS Rates Expiration Date :

Effective Dates:

07/01/2025

Rate	Fringe	Total
56.59	40.40	96.99

CLASSIFICATIONS:

Steam Generator or Boiler

Stone Spreader

Tamping Machine (vibrating ride-on type)

Temporary Heating Plant (Nelson or other type, including
propane, natural gas, and flow-type units)

Water or Sprinkler Truck

Welding Machine (gas, diesel, or electric convertor, of any type)

Welding System - Multiple (rectifier transformer type)

Wellpoint Systems (including installation by bull gang and
maintenance)

Effective Dates:

07/01/2025

Rate	Fringe	Total
63.54	40.40	103.94

CLASSIFICATIONS:

Helicopter Pilot/Engineer

Effective Dates:

07/01/2025

Rate	Fringe	Total
68.22	40.40	108.62

CLASSIFICATIONS:

Cranes, Derricks, Pile Driver (all types), 100 tons and over and TOWER CRANE with boom (including jib and/or leads) 140 ft.
and over

Effective Dates:

07/01/2025

Rate	Fringe	Total
67.22	40.40	107.62

CLASSIFICATIONS:

Cranes, Derricks, Pile Driver (all types), 100 tons and over and TOWER CRANE with boom (including jib and/or leads) from
100 ft. to 139 ft.

TERRITORY
ENTIRE STATE

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

OPERATING ENGINEERS **Rates Expiration Date :**

Effective Dates:

07/01/2025

Rate	Fringe	Total
63.72	40.40	104.12

CLASSIFICATIONS:

Cranes, Derricks, Pile Driver (all types) , under 100 tons with a boom (including jib and/or leads) 140 ft. and over

Effective Dates:

07/01/2025

Rate	Fringe	Total
66.22	40.40	106.62

CLASSIFICATIONS:

Cranes, Derricks, Pile Driver (all types), 100 tons and over and TOWER CRANE with a boom (including jib and/or leads) under 100 ft.

Effective Dates:

07/01/2025

Rate	Fringe	Total
62.72	40.40	103.12

CLASSIFICATIONS:

Cranes, Derricks, Pile Driver (all types), under 100 tons with a boom (including jib and/or leads) from 100 ft. to 139 ft.

TERRITORY
ENTIRE STATE

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

STRUCTURAL STEEL ERECTION Rates Expiration Date :

{For apprentice rates refer to "Operating Engineers" apprentice rates in any county rate package}

The regular workday consists of 8 hours, Monday to Friday, between 6:00 AM and 5:30 PM.

SHIFT DIFFERENTIALS:

- Shift work must be established for 5 consecutive workdays.
- Any work started outside of the allowed start time, 6:00 AM to 9:00 AM, except for * tidal work, shall be considered an irregular shift and paid at straight time, plus 15% for the first eight hours, inclusive of benefits.
- * FOR TIDAL WORK- a contractor can start their job according to tide schedules (tide schedules are the various high and low tides related to this work), providing the eight hour shift is completed between the hours of 5:00 AM and 6:30 PM.
- All time worked in excess of an established shift (an established shift is a shift that is determined at the time of the bid) shall be paid at the applicable overtime rate. When a portion of an established shift works into Saturday, Sunday or a holiday, that time worked shall be paid at the established shift rate.
- When working with other trades who receive a higher irregular shift differential, these employees shall also receive the higher differential rate.

OVERTIME:

- Hours in excess of 8 per day, or outside of the regular workday, Monday through Friday, that are not shift work, and all hours on Saturday shall be paid at time and one-half the regular rate, inclusive of benefits. All hours on Sunday and holidays shall be paid at double the regular rate, inclusive of benefits.
- Four 10-hour days may be worked, Monday through Thursday, at straight time, with all hours on Friday paid at time and one-half the regular rate, inclusive of benefits.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans Day, Thanksgiving Day, Christmas Day. Sunday holidays observed the following Monday. When all trades on a particular job site agree, the day after Thanksgiving may be substituted for Veterans Day.

For projects bid after April 1, 2020, on hazardous waste removal work of any kind, including a state or federally designated site, where the operating engineer is required to wear level A, B, or C personal protection, the operating engineer shall receive an hourly wage rate of his regular hourly wage plus \$5.00 per hour.

- An operating engineer working at a hazardous waste removal project or site at a task requiring hazardous waste related certification, but who is not working in a zone requiring level A, B, or C personal protection, shall receive an hourly wage rate of his regular rate plus \$1.00 per hour.

Effective Dates:

07/01/2025

Rate	Fringe	Total
65.35	40.40	105.75

CLASSIFICATIONS:

Helicopter Co-Pilot & Communications Engineer

TERRITORY
ENTIRE STATE

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

STRUCTURAL STEEL ERECTION **Rates Expiration Date :**

Effective Dates:

07/01/2025

Rate	Fringe	Total
61.29	40.40	101.69

CLASSIFICATIONS:

A-Frame

Cherry Picker -10 tons or less (Over 10 tons use crane rate)

Hoist (all types Except Chicago-boom)

Jack (screw, air hydraulic, power-operated unit or console
type, Except hand jack or pile load test type)

Side Boom

Straddle Carrier

STRUCTURAL STEEL ERECTION **Rates Expiration Date :**

Effective Dates:

07/01/2025

Rate	Fringe	Total
58.63	40.40	99.03

CLASSIFICATIONS:

Aerial Platform Used On Hoists

Apprentice Engineer/Oiler with Compressor or Welding Machine

Captain (Power Boats)

Compressor (2 or 3 in battery)

Concrete Cleaning/Decontamination Machine Operator

Conveyor or Tugger Hoist

Directional Boring Machine

Elevator or House Car

Fireman

Forklift

Generator (2 or 3)

Heavy Equipment Robotics, Operator/Technician

Maintenance Utility Man

Master Environmental Maintenance Technician

Tug Master (Power Boats)

Ultra High Pressure Waterjet Cutting Tool System Operator/Maintenance Technician

Vacuum Blasting Machine Operator/Maintenance Technician

Welding Machines, Gas or Electric Converters on any type-2 or 3 in battery including diesels

TERRITORY
ENTIRE STATE

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

STRUCTURAL STEEL ERECTION **Rates Expiration Date :**

Effective Dates:

07/01/2025

Rate	Fringe	Total
57.10	40.40	97.50

CLASSIFICATIONS:

Compressor (Single)

Generators

Welding Machines, Gas, Diesel, Or Electric Converters of any type-single

Welding System, Multiple (Rectifier Transformer Type)

Effective Dates:

07/01/2025

Rate	Fringe	Total
53.34	40.40	93.74

CLASSIFICATIONS:

Assistant Engineer/Oiler

Drillers Helper

Field Engineer - Transit/Instrument Man

Maintenance Apprentice (Deckhand)

Maintenance Apprentice (Oiler)

Off Road Back Dump

Effective Dates:

07/01/2025

Rate	Fringe	Total
60.91	40.40	101.31

CLASSIFICATIONS:

Lead Engineer, Foreman Engineer, Safety Engineer (Minimum)

Effective Dates:

07/01/2025

Rate	Fringe	Total
50.30	40.40	90.70

CLASSIFICATIONS:

Field Engineer - Rodman or Chainman

STRUCTURAL STEEL ERECTION Rates Expiration Date :

Effective Dates:

07/01/2025

Rate	Fringe	Total
62.05	40.40	102.45

CLASSIFICATIONS:

Field Engineer-Chief of Party

Vacuum Truck

Effective Dates:

07/01/2025

Rate	Fringe	Total
70.24	40.40	110.64

CLASSIFICATIONS:

Cranes (all cranes, land or floating with booms including jib, 140 ft. and over, above ground), Derricks (all derricks, land, floating or Chicago Boom type with booms including jib, 140 ft. and over, above ground), and Pile Drivers (all types) 100 tons and over and Tower Cranes.

Effective Dates:

07/01/2025

Rate	Fringe	Total
68.58	40.40	108.98

CLASSIFICATIONS:

Cranes (all cranes, land or floating with booms including jib, less than 140 ft. above ground), Derricks (all derricks, land, floating or Chicago Boom type with booms including jib, less than 140 ft. above ground), Pile Drivers (all types), 100 tons and over and Tower Crane.

Effective Dates:

07/01/2025

Rate	Fringe	Total
65.74	40.40	106.14

CLASSIFICATIONS:

Cranes (all cranes, land or floating with booms including jib, 140 ft. and over, above ground), Derricks (all derricks, land, floating or Chicago Boom type with booms including jib, 140 ft. and over, above ground), Pile Drivers (all types), under 100 tons.

Effective Dates:

07/01/2025

Rate	Fringe	Total
64.08	40.40	104.48

CLASSIFICATIONS:

Cranes (all cranes, land or floating with booms including jib, less than 140 ft. above ground), Derricks (all derricks, land, floating or Chicago Boom type with booms including jib, less than 140 ft. above ground), Pile Drivers (all types), under 100 tons.

TERRITORY
ENTIRE STATE

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

STRUCTURAL STEEL ERECTION **Rates Expiration Date :**

Effective Dates:

07/01/2025

Rate	Fringe	Total
65.74	40.40	106.14

CLASSIFICATIONS:

Helicopter Pilot & Engineer

BEST BORING PRELIMINARY TO CONSTRUCTION-SOUTH/WEST Rates Expiration Date :

THESE RATES APPLY IN THE FOLLOWING COUNTIES ONLY:

Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Hunterdon, Mercer, Monmouth, Ocean, Salem, Sussex, Warren

The regular workday consists of 8 hours, Monday to Friday, between 6:00 AM and 5:30 PM.

SHIFT DIFFERENTIALS:

- Shift work must be established for 5 consecutive workdays.
- Any work started outside of the allowed start time, 6:00 AM to 9:00 AM, except for * tidal work, shall be considered an irregular shift and paid at straight time, plus 15% for the first eight hours, inclusive of benefits.
- * FOR TIDAL WORK- a contractor can start their job according to tide schedules (tide schedules are the various high and low tides related to this work), providing the eight hour shift is completed between the hours of 5:00 AM and 6:30 PM.
- All time worked in excess of an established shift (an established shift is a shift that is determined at the time of the bid) shall be paid at the applicable overtime rate. When a portion of an established shift works into Saturday, Sunday or a holiday, that time worked shall be paid at the established shift rate.
- When working with other trades who receive a higher irregular shift differential, these employees shall also receive the higher differential rate.

OVERTIME:

- Hours in excess of 8 per day, or outside of the regular workday, Monday through Friday, that are not shift work, and all hours on Saturday shall be paid at time and one-half the regular rate, inclusive of benefits. All hours on Sunday and holidays shall be paid at double the regular rate, inclusive of benefits.
- Four 10-hour days may be worked, Monday through Thursday, at straight time, with all hours on Friday paid at time and one-half the regular rate, inclusive of benefits.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans Day, Thanksgiving Day, Christmas Day. Sunday holidays observed the following Monday. When all trades on a particular job site agree, the day after Thanksgiving may be substituted for Veterans Day.

For projects bid after April 1, 2020, on hazardous waste removal work of any kind, including a state or federally designated site, where the operating engineer is required to wear level A, B, or C personal protection, the operating engineer shall receive an hourly wage rate of his regular hourly wage plus \$5.00 per hour.

- An operating engineer working at a hazardous waste removal project or site at a task requiring hazardous waste related certification, but who is not working in a zone requiring level A, B, or C personal protection, shall receive an hourly wage rate of his regular rate plus \$1.00 per hour.

Effective Dates:

07/01/2025

Rate	Fringe	Total
61.72	40.40	102.12

CLASSIFICATIONS:

Driller

Effective Dates:

07/01/2025

Rate	Fringe	Total
54.88	40.40	95.28

CLASSIFICATIONS:

Driller's Helper

TERRITORY
ENTIRE STATE

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

FREE AIR TUNNEL JOBS **Rates Expiration Date :**

{For apprentice rates refer to "Heavy & General" apprentice rates in any county rate package}

The regular workday consists of 8 hours, starting at 7:00 AM or 8:00 AM.

SHIFT DIFFERENTIALS:

- Shifts must start at 3:00 PM, 4:00 PM, 12:00 AM, or 1:00 AM, to be considered shift work, except when the project owner mandates special hours of work in the job specifications, in which case those hours may be considered shift work.
- When such hours are mandated by the project owner, a shift that begins before midnight on Friday and ends on Saturday morning, or that begins at or after 8:00 PM on Sunday and ends on Monday morning may be paid at the shift differential rate.
- Shifts shall receive an additional \$3.00 per hour.

OVERTIME:

- Hours in excess of 8 per day, Monday through Friday, or outside of the regular workday that are not shift work, and all hours on Saturdays, shall be paid at time and one-half the hourly rate. All hours on Sundays and holidays shall be paid at double the hourly rate.
- Four 10-hour days may be worked, Monday through Thursday, at straight time, with Friday used as a make-up day for a day lost to inclement weather. If Friday is not a make-up day, all hours on Friday shall be paid at time and one-half the hourly rate.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays observed the following Monday. Veterans Day may be substituted for the day after Thanksgiving. However, in the trading of Veterans Day for the day after Thanksgiving, if overtime is worked on Veterans Day, it shall be paid at double the hourly rate.

Hazardous Waste Work:

- where Level A, B, or C protection is required: + \$5.00/hr
- other Hazardous Waste site: + \$1.00/hr

Traffic Control Coordinator: When either of the work classifications found below are working as a Traffic Control Coordinator they are to receive \$.75 above their current rate of pay.

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
67.13	39.13	106.26	109.94

CLASSIFICATIONS:

Walking Boss & Superintendent

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
66.75	39.13	105.88	109.57

CLASSIFICATIONS:

Heading Foreman, Shaft Foreman, Rod Foreman, Electrician Foreman, Rigging Foreman

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NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

FREE AIR TUNNEL JOBS Rates Expiration Date :

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
66.13	39.13	105.26	108.94

CLASSIFICATIONS:

Iron Foreman, Caulking Foreman, Form Foreman, Cement Finishing Foreman, Concrete Foreman, Track Foreman, Cleanup Foreman, Grout Foreman

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
69.25	39.13	108.38	112.07

CLASSIFICATIONS:

Blaster

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
65.44	39.13	104.57	108.26

CLASSIFICATIONS:

Top Labor Foreman

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
65.00	39.13	104.13	107.82

CLASSIFICATIONS:

Skilled Men (including Caulker, Powder Carrier, all other skilled men)

Skilled Men (including Miner, Drill Runner, Iron Man, Conveyor Man, Manintenance Man, Safety Miner, Rigger, Block Layer, Cement Finisher, Tod Man)

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
64.81	39.13	103.94	107.63

CLASSIFICATIONS:

Semi-Skilled Men (including Bell or Signal Man Top or Bottom, Form Worker & Mover, Concrete Worker, Shaft Man, Tunnel Laborer, Caulker's Helper, all other semi-skilled)

Semi-Skilled Men (including Miner's Helper, Chuck Tender, Track Man, Nipper, Brake Man, Derail Man, Cable Man, Hose Man, Gravel Man, Form Man)

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NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

FREE AIR TUNNEL JOBS Rates Expiration Date :

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
64.31	39.13	103.44	107.13

CLASSIFICATIONS:

All Others (including Powder Watchman, Change House Attendant, Top Laborer)

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NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
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BILL FOR GROUND WATER SUPPLY Rates Expiration Date :

The well driller and/or helper may perform all work relative to the construction, finishing, and servicing of wells, pumps and borings for ground water supply. The present methods of well drilling entailing as they do, many diverse job operations calling for drilling, pump discharge, piping, and the operation of various types of related power equipment, shall all be within the job duties and functions of the well driller and/or helper. In the event that an extension of work should occur beyond water well drilling functions, into the field of general construction work, such extension of work would come under the appropriate rates listed elsewhere in this wage determination.

- For Work Hours, Shift Differentials, Overtime Rates, and Recognized Holidays see the "Operating Engineers" section of this wage determination.

Effective Dates:

07/01/2025

Rate	Fringe	Total
60.47	40.40	100.87

CLASSIFICATIONS:

Driller

Effective Dates:

07/01/2025

Rate	Fringe	Total
53.63	40.40	94.03

CLASSIFICATIONS:

Driller's Helper

TERRITORY
ENTIRE STATE

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

OPERATING ENGINEERS MARINE-DREDGING **Rates Expiration Date :**

NOTE: These wage rates only apply to dredging and other marine construction activities occurring in navigable waters and their tributaries.

Boat crews carrying explosive material (dynamite, pourfex, and other similar materials) shall be paid at 120% of the hourly wage rate for hours engaged in handling of said materials. Employees required to possess a Hazardous Material Certification as a condition of employment shall be compensated at 120% of the hourly wage rate.

OVERTIME:

Hours in excess of 40 per week, and all hours on Saturdays and Sundays, shall be paid at time and one-half the hourly rate. All hours on holidays shall be paid at double the hourly rate.

RECOGNIZED HOLIDAYS: New Year's Day, Martin Luther King Day, Good Friday, Memorial Day, July 4th, Labor Day, Veterans Day, Thanksgiving Day, Christmas Day. Sunday holidays observed the following Monday.

Effective Dates:

10/01/2025			10/01/2026
Rate	Fringe	Total	Total
48.48	15.44	63.92	65.74

CLASSIFICATIONS:

Lead Dredgerman, Operator, Leverman

Licensed Tug Operator with MOTV, Deck Captain

Effective Dates:

10/01/2025			10/01/2026
Rate	Fringe	Total	Total
41.93	14.99	56.92	58.47

CLASSIFICATIONS:

Derrick Operator, Spider/Spill Barge Operator

Engineer, Electrician, Chief Welder, Chief Mate

Fill Placer, Operator II

Licensed Boat Operator

Maintenance Engineer

Effective Dates:

10/01/2025			10/01/2026
Rate	Fringe	Total	Total
39.46	14.81	54.27	55.75

CLASSIFICATIONS:

Certified Welder

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ENTIRE STATE

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OPERATING ENGINEERS MARINE-DREDGING Rates Expiration Date :

Effective Dates:

10/01/2025			10/01/2026
Rate	Fringe	Total	Total
38.38	14.74	53.12	54.54

CLASSIFICATIONS:

Mate, Drag Barge Operator, Steward, Assistant Fill Placer

Welder

Effective Dates:

10/01/2025			10/01/2026
Rate	Fringe	Total	Total
37.15	14.65	51.80	53.18

CLASSIFICATIONS:

Boat Operator

Effective Dates:

10/01/2025			10/01/2026
Rate	Fringe	Total	Total
30.86	14.21	45.07	46.22

CLASSIFICATIONS:

Shoreman, Deckhand, Rodman, Scowman

Effective Dates:

10/01/2025			10/01/2026
Rate	Fringe	Total	Total
43.20	15.07	58.27	59.89

CLASSIFICATIONS:

Crane Operator

TERRITORY
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NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

MICROSURFACING/SLURRY SEAL **Rates Expiration Date :**

THESE RATES APPLY IN THE FOLLOWING COUNTIES ONLY:

Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Mercer, Ocean, Salem

IN ALL OTHER COUNTIES use the Heavy and General Laborers - North "Slurry Seal Laborer" rates.

SHIFT DIFFERENTIALS:

Any shift starting at 3:30 PM or later shall receive an additional \$0.35/hr

OVERTIME:

Hours in excess of 8 per day or 40 per week shall be paid at time and one-half the hourly rate. All hours on holidays shall be paid at double the hourly rate.

RECOGNIZED HOLIDAYS: New Year's Day, Washington's Birthday, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day.

Effective Dates:

08/26/2025			03/01/2026
Rate	Fringe	Total	Total
52.05	28.95	81.00	83.75

CLASSIFICATIONS:

Foreman

Effective Dates:

08/26/2025			03/01/2026
Rate	Fringe	Total	Total
50.10	28.95	79.05	81.80

CLASSIFICATIONS:

Box man, Hopper, CM Controller

Effective Dates:

08/26/2025			03/01/2026
Rate	Fringe	Total	Total
48.40	28.95	77.35	80.10

CLASSIFICATIONS:

Microsurface/Slurry Preparation

Effective Dates:

08/26/2025			03/01/2026
Rate	Fringe	Total	Total
49.05	28.95	78.00	80.75

CLASSIFICATIONS:

Squeegee man

TERRITORY
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NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

MACROSURFACING/SLURRY SEAL Rates Expiration Date :

Effective Dates:

08/26/2025			03/01/2026
Rate	Fringe	Total	Total
46.95	28.95	75.90	78.65

CLASSIFICATIONS:

Cleaner, Taper

TERRITORY
ENTIRE STATE

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

ASPHALT LABORERS - SOUTH **Rates Expiration Date :**

"THESE RATES APPLY IN THE FOLLOWING COUNTIES ONLY: Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Mercer, Ocean, Salem

{For apprentice rates refer to "Laborer - Heavy & General" apprentice rates in any county rate package}

The regular workday consists of 8 hours, starting at 7:00 AM or 8:00 AM.

SHIFT DIFFERENTIALS:

- Shifts must start at 3:00 PM, 4:00 PM, 12:00 AM, or 1:00 AM, to be considered shift work, except when the project owner mandates special hours of work in the job specifications, in which case those hours may be considered shift work.
- When such hours are mandated by the project owner, a shift that begins before midnight on Friday and ends on Saturday morning, or that begins at or after 8:00 PM on Sunday and ends on Monday morning may be paid at the shift differential rate.
- Shifts shall receive an additional \$3.00 per hour.

OVERTIME:

- Hours in excess of 8 per day, Monday through Friday, or outside of the regular workday that are not shift work, and all hours on Saturdays, shall be paid at time and one-half the hourly rate. All hours on Sundays and holidays shall be paid at double the hourly rate.
- Four 10-hour days may be worked, Monday through Thursday, at straight time, with Friday used as a make-up day for a day lost to inclement weather. If Friday is not a make-up day, all hours on Friday shall be paid at time and one-half the hourly rate.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays observed the following Monday. Veterans Day may be substituted for the day after Thanksgiving. However, in the trading of Veterans Day for the day after Thanksgiving, if overtime is worked on Veterans Day, it shall be paid at double the hourly rate.

Hazardous Waste Work:

- where Level A, B, or C protection is required: + \$5.00/hr
- other Hazardous Waste site: + \$1.00/hr

FOR TIDE WORK (pertains to tidal water): A contractor can start their job according to tide schedules (tide schedules are the various high and low tides related to this work) providing the eight (8) hour shift is completed between the hours of 5:00 AM and 6:30 PM.

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
55.20	39.13	94.33	97.58

CLASSIFICATIONS:

Paving Foreman

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
51.75	39.13	90.88	94.13

CLASSIFICATIONS:

Head Raker

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
51.90	39.13	91.03	94.28

CLASSIFICATIONS:

Screedman

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ASPHALT LABORERS - SOUTH Rates Expiration Date :

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
51.35	39.13	90.48	93.73

CLASSIFICATIONS:

Tampers, Smoothers, Kettlemen,
Painters, Shovelers, Roller Boys

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
51.45	39.13	90.58	93.83

CLASSIFICATIONS:

Milling Controller

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
51.65	39.13	90.78	94.03

CLASSIFICATIONS:

Traffic Control Coordinator

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
51.60	39.13	90.73	93.98

CLASSIFICATIONS:

Raker, Luteman

Effective Dates:

Rate	Fringe	Total

CLASSIFICATIONS:

Certified Paving Foreman

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NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
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TEST BORING PRELIMINARY TO CONSTRUCTION-NORTH **Rates Expiration Date :**

THESE RATES APPLY IN THE FOLLOWING COUNTIES ONLY:
Bergen, Essex, Hudson, Middlesex, Morris, Passaic, Somerset, Union

SHIFT DIFFERENTIAL:

Employees on a shift other than between the hours of 8:00 AM and 5:00 PM shall receive an additional \$2.00 per hour.

OVERTIME:

Hours in excess of 8 per day, Monday through Friday, and all hours on Saturday shall be paid at time and one-half the regular rate. All hours on Sundays and holidays shall be paid at double the regular rate.

RECOGNIZED HOLIDAYS: New Year's Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day, and Christmas Day.
Sunday holidays observed the following Monday.

Hazardous Waste Pay (for Levels A, B, and C): an additional 15% of the hourly rate, per hour.

A newly hired Helper with no experience in the industry shall be paid as follows :

- 1st year on the job - 70% of Helper wage rate
- 2nd year on the job - 80% of Helper wage rate
- 3rd year on the job - 90% of Helper wage rate
- All helpers receive full fringe benefit rate.

Effective Dates:

10/21/2025

Rate	Fringe	Total
38.15	36.22	74.37

CLASSIFICATIONS:

Helper (4th year helper)

Effective Dates:

10/21/2025

Rate	Fringe	Total
48.78	36.22	85.00

CLASSIFICATIONS:

Driller

Effective Dates:

10/21/2025

Rate	Fringe	Total
55.61	36.22	91.83

CLASSIFICATIONS:

Foreman

HEAVY & GENERAL LABORERS - NORTH Rates Expiration Date :

THESE RATES APPLY IN THE FOLLOWING COUNTIES ONLY:

Bergen, Essex, Hudson, Hunterdon, Middlesex, Monmouth, Morris, Passaic, Somerset, Sussex, Union, Warren

{For apprentice rates refer to "Laborer - Heavy & General" apprentice rates in any county rate package}

The regular workday consists of 8 hours, starting at 7:00 AM or 8:00 AM.

SHIFT DIFFERENTIALS:

- Shifts must start at 3:00 PM, 4:00 PM, 12:00 AM, or 1:00 AM, to be considered shift work, except when the project owner mandates special hours of work in the job specifications, in which case those hours may be considered shift work.
- When such hours are mandated by the project owner, a shift that begins before midnight on Friday and ends on Saturday morning, or that begins at or after 8:00 PM on Sunday and ends on Monday morning may be paid at the shift differential rate.
- Shifts shall receive an additional \$3.00 per hour.

FOR TIDE WORK (pertains to tidal water): A contractor can start their job according to tide schedules (tide schedules are the various high and low tides related to this work) providing the eight (8) hour shift is completed between the hours of 5:00 AM and 6:30 PM.

OVERTIME:

- Hours in excess of 8 per day, Monday through Friday, or outside of the regular workday that are not shift work, and all hours on Saturdays, shall be paid at time and one-half the hourly rate. All hours on Sundays and holidays shall be paid at double the hourly rate.
- Four 10-hour days may be worked, Monday through Thursday, at straight time, with Friday used as a make-up day for a day lost to inclement weather. If Friday is not a make-up day, all hours on Friday shall be paid at time and one-half the hourly rate.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays observed the following Monday. Veterans Day may be substituted for the day after Thanksgiving. However, in the trading of Veterans Day for the day after Thanksgiving, if overtime is worked on Veterans Day, it shall be paid at double the hourly rate.

Hazardous Waste Work:

- where Level A, B, or C protection is required: + \$5.00/hr
- other Hazardous Waste site: + \$1.00/hr

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
50.95	39.13	90.08	93.33

CLASSIFICATIONS:

"D" Rate:

basic, landscape, asphalt, slurry seal, or railroad track laborer; utility meter installer; flagman; salamander tender; pitman; dumpman; rakers or tampers on cold patch work; wrappers or coaters of pipe; waterproofer; timberman; wagon drill or drill master helper; powder carrier; magazine tender; signal man; power buggy operator; tree cutter; operator of basic power tools

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
51.65	39.13	90.78	94.03

CLASSIFICATIONS:

"C" Rate:

pipe layer; laser man; conduit or duct line layer; operator of jack hammer, chipping hammer, pavement breaker, concrete cutter, asphalt cutter, sheet hammer, or walk-behind saw cutter; sandblaster; acetylene cutting or burning; wagon drill, directional drill, or hydraulic drill operator; drill master; core driller; asphalt raker or lute man

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HEAVY & GENERAL LABORERS - NORTH Rates Expiration Date :

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
51.90	39.13	91.03	94.28

CLASSIFICATIONS:

"B" Rate:

concrete finisher; setter of brick or stone pavers; stone cutter; form setter; manhole, catch basin, or inlet builder; asphalt screedman; rammer; hardscaping; gunite nozzle man

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
55.45	39.13	94.58	97.83

CLASSIFICATIONS:

"A" Rate:

blaster

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
55.20	39.13	94.33	97.58

CLASSIFICATIONS:

"FOREMAN" Rate:

labor foreman, asphalt foreman, drill foreman, pipe foreman, grade foreman, finisher foreman, concrete foreman

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
56.20	39.13	95.33	98.58

CLASSIFICATIONS:

"GENERAL FOREMAN" Rate

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
52.40	39.13	91.53	94.78

CLASSIFICATIONS:

TRAFFIC CONTROL COORDINATOR Rate

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HEAVY & GENERAL LABORERS - NORTH Rates Expiration Date :

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
56.70	39.13	95.83	100.08

CLASSIFICATIONS:

" CERTIFIED FOREMAN Rate" :

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
57.70	39.13	96.83	101.08

CLASSIFICATIONS:

" CERTIFIED GENERAL FOREMAN Rate" :

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NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

HEAVY & GENERAL LABORERS - SOUTH **Rates Expiration Date :**

THESE RATES APPLY IN THE FOLLOWING COUNTIES ONLY:

Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Mercer, Ocean, Salem

{For apprentice rates refer to "Laborer - Heavy & General" apprentice rates in any county rate package}

The regular workday consists of 8 hours, starting at 7:00 AM or 8:00 AM.

SHIFT DIFFERENTIALS:

- Shifts must start at 3:00 PM, 4:00 PM, 12:00 AM, or 1:00 AM, to be considered shift work, except when the project owner mandates special hours of work in the job specifications, in which case those hours may be considered shift work.
- When such hours are mandated by the project owner, a shift that begins before midnight on Friday and ends on Saturday morning, or that begins at or after 8:00 PM on Sunday and ends on Monday morning may be paid at the shift differential rate.
- Shifts shall receive an additional \$3.00 per hour.

FOR TIDE WORK (pertains to tidal water): A contractor can start their job according to tide schedules (tide schedules are the various high and low tides related to this work) providing the eight (8) hour shift is completed between the hours of 5:00 AM and 6:30 PM.

OVERTIME:

- Hours in excess of 8 per day, Monday through Friday, or outside of the regular workday that are not shift work, and all hours on Saturdays, shall be paid at time and one-half the hourly rate. All hours on Sundays and holidays shall be paid at double the hourly rate.
- Four 10-hour days may be worked, Monday through Thursday, at straight time, with Friday used as a make-up day for a day lost to inclement weather. If Friday is not a make-up day, all hours on Friday shall be paid at time and one-half the hourly rate.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays observed the following Monday. Veterans Day may be substituted for the day after Thanksgiving. However, in the trading of Veterans Day for the day after Thanksgiving, if overtime is worked on Veterans Day, it shall be paid at double the hourly rate.

Hazardous Waste Work:

- where Level A, B, or C protection is required: + \$5.00/hr
- other Hazardous Waste site: + \$1.00/hr

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
50.95	39.13	90.08	93.33

CLASSIFICATIONS:

"D" Rate:

basic, landscape, asphalt, slurry seal, or railroad track laborer; utility meter installer; flagman; salamander tender; pitman; dumpman; rakers or tampers on cold patch work; wrappers or coaters of pipe; waterproofer; timberman; wagon drill or drill master helper; powder carrier; magazine tender; signal man; power buggy operator; tree cutter; operator of basic power tools

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
51.65	39.13	90.78	94.03

CLASSIFICATIONS:

"C" Rate:

pipe layer; laser man; conduit or duct line layer; operator of jack hammer, chipping hammer, pavement breaker, concrete cutter, asphalt cutter, sheet hammer, or walk-behind saw cutter; sandblaster; acetylene cutting or burning; wagon drill, directional drill, or hydraulic drill operator; drill master; core driller; asphalt raker or lute man

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HEAVY & GENERAL LABORERS - SOUTH Rates Expiration Date :

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
55.45	39.13	94.58	97.83

CLASSIFICATIONS:

"A" Rate:

blaster

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
55.20	39.13	94.33	97.58

CLASSIFICATIONS:

"FOREMAN" Rate:

labor foreman, asphalt foreman, drill foreman, pipe foreman, grade foreman, finisher foreman, concrete foreman

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
56.20	39.13	95.33	98.58

CLASSIFICATIONS:

"GENERAL FOREMAN" Rate

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
52.40	39.13	91.53	94.78

CLASSIFICATIONS:

TRAFFIC CONTROL COORDINATOR Rate

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
57.70	39.13	96.83	101.08

CLASSIFICATIONS:

" CERTIFIED GENERAL FOREMAN Rate" :

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HEAVY & GENERAL LABORERS - SOUTH Rates Expiration Date :

Effective Dates:

03/01/2025			03/03/2026
Rate	Fringe	Total	Total
56.70	39.13	95.83	100.08

CLASSIFICATIONS:

" CERTIFIED FOREMAN Rate" :

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
51.90	39.13	91.03	94.28

CLASSIFICATIONS:

"B" Rate:

concrete finisher; setter of brick or stone pavers; stone cutter; form setter; manhole, catch basin, or inlet builder; asphalt screedman; rammer; hardscaping; gunite nozzle man

PIPELINE - MAINLINE TRANSMISSION **Rates Expiration Date :**

These rates apply to the following: welding on Transportation Mainline pipe lines (cross-country pipe lines, or any segments thereof, transporting coal, gas, oil, water or other transportable materials, vapors or liquids, including portions of such pipe lines within private property boundaries up to the final metering station or connection - the point where a valve, consumer connection, or town border station divides mainline transmission lines or higher pressure lateral and branch lines from lower pressure distribution systems).

PER DIEM PAYMENT:

In addition to the total wage rate paid for each craft, the following per diem (per day) amounts must also be paid - Pipeline Journeyman: \$80.50; Pipeline Journeyman Welder: \$140.50; and Pipeline Helper: \$64.50. Note: in order to receive the per diem payment an employee must work a minimum of 8 hours in a 24 hour period.

NOTES:

- Journeymen employed as "stringer bead" welders and journeymen who are regularly employed as "hot-pass" welders shall receive \$1.00 per hour more than other journeymen.
- Welders running "stringer bead" or "hot-pass" on "cutouts" or "tie-ins" on a production basis shall be paid \$1.00 per hour above the journeymen rate.
- Whenever a welder helper is employed using a power buffer or power grinder immediately behind the stringer bead and /or hot-pass welders, and the pipe gang is set on a production basis, the helper shall be paid \$2.00 per hour above the helper rate.
- If back welding is performed inside a pipe under either or both of the following conditions, the welder engaged in the welding will receive \$3.00 per hour above the regular rate for the job only for the days on which such back welding is performed:
 - The employer elects, as a regular procedure, to back weld each line-up. This condition is not intended to apply to occasional back welding performed by the pipe gang to repair a bead, to rectify a "high-lo" condition or wall thickness, etc.
 - A welder is required to back weld a completed weld behind the firing line.
- If the welder helper is required to go inside the pipe for the purpose of brushing, buffing and grinding the weld, they shall receive a wage rate \$1.00 per hour above the regular helper rate for the days involved.
- Welders working on "hot work" shall be paid \$2.00 per hour above the regular rate for each day engaged in such work. "Hot work" is defined as work on lines in service where there is the danger of fire or explosion.

The regular workday shall be 8 hours, between 8:00 AM and 4:30 PM.

OVERTIME:

Hours in excess of 8 per day, and all hours on Sundays shall be paid at time and one-half the regular rate, inclusive of benefits. All hours on holidays shall be paid at double the regular rate, inclusive of benefits.

RECOGNIZED HOLIDAYS: New Year's Day, July 4th, Labor Day, Thanksgiving Day, and Christmas Day. Sunday holidays observed the following Monday.

Effective Dates:

06/18/2025

Rate	Fringe	Total
58.89	36.35	95.24

CLASSIFICATIONS:

Pipeline Journeyman Welder

Effective Dates:

06/18/2025

Rate	Fringe	Total
58.89	36.35	95.24

CLASSIFICATIONS:

Pipeline Journeyman

TERRITORY
ENTIRE STATE

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

PIPELINE - MAINLINE TRANSMISSION **Rates Expiration Date :**

Effective Dates:

06/18/2025

Rate	Fringe	Total
33.84	25.47	59.31

CLASSIFICATIONS:

Pipeline Helper

PIPELINE - GAS DISTRIBUTION Rates Expiration Date :

These rates apply to the following: welding on gas line distribution systems (that portion of the gas distribution system placed in streets, roads, subways, tunnels, viaducts, highways and easements which serves the users of gas).

SHIFT DIFFERENTIALS:

An "irregular" shift may start any time from 5:00 PM to 12:00 AM, Monday through Friday, and shall receive an additional 15% of the regular rate per hour, inclusive of benefits.

OVERTIME:

Hours in excess of forty per week, and all hours on Saturdays shall be paid at time and one-half the regular rate, inclusive of benefits. All hours on Sundays and holidays shall be paid at double the regular rate, inclusive of benefits.

RECOGNIZED HOLIDAYS: New Year's Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day, and Christmas Day.
Sunday holidays observed the following Monday.

Effective Dates:

11/04/2024

Rate	Fringe	Total
64.70	34.74	99.44

CLASSIFICATIONS:

Pipeline Journeyman Welder

Effective Dates:

11/04/2024

Rate	Fringe	Total
64.70	34.74	99.44

CLASSIFICATIONS:

Pipeline Journeyman

Effective Dates:

11/04/2024

Rate	Fringe	Total
41.73	24.77	66.50

CLASSIFICATIONS:

Pipeline Helper

TERRITORY
ENTIRE STATE

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

ASPHALT LABORERS- NORTH **Rates Expiration Date :**

THESE RATES APPLY IN THE FOLLOWING COUNTIES ONLY:

Bergen, Essex, Hudson, Hunterdon, Middlesex, Monmouth, Morris, Passaic, Somerset, Sussex, Union, Warren

{For apprentice rates refer to "Laborer - Heavy & General" apprentice rates in any county rate package}

The regular workday consists of 8 hours, starting at 7:00 AM or 8:00 AM.

SHIFT DIFFERENTIALS:

- Shifts must start at 3:00 PM, 4:00 PM, 12:00 AM, or 1:00 AM, to be considered shift work, except when the project owner mandates special hours of work in the job specifications, in which case those hours may be considered shift work.
- When such hours are mandated by the project owner, a shift that begins before midnight on Friday and ends on Saturday morning, or that begins at or after 8:00 PM on Sunday and ends on Monday morning may be paid at the shift differential rate.
- Shifts shall receive an additional \$3.00 per hour.

OVERTIME:

- Hours in excess of 8 per day, Monday through Friday, or outside of the regular workday that are not shift work, and all hours on Saturdays, shall be paid at time and one-half the hourly rate. All hours on Sundays and holidays shall be paid at double the hourly rate.
- Four 10-hour days may be worked, Monday through Thursday, at straight time, with Friday used as a make-up day for a day lost to inclement weather. If Friday is not a make-up day, all hours on Friday shall be paid at time and one-half the hourly rate.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays observed the following Monday. Veterans Day may be substituted for the day after Thanksgiving. However, in the trading of Veterans Day for the day after Thanksgiving, if overtime is worked on Veterans Day, it shall be paid at double the hourly rate.

Hazardous Waste Work:

-where Level A, B, or C protection is required: + \$5.00/hr

-other Hazardous Waste site: + \$1.00/hr

FOR TIDE WORK (pertains to tidal water): A contractor can start their job according to tide schedules (tide schedules are the various high and low tides related to this work) providing the eight (8) hour shift is completed between the hours of 5:00 AM and 6:30 PM.

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
55.20	39.13	94.33	97.58

CLASSIFICATIONS:

Asphalt Foreman

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
51.90	39.13	91.03	94.28

CLASSIFICATIONS:

Asphalt Screedman

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
51.65	39.13	90.78	94.03

CLASSIFICATIONS:

Asphalt Raker or Lute Man

TERRITORY
ENTIRE STATE

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

ASPHALT LABORERS- NORTH Rates Expiration Date :

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
50.95	39.13	90.08	93.33

CLASSIFICATIONS:

Asphalt Laborer

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
56.70	39.13	95.83	100.08

CLASSIFICATIONS:

Certified Asphalt Foreman

TERRITORY
ENTIRE STATE

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

ELECTRICIAN- UTILITY WORK (NORTH) **Rates Expiration Date :**

Electrician-Utility Work (North)

(For apprentice rates refer to Electrician-Utility Work (North) in any county rate package).

These rates apply to work contracted for by the following utility companies:

Public Service Electric & Gas Co. of NJ, GPU Energy, Borough of Madison Electric Department, Sussex Rural Electric Cooperative, Rockland Utilities, and Butler Municipal Electric Co.

These rates do not apply to work on substations or switching stations.

For Utility work contracted for by a utility company other than those listed above or those listed under "Electrician-Utility Work (South)", see the "Outside Commercial Rates" for the county in which the jobsite is located.

*** FOR OUTSIDE COMMERCIAL RATES PLEASE SEE COUNTY RATES**

The regular workday is 8 hours, between 6:00 AM and 6:00 PM.

FOR EMERGENCY WORK ONLY: (emergency work is defined as work caused by storm, catastrophe, act of god, and circumstances beyond the control of the employer)-all hours of work shall be paid at double the hourly rate.

SHIFT DIFFERENTIALS:

Shift work must run for a minimum of 5 consecutive workdays.

2nd shift (between the hours of 4:30 PM and 1:00 AM): 8 hours of work + 17.3% of the regular rate, inclusive of benefits.

3rd shift (between the hours of 12:30 AM and 9:00 AM): 8 hours of work + 31.4% of the regular rate per hour, inclusive of benefits.

OVERTIME:

Hours in excess of 8 per day, or before or after the regular workday Monday through Friday, that is not shift work, and all hours on Saturday shall be paid at time and one-half the regular rate, inclusive of benefits. All hours on Sunday and holidays shall be paid at double the hourly rate, inclusive of benefits.

Four 10-hour days may be worked, at straight time, between 6:00 AM and 6:00 PM, Monday through Thursday.

RECOGNIZED HOLIDAYS:

New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day and Christmas Day, or day on which they are legally observed.

Effective Dates:

12/01/2024

Rate	Fringe	Total
64.83	44.73	109.56

CLASSIFICATIONS:

Chief Lineman

Effective Dates:

12/01/2024

Rate	Fringe	Total
61.16	42.20	103.36

CLASSIFICATIONS:

Journeyman Lineman

Effective Dates:

12/01/2024

Rate	Fringe	Total
61.16	42.20	103.36

CLASSIFICATIONS:

Special License Operator

TERRITORY
ENTIRE STATE

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

ELECTRICIAN- UTILITY WORK (NORTH)

Rates Expiration Date :

Effective Dates:

12/01/2024

Rate	Fringe	Total
60.55	41.77	102.32

CLASSIFICATIONS:

Transit Man

Effective Dates:

12/01/2024

Rate	Fringe	Total
58.71	40.50	99.21

CLASSIFICATIONS:

Line Equipment Operator

Effective Dates:

12/01/2024

Rate	Fringe	Total
51.37	35.44	86.81

CLASSIFICATIONS:

Dynamite Man

Effective Dates:

12/01/2024

Rate	Fringe	Total
76.45	52.75	129.20

CLASSIFICATIONS:

General Foreman

Effective Dates:

12/01/2024

Rate	Fringe	Total
70.33	48.52	118.85

CLASSIFICATIONS:

Assistant General Foreman

Effective Dates:

12/01/2024

Rate	Fringe	Total
68.50	47.26	115.76

CLASSIFICATIONS:

Line Foreman

TERRITORY
ENTIRE STATE

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

ELECTRICIAN- UTILITY WORK (NORTH)

Rates Expiration Date :

Effective Dates:

12/01/2024

Rate	Fringe	Total
49.54	34.18	83.72

CLASSIFICATIONS:

Street Light Mechanical Leader

Effective Dates:

12/01/2024

Rate	Fringe	Total
47.09	32.49	79.58

CLASSIFICATIONS:

Groundman Winch Operator

Effective Dates:

12/01/2024

Rate	Fringe	Total
47.09	32.49	79.58

CLASSIFICATIONS:

Groundman Truck Operator

Effective Dates:

12/01/2024

Rate	Fringe	Total
46.48	32.07	78.55

CLASSIFICATIONS:

Street Light Mechanic

Effective Dates:

12/01/2024

Rate	Fringe	Total
46.48	32.07	78.55

CLASSIFICATIONS:

Line Equipment Mechanic

Effective Dates:

12/01/2024

Rate	Fringe	Total
39.75	27.42	67.17

CLASSIFICATIONS:

Groundman 2nd Year

TERRITORY
ENTIRE STATE

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

ELECTRICIAN- UTILITY WORK (NORTH) Rates Expiration Date :

Effective Dates:

12/01/2024

Rate	Fringe	Total
36.70	25.32	62.02

CLASSIFICATIONS:

Groundman 1st Year

Effective Dates:

12/01/2024

Rate	Fringe	Total
60.55	41.77	102.32

CLASSIFICATIONS:

Line Equipment Foreman

TERRITORY
ENTIRE STATE

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

ELECTRICIAN- UTILITY WORK (SOUTH) **Rates Expiration Date :**

Electrician-Utility Work (South)

(For apprentice rates refer to Electrician-Utility Work (South) in any county rate package).

These rates apply to work contracted for by the following utility company:

Atlantic City Electric.

These rates do not apply to work on substations or switching stations.

For utility work contracted for by a utility company other than the one listed above or those listed under "Electrician-Utility Work (North)", see the "Outside Commercial Rates" for the county in which the jobsite is located.

*** FOR OUTSIDE COMMERCIAL RATES PLEASE SEE COUNTY RATES**

The regular workday is 8 hours, between 7:00 AM and 4:30 PM.

FOR EMERGENCY WORK ONLY: (emergency work is defined as work caused by storm, catastrophe, act of god, and circumstances beyond the control of the employer)- all hours of work shall be paid at double the hourly rate.

SHIFT DIFFERENTIALS:

Shift work must run for a minimum of 5 consecutive workdays.

When two (2) or three (3) shifts are worked the following shall apply:

1st shift (between the hours of 8:00 AM and 4:30 PM)

2nd shift (between the hours of 4:30 PM and 12:30 AM): 8 hours of work + 10% of the regular rate of pay for 7.5 hours worked.

3rd shift (between the hours of 12:30 AM and 8:00 AM): 8 hours of work + 15% of the regular rate of pay for 7 hours worked.

OVERTIME:

Hours in excess of 8 per day, or before or after the regular workday Monday through Friday, that is not shift work, and all hours on Saturday shall be paid at time and one-half the regular rate. All hours on Sundays and Holidays shall be paid double the hourly rate.

Four 10-hour days may be worked, at straight time, between 6:00 AM and 6:00 PM, Monday through Thursday with Friday used as a make-up day.

RECOGNIZED HOLIDAYS:

New Year's Day, Memorial Day, July 4th, Labor Day, Veterans' Day, Thanksgiving Day and Christmas Day or on days celebrated.

WORKING RULES:

There shall be a Foreman in charge of each work crew. No crews are to exceed twelve (12) men, including Foremen.

There shall be a General Foreman designated for transmission work when three (3) or more crews are on the same job and for distribution work where there are more than twenty (20) employees on site.

A small job crew shall consist of five (5) or less employees, one (1) of the Journeyman Linemen in the crew shall be designated as a Small Job Foreman.

Work performed from ladders and/or mechanical lift equipment shall be the work of Linemen and/or Apprentices.

On new construction, fitting and framing poles, towers or structures may be done by Journeymen and/or Apprentices.

Groundmen may assist, but may not perform any work which would be performed by Linemen if assembled in the air.

There shall be a Journeyman Lineman in each pole setting, erection, grounding, wire and cable-pulling crew of more than three (3) men.

Effective Dates:

12/01/2024

Rate	Fringe	Total
71.87	59.12	130.99

CLASSIFICATIONS:

General Foreman

TERRITORY
ENTIRE STATE

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

ELECTRICIAN- UTILITY WORK (SOUTH) Rates Expiration Date :

Effective Dates:

12/01/2024

Rate	Fringe	Total
64.01	54.22	118.23

CLASSIFICATIONS:

Foreman

Effective Dates:

12/01/2024

Rate	Fringe	Total
60.64	52.12	112.76

CLASSIFICATIONS:

Small Job Foreman

Effective Dates:

12/01/2024

Rate	Fringe	Total
56.15	49.33	105.48

CLASSIFICATIONS:

Heavy Equipment Operator

Effective Dates:

12/01/2024

Rate	Fringe	Total
56.15	49.33	105.48

CLASSIFICATIONS:

Cable Splicer

Effective Dates:

12/01/2024

Rate	Fringe	Total
56.15	49.33	105.48

CLASSIFICATIONS:

Journeyman Lineman

Effective Dates:

12/01/2024

Rate	Fringe	Total
56.15	49.33	105.48

CLASSIFICATIONS:

Journeyman Welder

TERRITORY
ENTIRE STATE

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

ELECTRICIAN- UTILITY WORK (SOUTH) Rates Expiration Date :

Effective Dates:

12/01/2024

Rate	Fringe	Total
56.15	49.33	105.48

CLASSIFICATIONS:

Journeyman Painter

Effective Dates:

12/01/2024

Rate	Fringe	Total
44.92	42.36	87.28

CLASSIFICATIONS:

Light Equipment Operator

Effective Dates:

12/01/2024

Rate	Fringe	Total
39.31	38.86	78.17

CLASSIFICATIONS:

Groundman Truck Driver

Effective Dates:

12/01/2024

Rate	Fringe	Total
36.50	37.12	73.62

CLASSIFICATIONS:

Groundman 3rd Year

Effective Dates:

12/01/2024

Rate	Fringe	Total
33.69	35.37	69.06

CLASSIFICATIONS:

Groundman 2nd Year

Effective Dates:

12/01/2024

Rate	Fringe	Total
30.88	33.62	64.50

CLASSIFICATIONS:

Groundman 1st Year

TERRITORY
ENTIRE STATE

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

ELECTRICIAN- UTILITY WORK (SOUTH) Rates Expiration Date :

Effective Dates:

12/01/2024

Rate	Fringe	Total
24.71	29.80	54.51

CLASSIFICATIONS:

Flagman

TERRITORY
ENTIRE STATE

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

HEAVY & GENERAL LABORERS- NEW TRANS HUDSON TUNNELS **Rates Expiration Date :**

****THESE RATES APPLY TO CONSTRUCTION ON NEW TRANS HUDSON TUNNELS ONLY****

{For apprentice rates refer to "Laborer - Heavy & General" apprentice rates in any county rate package}

The regular workday consists of 8 hours, starting at 7:00 AM or 8:00 AM.

SHIFT DIFFERENTIALS:

- Shifts must start at 3:00 PM, 4:00 PM, 12:00 AM, or 1:00 AM, to be considered shift work, except when the project owner mandates special hours of work in the job specifications, in which case those hours may be considered shift work.
- When such hours are mandated by the project owner, a shift that begins before midnight on Friday and ends on Saturday morning, or that begins at or after 8:00 PM on Sunday and ends on Monday morning may be paid at the shift differential rate.
- Shifts shall receive an additional \$3.00 per hour.

OVERTIME:

- Hours in excess of 8 per day, Monday through Friday, or outside of the regular workday that are not shift work, and all hours on Saturdays, shall be paid at time and one-half the hourly rate. All hours on Sundays and holidays shall be paid at double the hourly rate.
- Four 10-hour days may be worked, Monday through Thursday, at straight time, with Friday used as a make-up day for a day lost to inclement weather. If Friday is not a make-up day, all hours on Friday shall be paid at time and one-half the hourly rate.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays observed the following Monday. Veterans Day may be substituted for the day after Thanksgiving. However, in the trading of Veterans Day for the day after Thanksgiving, if overtime is worked on Veterans Day, it shall be paid at double the hourly rate.

Hazardous Waste Work:

- where Level A, B, or C protection is required: + \$5.00/hr
- other Hazardous Waste site: + \$1.00/hr

Traffic Control Coordinator: When either of the work classifications found below are working as a Traffic Control Coordinator they are to receive \$.75 above their current rate of pay.

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
80.55	39.13	119.68	123.81

CLASSIFICATIONS:

Walking Boss & Superintendent

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
80.10	39.13	119.23	123.36

CLASSIFICATIONS:

Heading Foreman, Shaft Foreman, Rod Foreman, Electrical Foreman, Rigging Foreman

TERRITORY
ENTIRE STATE

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

HEAVY & GENERAL LABORERS- NEW TRANS HUDSON TUNNELS Rates Expiration Date :

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
79.35	39.13	118.48	122.61

CLASSIFICATIONS:

Iron Foreman, Caulking Foreman, Form Foreman, Cement Finishing Foreman, Concrete Foreman, Track Foreman, Clean-up Foreman, Grout Foreman

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
83.10	39.13	122.23	126.36

CLASSIFICATIONS:

Blaster

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
78.53	39.13	117.66	121.78

CLASSIFICATIONS:

Top Labor Foreman

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
78.00	39.13	117.13	121.26

CLASSIFICATIONS:

Skilled Men (including Caulker, Powder Carrier, all other skilled men)
Skilled Men (including Miner, Drill Runner, Iron Man, Conveyor Man, Maintenance Man, Safety Miner, Rigger, Block Layer, Cement Finisher, Rod Man)

Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
77.78	39.13	116.91	121.03

CLASSIFICATIONS:

Semi-Skilled Men (including Bell or Signal Man top or bottom, Form Worker & Mover, Concrete Worker, Shaft Man, Tunnel Laborer, Caulker's Helper, all other semi-skilled)
Semi-Skilled Men (including Miner's Helper, Chuck Tender, Track Man, Nipper, Brake Man, Derail Man, Cable Man, Hose Man, Gravel Man, Form Man)

TERRITORY
ENTIRE STATE

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
PREVAILING WAGE RATE DETERMINATION

HEAVY & GENERAL LABORERS- NEW TRANS HUDSON TUNNELS **Rates Expiration Date :**

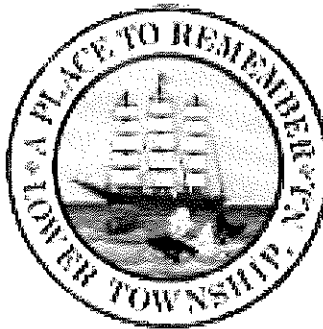
Effective Dates:

03/01/2025			03/01/2026
Rate	Fringe	Total	Total
77.18	39.13	116.31	120.43

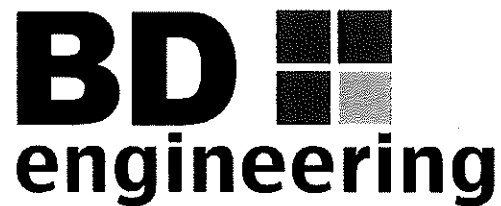
CLASSIFICATIONS:

All others (including Powder Watchman, Change House Attendant, Top Laborer, Job Steward)

Specifications
For
Public Works Building Replacement
Township of Lower, Cape May County, New Jersey
October 29, 2025



Prepared by:



44 MAIN STREET, FARMINGDALE, NJ 07727

Brian Tannenhaus, P.E., License #: 24GE04580100

Set #: 6

BD Eng. Project #240093

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DIVISION 22 – PLUMBING
220000 PLUMBING WORK SPECIFICATIONS

1. GENERAL:

- A. THE "GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION," AIA DOCUMENT A201, LATEST EDITION, AND THESE SPECIFICATIONS AS APPLICABLE ARE PART OF THIS CONTRACT.
- B. ALL APPLICABLE CODES, LAWS AND REGULATIONS GOVERNING OR RELATING TO ANY PORTION OF THIS WORK ARE HEREBY INCORPORATED INTO AND MADE PART OF THESE SPECIFICATIONS, AND THEIR PROVISIONS SHALL BE CARRIED OUT BY THE CONTRACTOR WHO SHALL INFORM THE OWNER, PRIOR TO SUBMITTING A PROPOSAL, OF ANY WORK OR MATERIAL WHICH VIOLATES ANY OF THE ABOVE LAWS AND REGULATIONS. ANY WORK DONE BY THE CONTRACTOR CAUSING SUCH VIOLATION SHALL BE CORRECTED BY THE CONTRACTOR AT THEIR OWN COST.
- C. INVESTIGATE EACH SPACE THROUGH WHICH EQUIPMENT MUST BE MOVED. WHERE NECESSARY, EQUIPMENT SHALL BE SHIPPED FROM THE MANUFACTURE IN SECTIONS OF A SIZE SUITABLE FOR MOVING THROUGH AVAILABLE RESTRICTIVE SPACES. ASCERTAIN FROM THE BUILDING OWNER AND TENANT AT WHAT TIMES OF THE DAY EQUIPMENT MAY BE MOVED THROUGH ALL AREAS.
- D. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. PIPE ROUTING IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS, DROPS AND RISES OF RUNS. THE CONTRACTOR SHALL ALLOW IN HIS/HER PRICE FOR ROUTING OF PIPING TO AVOID OBSTRUCTIONS. COORDINATION WITH EXISTING SERVICES, INCLUDING THOSE OF OTHER TRADES, IS REQUIRED. MAINTAIN HEADROOM AND SPACE CONDITIONS.
- E. SUPPORT ALL PIPING FROM BUILDING STRUCTURE AND/OR FRAMING IN AN APPROVED MANNER. WHERE OVERHEAD CONSTRUCTION DOES NOT PERMIT FASTENING OR SUPPORTS FOR EQUIPMENT, FURNISH ADDITIONAL FRAMING. INSERTS SHALL BE STEEL, SLOTTED TYPE AND FACTORY PAINTED. SINGLE ROD SHALL BE SIMILAR TO GRINNELL FIG. 281. MULTI-ROD SHALL BE SIMILAR TO FEE & MASON SERIES 9000 WITH END CAPS AND CLOSURE STRIPS. MAXIMUM LOADING INCLUDING PIPES CONTENT AND COVERING SHALL NOT EXCEED 75% OF RATED INSERT CAPABILITY. WHEN SUPPORTING FROM BUILDING USE BEAM CLAMPS IN APPROVED MANNER. PROVIDE SEISMIC RESTRAINTS AS REQUIRED BY CODE.
- F. INSTALL WORK AS TO BE READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS FROM THE DRAWINGS MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES, WHICH INVOLVE EXTRA COST, SHALL NOT BE MADE WITHOUT OUR OR OWNER APPROVAL.
- G. REMOVAL AND RELOCATION OF CERTAIN EXISTING WORK MAY BE NECESSARY FOR THE PERFORMANCE OF THE GENERAL WORK. ALL EXISTING CONDITIONS CANNOT BE COMPLETELY DETAILED ON THE DRAWINGS. THE CONTRACTOR SHALL SURVEY THE SITE AND INCLUDE ALL CHANGES AND CHARGES IN MAKING UP THE WORK PROPOSED.
- H. CONNECTIONS TO EXISTING WORK: INSTALL NEW WORK AND CONNECT TO EXISTING WORK WITH A MINIMUM INTERFERENCE TO EXISTING FACILITIES. TEMPORARY SHUTDOWNS OF EXISTING SERVICES SHALL BE PERFORMED AT NO ADDITIONAL CHARGES, AT TIMES NOT TO INTERFERE WITH NORMAL OPERATION OF EXISTING FACILITIES AND ONLY WITH WRITTEN CONSENT OF THE OWNER. ALARM AND EMERGENCY SYSTEMS SHALL NOT BE INTERRUPTED. MAINTAIN CONTINUOUS OPERATION OF THE EXISTING FACILITIES AS REQUIRED WITH NECESSARY TEMPORARY CONNECTIONS BETWEEN NEW AND EXISTING WORK. CONNECT NEW WORK TO EXISTING WORK IN NEAT AND ACCEPTABLE MANNER. RESTORE EXISTING DISTURBED

WORK TO ORIGINAL CONDITION, INCLUDING MAINTENANCE OF WIRING CONTINUITY AS REQUIRED.

- I. DISCONNECT, REMOVE AND/OR RELOCATE EXISTING MATERIAL, EQUIPMENT AND OTHER WORK AS NOTED OR REQUIRED FOR PROPER INSTALLATION OF NEW WORK.
- J. ALL EXISTING MATERIAL, EQUIPMENT AND CONSTRUCTION DEBRIS TO BE REMOVED UNDER THIS CONTRACT SHALL BECOME THE PROPERTY OF THE CONTRACTOR WITH THE EXCEPTION OF SPECIFIC EQUIPMENT AND APPARATUS REQUESTED BY THE BUILDING REPRESENTATIVE, ARCHITECT OR AS NOTED TO BE RELOCATED ON THE DRAWINGS. REMOVED EQUIPMENT SHALL BE PROPERLY DISPOSED OF BY THIS CONTRACTOR.
- K. THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND MATERIALS AND ALL PARTS OF THE BUILDING, EXTERIOR SPACES AND ADJACENT STREETS, SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND DEBRIS RESULTING FROM THE EXECUTION OF THIS WORK. EXCESS MATERIALS WILL NOT BE PERMITTED TO ACCUMULATE EITHER ON THE INTERIOR OR THE EXTERIOR.
- L. SEAL OPENING THROUGH PARTITIONS, WALLS AND FLOORS WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL. ALL PENETRATIONS THROUGH NEW AND EXISTING RATED FIRE AND SMOKE PARTITIONS AND/OR FLOORS SHALL BE COMPLETELY SEALED USING MATERIALS AND METHODS DESCRIBED IN SUBSEQUENT "FIRE STOPPING" SPECIFICATIONS SECTIONS.
- M. PROVIDE ALL NECESSARY FLASHING AND COUNTERFLASHING TO MAINTAIN THE WATERPROOFING INTEGRITY OF THE BUILDING AS REQUIRED BY THE INSTALLATION OR REMOVAL OF PIPING AND EQUIPMENT. PROVIDE EQUIPMENT CURBS AS REQUIRED AND POSITIVELY ATTACH THE EQUIPMENT TO THE STRUCTURE BELOW.
- N. THE WORK IN THE BUILDING SHALL BE DONE WHEN AND AS DIRECTED, IN A MANNER SATISFACTORY TO THE OWNER. THE WORK SHALL BE PERFORMED AS TO CAUSE THE LEAST POSSIBLE INCONVENIENCE AND DISTURBANCE TO THE PRESENT OCCUPANTS.
- O. THE CONTRACTOR'S PROPOSAL FOR ALL WORK SHALL BE PREDICATED ON THE PERFORMANCE OF THE WORK DURING REGULAR WORKING HOURS. WHEN SO DIRECTED, HOWEVER, THE CONTRACTOR SHALL INSTALL WORK DURING OVERTIME HOURS AND THE ADDITIONAL COST TO BE CHARGED THEREFORE SHALL BE ONLY THE "PREMIUM" PORTION OF THE WAGES PAID.
- P. UNLESS OTHERWISE SPECIFICALLY NOTED OF SPECIFIED, INCLUDE ALL CUTTING AND PATCHING OF EXISTING FLOORS, WALLS, PARTITIONS AND OTHER MATERIALS IN THE EXISTING BUILDING. THE CONTRACTOR SHALL RESTORE THESE AREAS TO ORIGINAL CONDITION.
- Q. PC IS RESPONSIBLE TO PROVIDE ACCESS PANELS FOR ANY CONCEALED PLUMBING WORK THAT MUST BE ACCESSIBLE EITHER BY CODE OR AS INDICATED IN THE DOCUMENTS. ALL ACCESS DOOR LOCATIONS SHALL BE REVIEWED AND APPROVED BY ARCHITECT PRIOR TO INSTALLATION OF DEVICE REQUIRING THE ACCESS PANEL. ALL ACCESS DOORS MUST MATCH THE FIRE RATING AND CONSTRUCTION TYPE OF THE CEILING OR WALL PENETRATION AS DESIGNATED ON THE ARCHITECTURAL DRAWINGS.
- R. ALL MATERIAL AND EQUIPMENT SHALL BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
- S. SUBMISSION OF A PROPOSAL SHALL BE CONSTRUED AS EVIDENCE THAT A CAREFUL EXAMINATION OF ALL OF THE PLANS APPLICABLE FOR THE PROJECT AND NOT JUST THE PLUMBING PLANS AND IS FAMILIAR WITH ANY PROPOSED CONDITIONS THAT WILL NEED TO BE COORDINATED IN THE FIELD. FOR EXISTING BUILDINGS: THE PORTIONS OF THE

EXISTING BUILDING, EQUIPMENT, ETC., WHICH AFFECT THIS WORK, AND THE ACCESS TO SUCH SPACES, HAS BEEN MADE AND THAT THE CONTRACTOR IS FAMILIAR WITH EXISTING CONDITIONS AND DIFFICULTIES THAT WILL AFFECT THE EXECUTION OF THE WORK. THE CONTRACTOR IS RESPONSIBLE TO INDICATE ANY DISCREPANCIES BETWEEN THE CONTRACT DRAWINGS AND ACTUAL FIELD CONDITIONS PRIOR TO SUBMITTAL OF BID. SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT THE CONTRACTOR HAS THOROUGHLY REVIEWED ALL OF THE DOCUMENTATION ASSOCIATED WITH THE PROJECT AND IF AN EXISTING BUILDING REVIEWED ALL OF THE EXISTING CONDITIONS. LATER CLAIMS SHALL NOT BE MADE FOR LABOR, EQUIPMENT OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN DURING SUCH AN EXAMINATION AND REVIEW. THE ON-SITE INSPECTION SHALL VERIFY EXISTING EQUIPMENT AND PIPING (SIZES, CLEARANCES, ETC.) AND CONDITIONS.

- T. INSURANCE: IN ACCORDANCE WITH BUILDING REQUIREMENTS AND SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.
- U. THE FINAL ACCEPTANCE SHALL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT, TESTED AND BALANCED THE VARIOUS SYSTEMS, DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS AND HAS FURNISHED ALL THE REQUIRED CERTIFICATES OF INSPECTION AND APPROVAL.
- V. SPECIFICATIONS ARE OF SIMPLIFIED FORM AND INCLUDE INCOMPLETE SENTENCES. WORDS OR PHRASES SUCH AS "THE CONTRACTOR SHALL," "SHALL BE," "FURNISH," "PROVIDE," "A," "THE," AND "ALL" HAVE BEEN OMITTED FOR BREVITY.
- W. DEFINITIONS:
 - 1. "PROVIDE": TO SUPPLY, INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION THE PARTICULAR WORK REFERRED TO UNLESS SPECIFICALLY OTHERWISE NOTED.
 - 2. "INSTALL": TO ERECT, MOUNT AND CONNECT COMPLETE WITH RELATED ACCESSORIES.
 - 3. "FURNISH" OR "SUPPLY": TO PURCHASE, PROCURE, ACQUIRE AND DELIVER COMPLETE WITH RELATED ACCESSORIES.
 - 4. "WORK": LABOR, MATERIALS, EQUIPMENT, APPARATUS, CONTROLS, ACCESSORIES AND OTHER ITEMS REQUIRED FOR PROPER AND COMPLETE INSTALLATION.
 - 5. "CONCEALED": EMBEDDED IN MASONRY OR OTHER CONSTRUCTION, INSTALLED IN FURRED SPACES, WITHIN DOUBLE PARTITIONS OR HUNG CEILINGS, IN TRENCHES, IN CRAWL SPACES, OR IN ENCLOSURES.
 - 6. "EXPOSED": NOT INSTALLED UNDERGROUND OR "CONCEALED" AS DEFINED ABOVE.
 - 7. "SIMILAR" OR "EQUAL": EQUAL IN MATERIALS, WEIGHT, SIZE, DESIGN AND EFFICIENCY OF SPECIFIED PRODUCT.

2. SCOPE OF WORK:

- A. THE SCOPE OF WORK SHALL CONSIST OF PROVIDING LABOR, MATERIALS, EQUIPMENT, SERVICES AND FEES NECESSARY FOR COMPLETE AND SAFE INSTALLATION IN CONFORMITY WITH THE NATIONAL STANDARD PLUMBING CODE AND ALL OTHER

APPLICABLE INDUSTRY, STATE, NATIONAL AND LOCAL CODES AND AUTHORITIES HAVING JURISDICTION, AS INDICATED ON THE DRAWINGS AND HEREIN SPECIFIED.

- B. ALL DRAWINGS, PLANS, DETAILS, SPECIFICATIONS AND SPECIFICATION ADDENDA ARE MADE PART OF THIS CONTRACT AND SHALL APPLY TO ALL WORK UNDER THE CONTRACT UNLESS OTHERWISE AMENDED, MODIFIED, SUPPLEMENTED OR SPECIFIED HEREIN.
- C. THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OF REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY WORKMANSHIP AND EQUIPMENT IN WHICH DEFECTS DEVELOP WITHIN ONE YEAR FROM THE DATED OF FINAL CERTIFICATE FOR PAYMENT AND/OR FROM DATE OF ACTUAL USE OF EQUIPMENT OR OCCUPANCY OF SPACES BY THE OWNER INCLUDED UNDER THE VARIOUS PARTS OF THE WORK, WHICHEVER DATE IS EARLIER. THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ALSO PROVIDE THAT WHERE DEFECTS OCCUR, THE CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED IN REPAIRING AND REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR.
- D. THE CONTRACTOR SHALL GIVE NECESSARY NOTICE, FILE DRAWINGS AND SPECIFICATIONS WITH ALL DEPARTMENTS HAVING JURISDICTION, OBTAIN PERMITS OR LICENSES NECESSARY TO CARRY OUT THIS WORK AND PAY ALL FEES THEREFORE. THE CONTRACTOR SHALL ARRANGE FOR INSPECTION AND TESTS OF ANY OR ALL PARTS OF THE WORK IF SO REQUIRED BY AUTHORITIES FOR, AND FURNISH TO THE OWNER BEFORE BILLING, ALL CERTIFICATES NECESSARY AS EVIDENCE THE WORK INSTALLED CONFORMS WITH ALL REGULATIONS WHERE THEY APPLY TO THIS WORK.

3. SHOP DRAWINGS:

- A. PRIOR TO THE INSTALLATION OF ANY WORK AND PROCUREMENT OF EQUIPMENT, THE CONTRACTOR SHALL PROVIDE COMPLETE SETS OF COORDINATED SHOP DRAWINGS OF ALL NEW AND EXISTING EQUIPMENT, OTHER TRADES SUCH AS BUT NOT LIMITED TO HVAC AND STRUCTURAL BEAMS, INDICATING CAPACITY, DIMENSIONS AND SEQUENCE OF OPERATION FOR WRITTEN APPROVAL BY THE ARCHITECT AND ENGINEER.
- B. INDICATE ON EACH SHOP DRAWINGS SUBMITTED:
 - 1) PROJECT NAME AND LOCATION
 - 2) NAME OF ARCHITECT AND ENGINEER
 - 3) ITEM IDENTIFICATION
 - 4) APPROVAL STAMP OF THE PRIME CONTRACTOR
- C. SUBMISSIONS:
 - 1) SUBMISSIONS 11 IN X 17 IN OR SMALLER. IF THE SUBMISSION IS A CATALOG CUT, THEN THE CONTRACTOR SHALL SUBMIT ONE ORIGINAL AND TWO COPIES. OTHERWISE, HE SHALL SUBMIT THREE COPIES. THE ARCHITECT WILL FORWARD THE ORIGINAL AND ONE COPY (TWO COPIES WHEN NO ORIGINAL IS RECEIVED) TO THE ENGINEER. ALL CATALOG CUTS SHALL BE COMPLETE.
 - 2) SUBMISSIONS LARGER THAN 11 IN X 17 IN. SUBMIT TWO PRINTS TO THE ARCHITECT. THE ARCHITECT WILL FORWARD ONE PRINT TO THE ENGINEER.

- D. THE CLIENT HAS NOT CONTRACTED WITH BD ENGINEERING FOR CONSTRUCTION ADMINISTRATION SERVICES. COORDINATE WHICH SHOP DRAWINGS THE CLIENT WOULD LIKE US TO REVIEW):

- 1) PIPING
- 2) VALVES
- 3) INSULATION
- 4) FITTINGS
- 5) FIXTURES AND EQUIPMENT

4. AS-BUILT DRAWINGS AND EQUIPMENT OPERATIONAL INSTRUCTIONS:

- A. UPON COMPLETION AND ACCEPTANCE OF WORK, CONTRACTOR SHALL FURNISH WRITTEN INSTRUCTIONS AND EQUIPMENT MANUALS AND DEMONSTRATE TO THE OWNER THE PROPER OPERATION AND MAINTENANCE OF ALL EQUIPMENT AND APPARATUS FURNISHED UNDER THE CONTRACT.
- B. THESE INSTRUCTIONS SHALL BE TYPED ON 8-1/2 X 11 IN. PAPER AND BOUND IN THREE RING BINDERS WITH CLEAR ACETATE COVERS. CONTRACTOR SHALL GIVE THREE COPIES OF THE INSTRUCTIONS TO THE OWNER AND ONE COPY TO THE ENGINEER.
- C. THE INSTRUCTION BOOKLET SHALL BEAR THE NAME, ADDRESS AND TELEPHONE NUMBER OF THE PROJECT, ARCHITECT AND ENGINEER.
- D. REPRODUCIBLE "AS-BUILT" DRAWINGS PREPARED IN COMPUTER AIDED DRAFTED (AUTO CAD) FORMAT SHALL BE PROVIDED TO THE OWNER INDICATING THE AS INSTALLED CONDITIONS OF THE WORK. A COMPLETE "AS-BUILT" DRAWING FILE SHALL BE PROVIDED TO THE OWNER AFTER COMPLETION OF THE INSTALLATION.

5. GENERAL PROVISIONS FOR PLUMBING WORK:

A. QUALITY ASSURANCE

1. QUALITY AND GAUGE OF MATERIALS: NEW, BEST OF THEIR RESPECTIVE KINDS, FREE FROM DEFECTS AND LISTED BY UNDERWRITERS LABORATORIES, INC., OR BEARING THEIR LABEL. MATERIALS AND EQUIPMENT OF SIMILAR APPLICATION SHALL BE OF SAME MANUFACTURER, EXCEPT AS NOTED.
2. GUARANTEE: ALL MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR FROM DATE OF ACCEPTANCE OF WORK.

B. PRODUCT DELIVERY, STORAGE AND HANDLING

1. MOVING OF EQUIPMENT: WHERE NECESSARY, SHIP IN CARTED SECTIONS OF SIZE TO PERMIT PASSING THROUGH AVAILABLE SPACES.
2. ACCESSIBILITY: FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS SHALL BE PERMITTED. CHANGES OF MAGNITUDE OR INVOLVING EXTRA COST ARE NOT PERMISSIBLE WITHOUT REVIEW. GROUP CONCEALED ELECTRICAL EQUIPMENT REQUIRING ACCESS WITH EQUIPMENT FREELY ACCESSIBLE THROUGH ACCESS DOORS.

- C. PAINT SHALL BE THE BEST GRADE FOR ITS PURPOSE. DELIVER IN ORIGINAL SEALED CONTAINERS AND APPLY IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

COLORS SHALL BE AS SELECTED. RED LEAD OR ZINC CHROMATE WITH FINISH TO MATCH SURROUNDINGS SHALL BE USED FOR MARRED SURFACES OF STEEL EQUIPMENT. A FIELD-APPLIED ZINC CHROMATE PRIME COAT SHALL BE UTILIZED FOR STEEL OR IRON WORK.

- D. BRUSH AND CLEAN WORK PRIOR TO CONCEALING, PAINTING AND ACCEPTANCE. PAINTED EXPOSED WORK SOILED OR DAMAGED. CLEAN AND REPAIR TO MATCH ADJOINING WORK BEFORE FINAL ACCEPTANCE. REMOVE DEBRIS FROM INSIDE AND OUTSIDE OF MATERIAL AND EQUIPMENT.
- E. G. FINAL LOCATIONS AND MOUNTING ORIENTATIONS OF ALL PLUMBING FIXTURES SHALL BE VERIFIED BY ARCHITECT.
- F. H. ALL ACCESS DOOR LOCATIONS SHALL BE REVIEWED BY ARCHITECT PRIOR TO INSTALLATION.

6. PLUMBING PIPING MATERIALS:

A. SANITARY DRAINAGE AND VENT

- 1. HUBLESS CAST IRON SOIL PIPE AND FITTINGS WITH EXTRA HEAVY DUTY GASKETED HUBLESS COUPLINGS FOR FOOD SERVICE APPLICATIONS.
- 2. SCHEDULE 40 PVC PIPE WITH CEMENT TYPE SLIP FIT PIPE AND FITTINGS.
- 3. GALVANIZED SCHEDULE 40 STEEL PIPE WITH GALVANIZED THREADED MALLEABLE IRON FITTINGS.

B. DOMESTIC WATER

- 1. TYPE L HARD COPPER TUBING WITH CAST BRONZE OR WROUGHT COPPER FITTINGS AND 95/5 TIN ANTIMONY SOLDER JOINTS.
- 2. STANDARD WEIGHT RED BRASS PIPE WITH STANDARD WEIGHT CAST BRONZE THREADED FITTINGS.

F. ALL EXPOSED PIPE AND FITTINGS SHALL BE CHROME PLATED BRASS.

G. ALL EXPOSED PIPING PASSING THROUGH WALLS, FLOORS, CEILINGS, AND PARTITIONS SHALL BE PROVIDED WITH CHROME PLATED CAST BRASS ESCUTCHEONS HELD IN PLACE WITH SET SCREWS.

7. VALVES:

- A. GATE VALVES: 1. BRONZE RISING STEM, 200 PSI WOG; SIMILAR TO STOCKHAM #B-105, B-109.
- B. BALL VALVES: 1. TWO PIECE, BRONZE, END ENTRY, 600 PSI WWP; SIMILAR TO STOCKHAM #S-216 BR-R-T, #S-216 BR-R-S.
- C. CHECK VALVES: 1. BRONZE, THREADED CAP, TEFLON DISC; SIMILAR TO STOCKHAM #B310T, B-320T.

8. INSULATION:

- A. ALL INSULATION (INCLUDING JACKET, FACING AND ADHESIVE) SHALL HAVE COMPOSITE FIRE AND SMOKE HAZARD RATINGS AS TESTED BY PROCEDURES LISTED IN ASTM E-84, NFPA 255 AND UL 273; NOT EXCEEDING A FLAME SPREAD OF 25 AND A SMOKE DEVELOPED OF 50.

- B. ON VALVES AND FITTINGS PROVIDE PRE-MOLDED FIBERGLASS FITTINGS. VAPOR SEAL INSULATION ON "CW".
- C. "CW" PIPING: PROVIDE 1/2 IN. THICK FIBERGLASS SECTION PIPE COVERING WITH VAPOR BARRIER JACKET.
- D. "HW" PIPING: PROVIDE 1 IN. THICK FIBERGLASS SECTIONAL PIPE COVERING WITH VAPOR BARRIER JACKET.

9. PLUMBING FIXTURES:

- A. PROVIDE ALL FIXTURES WITH STOP VALVES AND SUPPLIES AND FIXTURE TRAPS AS REQUIRED.
- B. ALL FIXTURES SHALL BE AS INDICATED ON THE ARCHITECTURAL DOCUMENTS.

10. PIPING SUPPORTS:

- A. SUPPORT ALL PIPING FROM BUILDING CONSTRUCTION BY PROVIDING INSERTS, BEAM CLAMPS, STEEL FISHPLATES (IN CONCRETE FILL ONLY), AND ACCEPTABLE BRACKETS. SUBMIT ALL METHODS FOR REVIEW.
- B. PROVIDE TRAPEZE HANGERS OF BOLTED ANGLES OR CHANNELS FOR GROUPED LINES AND SERVICES.
- C. PROVIDE ADDITIONAL FRAMING WHERE BUILDING CONSTRUCTION IS INADEQUATE. SUBMIT FOR REVIEW.
- D. SUSPENDED HORIZONTAL PIPING:
 - 1. SUPPORT ALL PIPING INDEPENDENTLY FROM STRUCTURE USING HEAVY IRON-HINGED TYPE HANGERS, SIMILAR TO GRINNELL CLEVIS NO. 260.
 - 2. PROVIDE ELECTROPLATED SOLID-BAND HANGERS SIMILAR TO AUTO-GRIP, FOR TWO-INCH AND SMALLER PIPE.
 - 3. PROVIDE WALL BRACKETS FOR WALL-SUPPORTED PIPING, AND PROVIDE PIPE SADDLES FOR FLOOR-MOUNTED PIPING.
 - 4. PROVIDE SUPPORTS WITH COPPER LINING FOR UNINSULATED COPPER PIPING.
 - 5. SUSPEND PIPING FROM INSERTS, USING BEAM CLAMPS WITH RETAINING CLAMP OR LOCKNUT, STEEL FISH PLATES, CANTILEVER BRACKETS OR OTHER ACCEPTED MEANS. BEAM CLAMPS SHALL BE SIMILAR TO GRINNELL FIGURES 61, 87, 131, OR 225.
 - 6. SUSPEND PIPING BY RODS WITH DOUBLE NUTS.
 - 7. PROVIDE ADDITIONAL STEEL FRAMING AS REQUIRED AND ACCEPTED WHERE OVERHEAD CONSTRUCTION DOES NOT PERMIT FASTENING HANGER RODS IN REQUIRED LOCATIONS.

8. SUPPORT BRANCH FIXTURE WATER PIPING IN CHASES WITH COPPER-PLATED METAL BRACKETS, SECURED TO STUDS, SIMILAR TO HOLDRITE NOS. 102-18, 107-18, 102-26, OR 101-26.
- E. PROVIDE 180 DEGREE ARC GALVANIZED METAL COVERING SHIELDS ON HANGERS FOR INSULATED PIPING WITHOUT INCOMPRESSIBLE INSULATING BLOCK IN INSULATION AT HANGERS.
 - F. MAXIMUM HANGER SPACING AS INDICATED.
 1. PIPE 1 INCH AND SMALLER SHALL BE EVERY 8 FEET.
 2. PIPE 1-1/4 INCH AND LARGER SHALL BE EVERY 10 FEET.
 3. COPPER TUBING 1-1/4 INCH AND SMALLER SHALL BE EVERY 6 FEET.
 4. COPPER TUBING 1-1/2 INCH AND LARGER SHALL BE EVERY 10 FEET.
 5. CAST IRON: EVERY 5 FEET AND AT EVERY FITTING OR JOINT.
 - G. EXPANSION ANCHORS:
 1. PROVIDE SMOOTH WALL, NON-SELF-DRILLING INTERNAL PLUG EXPANSION TYPE ANCHORS CONSTRUCTED OF AISC 12L14 STEEL AND ZINC PLATED IN ACCORDANCE WITH FED. SPEC. QQ-A-325 TYPE 1, CLASS 3.
 2. DO NOT EXCEED 1/4 OF AVERAGE VALVES FOR A SPECIFIC ANCHOR SIZE USING 2000 PSIG (13,800 KPA) CONCRETE ONLY, FOR MAXIMUM WORKING LOADS.
 3. PROVIDE SPACING AND INSTALL ANCHORS IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
 4. EXPANSION ANCHORS SHALL BE U.L. LISTED AND SIMILAR TO HILTI HDI.
11. TESTS:
- A. DOMESTIC WATER PIPING:
 12. TEST PIPING HYDROSTATICALLY AT A PRESSURE OF 125 PSI.
 13. DURATION OF TEST SHALL BE 2 HOURS WITHOUT A LOSS IN PRESSURE.
 - B. DRAINAGE AND VENT PIPING:
 1. CAP ALL OUTLETS AND FILL PIPING SYSTEM TO OVERFLOWING FROM A POINT AT LEAST 10 FEET ABOVE THE FLOOR.
 2. THE WATER LEVEL SHALL REMAIN CONSTANT THROUGHOUT THE TEST DURATION OF 2 HOURS.
 - C. COMPRESSED AIR PIPING:
 1. TEST PIPING PNEUMATICALLY PRELIMINARILY AT NO MORE THAN 10 PSIG TO CHECK FOR MAJOR LEAKS
 - A.
 2. THEN TEST AT 125% MORE THAN THE WORKING PRESSURE WITH 150 PSIG MAXIMUM AFTER FLUSHING PIPING SYSTEM WITH A VOLUME OF 2-5% EXPECTED FLOW RATE IN

INCREMENTS OF 25%, BUT NOT EXCEEDING PNEUMATIC TEST PRESSURE FOR ANY VESSEL OR COMPONENT IN THE SYSTEM UNDER TEST.

3. ALLOW TO EQUALIZE AND INVESTIGATE LEAKS AT EACH STEP AND ONCE MAXIMUM TEST PRESSURE ACHIEVED AND HELD FOR 10 MINUTES REDUCE TO DESIGN PRESSURE FOR FINAL LEAK TESTING
- D. ARRANGE AND COORDINATE TESTS WITH OWNER 48 HOURS IN ADVANCE. NOTIFY ENGINEER AND ARCHITECT OF TEST DATE AND TIME.
- E. DEFECTS DISCLOSED BY THE TESTS SHALL BE REPAIRED OR REPLACED. TESTS SHALL BE REPEATED AS DIRECTED UNTIL ALL WORK IS PROVEN SATISFACTORY.
- F. TAKE ALL PRECAUTIONS NECESSARY TO PREVENT DAMAGE TO THE BUILDING AND ITS CONTENTS AS A RESULT OF SUCH TESTS. REPAIR ANY DAMAGE CAUSED.

14. FLUSHING AND DISINFECTING POTABLE WATER SYSTEMS:

a) FLUSHING

1. THE WATER DISTRIBUTION PIPING TO ALL FIXTURES AND OUTLETS SHALL BE FLUSHED UNTIL THE WATER RUNS CLEAR AND FREE OF DEBRIS AND PARTICLES. FAUCET AERATORS OR SCREENS SHALL BE REMOVED DURING FLUSHING OPERATIONS.

b) DISINFECTING

1. THE HOT AND COLD WATER DISTRIBUTION PIPING IN NEW OR RENOVATED POTABLE WATER SYSTEMS SHALL BE DISINFECTED AFTER FLUSHING AND PRIOR TO USE. THE PROCEDURE USED SHALL BE AS FOLLOWS OR AN APPROVED EQUIVALENT:
 - a. ALL WATER OUTLETS SHALL BE POSTED TO WARN AGAINST USE DURING DISINFECTING OPERATIONS.
 - b. DISINFECTING SHALL BE PERFORMED BY PERSONS EXPERIENCED IN SUCH WORK.
 - c. THE WATER SUPPLY TO THE PIPING SYSTEM OR PARTS THEREOF BEING DISINFECTED SHALL BE VALVED-OFF FROM THE NORMAL WATER SOURCE TO PREVENT THE INTRODUCTION OF DISINFECTING AGENTS INTO A PUBLIC WATER SUPPLY OR PORTIONS OF A SYSTEM THAT ARE NOT BEING DISINFECTED.
 - d. THE PIPING SHALL BE DISINFECTED WITH A WATER-CHLORINE SOLUTION. DURING THE INJECTION OF THE DISINFECTING AGENT INTO THE PIPING, EACH OUTLET SHALL BE FULLY OPENED SEVERAL TIMES UNTIL A CONCENTRATION OF NOT LESS THAN 50 PARTS PER MILLION CHLORINE IS PRESENT AT EVERY OUTLET. THE SOLUTION SHALL BE ALLOWED TO STAND IN THE PIPING FOR AT LEAST 24 HOURS.
 - e. AN ACCEPTABLE ALTERNATE TO THE 50 PPM/24-HOUR PROCEDURE SHALL BE TO MAINTAIN A LEVEL OF NOT LESS THAN 200 PARTS PER MILLION FOR NOT LESS THAN THREE HOURS. IF THIS ALTERNATE PROCEDURE IS USED, THE HEAVILY CONCENTRATED CHLORINE SHALL NOT BE ALLOWED TO STAND IN THE PIPING SYSTEM FOR MORE THAN 6 HOURS. ALSO, SPECIAL PROCEDURES SHALL BE USED TO DISPOSE OF THE HEAVILY CONCENTRATED CHLORINE IN AN ENVIRONMENTALLY ACCEPTABLE AND APPROVED MANNER.

- f. AT THE END OF THE REQUIRED RETENTION TIME, THE RESIDUAL LEVEL OF CHLORINE AT EVERY OUTLET SHALL BE NOT LESS THAN FIVE PARTS PER MILLION. IF THE RESIDUAL IS LESS THAN FIVE PARTS PER MILLION, THE DISINFECTING PROCEDURE SHALL BE REPEATED UNTIL THE REQUIRED MINIMUM CHLORINE RESIDUAL IS OBTAINED AT EVERY OUTLET.
- g. AFTER THE REQUIRED RESIDUAL CHLORINE LEVEL IS OBTAINED AT EVERY OUTLET, THE SYSTEM SHALL BE FLUSHED TO REMOVE THE DISINFECTING AGENT. FLUSHING SHALL CONTINUE UNTIL THE CHLORINE LEVEL AT EVERY OUTLET IS REDUCED TO THAT OF THE INCOMING WATER SUPPLY.
- h. FURNISH A WRITTEN RECORD OF THE DISINFECTING TEST RESULTS.

15. NATURAL GAS PIPING

A. GENERAL REQUIREMENTS

- 8. QUALITY ASSURANCE: COMPLY WITH NFPA 54 AND ALL LOCAL BUILDING CODES.

B. PRODUCTS

1 PIPE, TUBE, AND SPECIALTIES

- a) STEEL PIPE: ASTM A 53, TYPE S (SEAMLESS), GRADE B, SCHEDULE 40, PLAIN ENDS.
- b) MALLEABLE IRON THREADED FITTINGS: ASME B16.3, CLASS 150.
- c) MANUAL VALVES: COMPLY WITH STANDARDS LISTED OR, IF APPROPRIATE, TO ANSI Z21.15.
- d) GAS STOPS: AGA CERTIFIED, BRONZE-BODY, PLUG TYPE WITH BRONZE PLUG, FOR 2-PSIG OR LESS NATURAL GAS. INCLUDE AGA STAMP, FLAT OR SQUARE HEAD OR LEVER HANDLE, AND THREADED ENDS COMPLYING WITH ASME B1.20.1.
- e) GAS VALVES:
 - (1) 150-PSIG WOG, CAST-IRON OR BRONZE BODY, BRONZE PLUG, STRAIGHTAWAY PATTERN, SQUARE HEAD, TAPERED-PLUG TYPE.
 - (2) FULL PORT BALL VALVES
- f) FLEXIBLE CONNECTORS: ANSI Z21.24, COPPER ALLOY.

C. EXECUTION

1. INSTALLATION

- a. CLOSE EQUIPMENT SHUTOFF VALVES BEFORE TURNING OFF GAS TO SECTION OF PIPING. PERFORM LEAKAGE TEST AS SPECIFIED TO DETERMINE THAT ALL EQUIPMENT IS TURNED OFF IN AFFECTED PIPING SECTION.
- b. LOW-PRESSURE, LESS THAN 2.0 PSIG, NATURAL GAS SYSTEMS: USE THE FOLLOWING: NPS 2" AND SMALLER: STEEL PIPE, MALLEABLE IRON THREADED FITTINGS, AND THREADED JOINTS.
- c. INSTALL GAS STOPS FOR SHUTOFF TO APPLIANCES WITH NPS 2" OR SMALLER.
- d. DRIPS AND SEDIMENT TRAPS: INSTALL DRIPS AT POINTS WHERE CONDENSATE MAY COLLECT. INCLUDE OUTLETS OF GAS METERS. LOCATE WHERE READILY

ACCESSIBLE TO PERMIT CLEANING AND EMPTYING. DO NOT INSTALL WHERE CONDENSATE WOULD BE SUBJECT TO FREEZING.

- e. INSTALL GAS PIPING AT UNIFORM SLOPE OF 0.1 PERCENT UPWARD TOWARD RISERS.
- f. USE ECCENTRIC REDUCER FITTINGS TO MAKE REDUCTIONS IN PIPE SIZES. INSTALL FITTINGS WITH LEVEL SIDE DOWN.
- g. CONNECT BRANCH PIPING FROM TOP OR SIDE OF HORIZONTAL PIPING.
- h. INSTALL STRAINERS ON SUPPLY SIDE OF EACH CONTROL VALVE, GAS PRESSURE REGULATOR, SOLENOID VALVE, AND ELSEWHERE AS INDICATED.
- i. INSTALL VALVES IN ACCESSIBLE LOCATIONS, PROTECTED FROM DAMAGE. TAG VALVES WITH METAL TAG INDICATING PIPING SUPPLIED. ATTACH TAG TO VALVE WITH METAL CHAIN.
- j. CONNECT GAS PIPING TO EQUIPMENT AND APPLIANCES WITH SHUTOFF VALVES AND UNIONS.
- k. INSTALL GAS VALVE UPSTREAM FROM AND WITHIN 72 INCHES OF EACH APPLIANCE USING GAS. INSTALL UNION OR FLANGED CONNECTION DOWNSTREAM FROM VALVE.

D. GAS PIPING INSPECTION, TESTING, AND PURGING

- 1. INSPECT, TEST, AND PURGE PIPING ACCORDING TO NFPA 54 AND REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION.

DIVISION 23 – HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)
230000 HVAC WORK SPECIFICATIONS

1. GENERAL

- X. THE "GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION," AIA DOCUMENT A201, LATEST EDITION, AND THESE SPECIFICATIONS AS APPLICABLE ARE PART OF THIS CONTRACT.
- Y. ALL APPLICABLE CODES, LAWS AND REGULATIONS GOVERNING OR RELATING TO ANY PORTION OF THIS WORK ARE HEREBY INCORPORATED INTO AND MADE PART OF THESE SPECIFICATIONS, AND THEIR PROVISIONS SHALL BE CARRIED OUT BY THE CONTRACTOR WHO SHALL INFORM THE OWNER, PRIOR TO SUBMITTING A PROPOSAL, OF ANY WORK OR MATERIAL WHICH VIOLATES ANY OF THE ABOVE LAWS AND REGULATIONS. ANY WORK DONE BY THE CONTRACTOR CAUSING SUCH VIOLATION SHALL BE CORRECTED BY THE CONTRACTOR AT THEIR OWN COST.
- Z. INVESTIGATE EACH SPACE THROUGH WHICH EQUIPMENT MUST BE MOVED. WHERE NECESSARY, EQUIPMENT SHALL BE SHIPPED FROM THE MANUFACTURE IN SECTIONS OF A SIZE SUITABLE FOR MOVING THROUGH AVAILABLE RESTRICTIVE SPACES. ASCERTAIN FROM THE BUILDING OWNER AND TENANT AT WHAT TIMES OF THE DAY EQUIPMENT MAY BE MOVED THROUGH ALL AREAS.
- AA. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. PIPING AND OR DUCT ROUTING IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS, DROPS AND RISES OF RUNS. THE CONTRACTOR SHALL ALLOW IN HIS/HER PRICE FOR ROUTING OF PIPING AND DUCTS TO AVOID OBSTRUCTIONS. COORDINATION WITH EXISTING SERVICES, INCLUDING THOSE OF OTHER TRADES, IS REQUIRED. MAINTAIN HEADROOM AND SPACE CONDITIONS.
- BB. SUPPORT ALL DUCTWORK AND PIPING FROM BUILDING STRUCTURE AND/OR FRAMING IN AN APPROVED MANNER. WHERE OVERHEAD CONSTRUCTION DOES NOT PERMIT FASTENING OR SUPPORTS FOR EQUIPMENT, FURNISH ADDITIONAL FRAMING. INSERTS SHALL BE STEEL, SLOTTED TYPE AND FACTORY PAINTED. SINGLE ROD SHALL BE SIMILAR TO GRINNELL FIG. 281. MULTI-ROD SHALL BE SIMILAR TO FEE & MASON SERIES 9000 WITH END CAPS AND CLOSURE STRIPS. MAXIMUM LOADING INCLUDING PIPES, DUCTWORK CONTENTS AND COVERING SHALL NOT EXCEED 75% OF RATED INSERT CAPABILITY. WHEN SUPPORTING FROM BUILDING USE BEAM CLAMPS IN APPROVED MANNER. PROVIDE SEISMIC RESTRAINTS AS REQUIRED BY CODE.
- CC. INSTALL WORK AS TO BE READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS FROM THE DRAWINGS MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES, WHICH INVOLVE EXTRA COST, SHALL NOT BE MADE WITHOUT OUR OR OWNER APPROVAL.

- DD. THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND MATERIALS AND ALL PARTS OF THE BUILDING, EXTERIOR SPACES AND ADJACENT STREETS, SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND DEBRIS RESULTING FROM THE EXECUTION OF THIS WORK. EXCESS MATERIALS WILL NOT BE PERMITTED TO ACCUMULATE EITHER ON THE INTERIOR OR THE EXTERIOR.
- EE. SEAL OPENING THROUGH PARTITIONS, WALLS AND FLOORS WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL. ALL PENETRATIONS THROUGH NEW AND EXISTING RATED FIRE AND SMOKE PARTITIONS AND/OR FLOORS SHALL BE COMPLETELY SEALED USING MATERIALS AND METHODS DESCRIBED IN SUBSEQUENT "FIRE STOPPING" SPECIFICATIONS SECTIONS.
- FF. PROVIDE ALL NECESSARY FLASHING AND COUNTERFLASHING TO MAINTAIN THE WATERPROOFING INTEGRITY OF THE BUILDING AS REQUIRED BY THE INSTALLATION OR REMOVAL OF PIPING, DUCTWORK AND EQUIPMENT. PROVIDE EQUIPMENT CURBS AS REQUIRED AND POSITIVELY ATTACH THE EQUIPMENT TO THE STRUCTURE BELOW.
- GG. THE WORK IN THE BUILDING SHALL BE DONE WHEN AND AS DIRECTED, IN A MANNER SATISFACTORY TO THE OWNER.
- HH. THE CONTRACTOR'S PROPOSAL FOR ALL WORK SHALL BE PREDICATED ON THE PERFORMANCE OF THE WORK DURING REGULAR WORKING HOURS. WHEN SO DIRECTED, HOWEVER, THE CONTRACTOR SHALL INSTALL WORK DURING OVERTIME HOURS AND THE ADDITIONAL COST TO BE CHARGED THEREFORE SHALL BE ONLY THE "PREMIUM" PORTION OF THE WAGES PAID.
- II. UNLESS OTHERWISE SPECIFICALLY NOTED OR SPECIFIED, INCLUDE ALL CUTTING AND PATCHING OF EXISTING FLOORS, WALLS, PARTITIONS AND OTHER MATERIALS IN THE EXISTING BUILDING. THE CONTRACTOR SHALL RESTORE THESE AREAS TO ORIGINAL CONDITION.
- JJ. REMOVABLE ACCESS TILE AND/OR ACCESS DOOR ARE REQUIRED IN CEILINGS, SHAFTS AND WALLS FOR ALL VOLUME AND FIRE DAMPERS, AUTOMATIC DAMPERS AND ALL OTHER MECHANICAL EQUIPMENT AND DEVICES. HVAC CONTRACTOR IS RESPONSIBLE TO PROVIDE APPROPRIATELY SIZED/RATED ACCESS DOORS WITH LOCATIONS COORDINATED WITH ALL TRADES AND THE GENERAL CONTRACTOR FOR OVERALL INSTALLATION COORDINATION. IN ORDER TO CLEARLY IDENTIFY THE LOCATION AND PURPOSE OF THE ACCESS DOOR, THE HVAC CONTRACTOR SHALL PROVIDE THE FOLLOWING ACCESS DOOR IDENTIFICATION INFORMATION: PROVIDE BUTTONS, TABS, AND MARKERS TO IDENTIFY LOCATION OF CONCEALED VALVES, DAMPERS AND EQUIPMENT.
- KK. ALL MATERIAL AND EQUIPMENT SHALL BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
- LL. SUBMISSION OF A PROPOSAL SHALL BE CONSTRUED AS EVIDENCE THAT A CAREFUL EXAMINATION OF ALL OF THE PLANS APPLICABLE FOR THE PROJECT AND NOT JUST THE HVAC PLANS AND IS FAMILIAR WITH ANY PROPOSED

CONDITIONS THAT WILL NEED TO BE COORDINATED IN THE FIELD. FOR EXISTING BUILDINGS: THE PORTIONS OF THE EXISTING BUILDING, EQUIPMENT, ETC. SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT THE CONTRACTOR HAS THOROUGHLY REVIEWED ALL OF THE DOCUMENTATION ASSOCIATED WITH THE PROJECT. LATER CLAIMS SHALL NOT BE MADE FOR LABOR, EQUIPMENT OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN DURING SUCH AN EXAMINATION AND REVIEW.

MM. INSURANCE: IN ACCORDANCE WITH BUILDING REQUIREMENTS AND SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.

NN. THE FINAL ACCEPTANCE SHALL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT, TESTED AND BALANCED THE VARIOUS SYSTEMS, DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS AND HAS FURNISHED ALL THE REQUIRED CERTIFICATES OF INSPECTION AND APPROVAL.

OO. SPECIFICATIONS ARE OF SIMPLIFIED FORM AND INCLUDE INCOMPLETE SENTENCES. WORDS OR PHRASES SUCH AS "THE CONTRACTOR SHALL," "SHALL BE," "FURNISH," "PROVIDE," "A," "THE," AND "ALL" HAVE BEEN OMITTED FOR BREVITY.

PP. DEFINITIONS:

1. "PROVIDE": TO SUPPLY, INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION THE PARTICULAR WORK REFERRED TO UNLESS SPECIFICALLY OTHERWISE NOTED.
2. "INSTALL": TO ERECT, MOUNT AND CONNECT COMPLETE WITH RELATED ACCESSORIES.
3. "FURNISH" OR "SUPPLY": TO PURCHASE, PROCURE, ACQUIRE AND DELIVER COMPLETE WITH RELATED ACCESSORIES.
4. "WORK": LABOR, MATERIALS, EQUIPMENT, APPARATUS, CONTROLS, ACCESSORIES AND OTHER ITEMS REQUIRED FOR PROPER AND COMPLETE INSTALLATION.
5. "CONCEALED": EMBEDDED IN MASONRY OR OTHER CONSTRUCTION, INSTALLED IN FURRED SPACES, WITHIN DOUBLE PARTITIONS OR HUNG CEILINGS, IN TRENCHES, IN CRAWL SPACES, OR IN ENCLOSURES.
6. "EXPOSED": NOT INSTALLED UNDERGROUND OR "CONCEALED" AS DEFINED ABOVE.

7. "SIMILAR" OR "EQUAL": EQUAL IN MATERIALS, WEIGHT, SIZE, DESIGN AND EFFICIENCY OF SPECIFIED PRODUCT.

2. SCOPE OF WORK:

- E. THE SCOPE OF WORK SHALL CONSIST OF PROVIDING LABOR, MATERIALS, EQUIPMENT, SERVICES AND FEES NECESSARY FOR COMPLETE AND SAFE INSTALLATION IN CONFORMITY WITH THE APPLICABLE MECHANICAL CODES AND ALL OTHER INDUSTRY, STATE, NATIONAL AND LOCAL CODES AND AUTHORITIES HAVING JURISDICTION, AS INDICATED ON THE DRAWINGS AND HEREIN SPECIFIED.
- F. ALL DRAWINGS, PLANS, DETAILS, SPECIFICATIONS AND SPECIFICATION ADDENDA ARE MADE PART OF THIS CONTRACT AND SHALL APPLY TO ALL WORK UNDER THE CONTRACT UNLESS OTHERWISE AMENDED, MODIFIED, SUPPLEMENTED OR SPECIFIED HEREIN.
- G. THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OF REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY WORKMANSHIP AND EQUIPMENT IN WHICH DEFECTS DEVELOP WITHIN ONE YEAR FROM THE DATED OF FINAL CERTIFICATE FOR PAYMENT AND/OR FROM DATE OF ACTUAL USE OF EQUIPMENT OR OCCUPANCY OF SPACES BY THE OWNER INCLUDED UNDER THE VARIOUS PARTS OF THE WORK, WHICHEVER DATE IS EARLIER. THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ALSO PROVIDE THAT WHERE DEFECTS OCCUR, THE CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED IN REPAIRING AND REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR.
- H. THE CONTRACTOR SHALL GIVE NECESSARY NOTICE, FILE DRAWINGS AND SPECIFICATIONS WITH ALL DEPARTMENTS HAVING JURISDICTION, OBTAIN PERMITS OR LICENSES NECESSARY TO CARRY OUT THIS WORK AND PAY ALL FEES THEREFORE. THE CONTRACTOR SHALL ARRANGE FOR INSPECTION AND TESTS OF ANY OR ALL PARTS OF THE WORK IF SO REQUIRED BY AUTHORITIES FOR, AND FURNISH TO THE OWNER BEFORE BILLING, ALL CERTIFICATES NECESSARY AS EVIDENCE THE WORK INSTALLED CONFORMS WITH ALL REGULATIONS WHERE THEY APPLY TO THIS WORK.

3. SHOP DRAWINGS:

- A. PRIOR TO THE INSTALLATION OF ANY WORK AND PROCUREMENT OF EQUIPMENT, THE CONTRACTOR SHALL PROVIDE COMPLETE SETS OF COORDINATED SHOP DRAWINGS OF ALL NEW AND EXISTING EQUIPMENT, INDICATING CAPACITY, DIMENSIONS AND SEQUENCE OF OPERATION FOR WRITTEN APPROVAL BY THE ARCHITECT AND ENGINEER.

B. THE CONTRACTOR SHALL PREPARE FULL COORDINATED COMPOSITE DRAWINGS FOR THE MECHANICAL, ELECTRICAL AND FIRE PROTECTION TRADES. THE CONTRACTOR SHALL OVERLAY EACH TRADE'S WORK (IN SEPARATE COLORS) ON A REPRODUCIBLE SET OF SHEETMETAL DRAWINGS. ALL CONFLICTS AND POTENTIAL CONFLICTS SHALL BE CLEARLY IDENTIFIED ON THE SHEETMETAL DRAWINGS. THIS SHALL INCLUDE BUT NOT BE LIMITED TO CONFLICTS WITH LIGHTS, EQUIPMENT, PIPING, DUCTWORK AND SUPPORTS OF OTHER TRADES, AS WELL AS CONFLICTS WITH ARCHITECTURAL AND STRUCTURAL WALLS, COLUMNS, CEILINGS AND STRUCTURAL BEAMS.

C. INDICATE ON EACH SHOP DRAWINGS SUBMITTED:

1. PROJECT NAME AND LOCATION
2. NAME OF ARCHITECT AND ENGINEER
3. ITEM IDENTIFICATION
4. APPROVAL STAMP OF THE PRIME CONTRACTOR

D. SUBMISSIONS:

1. SUBMISSIONS 11 IN X 17 IN OR SMALLER. IF THE SUBMISSION IS A CATALOG CUT, THEN THE CONTRACTOR SHALL SUBMIT ONE ORIGINAL AND TWO COPIES. OTHERWISE, HE SHALL SUBMIT THREE COPIES. THE ARCHITECT WILL FORWARD THE ORIGINAL AND ONE COPY (TWO COPIES WHEN NO ORIGINAL IS RECEIVED) TO THE ENGINEER. ALL CATALOG CUTS SHALL BE COMPLETE.
2. SUBMISSIONS LARGER THAN 11 IN X 17 IN. SUBMIT TWO PRINTS TO THE ARCHITECT. THE ARCHITECT WILL FORWARD ONE PRINT TO THE ENGINEER.

4. SUBMIT SHOP DRAWINGS FOR THE FOLLOWING

A. SUBMIT SHOP DRAWINGS FOR THE FOLLOWING:

1. DUCTWORK LAYOUT AND SHEET METAL DESIGNS.
2. AIR OUTLETS.
3. AIR BALANCE REPORT.
4. AC UNITS AND FANS.
5. PIPING LAYOUT.

6. INSULATION

7. VIBRATION ISOLATION.

8. MOTORIZED AND NON-MOTORIZED DAMPERS

9. ASHRAE 90.1 REQUIRED COMPLETION DOCUMENTS BUT AS A MINIMUM:

- i. DRAWINGS. CONSTRUCTION DOCUMENTS SHALL REQUIRE THAT, WITHIN 90 DAYS AFTER THE DATE OF SYSTEM ACCEPTANCE, RECORD DRAWINGS OF THE ACTUAL INSTALLATION BE PROVIDED TO THE BUILDING OWNER OR THE DESIGNATED REPRESENTATIVE OF THE BUILDING OWNER. RECORD DRAWINGS SHALL INCLUDE, AS A MINIMUM, THE LOCATION AND PERFORMANCE DATA ON EACH PIECE OF EQUIPMENT; GENERAL CONFIGURATION OF THE DUCT AND PIPE DISTRIBUTION SYSTEM, INCLUDING SIZES; AND THE TERMINAL AIR OR WATER DESIGN FLOW RATES.
- ii. MANUALS. CONSTRUCTION DOCUMENTS SHALL REQUIRE THAT AN OPERATING MANUAL AND A MAINTENANCE MANUAL BE PROVIDED TO THE BUILDING OWNER OR THE DESIGNATED REPRESENTATIVE OF THE BUILDING OWNER WITHIN 90 DAYS AFTER THE DATE OF SYSTEM ACCEPTANCE. THESE MANUALS SHALL BE IN ACCORDANCE WITH INDUSTRY-ACCEPTED STANDARDS (SEE INFORMATIVE APPENDIX E) AND SHALL INCLUDE, AT A MINIMUM, THE FOLLOWING:
 1. SUBMITTAL DATA STATING EQUIPMENT SIZE AND SELECTED OPTIONS FOR EACH PIECE OF EQUIPMENT REQUIRING MAINTENANCE.
 2. OPERATION MANUALS AND MAINTENANCE MANUALS FOR EACH PIECE OF EQUIPMENT AND SYSTEM REQUIRING MAINTENANCE, EXCEPT EQUIPMENT NOT FURNISHED AS PART OF THE PROJECT. REQUIRED ROUTINE MAINTENANCE ACTIONS SHALL BE CLEARLY IDENTIFIED.
 3. NAMES AND ADDRESSES OF AT LEAST ONE SERVICE AGENCY.
 4. HVAC CONTROLS SYSTEM MAINTENANCE AND CALIBRATION INFORMATION, INCLUDING WIRING DIAGRAMS, SCHEMATICS, AND CONTROL SEQUENCE DESCRIPTIONS. DESIRED OR FIELD-DETERMINED SETPOINTS SHALL BE PERMANENTLY RECORDED ON CONTROL DRAWINGS AT CONTROL DEVICES OR, FOR DIGITAL CONTROL SYSTEMS, IN PROGRAMMING COMMENTS.
 5. COMPLETE NARRATIVE OF HOW EACH SYSTEM IS INTENDED TO OPERATE, INCLUDING SUGGESTED SETPOINTS.

B. SHOP DRAWINGS

1. PREPARE AND SUBMIT DETAILED SHOP DRAWINGS FOR PIPING WORK AND OTHER DISTRIBUTION SERVICES, INCLUDING LOCATIONS AND SIZES OF ALL OPENINGS IN FLOOR WALLS AND ROOFS
2. THE WORK DESCRIBED IN ANY SHOP DRAWING SUBMISSION SHALL BE CAREFULLY CHECKED FOR ALL CLEARANCES (INCLUDING THOSE REQUIRED FOR MAINTENANCE AND SERVICING), FIELD CONDITIONS, MAINTENANCE OF ARCHITECTURAL CONDITIONS AND PROPER COORDINATION WITH ALL TRADES ON THE JOB.
3. EACH SUBMITTED SHOP DRAWING TO INCLUDE A CERTIFICATION THAT ALL RELATED JOB CONDITIONS HAVE BEEN CHECKED AND THAT NO CONFLICT EXISTS.
4. ALL DRAWINGS TO BE SUBMITTED SUFFICIENTLY IN ADVANCE OF FIELD REQUIREMENTS TO ALLOW AMPLE TIME FOR CHECKING. ALL SUBMITTALS TO BE COMPLETE AND CONTAIN ALL REQUIRED AND DETAILED INFORMATION. SHOP DRAWINGS WITH MULTIPLE PARTS SHALL BE SUBMITTED AS A PACKAGE.
5. IF SUBMITTALS DIFFER FROM THE CONTRACT DOCUMENT REQUIREMENTS, MAKE SPECIFIC MENTION OF SUCH DIFFERENCE IN A LETTER OF TRANSMITTAL, WITH REQUEST FOR SUBSTITUTION, TOGETHER WITH REASONS FOR SAME.
6. REVIEW OF ANY SUBMITTED DATA OR SHOP DRAWINGS FOR MATERIAL, EQUIPMENT APPARATUS, DEVICES, ARRANGEMENT AND LAYOUT SHALL NOT RELIEVE CONTRACTOR FROM RESPONSIBILITY OF FURNISHING SAME OF PROPER DIMENSIONS AND WEIGHT, CAPACITIES, SIZES, QUANTITY, QUALITY AND INSTALLATION DETAILS TO EFFICIENTLY PERFORM THE REQUIREMENTS AND INTENT OF THE WORK. SUCH REVIEW SHALL NOT RELIEVE THE CONTRACTOR FROM RESPONSIBILITY FOR ERRORS, OMISSIONS OR INADEQUACIES OF ANY SORT ON SUBMITTED DATA OR SHOP DRAWINGS.
7. EACH SHOP DRAWING TO CONTAIN JOB TITLE CONTRACTOR AND SUBCONTRACTOR NAMES AND PHONE NUMBERS, REFERENCE TO THE APPLICABLE DESIGN DRAWING OR SPECIFICATION ARTICLE, DATE AND SCALE.
8. WITHIN 15 DAYS AFTER AWARD OF CONTRACT, SUBMIT FOR REVIEW, A LIST OF ALL MATERIAL AND EQUIPMENT MANUFACTURERS WHOSE PRODUCTS ARE PROPOSED, AS WELL AS NAMES OF ALL SUBCONTRACTORS WHOM THIS TRADE PROPOSES TO EMPLOY.

C. RECORD DRAWINGS

1. THE CONTRACTOR SHALL MAINTAIN ON A DAILY BASIS AT THE PROJECT SITE A COMPLETE SET OF "RECORD DRAWINGS", REFLECTING AN ACCURATE DIMENSIONAL RECORD OF ALL WORK. THE "RECORD DRAWINGS" SHALL ALSO CONSIST OF A SET OF PRINTS OF THE FINAL "SIGNED OFF" CONTRACTOR'S "COORDINATION DRAWINGS" PREPARED BY THE SUBCONTRACTORS. IN ADDITION, THE "RECORD DRAWINGS SHALL BE MARKED TO SHOW THE PRECISE LOCATION OF CONCEALED WORK AND EQUIPMENT, INCLUDING CONCEALED OR EMBEDDED PIPING AND VALVES AND ALL CHANGES AND DEVIATIONS IN THE MECHANICAL WORK FROM THAT SHOWN ON THE CONTRACT DOCUMENTS. THIS REQUIREMENT SHALL NOT BE CONSTRUED AS AUTHORIZATION FOR THE CONTRACTOR TO MAKE CHANGES IN THE LAYOUT OR WORK WITHOUT WRITTEN DEFINITE INSTRUCTIONS FROM THE ARCHITECT OR ENGINEER. THE DAILY "RECORD DRAWINGS" SHALL CONSIST OF A SET OF PRINTS OF THE CONTRACT DRAWINGS FOR THIS DIVISION WITH THE ENGINEER'S SEAL AND ENGINEER'S FIRM NAME REMOVED OR BLACKED OUT. PRIOR TO COMMENCING WORK, THE CONTRACTOR SHALL PURCHASE FROM THE ARCHITECT OR ENGINEER A SET OF PRINTS TO BE USED FOR THE DAILY "RECORD DRAWINGS".
2. RECORD DIMENSIONS SHALL CLEARLY AND ACCURATELY DELINEATE THE WORK AS INSTALLED; LOCATIONS SHALL BE SUITABLY IDENTIFIED BY AT LEAST TWO DIMENSIONS TO PERMANENT STRUCTURES.
3. PRIOR TO FINAL ACCEPTANCE OF THE WORK OF THIS DIVISION, THE CONTRACTOR SHALL SUBMIT PROPERLY CERTIFIED "RECORD DRAWINGS" TO THE ARCHITECT AND ENGINEER FOR REVIEW AND SHALL MAKE CHANGES, CORRECTIONS, OR ADDITIONS AS THE ARCHITECT MAY REQUIRE TO THE "RECORD DRAWINGS". AFTER THE ARCHITECT AND ENGINEER REVIEW, THE "RECORD DRAWINGS" SHALL BE DELIVERED TO THE OWNER.
4. THE HVAC CONTRACTOR SHALL TAG/LABEL ALL EQUIPMENT AND SYSTEM COMPONENTS AND SUBMIT AS-BUILT DRAWINGS LOCATING ALL ACCESS DOORS AND PROVIDE A DETAILED LIST OF ALL SYSTEM COMPONENTS FOR WHICH THE ACCESS DOOR HAS BEEN PROVIDED. THIS DRAWING SHALL SERVE AS A "ROAD MAP" FOR THE OWNER TO PERFORM FUTURE MAINTENANCE.

5. SHEET METAL WORK

- A. EXCEPT AS OTHERWISE SHOWN OR NOTED, ALL DUCTWORK AND OTHER SHEET METAL WORK SHALL BE GALVANIZED SHEET STEEL AND SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION, INC. DUCT CONSTRUCTION STANDARDS, PRESSURE CLASSIFICATION 1 IN. W.G.

- B. VOLUME DAMPERS: GALVANIZED STEEL, PER SMACNA "LOW VELOCITY MANUAL," EXCEPT PROVIDE BEARING AT ONE END OF DAMPER ROD AND QUADRANT, WITH LEVER AND LOCKSCREW AT OTHER END. FOR INSULATED DUCTS, QUADRANTS MOUNTED ON COLLAR TO CLEAR INSULATION. INSTALL WITH LEVERS ACCESSIBLE.
- C. FLEXIBLE CONNECTIONS: NEOPRENE-COATED GLASS FABRIC, 30 OZ PER SQ YD WITH SEWED AND CEMENTED SEAMS, SIMILAR TO VENT FABRICS. PROVIDE WITH METAL COLLARS. ALLOW MINIMUM MOVEMENT OF 1 IN.
- D. TURNING VANES: GALVANIZED STEEL SMALL DOUBLE-THICKNESS VANES WITH 2 IN. INSIDE RADIUS.
- E. ALL DUCT DIMENSIONS INDICATED ON PLANS ARE INSIDE CLEAR DIMENSIONS.
- F. LOW PRESSURE FLEXIBLE DUCT: SHALL BE A FACTORY FABRICATED HIGH TEMPERATURE COPOLYMER IMPREGNATED GLASS FABRIC, LOCKED TO COLD ROLLED FLAT STEEL SPIRAL. SIMILAR TO THERMAFLEX. MAXIMUM INSTALLED LENGTH SHALL NOT EXCEED 5 FEET.
- G. OUTDOOR DUCTWORK SHALL BE LEAK TESTED PER ASHRAE 90.1 AND TESTED TO INDUSTRY-ACCEPTED TEST PROCEDURES PER APPENDIX IN ASHRAE 90.1.

6. AIR OUTLETS

A. GENERAL:

- 1. MARGIN TYPES, COLORS, FINISH AND METHODS OF ATTACHMENT FOR ALL DIFFUSERS, GRILLES AND REGISTERS SHALL BE COORDINATED WITH ARCHITECTURAL CEILING AND WALL DETAILS AND SPECIFICATIONS.
- 2. FRAME TYPE SUITABLE FOR MOUNTING IN CEILING OR WALL CONSTRUCTION AS INDICATED ON ARCHITECTURAL PLANS.
- 3. EXACT LOCATION OF ALL AIR OUTLETS AS PER ARCHITECTURAL PLANS.
- 4. SUITABLE FOR OPERATION AT 20% EXCESS AND 20% LESS THAN NOTED CAPACITY FOR CONSTANT VOLUME SYSTEMS AND AT 20% EXCESS AND 60% LESS THAN NOTED CAPACITY FOR VARIABLE VOLUME SYSTEMS. MANUFACTURER RESPONSIBLE FOR EXAMINING APPLICATION OF EACH OUTLET AND GUARANTEE THAT EACH WILL PROVIDE REQUIRED NC LEVELS AND COMFORT SPACE CONDITIONS WITHOUT DRAFTS THROUGHOUT OPERATING RANGE.
- 5. DIFFUSERS, GRILLES AND REGISTERS SHALL BE SELECTED TO ACHIEVE NC 35 OR LESS WHEN INSTALLED.

6. ALL REGISTERS AND DIFFUSERS SHALL BE PROVIDED WITH OPPOSED BLADE VOLUME DAMPERS. DAMPER OPERATING LEVERS SHALL BE ACCESSIBLE AT THE FACE OF AIR OUTLETS.

B. REGISTERS AND GRILLES:

1. RETURN AND EXHAUST REGISTERS: STEEL CONSTRUCTION WITH VOLUME DAMPER.
2. SUPPLY REGISTERS: ALUMINUM CONSTRUCTION, ADJUSTABLE DOUBLE DEFLECTION ALUMINUM AIRFOIL LOUVERS, WITH VOLUME DAMPER. PROVIDE AIR EQUALIZING DEFLECTOR WHERE REGISTER COLLAR DUCT IS LESS THAN 2 FT LONG.
3. TRANSFER GRILLES: STEEL CONSTRUCTION WITHOUT VOLUME DAMPER.

C. DIFFUSERS:

1. PERFORATED FACE SUPPLY: STEEL FACE WITH 1, 2, 3 OR 4 WAY ADJUSTABLE PATTERN, ROUND INLET COLLAR. WITH MATCHING RETURN.

D. FRESH AIR INTAKES:

1. ALL FRESH AIR INTAKES REQUIRE INSECT SCREENS.

7. APPLIANCE VENTING

- a) NON-CONDENSING/NEGATIVE PRESSURE = CATEGORY 1 VENT TYPE: B-VENT DOUBLE WALL
- b) NON-CONDENSING/POSITIVE PRESSURE = CATEGORY III VENT TYPE: FORCED DRAFT: UL P-STACK DOUBLE WALL DIRECT VENT: AL29-4C DOUBLE WALL
- c) CONDENSING/NEGATIVE PRESSURE = CATEGORY II VENT TYPE: AL29-4C DOUBLE WALL
- d) CONDENSING/POSITIVE PRESSURE = CATEGORY IV VENT TYPE: AL29-4C DOUBLE WALL

NOTES:

1. THIS VENT SYSTEM CATEGORY TYPES ABOVE IS PROVIDED TO INDICATE THE VENT MATERIAL TYPE THAT WILL BE REQUIRED BASED UPON THE APPLIANCE VENTING REQUIREMENTS. CONTRACTOR SHALL MAKE SURE THAT DURING BIDDING THEY CHECK WITH THE APPLIANCE MANUFACTURE FOR THE EXACT TYPE OF VENTING REQUIRED. SOME MANUFACTURES ONLT ALLOW ONE VENT TYPE OR VENT MANUFACTURE TYPE. FAILURE TO COORDINATE THIS DURING BIDDING WILL RESULT IN THE DENIAL OF ANY EXTRA'S.

2. VENTING MATERIAL SHALL MATCH THE APPLIANCE TYPE AND BE AS PER THE MANUFACTURER'S REQUIREMENTS.

3. THE VENT TYPE SHOWN IS THE TYPE REQUIRED UNLESS INDICATED OTHERWISE ON THE PLANS. ALTERNATES WILL BE REVIEWED IF THE MANUFACTURER OF THE APPLIANCE APPROVES A DIFFERENT VENTING MATERIAL. THIS SHOULD BE BROUGHT TO THE ATTENTION OF THE ENGINEER DURING THE BIDDING PROCESS. FAILURE TO PROVIDE THIS DURING THE BIDDING PROCESS WILL RESULT IN THE DENIAL OF ANY ADDITIONAL CHARGES.

8. TESTING, BALANCING AND COMMISSIONING

A. ALL AIR BALANCING SHALL BE IN ACCORDANCE WITH AABC, NEBB STANDARDS, AND ASHRAE 90.1.

B. AIR BALANCING SHALL BE ACCOMPLISHED BY ADJUSTMENT OF FANS AND BRANCH DAMPERS FOR MAJOR ADJUSTMENTS. ADJUSTMENT OF TERMINAL DAMPERS AND DEVICES SHALL BE FOR TRIM OR MINOR ADJUSTMENT ONLY. THIS SHALL BE DONE TO PERMIT THE LEAST NOISE GENERATION IN THE TERMINAL AREAS AND UTILIZE MINIMUM FAN ENERGY.

C. UPON COMPLETION OF THE INSTALLATION, THE CONTRACTOR SHALL REBALANCE ANY EXISTING PORTIONS OF AIR DISTRIBUTION SYSTEM AND WATER DISTRIBUTION SYSTEM AFFECTED BY THE RENOVATION AND ALSO BALANCE ALL NEW WORK.

D. THE CONTRACTOR SHALL PROVIDE ALL LABOR, PRESSURE GAUGES, FLOW METERS, SHEAVES, AND BELTS REQUIRED TO BALANCE SYSTEMS.

E. BALANCING REPORT SHALL BE PROVIDED ON AABC-TYPE FORMS.

F. FANS, AIR HANDLING UNITS AND COILS SHALL BE BALANCED TO WITHIN +5% OF THEIR DESIGN CAPACITIES. ALL OTHER AIR QUANTITIES SHALL BE BALANCED TO WITHIN +10% OF THE DESIGN QUANTITIES.

G. BALANCING AND TESTING SHALL BE PERFORMED AND SUPERVISED BY A CERTIFIED NEBB OR AABC TECHNICIAN:

- H. THE PERFORMANCE AND CAPACITY OF ALL SYSTEMS AND EQUIPMENT TO BE DEMONSTRATED BY THE CONTRACTOR.
- I. **AIR SYSTEM BALANCING.** AIR SYSTEMS SHALL BE BALANCED IN A MANNER TO FIRST MINIMIZE THROTTLING LOSSES. THEN, FOR FANS WITH FAN SYSTEM POWER GREATER THAN 1 HP, FAN SPEED SHALL BE ADJUSTED TO MEET DESIGN FLOW CONDITIONS.
- J. **SYSTEM COMMISSIONING.** HVAC CONTROL SYSTEMS SHALL BE TESTED TO ENSURE THAT CONTROL ELEMENTS ARE CALIBRATED, ADJUSTED, AND IN PROPER WORKING CONDITION. FOR PROJECTS LARGER THAN 50,000 FT² CONDITIONED AREA, EXCEPT WAREHOUSES AND SEMIHEATED SPACES, DETAILED INSTRUCTIONS FOR COMMISSIONING HVAC SYSTEMS (SEE INFORMATIVE APPENDIX E) SHALL BE PROVIDED BY THE DESIGNER IN PLANS AND SPECIFICATIONS.

9. INSULATION - GENERAL REQUIREMENTS

- A. ALL INSULATION MATERIALS, INCLUDING JACKETS, FACING, ADHESIVE, COATINGS, AND ACCESSORIES ARE TO BE FIRE HAZARD RATED AND LISTED BY UNDERWRITERS LABORATORIES, INC. USING STEINER TUNNEL TEST METHOD FOR FIRE HAZARD CLASSIFICATION OF BUILDING MATERIALS, STANDARD UL 723 (ASTM E-84), (ASA A2.5-1963). FLAMESPREAD: MAXIMUM 25. FUEL CONTRIBUTED AND SMOKE DEVELOPED: MAXIMUM 50. FLAMEPROOFING TREATMENTS SUBJECT TO DETERIORATION FROM MOISTURE OR HUMIDITY ARE NOT ACCEPTABLE.
- B. DEFINITIONS:
 - 2. EXPOSED: INDOOR DUCTS, PIPING OR EQUIPMENT LOCATED IN MECHANICAL EQUIPMENT ROOMS AND IN AREAS WHICH WILL BE VISIBLE WITHOUT REMOVING CEILINGS OR OPENING ACCESS PANELS.
 - 3. CONCEALED: INDOOR DUCTS, PIPING OR EQUIPMENT WHICH IS NOT EXPOSED.
 - 4. OUTDOOR: DUCTS, PIPING OR EQUIPMENT WHICH IS EXPOSED TO THE WEATHER.

10. DUCTWORK INSULATION

- A. INSULATE ALL DUCTWORK IN ACCORDANCE WITH INSULATION SCHEDULE EXCEPT AS OTHERWISE NOTED.
- B. MATERIAL (INSULATION R-VALUE (HR·FT²·°F.)/BTU):

1. DUCTS IN UNCONDITIONED SPACES
 - i. DUCTS IN UNCONDITIONED ATTICS OR OUTSIDE BUILDING.
 1. SUPPLY = 8
 2. RETURN = 8
 - ii. DUCTS IN UNCONDITIONED BASEMENTS, CRAWL SPACES, GARAGES, AND OTHER UNCONDITIONED SPACES
 1. SUPPLY = 6
 2. RETURN = 6
2. DUCTS ABOVE THE CEILING
 1. SUPPLY = 8
 2. RETURN = 8

SYSTEMS TO ACHIEVE REQUIRED R-VALUES FOR ASHRAE 90.1 AND IECC

R – 5:

1. AIR DUCT BOARD – 1-1/2" THICK (R 6.5)
2. SHEET METAL DUCTWORK WITH .75 PCF 2" DUCT WRAP (R 5.6 @ 25% COMPRESSION)
3. SHEET METAL DUCTWORK WITH 1.5 PCF 1-1/2" THICK ROTARY* DUCT LINER (R 6.0)

R – 8:

1. AIR DUCT BOARD – 2" THICK (R 8.7)
2. SHEET METAL DUCTWORK WITH .75 PCF 3" THICK DUCT WRAP (R 8.4 @ 25% COMPRESSION)
3. SHEET METAL DUCTWORK WITH 1.5 PCF 2" THICK ROTARY* DUCT LINER (R 8.0)

EXTERIOR DUCTWORK:

1. CELLULAR GLASS, TYPE I, - 2" THICK (R 8) OWENS CORNING FOAMGLAS OR EQUAL
2. VENTURECLAD INSULATION JACKETING SYSTEM – SEAL ALL INSULATION JOINTS WITH 3" ALUMINUM TAPE PRIOR TO INSTALLING VENTURECLAD JACKET

C. INSTALLATION:

1. EQUIPMENT INSULATION-FIBER GLASS

A. APPLY INSULATION TO THE EQUIPMENT SURFACE WITH JOINTS FIRMLY BUTTED AND AS CLOSE AS POSSIBLE TO THE EQUIPMENT SURFACE. INSULATION SHALL BE SECURED AS REQUIRED WITH MECHANICAL FASTENERS OR BANDING MATERIAL. FASTENERS SHALL BE

LOCATED A MAXIMUM OF 3" FROM EACH EDGE AND SPACED NO GREATER THAN 12" ON CENTER.

B. FOR BELOW AMBIENT SYSTEMS, VAPOR RETARDER JACKETING SHALL OVERLAP A MINIMUM OF 2" AT ALL SEAMS AND BE SEALED WITH APPROPRIATE PRESSURE-SENSITIVE TAPE OR MASTIC. ALL PENETRATIONS AND FACING DAMAGE SHALL BE COVERED WITH A MINIMUM 2" OVERLAP OF TAPE OR MASTIC.

C. EQUIPMENT INSULATION EXPOSED TO THE ELEMENTS OR IN REFRIGERATED SPACES SHALL BE FINISHED WITH MINIMUM 0.030-INCH THICK, OUTDOOR, WEATHER RESISTANT PVC; LAMINATED SELF-ADHESIVE WATER BASED WEATHERPROOF MASTIC AND GLASS CLOTH; OR METAL. ALL LONGITUDINAL JOINTS SHALL BE POSITIONED SO AS TO SHED WATER; WITH A MINIMUM 3" OVERLAP, AND COMPLETELY WEATHER SEALED. LAMINATED SYSTEMS SHALL BE APPLIED PER MANUFACTURER'S RECOMMENDATIONS.

D. FOR HIGH-TEMPERATURE APPLICATIONS, INSULATION MAY EITHER BE MOUNTED IN DIRECT CONTACT WITH THE HOT SURFACE, IN H-BAR CONFIGURATION, OR PRE-FABRICATED PANEL SYSTEMS MOUNTED AWAY FROM THE OPERATING SURFACE. WHEN INSTALLING H-BAR OR PANEL SYSTEMS WHICH ARE MOUNTED AWAY FROM THE OPERATING SURFACE, CONVECTION STOPS SHALL BE INSTALLED AT A MAXIMUM OF 8 FEET ALONG THE VERTICAL SURFACES. INSULATION MAY BE APPLIED OVER WELDED PINS OR STUDS UP TO 1/2" IN DIAMETER. INSULATION SHALL BE HELD IN PLACE USING MESH REINFORCEMENT OR STEEL BANDS. INSULATION SHALL NOT BE COMPRESSED BEYOND A MAXIMUM OF 1/8 INCH AT ANY POINT. PINS AND STUDS SHALL BE SPACED A MAXIMUM OF 4" FROM EACH EDGE AND NO GREATER THAN 16" ON CENTER. FOR TEMPERATURES ABOVE 500°F (260°C) AND DESIGN THICKNESSES OVER 3", INSULATION SHALL BE APPLIED USING DOUBLE-LAYER WITH STAGGERED JOINTS. FINISH SHALL BE MINIMUM 0.020-INCH THICK PVC JACKETING, INSULATING CEMENT WITH CANVAS, GLASS CLOTH WITH MASTIC, OR METAL AS SPECIFIED ON THE DRAWINGS.

E. FOR EQUIPMENT INSULATION EXPOSED IN MECHANICAL ROOMS OR SUBJECT TO MECHANICAL ABUSE, FINISH WITH MINIMUM 0.020 INCH THICK PVC JACKETING OR METAL OR LAMINATED SELF-ADHESIVE WATER AND WEATHER SEALS. ALL OTHER INSULATION SHALL BE FINISHED AS APPROPRIATE FOR THE LOCATION AND SERVICE OR AS SPECIFIED ON THE DRAWINGS.

2. INTERNAL DUCT LINING

A. DUCT LINING SHALL BE APPLIED IN STRICT ACCORDANCE WITH THE LATEST EDITION OF SMACNA'S "HVAC DUCT CONSTRUCTION STANDARD METAL & FLEXIBLE" AND NAIMA'S "FIBROUS GLASS DUCT LINER STANDARD".

B. LENGTH OF MECHANICAL FASTENERS SHALL BE SELECTED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATION AS LISTED ON EACH PRODUCT. MECHANICAL FASTENERS SHALL BE INSTALLED PERPENDICULAR TO THE DUCT SURFACE, AND IN NO INSTANCE SHALL THE PIN COMPRESS THE LINER MORE THAN 1/8" RELATIVE TO THE NOMINAL THICKNESS OF THE INSULATION.

C. ALL EXPOSED EDGES OF THE DUCT LINER SHALL BE COATED WITH THE FACTORY APPLIED EDGE COATING OR AN ADHESIVE WHICH CONFORMS TO ASTM C 916.

D. WHEN DUCT LINING IS APPLIED WITH AN ADHESIVE, THE ADHESIVE SHALL BE APPLIED TO THE SHEET METAL WITH A 90% MINIMUM COVERAGE. ALL EXPOSED DUCT LINER EDGES NOT COATED BY THE MANUFACTURER SHALL BE COATED WITH THE SAME ADHESIVE. ALL RIPS AND TEARS SHALL BE REPAIRED USING THIS SAME ADHESIVE.

E. TRANSVERSE JOINTS SHALL BE FIRMLY BUTTED WITH NO GAPS AND COATED WITH ADHESIVE. LONGITUDINAL CORNER JOINTS SHALL BE OVERLAPPED AND COMPRESSED.

F. WHEN AIR VELOCITIES ARE 4000 TO 6000 FPM, METAL NOSING SHALL BE APPLIED TO ALL UPSTREAM TRANSVERSE EDGES TO ADDITIONALLY SECURE THE INSULATION.

3. FLEXIBLE FIBER GLASS BLANKET

A. INSTALL DUCT WRAP USING MANUFACTURER'S STRETCH-OUT TABLES TO OBTAIN SPECIFIED R-VALUE USING A MAXIMUM COMPRESSION OF 25%.

B. INSTALLED R-VALUE SHALL BE PER ASHRAE 90.1; UCC CODE; OR OTHER DESIGN CRITERIA.

C. FIRMLY BUTT ALL JOINTS.

D. THE LONGITUDINAL SEAM OF THE VAPOR RETARDER MUST BE OVERLAPPED A MINIMUM OF 2 INCHES. A 2-INCH TAB SHOULD BE PROVIDED ON DUCT WRAP FOR THE CIRCUMFERENTIAL SEAM.

E. WHERE VAPOR RETARDER PERFORMANCE IS REQUIRED, ALL PENETRATIONS AND DAMAGE TO THE FACING SHALL BE REPAIRED USING PRESSURE-SENSITIVE TAPE MATCHING THE FACING, OR MASTIC PRIOR TO SYSTEM STARTUP. PRESSURE-SENSITIVE TAPES SHALL BE A MINIMUM 3 INCHES WIDE AND SHALL BE APPLIED WITH MOVING PRESSURE USING A SQUEEGEE OR OTHER APPROPRIATE SEALING TOOL. CLOSURE SHALL HAVE A 25/50 FLAME SPREAD/SMOKE DEVELOPED RATING PER UL 723.

F. DUCT WRAP SHALL BE ADDITIONALLY SECURED TO THE BOTTOM OF RECTANGULAR DUCTWORK OVER 24 INCHES WIDE USING MECHANICAL FASTENERS ON 18-INCH CENTERS. CARE SHOULD BE EXERCISED TO AVOID OVER-COMPRESSION OF THE INSULATION DURING INSTALLATION. UNFACED DUCT WRAP SHALL BE OVERLAPPED A MINIMUM OF 2 INCHES AND FASTENED USING 4-INCH TO 6-INCH NAILS OR SKEWERS SPACED 4 INCHES APART, OR SECURED WITH A WIRE/BANDING SYSTEM. CARE SHOULD BE EXERCISED TO AVOID DAMAGE TO THE DUCT WRAP.

4. ROUND DUCTWORK - PIPE & TANK INSULATION

A. APPLY ON CLEAN, DRY SURFACES.

B. CUT TO APPROPRIATE LENGTH USING MANUFACTURERS' STRETCH-OUT GUIDE FOR THE SPECIFIC DUCT SIZE. ADD AN ADDITIONAL 2 INCHES (51 MM) TO 4 INCHES (102 MM) FOR A STAPLE FLAP.

C. WRAP AROUND THE DUCT TO ENSURE PROPER FIT. STAPLE THE LAP ON 3 INCH (76 MM) CENTERS WITH OUTWARD CLINCHING STAPLES.

D. ENDS SHALL BE FIRMLY BUTTED AND SECURED WITH MATCHING BUTT STRIP MATERIAL AT EACH JOINT.

E. ON BELOW AMBIENT DUCTWORK, APPROPRIATE UL APPROVED VAPOR RETARDER SHALL BE APPLIED TO ALL LONGITUDINAL AND CIRCUMFERENTIAL JOINTS BEFORE APPLICATION OF BUTT STRIP MATERIAL.

5. FIBER GLASS DUCTWORK

A. DUCTWORK SHALL BE FABRICATED AND INSTALLED IN STRICT ACCORDANCE WITH THE LATEST EDITION OF NAIMA'S "FIBROUS GLASS DUCT CONSTRUCTION STANDARD" AND MANUFACTURER'S RECOMMENDATIONS.

B. CLOSURE SYSTEM SHALL BE UL 181 TESTED AND LISTED: PRESSURE-SENSITIVE ALUMINUM FOIL TAPES: UL 181 PART I (MARKED UL 181 A-P). HEAT SEALABLE CLOSURES: UL 181 PART II (MARKED UL 181 A-H). MASTICS: UL 181 PART III (MARKED UL 181 A-M) WITH 3-INCH WIDE GLASS FABRIC.

C. ALL LONGITUDINAL AND TRANSVERSE JOINTS HAVING A 1½" STAPLE FLAP SHALL BE SECURED WITH OUTWARD-CINCHING STAPLES ON APPROXIMATE 2-INCH CENTERS AND SEALED WITH APPROVED CLOSURE SYSTEM.

D. TRANSVERSE SHIPLAP JOINTS NOT HAVING STAPLES FLAPS, OR TRANSVERSE BUTT JOINTS SHALL BE SECURED WITH 8-INCH LONG CROSS TABS RUNNING PERPENDICULAR TO THE JOINT SEAM ON 12-INCH CENTERS. CROSS TABS SHALL BE MADE FROM AN APPROVED CLOSURE TAPE. THE SEAM OF THE JOINT SHALL THEN BE SEALED WITH AN APPROVED CLOSURE SYSTEM.

E. DUCT SECTIONS SHALL BE ADDITIONALLY REINFORCED PER NAIMA'S AND MANUFACTURER'S RECOMMENDATIONS WHEN NECESSARY. REINFORCEMENT IS DEPENDENT ON DUCT WIDTH AND OPERATING PRESSURE.

F. DUCTWORK SHALL BE SUSPENDED AND SUPPORTED AS REQUIRED ON STRAIGHT RUNS, AT ALL TURNS, AND AT TRANSITIONS TO MAINTAIN PROPER ALIGNMENT. HANGERS AND SUPPORTS SHALL BE IN STRICT ACCORDANCE WITH NAIMA'S AND MANUFACTURER'S RECOMMENDATIONS.

11. PIPING INSULATION

A. INSULATE ALL PIPING IN ACCORDANCE WITH INSULATION SCHEDULE EXCEPT AS OTHERWISE NOTED.

INSULATION SCHEDULE – PIPING

1. SERVICE LOW TEMP 40F TO 100F
 - a. THICKNESS UP TO 4" PIPE SHALL BE 1-1/2" INSULATION MATERIAL TYPE P-1 WITH A VAPORSEAL FINISH.
2. SERVICE - FITTINGS & VALVES LOW TEMP 40 TO 100 F
 - a. THICKNESS UP TO 4" PIPE SHALL BE 1-1/2" INSULATION MATERIAL TYPE P-2 WITH A F-1 VAPORSEAL FINISH.
3. REFRIGERANT LIQUID SUCTION LINES
 - a. THICKNESS ALL PIPE SHALL BE 1/2" INSULATION MATERIAL TYPE P-4 WITH A VAPORSEAL FINISH.
4. PIPING, FITTINGS & VALVES MEDIUM TEMP 100 TO 200 F
 - a. THICKNESS UP TO 4" PIPE SHALL BE 2" INSULATION MATERIAL TYPE P-3 WITH A VAPORSEAL FINISH.
5. HOT WATER
 - a. THICKNESS UP TO 4" PIPE SHALL BE 2" INSULATION MATERIAL TYPE P-3 WITH A VAPORSEAL FINISH.
6. STEAM
 - a. THICKNESS UP TO 2" PIPE SHALL BE 2-1/2" INSULATION MATERIAL TYPE P-2 WITH AN F-6 FINISH.
7. STEAM
 - a. THICKNESS GREATER THAN 2" PIPE SHALL BE 3" INSULATION MATERIAL TYPE P-2 WITH AN F-6 FINISH.

12. PIPING, VALVES AND FITTINGS TO BE INSULATED

A. LOW/MED/HIGH TEMPERATURE PIPING SYSTEMS INCLUDING:

1. CONDENSATE DRAINAGE
2. CHILLED WATER
3. CONDENSER WATER
4. HOT WATER
5. STEAM

B. MATERIAL:

1. TYPE P-1: MINIMUM 4 LB DENSITY MOLDED FIBERGLASS, MAXIMUM 0.23 K-FACTOR AT 75 F MEAN TEMPERATURE WITH FACTORY-APPLIED FIRE-RETARDANT FOIL-SKRIM-KRAFT FACING. ALL SERVICE JACKET. SIMILAR TO OWENS-CORNING 650 ASJ.
2. TYPE P-2: MINIMUM 4 LB DENSITY MOLDED FIBERGLASS FITTING, MAXIMUM 0.23 K-FACTOR AT 75 F MEAN TEMPERATURE SIMILAR TO EPOLUX HAMFAB MOLDED FITTINGS.

3. TYPE P-3: MINIMUM 1 LB DENSITY FIBERGLASS FITTING INSERTS, MAXIMUM 0.28 K-FACTOR AT 75 F MEAN TEMPERATURE SIMILAR TO MANVILLE HI-LO TEMP INSULATION INSERTS.
4. TYPE P-4: MINIMUM 6 LB MOLDED FOAMED PLASTIC. MAXIMUM 0.27 K-FACTOR AT 75 F MEAN TEMPERATURE. MAXIMUM 0.08 PERMEANCE. SIMILAR TO ARMSTRONG ARMAFLEX II.

C. FINISH:

1. TYPE F-1: FITTING COVER, MOLDED WHITE PVC JACKET, UL CLASS 1, MAXIMUM PERMEANCE 0.05 SIMILAR TO MANVILLE ZESTRON.
2. TYPE F-2: WHITE VAPOR BARRIER COATING WITH 10X10 OR 20X20 MESH WHITE GLASS, POLYESTER OR NYLON CLOTH REINFORCING MEMBRANE, MINIMUM 31 MIL DRY FILM THICKNESS, SIMILAR TO FOSTER TITE-FIT, UL LABEL.
3. TYPE F-4: ALUMINUM JACKETING WITH MINIMUM 0.016 IN. WALL THICKNESS AND LONGITUDINAL JOINTS WITH LOCK SEAMS.
4. TYPE F-6: WHITE FINISHING AND INSULATING CEMENT APPLIED OVER HEXAGONAL WIRE MESH. CEMENT SIMILAR TO KEENE SUPERSLICK.

D. OUTDOOR PIPING:

1. FOR ALL PIPING, FITTINGS AND VALVES LOCATED OUTDOORS, INCREASE SCHEDULED INSULATION THICKNESS BY A MINIMUM OF 1 IN. AND PROVIDE F-4 FINISH. PROVIDE VAPORSEAL ON ALL OUTDOOR PIPES, VALVES AND FITTINGS SUBJECT TO CONDENSATION.

E. INSTALLATION:

1. BEFORE APPLYING INSULATION ALL PRESSURE AND LEAK TESTS SHALL BE COMPLETED AND APPROVED.
2. ALL INSULATION SHALL BE BUTTED FIRMLY TOGETHER. PROVIDE 2 IN. LAMP STRIPS AT ALL SEAMS SECURED WITH ADHESIVE. USE VAPOR BARRIER TAPE AND VAPORSEAL ADHESIVE WHERE REQUIRED. STAPLES NOT PERMITTED. REFRIGERANT PIPING INSULATION SHALL HAVE MITERED FITTINGS.
3. ALL INSULATION AND VAPOR BARRIERS SHALL BE CONTINUOUS PASSING THROUGH SLEEVES, HANGERS, ETC., OR OTHER OPENINGS. PROVIDE SADDLES OR SHIELDS FOR PROTECTION.

4. INSULATION FOR STRAINERS OR OTHER FITTINGS OR ACCESSORIES REQUIRING SERVICING OR INSPECTION SHALL HAVE INSULATION REMOVABLE AND REPLACEABLE WITHOUT DAMAGE.

13. VIBRATION ISOLATION

A. GENERAL:

1. PROVIDE ISOLATION FOR EQUIPMENT, PIPING AND DUCTWORK.
2. INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
3. PROVIDE LEVELING DEVICES AND APPROVED RESILIENT RESTRAINING DEVICES AS REQUIRED TO LIMIT EQUIPMENT AND PIPING MOTION IN EXCESS OF 1/4 IN.
4. ACCEPTABLE MANUFACTURERS:
 - a MASON INDUSTRIES, INC.
 - b VIBRATION ELIMINATOR CO.
 - c KORFUND DYNAMICS CORP.

B. CEILING-HUNG FANS AND EQUIPMENT:

1. PROVIDE SPRING HANGER ROD ISOLATORS. STEEL COMPRESSION SPRING AND NEOPRENE SOUND PAD WITHIN A STEEL RETAINER BOX. SIMILAR TO MASON TYPE PCHS. 1 IN. MINIMUM STATIC DEFLECTION. 1/2 IN. MINIMUM.
2. RESERVED DEFLECTION. FACTORY-PRELOADED TO 75% OF RATED LOAD. PROVIDE SUPPLEMENTAL STEEL AS REQUIRED WHERE
3. EQUIPMENT OR STRUCTURE CANNOT SUPPORT POINT LOADS.

C. FLOOR MOUNTED EQUIPMENT HAVING INTERNAL ISOLATION:

1. PROVIDE 5/16 IN.-THICK NEOPRENE ACOUSTICAL BASE PADS OF RIBBED OR WAFFLE CONSTRUCTION. SIMILAR TO MASON TYPE W. 50 PSI MAXIMUM LOADING. PROVIDE STEEL BEARING.
2. PLATE TO DISTRIBUTE LOAD WHERE REQUIRED.

14. PIPING - GENERAL REQUIREMENTS

- A. COMPLETE WITH: PIPE, FITTINGS, VALVES, STRAINERS, MOTORIZED VALVE OPERATORS, STRAINERS, HANGERS, SUPPORTS, GUIDE, SLEEVES, AND ACCESSORIES.
- B. ALL ITEMS SHALL BE FURNISHED AND INSTALLED IN ACCORDANCE WITH THE LATEST EDITIONS OF THE FOLLOWING CODES AND STANDARDS:
 - 1. AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME).
 - 2. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM).
 - 3. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI). MANUFACTURERS STANDARDIZATION SOCIETY OF THE
 - 4. VALVE AND FITTING INDUSTRY (MSS).
- C. ALL PRESSURIZED PIPING TO BE TESTED HYDROSTATICALLY TO 150PSI OR 150% OF OPERATING PRESSURE, WHICHEVER IS GREATER, BUT NEVER EXCEED TEST PRESSURE ANSI B16.1 BASIS. TEST DURATION TO BE 2 HOURS WITH NO PRESSURE CHANGE CORRECTED FOR TEMPERATURE CHANGE. REPAIR OR REPLACE LEAKS OR DEFECTS WITHOUT ADDITIONAL COST.
- D. PROVIDE DIELECTRIC FITTINGS WHERE DISSIMILAR METALS ARE TO BE JOINED.
- E. PIPE SUPPORTS:
 - 1. PROVIDE ADEQUATE SUPPORT FOR PIPE AND CONTENTS TO PREVENT SAGGING, VIBRATION, OR SWAYING AND ALLOW FOR EXPANSION AND CONTRACTION. PROVIDE SUPPLEMENTAL STEEL AS REQUIRED WHERE STRUCTURE CANNOT SUPPORT POINT LOADS.
 - 2. HORIZONTAL PIPING TO BE SUPPORTED BY FORGED STEEL ADJUSTABLE CLEVIS TYPE HANGER. MAXIMUM SPACING AS FOLLOWS:
 - a. STEEL 1 IN. AND SMALLER: 7 FT.
 - b. STEEL 1-1/4 IN. AND LARGER: 10 FT.
 - c. COPPER 3 IN. AND SMALLER: 7 FT

- d. ADDITIONAL SUPPORTS AT CHANGES IN DIRECTION, RUNOUTS, AND CONCENTRATED LOADS DUE TO VALVES, ETC.

3. VERTICAL PIPING:

- a. BASE ELBOW SUPPORT WITH BEARING PLATE ON STRUCTURAL SUPPORT.
- b. GUIDES AT EVERY SECOND FLOOR (SPACING NOT TO EXCEED 25 FT).
- c. TOP SUPPORT HANGER OR SADDLE IN HORIZONTAL CONNECTION WITH PROVISIONS FOR EXPANSION.
- d. INTERMEDIATE STEEL RISER CLAMP SUPPORT BOLTED AND WELDED TO PIPE BEARING ON STRUCTURAL STEEL OR BEARING PLATE AT FLOOR.

15. CONDENSATE DRAIN PIPING

- A. PIPE: ASTM B88, HARD DRAWN COPPER TUBING TYPE "L".
- B. FITTINGS: SOLDERED JOINT FITTINGS, 95/5 SOLDER.
- C. PITCH AND DRAIN TO NEAREST AVAILABLE DRAIN, EXCEPT AS NOTED:
 - 1. 1 IN. IN 4 FT PREFERRED.
 - 2. 1 IN. IN 8 FT MINIMUM.

16. REFRIGERANT PIPING

A. REFRIGERANT PIPING

- 1. PIPE: COPPER TYPE ACR IN ACCORDANCE WITH ASTM B280, NITROGEN CHANGE AND CAPPED. FITTINGS: WROUGHT COPPER WITH SILVER BRAZING
- 2. ALLOY SOLDER SIMILAR TO HANDY AND HARMAN EASY-FLO.
- 3. INSULATE ALL REFRIGERANT PIPING.

17. NOISE CRITERIA

- A. ALL AIR DISTRIBUTION SYSTEMS, REGISTERS AND RETURNS MUST BE NC 35 OR LESS.

18. DAMPERS

- A. MAXIMUM DAMPER LEAKAGE FOR NONMOTORIZED SHALL BE 20CFM PER SQUARE FOOT, MOTORIZED SHALL BE 4CFM PER SQUARE FOOT. IF THE DAMPER IS SERVING AN AREA MAINTAINING A TEMPERATURE LESS THAN 50 DEGREES THE DAMPER SHALL BE MOTORIZED, HAVE A 0CFM(BUBBLE TIGHT) LEAKAGE INSULATED DAMPER WITH SILICONE AND HEATED SEALS.
- B. ALL OUTDOOR AIR INTAKE AND EXHAUST SYSTEMS SHALL BE EQUIPPED WITH MOTORIZED DAMPERS.

19. FRACTIONAL HORSEPOWER FAN MOTORS

- A. MOTORS FOR FANS THAT ARE 1/12 HP OR GREATER AND LESS THAN 1 HP SHALL BE ELECTRONICALLY-COMMUTATED MOTORS OR SHALL HAVE A MINIMUM MOTOR EFFICIENCY OF 70% WHEN RATED IN ACCORDANCE WITH DOE 10 CFR 431. THESE MOTORS SHALL ALSO HAVE THE MEANS TO ADJUST MOTOR SPEED FOR EITHER BALANCING OR REMOTE CONTROL. BELTDRIVEN FANS MAY USE SHEAVE ADJUSTMENTS FOR AIRFLOW BALANCING IN LIEU OF A VARYING MOTOR SPEED.

EXCEPTIONS:

1. MOTORS IN THE AIRSTREAM WITHIN FAN-COILS AND TERMINAL UNITS THAT OPERATE ONLY WHEN PROVIDING HEATING TO THE SPACE SERVE

20. CONTROLS

- A. UNLESS OTHERWISE NOTED, EACH THERMOSTAT OR TEMPERATURE SENSOR SHALL CONTROL NO MORE THAN 25,000 SQUARE FEET OF SPACE AND SHALL BE LOCATED IN THE ZONE IT IS CONTROLLING.
- B. UNLESS OTHERWISE NOTED, EACH ZONE THERMOSTATIC CONTROL FOR BOTH HEATING AND COOLING SHALL HAVE A DEAD BAND CAPABILITY OF AT LEAST 5 DEGREES F.

- C. CONTROLS SHALL HAVE SETPOINT OVERLAP RESTRICTION TO PREVENT HEATING SETPOINT FROM EXCEEDING THE COOLING SETPOINT MINUS ANY APPLICABLE PROPORTIONAL BAND.
- D. HVAC SYSTEMS SHALL HAVE THE OFF-HOUR CONTROLS REQUIRED BY OTHER SECTIONS (EXCEPTIONS INCLUDE SYSTEMS INTENDED TO OPERATE CONTINUOUSLY AND SYSTEMS THAT HAVE A DESIGN HEATING CAPACITY AND COOLING CAPACITY LESS THAN 15000 BTU/H THAT ARE EQUIPPED WITH READILY ACCESSIBLE MANUAL ON/OFF CONTROLS AND SWITCHES.
- E. CONTROLS SHALL HAVE THE ABILITY TO START AND STOP UNDER DIFFERENT TIME SCHEDULES FOR SEVEN DIFFERENT DAY TYPES PER WEEK AND BE CAPABLE OF RETAINING PROGRAMMING AND TIME SETTING DURING A POWER LOSS PERIOD OF AT LEAST TEN HOURS, AND INCLUDE AN ACCESSIBLE MANUAL OVERRIDE, OR EQUIVALENT FUNCTION, THAT ALLOWS TEMPORARY OPERATION OF THE SYSTEM FOR UP TO TWO HOURS.
- F. SETBACK CONTROLS: HEATING ADJUSTABLE AT LEAST 10 DEGREES F BELOW SETPOINT, COOLING ADJUSTABLE AT LEAST 5 DEGREES ABOVE SETPOINT OR TO PREVENT HIGH SPACE HUMIDITY LEVELS.
- G. OPTIMUM START CONTROLS THE CONTROL ALGORITHM SHALL, AS A MINIMUM, BE A FUNCTION OF THE DIFFERENCE BETWEEN SPACE TEMPERATURE AND OCCUPIED SETPOINT, THE OUTDOOR TEMPERATURE, AND THE AMOUNT OF TIME PRIOR TO SCHEDULED OCCUPANCY. MASS RADIANT FLOOR SLAB SYSTEMS SHALL INCORPORATE FLOOR TEMPERATURE INTO THE OPTIMUM START ALGORITHM.
- H. SHUTOFF DAMPER CONTROLS – AUTOMATICALLY SHUT WHEN THE SYSTEMS OR SPACES SERVED ARE NOT IN USE, DURING PREOCCUPANCY WARMUP, COOLDOWN, AND SETBACK, EXCEPT WHEN VENTILATION REDUCES ENERGY COSTS OR WHEN VENTILATION MUST BE SUPPLIED TO MEET CODE REQUIREMENTS. WHERE OUTDOOR AIR SUPPLY AND EXHAUST/RELIEF DAMPERS ARE REQUIRED, THEY SHALL HAVE A MAXIMUM LEAKAGE RATE AS INDICATED IN ASHRAE 90.1-2019 TABLE 6.4.3.4.3.
- I. UNLESS OTHERWISE NOTED, VENTILATION FANS SHALL HAVE AUTOMATIC CONTROLS TO SHUT OFF WHEN NOT REQUIRED EXCEPT FOR SYSTEMS INTENDED TO RUN CONTINUOUSLY.
- J. HEAT PUMPS EQUIPPED WITH INTERNAL ELECTRIC RESISTANCE HEATERS SHALL HAVE CONTROLS THAT PREVENT SUPPLEMENTAL HEATER OPERATION WHEN HEATING LOAD CAN BE MET BY HEAT PUMP ALONE.
- K. FREEZE PROTECTION SYSTEMS SHALL INCLUDE AUTOMATIC CONTROLS CAPABLE OF AND CONFIGURED TO SHUT OFF SYSTEMS WHEN OUTDOOR TEMPERATURE IS ABOVE 40 DEGREES FAHRENHEIT. SNOW/ICE MELTING

SYSTEMS SHALL BE CAPABLE OF SHUTTING OFF WHEN TEMPERATURE IS ABOVE 50 DEGREES FAHREINHEIT.

L. HUMIDISTATIC CONTROLS SHALL NOT USE MECHANICAL COOLING TO REDUCE HUMIDITY BELOW A DEW POINT OF 55 DEGREES FAHRENHEIT OR RELATIVE HUMIDITY OF 60% IN THE COLDEST ZONE SERVED BY THE SYSTEM DURING DEHUMIDIFICATION. ELECTRIC HEAT SHALL NOT BE USED TO PRODUCE RELATIVE HUMIDITY ABOVE 30% IN THE WARMEST ZONE SERVED BY SYSTEM DURING HUMIDIFICATION.

M. DEMAND CONTROL VENTILATION - REQUIRED FOR SPACES LARGER THAN 500 FEET SQUARE AND WITH A DESIGN OCCUPANCY FOR VENTILATION OF GREATER THAN OR EQUAL TO 25 PEOPLE PER 1000 FT² OF FLOOR AREA AND SERVED BY SYSTEMS WITH ONE OR MORE OF THE FOLLOWING:

A. AIR-SIDE ECONOMIZER

B. AUTOMATIC MODULATING CONTROL OF OUTDOOR AIR DAMPER

C. DESIGN OUTDOOR AIRFLOW GREATER THAN 3000 CFM.

N. HEATING AND/OR AIR CURTAIN HEAT IN VESTIBULES- IF PROVIDED THE VESTIBULE SHALL BE TEMPERATURE CONTROLLED TO A MAXIMUM SETPOINT OF 60 DEGREES F AND SHUT OFF WHEN OUTDOOR AIR TEMPERATURES ARE ABOVE 45 DEGREES F.

O. DIRECT DIGITAL CONTROL(DDC) SHALL BE CAPABLE OF ALL OF THE FOLLOWING:

A. MONITORING ZONE AND SYSTEM DEMAND FOR FAN PRESSURE, PUMP PRESSURE, HEATING, AND COOLING

B. TRANSFERRING ZONE AND SYSTEM DEMAND INFORMATION FROM ZONES TO AIR DISTRIBUTION SYSTEM CONTROLLERS AND FROM AIR DISTRIBUTION SYSTEMS TO HEATING AND COOLING PLANT CONTROLLERS

C. AUTOMATICALLY DETECTING THOSE ZONES AND SYSTEMS THAT MAY BE EXCESSIVELY DRIVING THE RESET LOGIC AND GENERATE AN ALARM OR OTHER INDICATION TO THE SYSTEM OPERATOR

D. READILY ALLOWING OPERATOR REMOVAL OF ZONE(S) FROM THE RESET ALGORITHM

DDC DISPLAY - THE DDC SYSTEM SHALL BE CAPABLE OF TRENDING AND GRAPHICALLY DISPLAYING INPUT AND OUTPUT POINTS.

- P. AIR ECONOMIZER SYSTEM(S) SHALL BE CAPABLE OF MODULATING OUTDOOR AIR AND RETURN AIR DAMPERS TO PROVIDE UP TO 100% OF THE DESIGN SUPPLY AIR QUANTITY AS OUTDOOR AIR FOR COOLING.

CONTROL SIGNAL. ECONOMIZER DAMPERS SHALL BE CAPABLE OF BEING SEQUENCED WITH THE MECHANICAL COOLING EQUIPMENT AND SHALL NOT BE CONTROLLED BY ONLY MIXED-AIR TEMPERATURE.

EXCEPTION: THE USE OF MIXED-AIR TEMPERATURE LIMIT CONTROL SHALL BE PERMITTED FOR SYSTEMS CONTROLLED FROM SPACE TEMPERATURE (SUCH AS SINGLE-ZONE SYSTEMS).

HIGH-LIMIT SHUTOFF. ALL AIR ECONOMIZERS SHALL BE CAPABLE OF AUTOMATICALLY REDUCING OUTDOOR AIR INTAKE TO THE DESIGN MINIMUM OUTDOOR AIR QUANTITY WHEN OUTDOOR AIR INTAKE WILL NO LONGER REDUCE COOLING ENERGY USAGE. HIGH-LIMIT SHUTOFF CONTROL TYPES AND ASSOCIATED SETPOINTS FOR SPECIFIC CLIMATE ZONES SHALL COMPLY WITH ASHRAE 90.1-2019 CLIMATE ZONE 4A.

DAMPERS. RETURN, EXHAUST/RELIEF, AND OUTDOOR AIR DAMPERS SHALL MEET THE REQUIREMENTS LISTED IN THE DAMPER SECTION OF THE SPECIFICATION.

RELIEF OF EXCESS OUTDOOR AIR. SYSTEMS SHALL PROVIDE A MEANS TO RELIEVE EXCESS OUTDOOR AIR DURING AIR ECONOMIZER OPERATION TO PREVENT OVERPRESSURIZING THE BUILDING. THE RELIEF AIR OUTLET SHALL BE LOCATED SO AS TO AVOID RECIRCULATION INTO THE BUILDING.

SENSOR ACCURACY. OUTDOOR AIR, RETURN AIR, MIXED AIR, AND SUPPLY AIR SENSORS SHALL BE CALIBRATED WITHIN THE FOLLOWING ACCURACIES:

A. DRY-BULB AND WET-BULB TEMPERATURES SHALL BE ACCURATE TO $\pm 2^{\circ}\text{F}$ OVER THE RANGE OF 40°F TO 80°F .

B. ENTHALPY AND THE VALUE OF A DIFFERENTIAL ENTHALPY SENSOR SHALL BE ACCURATE TO $\pm 3 \text{ BTU/LB}$ OVER THE RANGE OF 20 TO 36 BTU/LB.

C. RELATIVE HUMIDITY SHALL BE ACCURATE TO $\pm 5\%$ OVER THE RANGE OF 20% TO 80% RH

HEATING SYSTEM IMPACT. THE ECONOMIZER CONTROLS SHALL BE SUCH THAT ECONOMIZER OPERATION DOES NOT INCREASE THE BUILDING HEATING ENERGY USE DURING NORMAL OPERATION UNLESS VAV'S ARE USED ON THE PROJECT AND THE VAV SYSTEM(S) SHALL CAUSE ZONE-LEVEL HEATING TO INCREASE DUE TO A REDUCTION IN SUPPLY AIR TEMPERATURE.

Q. ZONE THERMOSTATIC CONTROLS SHALL PREVENT

A. REHEATING;

B. RECOOLING;

C. MIXING OR SIMULTANEOUSLY SUPPLYING AIR THAT HAS BEEN PREVIOUSLY MECHANICALLY HEATED AND AIR THAT HAS BEEN PREVIOUSLY COOLED, EITHER BY MECHANICAL COOLING OR BY

ECONOMIZER SYSTEMS; AND

D. OTHER SIMULTANEOUS OPERATION OF HEATING AND COOLING SYSTEMS TO THE SAME ZONE

R. CONTROLS SHALL PREVENT REHEATING, MIXING OF HOT AND COLD AIRSTREAMS, OR OTHER MEANS OF SIMULTANEOUS HEATING AND COOLING OF THE SAME AIRSTREAM

S. FAN CONTROL – FANS IN MECHANICAL COOLING SYSTEM SHALL BE MODULATING TYPE AND MODULATE BASED UPON SPACE TEMPERATURE AND/OR VENTILATION REQUIREMENTS.

T. DOOR SWITCHES – PROVIDE DOOR SWITCHES AT ALL OUTSIDE DOORS. UPON A DOOR BEING LEFT OPEN FOLLOW SEQUENCE BELOW:

1. DISABLE MECHANICAL HEATING OR RESET THE HEATING SETPOINT TO 55°F OR LOWER WITHIN FIVE MINUTES OF THE DOOR OPENING AND
2. DISABLE MECHANICAL COOLING OR RESET THE COOLING SETPOINT TO 90°F OR GREATER WITHIN FIVE MINUTES OF THE DOOR OPENING. MECHANICAL COOLING SHALL REMAIN ENABLED IF OUTDOOR AIR TEMPERATURE IS BELOW SPACE TEMPERATURE.

EXCEPTIONS:

1. BUILDING ENTRIES WITH AUTOMATIC CLOSING DEVICES
2. ANY SPACE WITHOUT A THERMOSTAT
3. ALTERATIONS TO EXISTING BUILDINGS
4. LOADING DOCKS

DIVISION 26 – ELECTRICAL
260000 ELECTRICAL WORK SPECIFICATIONS

1. GENERAL:

QQ. THE "GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION," AIA DOCUMENT A201, LATEST EDITION, AND THESE SPECIFICATIONS AS APPLICABLE ARE PART OF THIS CONTRACT.

RR. ALL APPLICABLE CODES, LAWS AND REGULATIONS GOVERNING OR RELATING TO ANY PORTION OF THIS WORK ARE HEREBY INCORPORATED INTO AND MADE PART OF THESE SPECIFICATIONS, AND THERE PROVISIONS SHALL BE CARRIED OUT BY THE CONTRACTOR WHO SHALL INFORM THE OWNER, PRIOR TO SUBMITTING A PROPOSAL, OF ANY WORK OR MATERIAL WHICH VIOLATES ANY OF THE ABOVE LAWS AND REGULATIONS. ANY WORK DONE BY THE CONTRACTOR CAUSING SUCH VIOLATION SHALL BE CORRECTED BY THE CONTRACTOR AT THEIR OWN COST.

SS. INVESTIGATE EACH SPACE THROUGH WHICH EQUIPMENT MUST BE MOVED. WHERE NECESSARY, EQUIPMENT SHALL BE SHIPPED FROM THE MANUFACTURE IN SECTIONS OF A SIZE SUITABLE FOR MOVING THROUGH AVAILABLE RESTRICTIVE SPACES. ASCERTAIN FROM THE BUILDING OWNER AND TENANT AT WHAT TIMES OF THE DAY EQUIPMENT MAY BE MOVED THROUGH ALL AREAS.

TT. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. CONDUIT ROUTING IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS, DROPS AND RISES OF RUNS. THE CONTRACTOR SHALL ALLOW IN HIS/HER PRICE FOR ROUTING OF CONDUIT TO AVOID OBSTRUCTIONS. COORDINATION WITH EXISTING SERVICES, INCLUDING THOSE OF OTHER TRADES, IS REQUIRED. MAINTAIN HEADROOM AND SPACE CONDITIONS.

UU. INSTALL WORK AS TO BE READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS FROM THE DRAWINGS MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES, WHICH INVOLVE EXTRA COST, SHALL NOT BE MADE WITHOUT OUR OR OWNER APPROVAL.

VV. REMOVAL AND RELOCATION OF CERTAIN EXISTING WORK MAY BE NECESSARY FOR THE PERFORMANCE OF THE GENERAL WORK. ALL EXISTING CONDITIONS CANNOT BE COMPLETELY DETAILED ON THE DRAWINGS. THE CONTRACTOR SHALL SURVEY THE SITE AND INCLUDE ALL CHANGES AND CHARGES IN MAKING UP THE WORK PROPOSED.

WW. CONNECTIONS TO EXISTING WORK: INSTALL NEW WORK AND CONNECT TO EXISTING WORK WITH A MINIMUM INTERFERENCE TO EXISTING FACILITIES. TEMPORARY SHUTDOWNS OF EXISTING SERVICES SHALL BE PERFORMED AT NO ADDITIONAL CHARGES, AT TIMES NOT TO INTERFERE WITH NORMAL OPERATION OF EXISTING FACILITIES AND ONLY WITH WRITTEN CONSENT OF THE OWNER. ALARM AND EMERGENCY SYSTEMS SHALL NOT BE INTERRUPTED. MAINTAIN

CONTINUOUS OPERATION OF THE EXISTING FACILITIES AS REQUIRED WITH NECESSARY TEMPORARY CONNECTIONS BETWEEN NEW AND EXISTING WORK. CONNECT NEW WORK TO EXISTING WORK IN NEAT AND ACCEPTABLE MANNER. RESTORE EXISTING DISTURBED WORK TO ORIGINAL CONDITION, INCLUDING MAINTENANCE OF WIRING CONTINUITY AS REQUIRED.

XX. DISCONNECT, REMOVE AND/OR RELOCATE EXISTING MATERIAL, EQUIPMENT AND OTHER WORK AS NOTED OR REQUIRED FOR PROPER INSTALLATION OF NEW WORK.

YY. ALL EXISTING MATERIAL, EQUIPMENT AND CONSTRUCTION DEBRIS TO BE REMOVED UNDER THIS CONTRACT SHALL BECOME THE PROPERTY OF THE CONTRACTOR WITH THE EXCEPTION OF SPECIFIC EQUIPMENT AND APPARATUS REQUESTED BY THE BUILDING REPRESENTATIVE, ARCHITECT OR AS NOTED TO BE RELOCATED ON THE DRAWINGS. REMOVED EQUIPMENT SHALL BE PROPERLY DISPOSED OF BY THIS CONTRACTOR.

ZZ. THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND MATERIALS AND ALL PARTS OF THE BUILDING, EXTERIOR SPACES AND ADJACENT STREETS, SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND DEBRIS RESULTING FROM THE EXECUTION OF THIS WORK. EXCESS MATERIALS WILL NOT BE PERMITTED TO ACCUMULATE EITHER ON THE INTERIOR OR THE EXTERIOR.

AAA. SEAL OPENING THROUGH PARTITIONS, WALLS AND FLOORS WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL. ALL PENETRATIONS THROUGH NEW AND EXISTING RATED FIRE AND SMOKE PARTITIONS AND/OR FLOORS SHALL BE COMPLETELY SEALED USING MATERIALS AND METHODS DESCRIBED IN SUBSEQUENT "FIRE STOPPING" SPECIFICATIONS SECTIONS.

BBB. PROVIDE ALL NECESSARY FLASHING AND COUNTERFLASHING TO MAINTAIN THE WATERPROOFING INTEGRITY OF THE BUILDING AS REQUIRED BY THE INSTALLATION OR REMOVAL OF CONDUIT AND EQUIPMENT. PROVIDE EQUIPMENT CURBS AS REQUIRED.

CCC. THE WORK IN THE BUILDING SHALL BE DONE WHEN AND AS DIRECTED, IN A MANNER SATISFACTORY TO THE OWNER. THE WORK SHALL BE PERFORMED AS TO CAUSE THE LEAST POSSIBLE INCONVENIENCE AND DISTURBANCE TO THE PRESENT OCCUPANTS.

DDD. THE CONTRACTOR'S PROPOSAL FOR ALL WORK SHALL BE PREDICATED ON THE PERFORMANCE OF THE WORK DURING REGULAR WORKING HOURS. WHEN SO DIRECTED, HOWEVER, THE CONTRACTOR SHALL INSTALL WORK DURING OVERTIME HOURS AND THE ADDITIONAL COST TO BE CHARGED THEREFORE SHALL BE ONLY THE "PREMIUM" PORTION OF THE WAGES PAID.

EEE. UNLESS OTHERWISE SPECIFICALLY NOTED OR SPECIFIED, INCLUDE ALL CUTTING AND PATCHING OF EXISTING FLOORS, WALLS, PARTITIONS AND OTHER

MATERIALS IN THE EXISTING BUILDING. THE CONTRACTOR SHALL RESTORE THESE AREAS TO ORIGINAL CONDITION.

FFF. ALL MATERIAL AND EQUIPMENT SHALL BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.

GGG. SUBMISSION OF A PROPOSAL SHALL BE CONSTRUED AS EVIDENCE THAT A CAREFUL EXAMINATION OF ALL OF THE PLANS APPLICABLE FOR THE PROJECT AND NOT JUST THE HVAC PLANS AND IS FAMILIAR WITH ANY PROPOSED CONDITIONS THAT WILL NEED TO COORDINATED IN THE FIELD. FOR EXISTING BUILDINGS: THE PORTIONS OF THE EXISTING BUILDING, EQUIPMENT, ETC., WHICH AFFECT THIS WORK, AND THE ACCESS TO SUCH SPACES, HAS BEEN MADE AND THAT THE CONTRACTOR IS FAMILIAR WITH EXISTING CONDITIONS AND DIFFICULTIES THAT WILL AFFECT THE EXECUTION OF THE WORK. THE CONTRACTOR IS RESPONSIBLE TO INDICATE ANY DISCREPANCIES BETWEEN THE CONTRACT DRAWINGS AND ACTUAL FIELD CONDITIONS PRIOR TO SUBMITTAL OF BID. SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT THE CONTRACTOR HAS THOROUGHLY REVIEWED ALL OF THE DOCUMENTATION ASSOCIATED WITH THE PROJECT AND IF AN EXISTING BUILDING REVIEWED ALL OF THE EXISTING CONDITIONS. LATER CLAIMS SHALL NOT BE MADE FOR LABOR, EQUIPMENT OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN DURING SUCH AN EXAMINATION AND REVIEW. THE ON-SITE INSPECTION SHALL VERIFY EXISTING CONDUIT (SIZES, CLEARANCES, ETC.) AND CONDITIONS.

HHH. INSURANCE: IN ACCORDANCE WITH BUILDING REQUIREMENTS AND SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.

III. THE FINAL ACCEPTANCE SHALL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT, TESTED THE VARIOUS SYSTEMS, DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS AND HAS FURNISHED ALL THE REQUIRED CERTIFICATES OF INSPECTION AND APPROVAL.

2. SCOPE OF WORK:

I. THE SCOPE OF WORK SHALL CONSIST OF PROVIDING LABOR, MATERIALS, EQUIPMENT, SERVICES AND FEES NECESSARY FOR COMPLETE AND SAFE INSTALLATION IN CONFORMITY WITH THE NATIONAL ELECTRICAL CODE(NEC) AND ALL OTHER APPLICABLE INDUSTRY, STATE, NATIONAL AND LOCAL CODES AND AUTHORITIES HAVING JURISDICTION, AS INDICATED ON THE DRAWINGS AND HEREIN SPECIFIED.

J. ALL DRAWINGS, PLANS, DETAILS, SPECIFICATIONS AND SPECIFICATION ADDENDA ARE MADE PART OF THIS CONTRACT AND SHALL APPLY TO ALL WORK UNDER THE CONTRACT UNLESS OTHERWISE AMENDED, MODIFIED, SUPPLEMENTED OR SPECIFIED HEREIN.

K. THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OF REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY WORKMANSHIP AND EQUIPMENT IN WHICH DEFECTS DEVELOP WITHIN ONE YEAR FROM THE DATED OF FINAL CERTIFICATE FOR PAYMENT AND/OR FROM DATE OF ACTUAL USE OF EQUIPMENT OR OCCUPANCY OF SPACES BY THE OWNER INCLUDED UNDER THE VARIOUS PARTS OF THE WORK, WHICHEVER DATE IS EARLIER. THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ALSO PROVIDE THAT WHERE DEFECTS OCCUR, THE CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED IN REPAIRING AND REPLACING WORK OF OTHER TRADES AFFECTED BE DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR.

L. THE CONTRACTOR SHALL GIVE NECESSARY NOTICE, FILE DRAWINGS AND SPECIFICATIONS WITH ALL DEPARTMENTS HAVING JURISDICTION, OBTAIN PERMITS OR LICENSES NECESSARY TO CARRY OUT THIS WORK AND PAY ALL FEES THEREFORE. THE CONTRACTOR SHALL ARRANGE FOR INSPECTION AND TESTS OF ANY OR ALL PARTS OF THE WORK IF SO REQUIRED BY AUTHORITIES FOR, AND FURNISH TO THE OWNER BEFORE BILLING, ALL CERTIFICATES NECESSARY AS EVIDENCE THE WORK INSTALLED CONFORMS WITH ALL REGULATIONS WHERE THEY APPLY TO THIS WORK.

3. SHOP DRAWINGS:

E. PRIOR TO THE INSTALLATION OF ANY WORK AND PROCUREMENT OF EQUIPMENT, THE CONTRACTOR SHALL PROVIDE COMPLETE SETS OF COORDINATED SHOP DRAWINGS OF ALL NEW AND EXISTING EQUIPMENT, INDICATING CAPACITY, DIMENSIONS AND SEQUENCE OF OPERATION FOR WRITTEN APPROVAL BY THE ARCHITECT AND ENGINEER.

F. INDICATE ON EACH SHOP DRAWINGS SUBMITTED:

5) PROJECT NAME AND LOCATION

6) NAME OF ARCHITECT AND ENGINEER

7) ITEM IDENTIFICATION

8) APPROVAL STAMP OF THE PRIME CONTRACTOR

G. SUBMISSIONS:

3) SUBMISSIONS 11 IN X 17 IN OR SMALLER. IF THE SUBMISSION IS A CATALOG CUT, THEN THE CONTRACTOR SHALL SUBMIT ONE ORIGINAL AND TWO COPIES. OTHERWISE, HE SHALL SUBMIT THREE COPIES. THE ARCHITECT WILL FORWARD THE ORIGINAL AND ONE COPY (TWO COPIES

WHEN NO ORIGINAL IS RECEIVED) TO THE ENGINEER. ALL CATALOG CUTS SHALL BE COMPLETE.

- 4) SUBMISSIONS LARGER THAN 11 IN X 17 IN. SUBMIT TWO PRINTS AND ONE PAPER SEPA TO THE ARCHITECT. THE ARCHITECT WILL FORWARD ONE PRINT AND THE PAPER SEPA TO THE ENGINEER.

H. SUBMIT SHOP DRAWINGS FOR THE FOLLOWING:

- 6) CIRCUIT BREAKERS
- 7) PANELBOARDS(INCLUDING DIMENSIONS, SCHEDULES AND CATALOG CUTS).
- 8) RACEWAYS
- 9) WIRE AND CABLE
- 10) WALL SWITCHES
- 11) INSERTION RECEPTACLES
- 12) LUMINAIRES
- 13) TRANSFORMERS

4. AS-BUILT DRAWINGS AND EQUIPMENT OPERATIONAL INSTRUCTIONS:

- E. UPON COMPLETION AND ACCEPTANCE OF WORK, CONTRACTOR SHALL FURNISH WRITTEN INSTRUCTIONS AND EQUIPMENT MANUALS AND DEMONSTRATE TO THE OWNER THE PROPER OPERATION AND MAINTENANCE OF ALL EQUIPMENT AND APPARATUS FURNISHED UNDER THE CONTRACT.
- F. THESE INSTRUCTIONS SHALL BE TYPED ON 8-1/2 X 11 IN. PAPER AND BOUND IN THREE RING BINDERS WITH CLEAR ACETATE COVERS. CONTRACTOR SHALL GIVE THREE COPIES OF THE INSTRUCTIONS TO THE OWNER AND ONE COPY TO THE ENGINEER.
- G. THE INSTRUCTION BOOKLET SHALL BEAR THE NAME, ADDRESS AND TELEPHONE NUMBER OF THE PROJECT, ARCHITECT AND ENGINEER.
- H. REPRODUCIBLE "AS-BUILT" DRAWINGS PREPARED IN COMPUTER AIDED DRAFTED (AUTO CAD) FORMAT SHALL BE PROVIDED TO THE OWNER INDICATING

THE AS INSTALLED CONDITIONS OF THE WORK. A COMPLETE "AS-BUILT" DRAWING FILE SHALL BE PROVIDED TO THE OWNER AFTER COMPLETION OF THE INSTALLATION.

5. GENERAL PROVISIONS FOR ELECTRICAL WORK:

A. SPECIFICATIONS ARE OF SIMPLIFIED FORM AND INCLUDE INCOMPLETE SENTENCES. WORDS OR PHRASES SUCH AS "THE CONTRACTOR SHALL", "SHALL BE", "FURNISH", "PROVIDE" "A", "THE", "ALL" HAVE BEEN OMITTED FOR BREVITY.

B. DEFINITIONS:

- 1) "PROVIDE": TO SUPPLY, INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION THE PARTICULAR WORK REFERRED TO UNLESS SPECIFICALLY OTHERWISE NOTED.
- 2) "INSTALL": TO ERECT, MOUNT AND CONNECT COMPLETE WITH RELATED ACCESSORIES
- 3) "FURNISH" OR "SUPPLY": TO PURCHASE, PROCURE, ACQUIRE AND DELIVER COMPLETE WITH RELATED ACCESSORIES.
- 4) "WORK": LABOR, MATERIALS EQUIPMENT, APPARATUS, CONTROLS, ACCESSORIES AND OTHER ITEMS REQUIRED FOR PROPER AND COMPLETE INSTALLATION
- 5) "WIRING": RACEWAY, FITTINGS, WIRE, BOXES AND RELATED ITEMS.
- 6) "CONCEALED": EMBEDDED IN MASONRY OR OTHER CONSTRUCTION. INSTALLED IN FURRED SPACES, WITHIN DOUBLE PARTITIONS OR HUNG CEILINGS, IN TRENCHES, IN CRAWL SPACES, OR IN ENCLOSURES.
- 7) "EXPOSED": NOT INSTALLED UNDERGROUND OR "CONCEALED" AS DEFINED ABOVE.
- 8) "SIMILAR" OR "EQUAL": EQUAL IN MATERIALS, WEIGHT, SIZE, DESIGN AND EFFICIENCY OF SPECIFIED PRODUCT.

C. GENERAL:

- 1) THE DRAWING SHOWS THE APPROXIMATE LOCATIONS OF ALL APPARATUS, THE EXACT LOCATIONS OF WHICH ARE SUBJECT TO THE APPROVAL OF THE OWNER, WHO RESERVES THE RIGHT TO MAKE ANY REASONABLE CHANGES IN THE LOCATION INDICATED WITHOUT EXTRA

COST. WHILE THE GENERAL RUN OF CONDUIT AND CABLES ARE INDICATED ON THE DRAWING. IT IS NOT INTENDED THAT THE EXACT ROUTING OR LOCATIONS OF CONDUIT AND CABLES BE DETERMINED THEREFROM.

- 2) THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL REQUIRED ENDS, OFFSETS, PULL BOXES AND OBSTRUCTIONS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO INSTALL HIS WORK TO CONFORM TO THE STRUCTURE, MAINTAIN HEADROOM AND KEEP OPENINGS AND PASSAGEWAYS CLEAR.
- 3) THE CONTRACTOR SHALL BE RESPONSIBLE TO COORDINATE WITH ALL TRADES.
- 4) WIRE ALL FIXTURES, DEVICES, ETC. TO RESPECTIVE PANEL AND CONTROLS AS SHOWN ON PLANS IN SYMBOL FORM.
- 5) THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEANUP AND REMOVAL FROM THE SITE OF RESULTING DEBRIS UPON COMPLETION OF WORK UNDER THIS SECTION.
- 6) PROVIDE SEPARATE SYSTEMS AND ENCLOSURES FOR 120/208 AND 277/480 VOLT POWER AND CONTROL WIRING. COMMON PULL BOXES AND JUNCTION BOXES ARE NOT ACCEPTABLE.
- 7) NEUTRAL SHARING IS NOT ACCEPTABLE. EACH CIRCUIT, IF REQUIRED, SHALL HAVE A SEPARATE AND DEDICATED NEUTRAL CONDUCTOR.
- 8) LOCATIONS INDICATED FOR LOCAL WALL SWITCHES ARE SUBJECT TO RELOCATIONS. AT OR NEAR DOORS INSTALL SWITCH INSIDE OPPOSITE HINGE, VERIFY FINAL DOOR HINGE. LOCATION IN FIELD PRIOR TO SWITCH OUTLET INSTALLATION.
- 9) HEIGHTS OF INSERTION AND CONTROL DEVICES. REFER TO THE ELECTRICAL GENERAL NOTES.
- 10) ERECT WALL AND SWITCH OUTLETS IN ADVANCE OF FURRING AND FIREPROOFING OUTLET BOXES SHALL BE SET SQUARE AND TRUE WITH BUILDING FINISH. SECURE TO BUILDING STRUCTURE BY ADJUSTABLE STRAP IRON OR GROUT IN WITH MASONRY. VERIFY OUTLET LOCATIONS IN FINISHED SPACES WITH ARCHITECTURAL DRAWINGS OF INTERIOR DETAILS AND FINISHES. PROVIDE BARRIERS BETWEEN SWITCHES CONNECTED TO DIFFERENT PHASES FOR VOLTAGES EXCEEDING 150 VOLTS TO GROUND. PROVIDE BARRIERS BETWEEN NORMAL ONLY AND NORMAL/EMERGENCY SWITCHES INSTALLED WITHIN A COMMON OUTLET BOX.

- 11) PANEL JUNCTION AND PULL BOXES LOCATED CLEAR OF OTHER TRADES, CONCEAL JUNCTION AND PULL BOXES IN FINISHED SPACES WHERE NECESSARY, REROUTE RACEWAYS OR MAKE OTHER ARRANGEMENTS FOR CONCEALMENT. BOXES SHALL BE ACCESSIBLE. SUPPORT BOXES FROM BUILDING STRUCTURE, INDEPENDENT OF CONDUIT, PROVIDE FLOOR-TO-CEILING CHANNELS FOR MOUNTING ON DRYWALL AND LIGHTWEIGHT CONSTRUCTION. OUTLET BOXES FOR FIXTURES RECESSED IN HUNG CEILINGS SHALL BE ACCESSIBLE THROUGH OPENING CREATED BY REMOVAL OF FIXTURE. SECURE TO BLACK IRON SUPPORT. MOTOR TERMINAL BOXES: COORDINATE WITH MOTOR BRANCH CIRCUIT AND WIRING, ADD BOX VOLUME WHERE REQUIRED.
- 12) ALL EXTERIOR ELECTRICAL COMPONENTS SHALL BE WEATHERPROOF WHILE IN USE TYPE.
- 13) IF THE PROJECT HAS COOLERS OR FREEZERS WITH NO WASHDOWN ALL ELECTRICAL COMPONENTS SHALL BE DAMP RATED INCLUDING BUT NOT LIMITED TO JUNCTION BOXES, CONDUITS, CONDUIT FITTING AND WIRING METHODS.
- 14) IF THE PROJECT HAS COOLERS OR FREEZERS WITH WASHDOWN ALL ELECTRICAL COMPONENTS SHALL BE NEMA 4X TYPE INCLUDING BUT NOT LIMITED TO JUNCTION BOXES, CONDUITS, CONDUIT FITTING AND WIRING METHODS. OUTLET COVERS SHALL BE WATERPROOF WHILE IN USE TYPE. FOR PRICING ASSUME 316 STAINLESS STEEL.

D. TEMPORARY LIGHT AND POWER:

- 1) PROVIDE TEMPORARY LIGHT AND POWER SYSTEMS AT EARLIEST POSSIBLE DATE WITHIN THE CONSTRUCTION AREAS FOR THE REQUIREMENTS OF ALL TRADES AS HEREIN DESCRIBED. EXTEND SYSTEMS TO NEW CONSTRUCTION AS SOON AS PHYSICALLY POSSIBLE. MAINTAIN SYSTEM DURING WORKING HOURS OF ALL TRADES. COST OF ENERGY WILL BE PAID FOR BY OWNER. PROVIDE ALL REQUIRED MAINTENANCE, INCLUDING LAMPS AND SOCKETS.

E. QUALITY ASSURANCE:

- 1) QUALITY AND GAUGE OF MATERIALS: NEW, BEST OF THEIR RESPECTIVE KINDS, FREE FROM DEFECTS AND LISTED BY UNDERWRITERS LABORATORIES INC. OR OTHER NATIONALLY APPROVED TESTING AGENCY AND BEARING THEIR LABEL. MATERIALS AND EQUIPMENT OF SIMILAR APPLICATION SHALL BE OF SAME MANUFACTURER, EXCEPT AS NOTED.
- 2) ON COMPLETION OF THE WORK, THE ENTIRE WIRING SYSTEM SHALL BE ENTIRELY FREE FROM GROUNDS, SHORT CIRCUITS, OPENS, OVERLOADS AND IMPROPER VOLTAGES AND THOROUGH TEST SHALL BE MADE. FURNISH ALL LABOR AND MATERIALS AND INSTRUMENTS.

3) CURRENT CHARACTERISTICS:

- a. SERVICE: 277/480 VOLT (AND 120/208 VOLT), 3 PHASE, 4 WIRE 60 HERTZ WITH GROUNDED NEUTRAL
- b. DISTRIBUTION: 277/480 VOLT (AND 120/208 VOLT) 3 PHASE, 4 WIRE, 60 HERTZ WITH GROUNDED NEUTRAL.

4) HEIGHTS OF OUTLETS:

- a. REFER TO THE ELECTRICAL GENERAL NOTES.
- b. EXCEPTIONS: AT JUNCTION OF DIFFERENT WALL FINISH MATERIALS, ON MOLDING OR BREAK IN WALL SURFACE IN VIOLATION OF CODE, OR AS NOTED OR DIRECTED

F. PRODUCT DELIVERY, STORAGE AND HANDLING:

- 1) MOVING OF EQUIPMENT: WHERE NECESSARY, SHIP IN CARTED SECTIONS OF SIZE TO PERMIT PASSING THROUGH AVAILABLE SPACES.
- 2) ACCESSIBILITY: FOR OPERATIONS, MAINTENANCE AND REPAIR. MINOR DEVIATIONS SHALL BE PERMITTED. CHANGE OF MAGNITUDE OR INVOLVING EXTRA COST ARE NOT PERMISSIBLE WITHOUT REVIEW. GROUP CONCEALED ELECTRICAL EQUIPMENT REQUIRING ACCESS WITH EQUIPMENT FREELY ACCESSIBLE THROUGH ACCESS DOORS.

G. MATERIALS:

- 1) NAMEPLATES: PROVIDE BLACK LAMINATED SHEET WITH 3/4 IN. WHITE LETTERING, FASTENED EPOXY CEMENT FOR EACH DISCONNECT SWITCH, CIRCUIT BREAKER, PANEL, CABINET, TRANSFORMER, ENCLOSURE MOTOR CONTROLLER AND THE LIKE. NAMEPLATES SHALL DESCRIBE THE NAME AND NUMBER OF EACH COMPONENT.
- 2) CABLE TAGS: TAG EACH CONDUCTOR PASSING THROUGH SPLICE OR PULLBOX WITH A WHITE LINEN TAG, INDICATING POINT OF ORIGIN AND TERMINATION OF THE CIRCUIT.
- 3) INSERTS AND SUPPORTS:
 - a. INSERTS: STEEL, SLOTTED TYPE, FACTORY PAINTED.

- b. USE THREADED RODS AND UNISTRUT TYPE SUPPORTS DESIGNED TO CARRY THE WEIGHT REQUIRED.
 - c. SUPPORTS FROM BUILDING CONSTRUCTION: INSERTS, BEAM CLAMPS, STEEL FISHPLATES (IN CONCRETE FILL ONLY), CANTILEVER BRACKETS OR VERIFY SUPPORT TYPES WITH OTHER MEANS. THE ARCHITECT AND/OR STRUCTURAL ENGINEER IF A STRUCTURAL ENGINEER IS NOT ON THE PROJECT THE CONTRACTOR SHALL BE RESPONSIBLE FOR HIRING A QUALIFIED LICENSED STRUCTURAL ENGINEER.
 - d. GROUPED LINES AND SERVICES: TRAPEZE HANGERS OF BOLTED ANGLES OR CHANNELS
 - e. WHERE BUILDING CONSTRUCTION IS INADEQUATE: PROVIDE ADDITIONAL FRAMING. SUBMIT FOR REVIEW
- H. PAINT SHALL BE THE BEST GRADE FOR ITS PURPOSE. DELIVER IN ORIGINAL SEALED CONTAINERS AND APPLY IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. COLORS SHALL BE AS SELECTED BY ARCHITECT OR ENGINEER. UTILIZE GALVANIZED IRON PRIMER ON PANEL AND PULL BOXES, AFTER FABRICATION. UTILIZE HOT DIPPED GALVANIZED OR DIPPED IN ZINC CHROMATE FOR: OUTLET BOXES, JUNCTION BOXES, CONDUIT HANGERS, RODS, INSERTS AND SUPPORTS. RED LEAD OR ZINC CHROMATE WITH FINISH TO MATCH SURROUNDINGS SHALL BE USED FOR MARKED SURFACES OF STEEL EQUIPMENT AND RACEWAYS. A FIELD-APPLIED ZINC CHROMATE PRIME COAT SHALL BE UTILIZED FOR STEEL OR IRON WORK.
- I. BRUSH AND CLEAN WORK PRIOR TO CONCEALING, PAINTING AND ACCEPTANCE. PAINTED EXPOSED WORK SOILED OR DAMAGED; CLEAN AND REPAIR TO MATCH ADJOINING WORK BEFORE FINAL ACCEPTANCE. REMOVE DEBRIS FROM INSIDE AND OUTSIDE OF MATERIAL AND EQUIPMENT.
- J. FINAL LOCATIONS AND MOUNTING ORIENTATIONS OF ALL SWITCHES, RECEPTACLES, AND LIGHT FIXTURES SHALL BE VERIFIED WITH ARCHITECT PRIOR TO ROUGH IN.
- K. ALL ACCESS DOOR LOCATIONS SHALL BE REVIEWED BY ARCHITECT PRIOR TO INSTALLATION.
6. DEMOLITION:
- A. "SELECTIVE DEMOLITION" IS HEREBY DEFINED TO INCLUDE BUT IS NOT NECESSARY LIMITED TO THE REMOVAL OF THE FOLLOWING EXISTING MATERIALS, ITEMS AND EQUIPMENT.
- 1) REFER TO THE ELECTRICAL PLANS FOR THE EXTENT OF DEMOLITION.

- 2) REFER TO EXISTING DRAWINGS AND SITE CONDITIONS FOR ALL REMOVAL OF WORK NECESSARY FOR COMPLETION OF NEW WORK AS SHOWN. EACH BIDDER SHALL CAREFULLY EXAMINE THE PREMISES AND DOCUMENTS DURING THE BIDDING PERIOD AND ASCERTAIN THE EXTENT OF REMOVAL OF EXISTING WORK. IF ADDITIONAL WORK IS NOTED BY THE CONTRACTOR, CALL IT TO THE ATTENTION OF THE ARCHITECT PRIOR TO SUBMITTING BID. BY SUBMITTING A BID, THE CONTRACTOR WILL HAVE DEEMED TO HAVE MADE SUCH EXAMINATION TO HAVE ACCEPTED SUCH CONDITIONS AND TO HAVE MADE ALLOWANCES IN PREPARING HIS BID.

7. CUTTING AND PATCHING:

- A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CUTTING AND PATCHING OF THE EXISTING AND NEW CONSTRUCTION WORK, WHICH MAY BE REQUIRED FOR THE PROPER INSTALLATION OF THE ELECTRICAL WORK. ALL PATCHING SHALL BE OF THE SAME MATERIALS, WORKMANSHIP, AND FINISH AND SHALL ACCURATELY MATCH ALL SURROUNDING WORK.
- B. CORE BORING OF CONCRETE FLOORS AND/OR WALLS IF REQUIRED, IS THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR.

8. COORDINATION:

- A. THE CONTRACTOR SHALL VERIFY LOCATIONS OF ALL EQUIPMENT WITH THE ARCHITECTURAL DRAWINGS, IN CENTERING OUTLETS AND LOCATING BOXES AND OUTLETS, ALLOW FOR OVERHEAD PIPES, DUCTS AND MECHANICAL EQUIPMENT, VARIATIONS IN FIRE PROOFING AND PLASTERING. WINDOW AND DOOR TRIM, PANELING HUNG CEILINGS AND THE LIKE AND CORRECT ANY INACCURACY RESULTING FROM FAILURE TO DO SO WITHOUT EXPENSES TO THE OWNER.

9. EQUIPMENT FURNISHED BY OTHERS:

- A. THE CONTRACTOR SHALL FURNISH AND INSTALL WIRING FOR EQUIPMENT FURNISHED BY OTHERS, AS SHOWN ON DRAWINGS, COORDINATE WITH ALL OTHER TRADES OR DETAILS FOR INSTALLATION. THE TERM "WIRING" AS USED HEREIN, INCLUDES BUT IS NOT LIMITED TO, FURNISHING AND INSTALLING CONDUIT, WIRE, JUNCTION BOXES, DISCONNECTS AND MAKING CONNECTIONS. CONTRACTOR SHALL CHECK ARCHITECTURAL, MECHANICAL AND PLUMBING DRAWINGS AND SPECIFICATIONS FOR EQUIPMENT TO BE INSTALLED BY OTHERS, CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER WIRING AND NECESSARY ELECTRICAL ADJUSTMENTS TO EQUIPMENT TO CONFORM TO SPECIFIED REQUIREMENTS OF THE EQUIPMENT.

10. LOW-VOLTAGE DISTRIBUTION EQUIPMENT:

- A. PROVIDE COMPLETE EQUIPMENT INCLUDING: SWITCHES, FUSES, CIRCUIT BREAKERS, PANELS AND TRANSFORMERS FROM ONE OF THE FOLLOWING APPROVED MANUFACTURER'S: SQUARE D, SIEMENS, CUTLER HAMMER, GE AND BUSSMAN.

- B. ALL EQUIPMENT SHALL CONFORM TO NEMA, ANSI, DOE AND IEEE STANDARDS.
- C. DISCONNECT SWITCHES SHALL BE FUSED OR NONFUSED AS NOTED. VOLTAGE SHALL BE AS REQUIRED. SWITCHES SHALL BE HEAVY DUTY, EXCEPT AS NOTED, AND HORSEPOWER RATED FOR MOTOR LOADS. TOGGLE TYPE SWITCHES SHALL BE NONFUSED, LOAD BREAK, HAVING MAXIMUM RATINGS OF 20 AMP AT 600 VOLTS AND 30 AMP AT 240 VOLTS. KNIFE-BLADE TYPE SWITCHES SHALL BE LOAD BREAK, QUICK-MAKE-QUICK-BREAK, UL CLASS R UP TO 600 AMP. MAXIMUM RATING EXCEPT AS NOTED SHALL BE 800 AMP. ARC QUENCHERS SHALL BE PROVIDED. ALL SWITCH ENCLOSURES SHALL BE DEAD FRONT, NEMA, TYPE 1 EXCEPT AS NOTED. ACCEPTABLE MANUFACTURES ARE SQUARE D, SIEMENS, CUTLER HAMMER AND GE.
- D. CIRCUIT BREAKERS: MOLDED CASE BREAKERS SHALL BE THERMAL-MAGNETIC, QUICK-MAKE-QUICK-BREAK, BOLT-ON TYPE, MANUALLY OPERATED WITH INSULATED TRIP-FREE HANDLE. MULTI-POLE TYPE BREAKERS SHALL CONTAIN INTERNAL TRIP BAR. TERMINALS SHALL BE SUITABLE FOR COPPER OR ALUMINUM CABLE. FURNISH AUXILIARY DEVICES WHERE REQUIRED FOR SHUNT-TRIPING, OPEN AND CLOSE MOTOR OPERATOR AND ALARM INDICATION. ENCLOSURES SHALL BE DEAD FRONT, NEMA TYPE 1, AS NOTED. FRAMES IC AND INTERCHANGEABLE TRIPS SHALL BE AS FOLLOWS:
- a. CIRCUIT BREAKERS TO BE INSTALLED IN EXISTING PANEL BOARDS, SHALL BE OF THE SAME MANUFACTURE TYPE AND A.I.C. RATING AS PRESENTLY IN USE.
- E. DISTRIBUTION PANELS: SWITCHING UNITS SHALL BE 3 PHASE, 4 WIRE CIRCUIT-BREAKER TYPE UNLESS OTHERWISE NOTED ON PANEL SCHEDULES. BUS BARS SHALL BE HARD DRAWN COPPER, MINIMUM 98 PERCENT CONDUCTIVITY, SILVER, OR TIN-PLATED JOINTS. PROVIDE A COPPER FULLY RATED GROUND BUS BAR. CABINETS SHALL BE GALVANIZED SHEET STEEL BACK BOX, WITH DOOR AND TRIM AND LAPPED AND WELDED CORNERS. HARDWARE SHALL BE CHROME-PLATED WITH FLUSH LOCK/LATCH HANDLE ASSEMBLY (UP TO 48 IN HIGH DOORS) OR VAULT HANDLE, LOCK AND 3-POINT CATCH (LARGER THAN 48 IN HIGH DOORS). HINGES SHALL BE SEMI-CONCEALED, 5-KNUCKLE STEEL WITH NONFERROUS PINS, 180-DEG OPENING, LOCATED A MAXIMUM 26 IN. ON CENTERS. PROVIDE DOOR-IN-DOOR CONSTRUCTION. MINIMUM GUTTER SPACES FOR LIGHTING PANELS SHALL BE 5-3/4 IN SIDES, TOP AND BOTTOM. DIRECTORY HOLDER SHALL BE METAL FRAME WITH CLEAR PLASTIC TRANSPARENT COVER. A TYPEWRITTEN LIST INDICATING FEEDER CABLE AND CONDUIT SIZE, CIRCUIT NUMBERS, OUTLETS SUPPLIED AND THEIR LOCATIONS SHALL BE PROVIDED. PANELS SHALL MEET UL 67 REQUIREMENTS FOR SERVICE ENTRANCE BARRIERS.
- F. BALANCE THE LOAD OVER PHASES WHEN NEW CIRCUITS ARE ADDED TO NEW OR EXISTING PANELS. PROVIDE MULTI-CABLE LUGS WHERE REQUIRED. DOUBLE LUGGING SHALL NOT BE PERMITTED, MOUNTING HEIGHT SHALL BE A MAXIMUM OF 6 FT-6 IN FROM FLOOR TO TOP SWITCH UNIT. UPDATE DIRECTORIES ON EXISTING PANELBOARDS WHERE CIRCUITING IS CHANGED.

- G. TESTS: OPEN AND CLOSE LOAD BREAK SWITCHING DEVICES UNDER LOAD.
- H. TRANSFORMERS SHALL MEET THE LATEST DOE(DEPARTMENT OF ENERGY), LOCAL AND/OR STATE REQUIREMENTS.

11. GROUNDING:

- A. AN EQUIPMENT GROUNDING CONDUCTOR COMMONLY DESCRIBED AS A "GREEN WIRE" SHALL BE PROVIDED FOR ALL BRANCH CIRCUITS PROTECTED BY OVERCURRENT DEVICES. "GREEN GROUND" WIRE SHALL ALSO BE PROVIDED FOR FLEXIBLE CONDUIT AND MOTOR CIRCUITS.

12. RACEWAYS:

- A. PROVIDE RACEWAYS COMPLETE WITH BOXES, FITTINGS AND ACCESSORIES. CONDUIT OR TUBING SIZES REFERRED TO IN SPECIFICATIONS AND ON DRAWINGS ARE NOMINAL DIAMETERS. MINIMUM DIAMETER SHALL BE 3/4IN.

B. MATERIALS

1) RACEWAYS:

- a. RIGID STEEL CONDUIT: FULL-WEIGHT PIPE, GALVANIZED THREADED.
- b. ELECTROMETALLIC TUBING (EMT) THIN WALL PIPE, GALVANIZED THREADLESS. USE EXCLUSIVELY FOR EMERGENCY BRANCH CKT WIRING.
- c. FLEXIBLE STEEL CONDUIT: CONTINUOUS STEEL STRIP, GALVANIZED.
- d. WIREWAYS: WIRE SHALL BE AS NOTED, MINIMUM NUMBER 16GA STEEL WITH GROUND CONTINUITY. FINISH SHALL BE BAKED ENAMEL. COVERS SHALL BE SCREW ON.

2) FITTING AND ACCESSORIES:

- a. RIGID STEEL: NONSPLIT, THREADED, STEEL OR MALLEABLE IRON. ZINC DIE CAST NOT PERMITTED.
- b. ELECTROMETALLIC TUBING: COMPRESSION TYPE FOR 2" AND UNDER. SET SCREW TYPE FOR 2" AND LARGER. GALVANIZED RIGID STEEL ELBOWS FOR 2" OR LARGER.
- c. FLEXIBLE METALLIC CONDUIT: ANGLE WEDGE TYPE WITH INSULATED THROAT.

- c. PROVIDE PLASTIC BUSHINGS AT THE END OF ALL CONDUITS WHERE A WIRE WILL PASS THROUGH.

3) BOXES:

- a. OUTLET BOXES: EXCEPT AS OTHERWISE REQUIRED BY CONSTRUCTION. DEVICES OR WIRING, BOXES SHALL BE STAMPED STEEL, 4 IN. SQUARE OR OCTAGON FOR FIXTURES. BOXES ABOVE CEILING SHALL BE 1-1/2 IN. DEEP. BOXES IN CEILING OR SLAB SHALL BE 3" DEEP. BOXES IN WALL FOR FIXTURES SHALL BE 2-3/4" DEEP. BOXES IN WALL FOR RECEPTACLES AND SWITCHES SHALL BE 1-1/2 IN. DEEP. FURNISH WITH RAISED COVERS AND FIXTURE STUDS WHERE REQUIRED. WITHOUT FIXTURE OR DEVICE: FURNISH BLANK COVER. OFFSET BACK-TO-BACK OUTLETS WITH A MINIMUM 6 IN. SEPARATION.
- b. JUNCTION AND PULL BOXES: GALVANIZED SHEET STEEL WITH SCREW-ON COVERS, EXCEPT AS NOTED. FURNISH WITH INSULATED SUPPORTS FOR CABLES. LOCATIONS SHALL BE AS NOTED OR REQUIRED AND ACCESSIBLE. PROVIDE BARRIERS IN NEW AND RENOVATED BOXES IN BETWEEN 120/208 VOLT AND 277/480 VOLT WIRING AND BETWEEN EMERGENCY AND NORMAL LIGHTING.
- c. FLOOR BOXES SHALL BE SUITABLE FOR CONDUIT AND DEVICES NOTED. RAISED OUTLETS SHALL BE HUBBELL #B2414 SERIES WITH ABOVE FLOOR FITTING. TELEPHONE: BUSHED HOLE. POWER: DUPLEX RECEPTACLE OR OTHER AS NOTED. INCREASE SIZE TO SUIT AS NECESSARY. FLUSH OUTLETS SHALL BE HUBBELL #B2414 SERIES WITH FLUSH FLOOR FITTING FOR TELEPHONE AND FLUSH DUAL FLAP COVER WITH RECEPTACLE FOR POWER AS NOTED. INCREASE SIZE TO SUIT AS NECESSARY.
- d. PROVIDE RACEWAYS ONLY AS HEREIN SPECIFIED, EXCEPT AS NOTED. RACEWAYS SHALL BE RUN CONCEALED, EXCEPT AS NOTED.
- e. PROVIDE RACEWAY SUPPORT UTILIZING CEILING TRAPEZE, STRAP HANGERS OR WALL BRACKETS. PROVIDE U-BOLTS AT EACH FLOOR LEVEL OR RISER RACEWAYS AND CONNECTED TO ACCEPTABLE SUPPORTS. PROVIDE RISER CLAMPS AT EACH FLOOR LEVEL OF RISER RACEWAYS AND RESTING ON SLAB. FOR THROUGH-THE-FLOOR SYSTEMS, UTILIZE AN ASSEMBLY SIMILAR TO HUBBELL FIRE RATED POKE-THROUGH -FLOOR BOX SYSTEM. FOR ABOVE FLOOR FITTINGS TELEPHONE SHALL BE BUSHED HOLE AND POWER SHALL BE DUPLEX RECEPTACLE OR OTHER AS NOTED. PROVIDE SEPARATION BARRIER BETWEEN POWER AND TELEPHONE COMPARTMENTS. PROVIDE JUNCTION BOX ON UNDERSIDE OF FLOOR. PACK FITTING TO RESTORE FIRE RATING OF FLOOR.
- f. SECURE ALL RACEWAYS TO SUPPORTS WITH PIPE STRAPS OR U-BOLTS. SPACING OF SUPPORTS SHALL BE A MINIMUM OF 10 FT ON

CENTER FOR METALLIC RACEWAY AND AS REQUIRED FOR NONMETALLIC RACEWAY. SPACING SHALL BE 5 FT ON CENTER FOR WIREWAYS AND PER CODE AND AS NOTED ON OTHERS. MOUNT SUPPORTS TO STRUCTURE MASONRY WITH TOGGLE BOLTS ON HOLLOW MASONRY, EXPANSION SHIELDS OR INSERTS IN CONCRETE AND BRICK, MACHINE SCREWS ON METAL, BEAM CLAMPS ON FRAMEWORK, WOOD SCREWS ON WOOD, AND PAN THROUGH STRAPS IN METAL DECK. NAILS, RAW PLUGS OR WOOD PLUGS SHALL NOT BE PERMITTED. WHERE REQUIRED BY STRUCTURE, FURNISH THROUGH BOLTS AND FISH PLATES.

- g. EXPOSED RACEWAYS SHALL BE RUN PARALLEL WITH OR AT RIGHT ANGLES TO WALLS. PROVIDE CLEARANCE WITH WATER, STEAM OR OTHER PIPING (MINIMUM 3 IN. SEPARATION FROM STEAM AND HOT WATER PIPES, EXCEPT 1 IN. FROM PIPE COVER AT CROSSINGS AND 18 IN. FOR PARALLEL RUNS). FOR HUNG CEILING OUTLETS, RUN IN HUNG CEILING AND CONNECT TO CEILING SUPPORT CHANNELS. IN MASONRY AND POURED CONCRETE, RUN VERTICALLY ONLY.
- h. MAINTAIN GROUNDING CONTINUITY OF INTERRUPTED METALLIC RACEWAYS WITH GROUND CONDUCTOR, AND IN FLEXIBLE CONDUIT FOR FEEDERS AND MOTOR TERMINAL CONNECTIONS.
- i. EMPTY RACEWAYS OVER 10' LONG: PROVIDE FISH OR PULL WIRE, GALVANIZED OR NYLON PVC.
- j. RIGID STEEL CONDUIT SHALL BE PERMITTED FOR FEEDERS AND BRANCH CIRCUITS. PAINT THREADS OF FIELD-THREADED CONDUIT WITH GRAPHITE-BASE PIPE COMPOUND AND BUTT CONDUIT ENDS. TOUCH UP MARRED SURFACES AND FIELD-CUT THREADS, CRC-COLD GALVANIZED.
- k. EMT SHALL BE PERMITTED FOR FEEDER AND BRANCH CIRCUITS. IN DRY LOCATIONS, DRY WALLS, HUNG CEILINGS. HOLLOW BLOCK WALLS AND FURRED SPACES. EMT SHALL NOT BE PERMITTED IN RAISED FLOORS OR FOR VERTICLE RISERS THROUGH FLOORS IN A MULTI-STORY BUILDING.
- l. FLEXIBLE STEEL CONDUIT SHALL BE UTILIZED FOR SHORT CONNECTIONS WHERE RIGID CONDUIT IS IMPRACTICAL- FROM OUTLET BOX TO RECESSED LIGHTING FIXTURE: PROVIDE MINIMUM 4 FT AND MAXIMUM 6 FT LENGTHS. FOR FINAL CONNECTION TO MOTOR TERMINAL BOX, TRANSFORMER AND OTHER VIBRATING EQUIPMENT: PROVIDE WITH POLYVINYL SHEATHING AND GROUND CONDUCTOR. MINIMUM LENGTH: 18 IN. WITH SLACK. CONNECT GROUND CONDUCTOR TO ENCLOSURE OR RACEWAY AT EACH END. FOR EXPANSION JOINT CROSSINGS, CROSS AT RIGHT ANGLES AND ANCHOR ENDS.

- m. CUT CONDUIT ENDS SQUARE REAM SMOOTH. PAINT MALE THREADS OF FIELD THREADED RACEWAYS WITH GRAPHITE BASE PIPE COMPOUND. DRAW UP TIGHT WITH RACEWAY COUPLING.
- n. ALL COUPLINGS ON EMT RACEWAYS SHALL BE COMPRESSION TYPE UP TO AND INCLUDING 2" CONDUIT. SET SCREW TYPE FITTINGS SHALL BE USED ON EMT CONDUIT LARGER THAN 2".
- o. EXPANSION FITTINGS SHALL BE INSTALLED AT RIGHT ANGLES WITH CLIP JOINT CENTERED N EXPANSION JOINT. PROVIDE A LENGTH OF RUN IN ACCORDANCE MANUFACTURER'S RECOMMENDATIONS. PRESET FITTINGS SHALL ALLOW FOR TEMPERATURE VARIATION.
- p. RACEWAYS PASSING THROUGH FIRE-RATED CONSTRUCTION: SEAL OPENING WITH FIRE SEALANT TO MATCH THE FIRE RATING OF THE PARTITION. COORDINATE WITH THE ARCHITECT.
- q. PROVIDE RACEWAYS PERFORM CONTINUITY TESTS OF RESISTANCE OF FEEDER CONDUITS FROM SERVICE TO POINT OF FINAL DISTRIBUTION USING 1 CONDUCTOR RETURN. MAXIMUM RESISTANCE SHALL BE 25 OHMS.
- r. IN COLD STORAGE SPACES ONLY PIPE AND WIRE SHALL BE USED AND UTILIZE COMPRESSION WATER TIGHT FITTINGS. WHERE WASHDOWN OCCURS 316 STAINLESS STEEL COMPONENTS SHALL BE USED.

13. WIRE AND CABLE:

- A. PROVIDE WIRE AND CABLE COMPLETE WITH ACCESSORIES. SIZE REFERENCE SHALL BE AWG AS NOTED.
- B. CONDUCTORS SHALL BE COPPER, ASTM STANDARD SOLID (NO. 10 AND SMALLER) OR STRANDED.(NO. 8 AND LARGER). GENERAL USE CABLING SHALL BE NO.12 MINIMUM. AT 120 VOLTS AND OVER 100 FT CIRCUIT LENGTH PROVIDE NO. 10 MINIMUM. AT 277 VOLTS AND OVER 200 FT CIRCUIT LENGTH PROVIDE NO. 10 MINIMUM.
- C. CONTROL AND ALARM CABLING, EXCEPT AS NOTED, SHALL BE NO. 14 MINIMUM. AT 120 VOLTS INC OVER 200 FT CIRCUIT LENGTH, PROVIDE NO. 12 MINIMUM.
- D. OTHER VOLTAGES AND PHASE: ADJUST CABLE SIZING AS REQUIRED TO MAINTAIN VOLTAGE DROP. INCREASE RACEWAY SIZES FOR LARGER WIRE AS REQUIRED.
- E. INSULATION SHALL BE RUBBER AND THERMOPLASTIC MEETING ASTM AND IPCEA STANDARDS. TYPE THHN/THWN SHALL BE UTILIZED FOR FEEDERS AND BRANCH CIRCUITS EXCEPT AS NOTED. TYPE XHHW SHALL BE USED FOR SERVICE

ENTRANCE FEEDERS, EXTERIOR, COLD STORAGE(SUCH AS FREEZERS) AND ALL UNDERGROUND CONDUCTORS. TYPE SFF-2 SHALL BE UTILIZED FOR BRANCH CIRCUITS LOCATED IN WIRING CHANNELS OF CONTINUOUS FLUORESCENT FIXTURES AND IN AMBIENT TEMPERATURES OVER 90 DEG C

- F. PRE MANUFACTURED METAL CLAD CABLE SHALL BE UTILIZED FOR ALL. NORMAL BRANCH CIRCUITS ONLY IN DRY HOLLOW STUD WALL LOCATIONS, ABOVE ACCESSIBLE CEILING AND WHERE PERMITTED BY ARTICLE 330 & 517 OF THE NATIONAL ELECTRICAL CODE. MINIMUM CONDUCTOR SIZE SHALL BE NO. 12 AWG COPPER WITH BARE BONDING CONDUCTOR IN DIRECT CONTACT WITH THE OUTER METAL JACKET.
- G. THE INSULATION OF ALL CONDUCTORS SHALL BE 90C RATED THERMOPLASTIC WITH COLOR CODING AS FOLLOWS:
 - 1) 208/120 VOLT SYSTEM:
 - a. BLACK FOR 'A' PHASE
 - b. RED FOR 'B' PHASE
 - c. BLUE FOR 'C' PHASE
 - 2) 480/277 VOLT SYSTEM:
 - a. BROWN FOR 'A' PHASE
 - b. ORANGE FOR 'B' PHASE
 - c. YELLOW FOR 'C' PHASE
 - 3) NEUTRAL WIRE SHALL UTILIZE WHITE OUTER COVERING THROUGHOUT. EQUIPMENT GROUND WIRE SHALL UTILIZE GREEN OUTER COVERING THROUGHOUT.
 - 4) WHERE COLOR-CODED CABLE IS NOT AVAILABLE, CERTIFY IN WRITING AND REQUEST PERMISSION TO OVERLAP CONDUCTORS WITH 6 IN. OF COLOR TAPING IN ACCESSIBLE LOCATIONS.
- H. PROVIDE FLAMEPROOF LINEN OR FIBER TAGS IN ACCESSIBLE LOCATIONS. FOR FEEDERS INDICATE FEEDER NUMBER, SIZE, PHASE, POINTS OF ORIGIN AND TERMINATIONS. FOR CONTROL AND ALARM WIRING, INDICATE TYPE (CONTROL OR ALARM), SIZE OF WIRE AND POINTS OF ORIGIN AND TERMINATIONS.

- I. TERMINATIONS, SPLICES AND TAPS UNDER 600 VOLTS: COPPER CONDUCTORS NO.10 AND SMALLER SHALL UTILIZE COMPRESSION-TYPE OF TWIST-ON SPRING-LOADED CONNECTORS AND CLEAR NYLON-INSULATED COVERING. COPPER CONDUCTORS NO. 8 AND LARGER SHALL UTILIZE MECHANICAL BOLTED PRESSURE OR HYDRAULIC COMPRESSION TYPE USING MANUFACTURER'S RECOMMENDED TOOLING. CABLE LUGS AND CONNECTORS SHALL UTILIZE COMPRESSION TYPE OF SAME METAL AS CONDUCTOR. PROVIDE TO MATCH CABLE, WITH A MARKING INDICATING SIZE AND TYPE. COPPER LUG CONNECTIONS TO BUS BARS: USE ANTISEIZE COMPOUND ON TANG.
 - J. NOT MORE THAN 3 LIGHTING OR CONVENIENCE OUTLET CIRCUITS SHALL BE INSTALLED IN ONE CONDUIT UNLESS OTHERWISE INDICATED. PULL NO THERMOPLASTIC WIRES AT TEMPERATURES LOWER THAN 32 DEG F. PROVIDE SEPARATE RACEWAYS FOR CONDUCTORS OF 120/208 AND 277/480 VOLT SYSTEMS, EXCEPT 460 VOLT MOTOR BRANCH CIRCUIT WIRING AND RELATED 120 VOLT CONTROL WIRING. THERMOPLASTIC WIRES SHALL NOT BE INSTALLED IN COMPUTER AREA RAISED FLOORS.
 - K. LEAVE WIRES WITH SUFFICIENT SLACK TO PERMIT MAKING FINAL CONNECTIONS.
 - L. PERFORM CONTINUITY AND INSULATION TESTS. MEGGER TEST 100 PERCENT OF FEEDERS, 10 PERCENT OF BRANCH CIRCUITS AND ALL MOTOR BRANCH CIRCUITS OVER 25 HP.
 - M. PERFORM TESTS PRIOR TO CONNECTING EQUIPMENT AND IN PRESENCE OF AUTHORIZED REPRESENTATIVES. SUBMIT WRITTEN REPORT OF RESULTS. CORRECT OR REPLACE CABLE TESTING BELOW MANUFACTURER'S STANDARDS.
14. POWER WIRING:
- A. PROVIDE ALL POWER WIRING TO ALL MOTORS AND EQUIPMENT FURNISHED UNDER ALL CONTRACTS ON THE PROJECT. INCLUDE EXTENSIONS FROM CONTROLLERS TO MOTORS AND MOTOR CONNECTIONS. MOUNT AND WIRE ALL CONTACTORS AND POWER DEVICES FURNISHED UNDER ALL CONTRACTS.
15. CONTROL WIRING:
- B. PROVIDE ALL CONTROL WIRING LINE AND LOW VOLTAGE FOR MOTORS, ACTUATORS AND EQUIPMENT FURNISHED UNDER ALL CONTRACTS AND AS SPECIFICALLY SHOWN ON THE DRAWINGS, EXCEPT AS NOTED. THE ELECTRICAL CONTRACTOR SHALL COORDINATED WITH THE OTHER TRADES DURING THE BIDDING PROCESS AND INDICATION OF THIS COORDINATION SHALL BE STATED ON THE CONTRACTORS PROPOSAL. FAILURE TO COORDINATE WITH THE OTHER CONTRACTORS DURING THE BIDDING PROCESS WILL RESULT IN THE DENIAL OF EXTRA'S FOR PROVIDING ALL NECESSARY CONTROL WIRING.
 - C. CONTROL WIRING LESS THAN 120 VOLTS FOR MOTORS, ALARMS FOR EQUIPMENT FURNISHED UNDER MECHANICAL/PLUMBING WILL BE PROVIDED BY

THE ELECTRICAL CONTRACTOR UNLESS COORDINATED WITH THE MECHANICAL AND PLUMBING CONTRACTOR DURING THE BIDDING PROCESS AND INDICATION OF THIS COORDINATION IS STATED ON THE CONTRACTORS PROPOSAL. FAILURE TO COORDINATE WITH THE MECHANICAL AND PLUMBING CONTRACTOR DURING THE BIDDING PROCESS WILL RESULT IN THE DENIAL OF EXTRA'S FOR PROVIDING ALL NECESSARY CONTROL WIRING.

16. DEVICES:

A. LOCAL SWITCHES:

- 1) CONVENTIONAL QUIET TOGGLE TYPE, RATED AT 20 AMP. 120/277 VOLT AC SIMILAR TO LEVITON 11221-2, 1223-2, 1224-2 OR EQUAL BY HUBBELL OR PASS & SEYMOUR. TOGGLE COLOR SHALL BE SELECTED BY THE OWNER OR ARCHITECT.
- 2) PILOT LIGHT TOGGLE TYPE WITH NEON LAMP, RATED AT 20 AMP, 120/277 VOLT AC SIMILAR TO LEVITON 11221-PLC.

B. INSERTION RECEPTACLES:

- 1) COMMERCIAL SPECIFICATION GRADE DUPLEX CONVENIENCE 125 VOLT. 2 POLE, 3 WIRE, 20 AMP WITH U GROUND SLOT GROUNDED, EXCEPT AS NOTED. DEVICE SHALL MEET OR EXCEED:
 - a. NEMA WD-1 AND WD-6
 - b. DEVICE SHALL BE SIMILAR TO HUBBELL 5362 DR EQUAL BY LEVITON, PASS & SEYMOUR OR GE. FACE COLOR SHALL BE SELECTED BY OWNER OR ARCHITECT. DEVICES USED ON EMERGENCY BRANCH CIRCUITS SHALL BE RED FACE ONLY.
- 2) 5mA GROUND FAULT INTERRUPTER WITH SELF-PROTECTION AND LED INDICATOR LIGHT, SIMILAR TO HUBBELL 5362-G OR EQUAL BY LEVITON AND PASS & SEYMOUR.
- 3) SPECIAL RECEPTACLES:
 - a. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE SPECIAL RECEPTACLES REQUIRED TO MATCH PROVIDED, EXISTING AND NEW EQUIPMENT PLUGS. COORDINATE RECEPTACLE TYPE PRIOR TO INSTALLATION.
- 4) RECEPTACLE ORIENTATION:

- a. CONTRACTOR SHALL COORDINATE ORIENTATION OF DEVICE WITH ARCHITECT.

C. DEVICE PLATES:

- 1) BRUSHED 302 STAINLESS STEEL. IF IT IS ASSOCIATED WITH AN EMERGENCY BRANCH CIRCUIT DEVICE THE PLATE SHALL BE ENGRAVED WITH THE CIRCUIT IDENTIFICATION FOR THAT DEVICE.

17. LUMINAIRES:

- A. MANUFACTURE AND INSTALL LUMINAIRES IN ACCORDANCE WITH NEC ARTICLE 410.
- B. PROVIDE ALL LUMINAIRES INDICATED, COMPLETE WITH LAMPS. INCLUDE ALL INTERIOR LUMINAIRES, AND ALL EXTERIOR FIXTURES MOUNTED ON THE BUILDING.
- C. FURNISH ALL PLASTER FRAMES OR DRY WALL AND DELIVER TO PROJECT SITE FOR INSTALLATION UNDER FINISHES, COORDINATE WITH THE ARCHITECTURAL DRAWINGS.
- D. USE FIXTURES CONFORMING TO UL STANDARDS, AND BEARING UL LABEL AND UNION LABEL WHERE A UNION LABEL IS REQUIRED.
- E. ALL LED ELECTRONIC DRIVERS SHALL HAVE BUILT IN 0-10V DIMMING CAPABILITIES AND BE UL LISTED.
- F. ALL FLUORESCENT ELECTRONIC BALLASTS SHALL MEET OR EXCEED THE REQUIREMENTS OF:
 - 1) ANSI/IEEE C62.41 (AMERICAN NATIONAL STANDARDS INSTITUTE).
 - 2) FCC PART 18 (RFI AND EMI).
 - 3) CBM (CERTIFIED BALLAST MANUFACTURERS).
 - 4) UL (UNDERWRITERS LABORATORIES).
 - 5) PUBLIC LAW #100-357 (MINIMUM EFFICIENCY STANDARDS).
 - 6) NAECA (NATIONAL APPLIANCE ENERGY CONSERVATION AMENDMENTS).
 - 7) NEC (NATIONAL ELECTRIC CODE)

G. GENERAL CONSTRUCTION

PLASTICS: 100% VIRGIN ACRYLIC. REFER TO FIXTURE LIST FOR FURTHER DESCRIPTION.

METAL:

- a. MATERIAL: STEEL, ALUMINUM OR OTHER TYPES MENTIONED.
- b. B & S GAUGE: NO. 22 MINIMUM FOR HOUSINGS, WITH APPROPRIATE CROSS-SECTIONAL CONFIGURATION FOR FIXTURE HOUSING; THINNER SHEET METAL ACCEPTABLE FOR BALLAST ENCLOSURES AND INCIDENTAL PURPOSES.

FINISHES:

- a. CORROSION PROTECTION: PLATING, BONDERIZING, PRIMING, ELECTROSTATIC PAINTING, OR OTHER APPROVED MEANS.
- b. FINAL COATING: BAKED PAINT OR ENAMEL ON STEEL AND ALUMINUM; BAKED CLEAR LACQUER OR OTHER DURABLE TRANSPARENT FILM ON POLISHED METAL SURFACES.

H. EXTERIOR FIXTURES: ENCLOSED AND GASKETED. UNLESS OTHERWISE NOTED.

I. FLUORESCENT LAMP SOCKETS: WHITE FINISH, SILVER-PLATED CONTACT SURFACES.

J. LATCHES: QUICK-OPERATING TYPE WITHOUT NEED FOR TOOLS. UNLESS OTHERWISE NOTED; STAINLESS STEEL OR CADMIUM PLATED STEEL. IN COOLER, FREEZER OR WASHDOWN AREAS 316 STAINLESS STEEL SHALL ONLY BE USED.

K. EXPOSED HARDWARE: NOT ACCEPTABLE ON VISIBLE SURFACES OF FIXTURES IN FINISHED AREAS UNLESS OTHERWISE NOTED.

L. OPERATING TEMPERATURE: NOT TO EXCEED 25 DEGREES C TEMPERATURE RISE OVER 40 DEGREES C A MAXIMUM 90 DEGREES C BALLAST HOT SPOT WHEN FLUORESCENT FIXTURE IS OPERATED IN 25 DEGREES C AMBIENT. MAXIMUM CASE TEMPERATURE SHALL NOT EXCEED 85 DEGREES C.

- M. PROVIDE APPROPRIATE MOUNTING ACCESSORIES FOR EACH FIXTURE, COMPATIBLE WITH THE VARIOUS STRUCTURAL CONDITIONS THAT WILL BE ENCOUNTERED. PROVIDE FASTENING CLIPS (EARTHQUAKE CLIPS) AND AT LEAST TWO INDEPENDANT SUPPORT RODS OR WIRES FROM THE STRUCTURE TO A TAB ON THE LIGHTING FIXTURE. WIRE OR ROD SHALL HAVE A BREAKING STRENGTH OF THE WEIGHT OF THE FIXTURE AT A SAFETY FACTOR OF 3 FOR LUMINAIRES THAT ARE SUPPORTED FROM FRAMING MEMBERS OF SUSPENDED CEILINGS.
- N. ASSEMBLE, WIRE AND INSTALL ALL LUMINAIRES AT THERE RESPECTIVE OUTLETS AS INDICATED AND ASSUME RESPONSIBILITY FOR THEIR CONDITION UNTIL ACCEPTANCE BY OWNER. INSTALL PROPER LAMPS IN EACH FIXTURE.
- O. FIXTURE CONNECTIONS TO BRANCH CIRCUITS SHALL BE MADE USING STRANDED WIRE WITH INSULATION TEMPERATURE RATING EQUAL TO OR HIGHER THAN THAT OR WIRE SUPPLIED WITH THE FIXTURE OR SPECIFIED BY FIXTURE MANUFACTURER. FIXTURES ARE TO BE CONNECTED TO BRANCH CIRCUITS VIA JUNCTION BOX USING FLEXIBLE CONDUIT OF LENGTHS BETWEEN 4 FT MINIMUM AND 6 FT MAXIMUM.
- P. THE USE OF FLEXIBLE CONDUIT. TO FIXTURES IN ANY LENGTH OVER 6FT IS PERMITTED ONLY WHEN A SEPARATE GROUND WIRE IS INSTALLED ALONG WITH THE CONDUCTORS INSIDE THE FLEXIBLE CONDUIT. IN THIS APPLICATION THE GROUND WIRE MUST BOND THE LIGHTING FIXTURE HOUSINGS TO EACH OTHER AND/OR TO THE JUNCTION BOX. ALL FLEXIBLE CONDUIT SHALL BE SUPPORTED AS REQUIRED BY NEC AND SHALL BE INSTALLED IN A WORKMANLIKE MANNER.
- Q. NOTE THAT SPECIFICATIONS FOR RECESSED FIXTURES GENERALLY DO NOT INCLUDE MOUNTING ACCESSORIES. AND THAT EACH FIXTURE TYPE MAY BE USED IN SEVERAL DIFFERENT CEILINGS, SUCH AS LAY-IN EXPOSED GRID, CONCEALED SPUME TILE, OR DRYWALL. VERIFY MOUNTING DETAILS FOR EACH SPACE BEFORE ORDERING FIXTURES SO THAT PROPER QUANTITIES FOR EACH CONDITION WILL BE DELIVERED IN TIME TO AVOID CONSTRUCTION DELAYS.
- R. SECURELY FASTEN LUMINAIRES TO FRAMING MEMBERS OF SUSPENDED CEILINGS WITH FASTENING CLIPS. AS SPECIFIED. CLIP EACH FIXTURE TO ALL ADJOINING FRAMING MEMBERS TO PREVENT MOVEMENT OF THE MEMBERS AWAY FROM THE FIXTURES.
- S. SUPPORT EXIT SIGNS IN TILE CEILINGS WITH RAILS THAT SPAN BETWEEN RUNNERS OF CEILING SUSPENSION SYSTEM. USE FLANGED FIXTURES FOR FINISHED APPEARANCE.
- T. SUPPORT FLUORESCENT FIXTURES IN DRYWALL CEILINGS FROM PLASTER FRAMES, WITH ADJUSTABLE LUGS ON 510E OF FIXTURE OR YOKE MOUNTING AS RECOMMENDED BY FIXTURE MANUFACTURER. USE FLANGED FIXTURES FOR FINISHED APPEARANCE, UNLESS OTHERWISE NOTED.

- U. LOCATE FIXTURE IN CENTER OF PANEL WHERE USED IN MODULAR TILE CEILINGS, UNLESS OTHERWISE NOTED. REFER TO REFLECTED CEILING PLAN.
- V. FLUORESCENT BALLASTS SHALL BE HIGH EFFICIENCY ELECTRONIC TYPE WITH A MAXIMUM 10% HARMONIC DISTORTION.
- W. FLUORESCENT LAMPS SHALL HAVE A COLOR OF 4,000 KELVIN, UNLESS OTHERWISE NOTED.
- X. HID(HIGH INTENSITY DISCHARGE) BALLASTS SHALL BE CONSTANT WATTAGE AUTO-TRANSFORMER TYPE.
- Y. THE LUMINAIRES SHALL BE HUNG FROM THE TOP CORD OF THE STRUCTURE ABOVE. PROVIDE UNISTRUT STRATTALED AND SECURED TO THE TOP CORD OF THE STRUCTURE AS REQUIRED TO ENSURE THE LUMINAIRE HANGING DEVICE IS PERPENDICULAR TO THE FIXTURE AND THE ROOF OR FLOOR ABOVE.

18. EMPTY RACEWAY SYSTEMS:

- A. A COMPLETE EMPTY RACEWAY SYSTEM CONSISTING OF BLANK 4-11/16IN. X 2-1/2IN. DEEP OUTLET BOXES WITH SINGLE OR DOUBLE GANG DRYWALL FINISH COLLAR AS NOTED. METALLIC RACEWAY WITH PULL STRING SHALL BE PROVIDED AND INSTALLED WHERE SHOWN FOR THE FOLLOWING SYSTEMS 1) TELEPHONE/DATA (SINGLE GANG) 2) CABLE TELEVISION (SINGLE GANG)
- B. RACEWAY SIZE SHALL BE A MINIMUM OF 3/4IN. OR AS DOCUMENTED IN PLANS AND DETAILS.
- C. ALL METALLIC RACEWAY SYSTEMS SHALL BE STUBBED UP AND TERMINATE IN ACCESSIBLE CEILING. END BUSHINGS AND PULL WIRES SHALL BE PROVIDED. BONDING OF ALL RACEWAY SYSTEMS TO PROVIDE A COMMON GROUND PATH SHALL BE PROVIDED.
- D. ACTUAL DEVICES, CONNECTORS, WIRING COMPLETE WITH TERMINATIONS AND BOX COVERS SHALL BE PROVIDED BY THE OWNER.

19. FIRE STOPPING:

- A. DRAWINGS AND GENERAL PROVISIONS OF CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION SPECIFICATION SECTIONS, APPLY TO WORK OF THIS SECTION.
- B. PROVIDE ALL REQUIRED FIRE-STOPPING. WORK INCLUDES FIRE STOPPING PENETRATIONS OF FIRE-RESISTANCE RATED FLOORS, WALLS AND PARTITIONS IN NEW CONSTRUCTION, AS WELL AS PRE-EXISTING PENETRATIONS IN RENOVATION AREAS OF EXISTING CONSTRUCTION.

- C. PRODUCT DATA. SUBMIT MANUFACTURER'S PRODUCT DATA FOR EACH FIRE-STOPPING PRODUCT REQUIRED, INCLUDING INSTRUCTIONS FOR SUBSTRATE PREPARATION AND FIRE-STOPPING INSTALLATION.
- D. FIRE RESISTANT JOINT SEALERS: PROVIDE MANUFACTURER'S STANDARD FIRE-STOPPING SEALANT WITH ACCESSORY MATERIALS HAVING FIRE RESISTANCE RATINGS INDICATED AS ESTABLISHED BY TESTING IDENTICAL ASSEMBLIES BY UNDERWRITERS LABORATORY, OR OTHER TESTING AND INSPECTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION.
- E. THE RATING OF THE FIRE SEALANT SHALL MEET OR EXCEED THE FIRE RATING OF THE FIRE RATED PARTITION.

20. TESTS:

- A. BEFORE MAKING TESTS, COMPLETE ALL CONNECTIONS AT PANELS, FIXTURES AND OTHER EQUIPMENT. INSTALL FUSES AND HAVE ALL WIRING CONTINUOUS FROM SERVICE EQUIPMENT TO UTILIZATION OUTLETS. CORRECT ALL UNDESIRABLE GROUND, OPEN AND SHORT CIRCUIT CONDITIONS.
- B. PROVIDE A SOURCE OF TEMPORARY POWER FOR MAKING TESTS IF NORMAL BUILDING POWER IS NOT AVAILABLE AT THE TIME.
- C. TAKE AND RECORD THE FOLLOWING READINGS ON SYSTEMS 600 VOLTS AND BELOW:
 - 1) MEGGER TESTS OF ALL FEEDER CIRCUIT CONDUCTORS, GROUND CONDUCTORS AND CONDUIT GROUND.
 - 2) AMMETER READINGS ON ALL PHASES AND NEUTRAL OF EACH FEEDER TO INDICATE BALANCE.
 - 3) AMMETER READINGS ON ALL PHASES OF EACH POLYPHASE MOTOR. INCLUDE NAMEPLATE FULL LOAD CURRENT OF EACH MOTOR ON DATA SHEET.
 - 4) CERTIFY THAT ALL OVERLOAD DEVICES HAVE BEEN SET IN ACCORDANCE WITH DATA SHOWN ON THE DRAWINGS AND/OR MANUFACTURER'S RECOMMENDED SETTING.
- D. SEND FINAL CERTIFIED TEST REPORTS AND CERTIFICATIONS TO THE ARCHITECT FOR APPROVAL AND TRANSMITTAL TO THE OWNER.

21. DEMONSTRATION OF COMPLETE ELECTRICAL SYSTEMS:

A. SUBMIT WRITTEN CERTIFICATION THAT ELECTRICAL SYSTEMS ARE COMPLETE AND OPERATIONAL. SUBMIT CERTIFICATION WITH CONTRACTOR'S REQUEST FOR FINAL REVIEW.

1) AT THE TIME OF FINAL REVIEW OF ELECTRICAL WORK, DEMONSTRATE THE OPERATION OF ELECTRICAL SYSTEMS. FURNISH LABOR, APPARATUS AND EQUIPMENT FOR SYSTEMS' DEMONSTRATION. THE VARIOUS TEST SHALL BE WITNESSED BY AND THE OWNER OR HIS REPRESENTATIVE.

B. THE CONTRACTOR SHALL FURNISH ALL TEST EQUIPMENT, MATERIALS, LABOR, AND TEMPORARY POWER HOOK-UPS TO PERFORM START-UP AND ALL TESTS AS REQUIRED TO OBTAIN FINAL FIELD ACCEPTANCE FROM OWNER. ALL TESTS SHALL BE CONDUCTED IN THE PRESENCE OF THE OWNER OR HIS REPRESENTATIVE. ALL TEST PROCEDURES SHALL CONFORM TO THIS SPECIFICATION AND APPLICABLE STANDARDS THE ANSI, IEEE, NEMA, OSHA, NEPA, ETC.

C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TESTS AND TEST RECORD. TESTING SHALL BE PERFORMED BY AND UNDER THE IMMEDIATE SUPERVISION OF THE CONTRACTOR. TEST RECORD SHALL BE KEPT FOR EACH PIECE OF EQUIPMENT. COPIES SHALL BE FURNISHED TO THE ENGINEER FOR REVIEW AND/OR APPROVAL.

D. A VISUAL INSPECTION OF ALL ELECTRICAL EQUIPMENT, TO CHECK FOR THE FOREIGN MATERIAL, TIGHTNESS OR WIRING AND CONNECTION. PROPER GROUNDING, MATCHING NAMEPLATE CHARTS WITH SPECIFICATION, ETC., SHALL BE MADE PRIOR TO ACTUAL TESTING.

E. A COMPLETE OPERATIONAL TEST SHALL BE MADE ON THE LIFE SAFETY FIRE ALARM SYSTEM. THIS COMPLETE OPERATIONAL TEST SHALL ALSO BE PROVIDED ON ANY EXISTING DEVICES AND SYSTEMS IF THIS IS A RENOVATION PROJECT. THE CONTRACTOR SHALL CONSULT WITH THE EQUIPMENT VENDORS AND THEN SUBMIT FOR APPROVAL A STEP-BY-STEP PROCEDURE DESCRIBING THE METHOD OF MAKING THE TESTS, THE EQUIPMENT TO BE UTILIZED AND THE FEATURE TO BE CHECKED BY THE TEST. ALL INTERLOCKS AND PROTECTIVE FEATURES SHALL BE CHECKED.

22. SPECIAL ENGINEERING SERVICES:

A. IN THE INSTANCE OF COMPLEX OR SPECIALIZED ELECTRICAL SYSTEMS SUCH AS EMERGENCY SYSTEM FIRE ALARM OR SIMILAR MISCELLANEOUS SYSTEMS. THE INSTALLATION, FINAL CONNECTIONS AND TESTING OF SUCH SYSTEMS SHALL BE MADE UNDER THE DIRECT SUPERVISION OF COMPETENT AUTHORIZED SERVICE ENGINEERS WHO SHALL BE IN THE EMPLOY OF THE RESPECTIVE EQUIPMENT MANUFACTURER.

B. ANY AND ALL EXPENSES INCURRED BY THE EQUIPMENT MANUFACTURERS' REPRESENTATIVES RELATED TO THIS PROJECT SHALL BE BORNE BY THE ELECTRICAL CONTRACTOR.

23. DESIGN MODIFICATIONS:

- A. THE DRAWINGS SHOW ELECTRICAL SYSTEMS WHICH SUPPLY, CONTROL, AND/OR MONITOR SYSTEMS SPECIFIED ELSEWHERE. THE ELECTRICAL SYSTEM SHOWN HAS BEEN BASED ON SPECIFIC MANUFACTURERS DATA OR INFORMATION CONVEYED TO THE ELECTRICAL DESIGNER. WHERE ANY AGREEMENT OR CHANGE IS MADE TO SUPPLY EQUIPMENT OF LARGER CAPACITY OR DIFFERENT ELECTRICAL CHARACTERISTICS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING THE ELECTRICAL SYSTEM TO EFFECT SUCH CHANGES WITHIN THE INTENT OF THESE SPECIFICATIONS AND TO INFORM THE ENGINEER, IN WRITING, OF SUCH CHANGE. FOR EXAMPLE. IF HVAC COMPRESSORS AND/OR MOTORS ARE ALLOWED TO BE CHANGED TO 230 VOLTS RATHER THAN THE ORIGINALLY SPECIFIED 208 VOLTS. BOOSTING OR BUCKING TRANSFORMERS SHALL BE SUPPLIED, INSTALLED, AND WIRED TO ACCOMMODATE THE CHANGE AT NO ADDITIONAL COST.

SECTION 263600 - TRANSFER SWITCHES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Contactor-type automatic transfer switches.
2. Molded-case-type automatic transfer switches.
3. Nonautomatic transfer switches.
4. Transfer switch accessories.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Contactor-type automatic transfer switches.
2. Molded-case-type automatic transfer switches.
3. Nonautomatic transfer switches.
4. Transfer switch accessories.

B. Product Data Submittals: For each product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for transfer switches.
2. Include rated capacities, operating characteristics, electrical characteristics, and accessories.

C. Shop Drawings:

1. Include plans, elevations, sections, details showing minimum clearances, conductor entry provisions, gutter space, and installed features and devices.
2. Include material lists for each switch specified.
3. Single-Line Diagram: Show connections between transfer switch, power sources, and load; and show interlocking provisions for each combined transfer switch and bypass/isolation switch.

1.3 QUALITY ASSURANCE

A. Testing Agency Qualifications:

1. Member company of NETA.
 - a. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

1.4 FIELD CONDITIONS

- ##### A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service:

1. Notify Architect no fewer than two days in advance of proposed interruption of electrical service.
2. Do not proceed with interruption of electrical service without Architect's written permission.

1.5 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of transfer switch or transfer switch components 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.
- B. Comply with NEMA ICS 1.
- C. Comply with NFPA 99.
- D. Comply with NFPA 110.
- E. Comply with UL 1008 unless requirements of these Specifications are stricter.
- F. Indicated Current Ratings: Apply as defined in UL 1008 for continuous loading and total system transfer, including tungsten filament lamp loads not exceeding 30 percent of switch ampere rating, unless otherwise indicated.
- G. Tested Fault-Current Closing and Short-Circuit Ratings: Adequate for duty imposed by protective devices at installation locations in Project under the fault conditions indicated, based on testing according to UL 1008.
 1. Where transfer switch includes internal fault-current protection, rating of switch and trip unit combination shall exceed indicated fault-current value at installation location.
 2. Short-time withstand capability for three cycles.
- H. Repetitive Accuracy of Solid-State Controls: All settings shall be plus or minus 2 percent or better over an operating temperature range of minus 20 to plus 70 deg C.
- I. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.62. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.
- J. Electrical Operation: Accomplish by a nonfused, momentarily energized solenoid or electric-motor-operated mechanism. Switches for emergency or standby purposes shall be mechanically and electrically interlocked in both directions to prevent simultaneous connection to both power sources unless closed transition.
- K. Service-Rated Transfer Switch:

1. Comply with UL 869A and UL 489.
 2. Provide terminals for bonding the grounding electrode conductor to the grounded service conductor.
 3. In systems with a neutral, the bonding connection shall be on the neutral bus.
 4. Provide removable link for temporary separation of the service and load grounded conductors.
 5. Surge Protective Device: Service rated.
 6. Ground-Fault Protection: Comply with UL 1008 for normal bus.
 7. Service Disconnecting Means: Externally operated, manual electrically actuated.
- L. Neutral Switching: Where four-pole switches are indicated, provide neutral pole switched simultaneously with phase poles.
- M. Annunciation, Control, and Programming Interface Components: Devices at transfer switches for communicating with remote programming devices, annunciators, or annunciator and control panels shall have communication capability matched with remote device.
- N. Factory Wiring: Train and bundle factory wiring and label, consistent with Shop Drawings, by color-code or by numbered or lettered wire and cable with printed markers at terminations. Color-coding and wire and cable markers are specified in Section 260553 "Identification for Electrical Systems."
1. Designated Terminals: Pressure type, suitable for types and sizes of field wiring indicated.
 2. Power-Terminal Arrangement and Field-Wiring Space: Suitable for top, side, or bottom entrance of feeder conductors as indicated.
 3. Control Wiring: Equipped with lugs suitable for connection to terminal strips.
 4. Accessible via front access.
- O. Enclosures: General-purpose NEMA 250, Type 1, complying with NEMA ICS 6 and UL 508, unless otherwise indicated.
- 2.2 CONTACTOR-TYPE AUTOMATIC TRANSFER SWITCHES
- A. Comply with Level 1 equipment according to NFPA 110.
- B. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.
1. Limitation: Switches using molded-case switches or circuit breakers or insulated-case circuit-breaker components are unacceptable.
 2. Switch Action: Double throw; mechanically held in both directions.
 3. Contacts: Silver composition or silver alloy for load-current switching. Contactor-style automatic transfer-switch units, rated 600 A and higher, shall have separate arcing contacts.
 4. Conductor Connectors: Suitable for use with conductor material and sizes.
 5. Material: Tin-plated aluminum.
 6. Main and Neutral Lugs: Compression type.
 7. Ground Lugs and Bus-Configured Terminators: Compression type.
 8. Connectors shall be marked for conductor size and type according to UL 1008.
- C. Automatic Open-Transition Transfer Switches: Interlocked to prevent the load from being closed on both sources at the same time.
1. Sources shall be mechanically and electrically interlocked to prevent closing both sources on the load at the same time.

- D. Manual Switch Operation, Load-Breaking: Under load, with door closed and with either or both sources energized. Transfer time is same as for electrical operation. Control circuit automatically disconnects from electrical operator during manual operation.
- E. Manual Switch Operation, Non-Load-Breaking: Unloaded. Control circuit automatically disconnects from electrical operator during manual operation.
- F. Electric Nonautomatic Switch Operation: Electrically actuated by push buttons designated "Normal Source" and "Alternative Source." Switch shall be capable of transferring load in either direction with either or both sources energized.
- G. Signal-Before-Transfer Contacts: A set of normally open/normally closed dry contacts operates in advance of retransfer to normal source. Interval shall be adjustable from 1 to 30 seconds.
- H. Digital Communication Interface: Matched to capability of remote annunciator or annunciator and control panel.
- I. Automatic Transfer-Switch Controller Features:
 - 1. Controller operates through a period of loss of control power.
 - 2. Undervoltage Sensing for Each Phase of Normal and Alternate Source: Sense low phase-to-ground voltage on each phase. Pickup voltage shall be adjustable from 85 to 100 percent of nominal, and dropout voltage shall be adjustable from 75 to 98 percent of pickup value. Factory set for pickup at 90 percent and dropout at 85 percent.
 - 3. Voltage/Frequency Lockout Relay: Prevent premature transfer to generator. Pickup voltage shall be adjustable from 85 to 100 percent of nominal. Factory set for pickup at 90 percent. Pickup frequency shall be adjustable from 90 to 100 percent of nominal. Factory set for pickup at 95 percent.
 - 4. Time Delay for Retransfer to Normal Source: Adjustable from zero to 30 minutes, and factory set for 10 minutes. Override shall automatically defeat delay on loss of voltage or sustained undervoltage of emergency source, provided normal supply has been restored.
 - 5. Test Switch: Simulate normal-source failure.
 - 6. Switch-Position Pilot Lights: Indicate source to which load is connected.
 - 7. Source-Available Indicating Lights: Supervise sources via transfer-switch normal- and emergency-source sensing circuits.
 - a. Normal Power Supervision: Green light with nameplate engraved "Normal Source Available."
 - b. Emergency Power Supervision: Red light with nameplate engraved "Emergency Source Available."
 - 8. Unassigned Auxiliary Contacts: Two normally open, single-pole, double-throw contacts for each switch position, rated 10 A at 240-V ac.
 - 9. Transfer Override Switch: Overrides automatic retransfer control so transfer switch will remain connected to emergency power source regardless of condition of normal source. Pilot light indicates override status.
 - 10. Engine Starting Contacts: One isolated and normally closed, and one isolated and normally open; rated 10 A at 32-V dc minimum.
 - 11. Engine Shutdown Contacts:
 - a. Instantaneous; shall initiate shutdown sequence at remote engine-generator controls after retransfer of load to normal source.

12. Engine-Generator Exerciser: Solid-state, programmable-time switch starts engine generator and transfers load to it from normal source for a preset time, then retransfers and shuts down engine after a preset cool-down period. Initiates exercise cycle at preset intervals adjustable from 7 to 30 days. Running periods shall be adjustable from 10 to 30 minutes. Factory settings shall be for 7-day exercise cycle, 20-minute running period, and 5-minute cool-down period. Exerciser features include the following:
 - a. Exerciser Transfer Selector Switch: Permits selection of exercise with and without load transfer.
 - b. Push-button programming control with digital display of settings.
 - c. Integral battery operation of time switch when normal control power is unavailable.

2.3 MOLDED-CASE-TYPE AUTOMATIC TRANSFER SWITCHES

- A. Comply with Level 1 equipment according to NFPA 110.
- B. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.
 1. Limitation: Switches using contactor-based components are unacceptable.
 2. Switch Action: Double throw; mechanically held in both directions.
 3. Contacts: Silver composition or silver alloy for load-current switching.
 4. Conductor Connectors: Suitable for use with conductor material and sizes.
 5. Material: Tin-plated aluminum.
 6. Main and Neutral Lugs: Compression type.
 7. Ground Lugs and Bus-Configured Terminators: Compression type.
 8. Connectors shall be marked for conductor size and type according to UL 1008.
- C. Automatic Open-Transition Transfer Switches: Interlocked to prevent the load from being closed on both sources at the same time.
 1. Sources shall be mechanically and electrically interlocked to prevent closing both sources on the load at the same time.
- D. Manual Switch Operation, Load-Breaking: Under load, with door closed and with either or both sources energized. Transfer time is same as for electrical operation. Control circuit automatically disconnects from electrical operator during manual operation.
- E. Manual Switch Operation, Non-Load-Breaking: Unloaded. Control circuit automatically disconnects from electrical operator during manual operation.
- F. Electric Nonautomatic Switch Operation: Electrically actuated by push buttons designated "Normal Source" and "Alternative Source." Switch shall be capable of transferring load in either direction with either or both sources energized.
- G. Signal-Before-Transfer Contacts: A set of normally open/normally closed dry contacts operates in advance of retransfer to normal source. Interval shall be adjustable from 1 to 30 seconds.
- H. Digital Communication Interface: Matched to capability of remote annunciator or annunciator and control panel.
- I. Transfer Switches Based on Molded-Case-Switch Components: Comply with UL 489 and UL 869A.
- J. Automatic Transfer-Switch Controller Features:

1. Controller operates through a period of loss of control power.
2. Undervoltage Sensing for Each Phase of Normal Source: Sense low phase-to-ground voltage on each phase. Pickup voltage shall be adjustable from 85 to 100 percent of nominal, and dropout voltage shall be adjustable from 75 to 98 percent of pickup value. Factory set for pickup at 90 percent and dropout at 85 percent.
3. Voltage/Frequency Lockout Relay: Prevent premature transfer to generator. Pickup voltage shall be adjustable from 85 to 100 percent of nominal. Factory set for pickup at 90 percent. Pickup frequency shall be adjustable from 90 to 100 percent of nominal. Factory set for pickup at 95 percent.
4. Time Delay for Retransfer to Normal Source: Adjustable from zero to 30 minutes, and factory set for 10 minutes. Override shall automatically defeat delay on loss of voltage or sustained undervoltage of emergency source, provided normal supply has been restored.
5. Test Switch: Simulate normal-source failure.
6. Switch-Position Pilot Lights: Indicate source to which load is connected.
7. Source-Available Indicating Lights: Supervise sources via transfer-switch normal- and emergency-source sensing circuits.
 - a. Normal Power Supervision: Green light with nameplate engraved "Normal Source Available."
 - b. Emergency Power Supervision: Red light with nameplate engraved "Emergency Source Available."
8. Unassigned Auxiliary Contacts: Two normally open, single-pole, double-throw contacts for each switch position, rated 10 A at 240-V ac.
9. Transfer Override Switch: Overrides automatic retransfer control so automatic transfer switch will remain connected to emergency power source regardless of condition of normal source. Pilot light indicates override status.
10. Engine Starting Contacts: One isolated and normally closed, and one isolated and normally open; rated 10 A at 32-V dc minimum.
11. Engine Shutdown Contacts:
 - a. Instantaneous; shall initiate shutdown sequence at remote engine-generator controls after retransfer of load to normal source.
12. Engine-Generator Exerciser: Solid-state, programmable-time switch starts engine generator and transfers load to it from normal source for a preset time, then retransfers and shuts down engine after a preset cool-down period. Initiates exercise cycle at preset intervals adjustable from 7 to 30 days. Running periods shall be adjustable from 10 to 30 minutes. Factory settings shall be for 7-day exercise cycle, 20-minute running period, and 5-minute cool-down period. Exerciser features include the following:
 - a. Exerciser Transfer Selector Switch: Permits selection of exercise with and without load transfer.
 - b. Push-button programming control with digital display of settings.
 - c. Integral battery operation of time switch when normal control power is unavailable.

2.4 TRANSFER SWITCH ACCESSORIES

A. Bypass/Isolation Switches:

1. Source Limitations: Same manufacturer as transfer switch in which installed.
2. Comply with requirements for Level 1 equipment according to NFPA 110.

3. Description: Manual type, arranged to select and connect either source of power directly to load, isolating transfer switch from load and from both power sources. Include the following features for each combined automatic transfer switch and bypass/isolation switch:
 - a. Means to lock bypass/isolation switch in the position that isolates transfer switch with an arrangement that permits complete electrical testing of transfer switch while isolated. Interlocks shall prevent transfer-switch operation, except for testing or maintenance, while automatic transfer switch is isolated.
 - b. Provide means to make power available to transfer-switch control circuit for testing and maintenance purposes.
 - c. Drawout Arrangement for Transfer Switch: Provide physical separation from live parts and accessibility for testing and maintenance operations. Transfer switch and bypass/isolation switch shall be in isolated compartments.
 - d. Transition:
 - 1) Provide closed-transition operation when transferring from main transfer switch to bypass/isolation switch on the same power source.
 - e. Bypass/Isolation Switch Current, Voltage, Closing, and Short-Circuit Withstand Ratings: Equal to or greater than those of associated automatic transfer switch, and with same phase arrangement and number of poles.
 - f. Contact temperatures of bypass/isolation switches shall not exceed those of automatic transfer-switch contacts when they are carrying rated load.
 - g. Manual Control: Constructed so load bypass and transfer-switch isolation can be performed by one person in no more than two operations in 15 seconds or less. Operating handles shall be externally operated.
 - h. Automatic and Nonautomatic Control: Automatic transfer-switch controller shall also control the bypass/isolation switch.
 - i. Legend: Manufacturer's standard legend for control labels and instruction signs shall describe operating instructions.
 - j. Maintainability: Fabricate to allow convenient removal of major components from front without removing other parts or main power conductors.
4. Interconnection of Bypass/Isolation Switches with Automatic Transfer Switches: Factory-installed copper bus bars; plated at connection points and braced for the indicated available short-circuit current.

B. Remote Annunciator System:

1. Source Limitations: Same manufacturer as transfer switch in which installed.
2. Functional Description: Remote annunciator panel shall annunciate conditions for indicated transfer switches.
3. Annunciation panel display shall include the following indicators:
 - a. Sources available, as defined by actual pickup and dropout settings of transfer-switch controls.
 - b. Switch position.
 - c. Switch in test mode.
 - d. Failure of communication link.
4. Annunciator Panel: LED-lamp type with audible signal and silencing switch.
 - a. Indicating Lights: Grouped for each transfer switch monitored.
 - b. Label each group, indicating transfer switch it monitors, location of switch, and identity of load it serves.

- c. Mounting: Flush, modular, steel cabinet unless otherwise indicated.
- d. Lamp Test: Push-to-test or lamp-test switch on front panel.

C. Remote Annunciator and Control System:

1. Source Limitations: Same manufacturer as transfer switch in which installed.
2. Include the following functions for indicated transfer switches:
 - a. Indication of sources available, as defined by actual pickup and dropout settings of transfer-switch controls.
 - b. Indication of switch position.
 - c. Indication of switch in test mode.
 - d. Indication of failure of digital communication link.
 - e. Key-switch or user-code access to control functions of panel.
 - f. Control of switch-test initiation.
3. Remote Annunciation and Control Panel: Solid-state components. Include the following features:
 - a. Controls and indicating lights grouped together for each transfer switch.
 - b. Label each indicating light control group. Indicate transfer switch it controls, location of switch, and load it serves.
 - c. Digital Communication Capability: Matched to that of transfer switches supervised.
 - d. Mounting: Flush, modular, steel cabinet unless otherwise indicated.

2.5 SOURCE QUALITY CONTROL

- A. Factory Tests: Test and inspect components, assembled switches, and associated equipment according to UL 1008. Ensure proper operation. Check transfer time and voltage, frequency, and time-delay settings for compliance with specified requirements. Perform dielectric strength test complying with NEMA ICS 1.
- B. Prepare test and inspection reports.
 1. For each of the tests required by UL 1008, performed on representative devices, for emergency systems. Include results of test for the following conditions:
 - a. Overvoltage.
 - b. Undervoltage.
 - c. Loss of supply voltage.
 - d. Reduction of supply voltage.
 - e. Alternative supply voltage or frequency is at minimum acceptable values.
 - f. Temperature rise.
 - g. Dielectric voltage-withstand; before and after short-circuit test.
 - h. Overload.
 - i. Contact opening.
 - j. Endurance.
 - k. Short circuit.
 - l. Short-time current capability.
 - m. Receptacle withstand capability.
 - n. Insulating base and supports damage.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Floor-Mounting Switch: Anchor to floor by bolting.
 - 1. Install transfer switches on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-in-Place Concrete."
 - 2. Comply with requirements for seismic control devices specified in Section 260548.16 "Seismic Controls for Electrical Systems."
 - 3. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases.
 - 4. Provide workspace and clearances required by NFPA 70.
- B. Annunciator and Control Panel Mounting: Flush in wall unless otherwise indicated.
- C. Identify components according to Section 260553 "Identification for Electrical Systems."
- D. Set field-adjustable intervals and delays, relays, and engine exerciser clock.
- E. Comply with NECA 1.

3.2 CONNECTIONS

- A. Wiring to Remote Components: Match type and number of cables and conductors to generator sets, motor controls, control, and communication requirements of transfer switches as recommended by manufacturer. Increase raceway sizes at no additional cost to Owner if necessary to accommodate required wiring.
- B. Wiring Method: Install cables in raceways and cable trays except within electrical enclosures. Conceal raceway and cables except in unfinished spaces.
 - 1. Comply with requirements for raceways specified in Section 260533.13 "Conduits for Electrical Systems."
- C. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii.
- D. Route and brace conductors according to manufacturer's written instructions. Do not obscure manufacturer's markings and labels.
- E. Brace and support equipment according to Section 260548.16 "Seismic Controls for Electrical Systems."
- F. Final connections to equipment shall be made with liquid tight, flexible metallic conduit no more than 18 inches in length.

3.3 FIELD QUALITY CONTROL

- A. Adminstrant for Tests and Inspections:
 - 1. Engage qualified testing agency to administer and perform tests and inspections.

B. Tests and Inspections:

1. After installing equipment, test for compliance with requirements according to NETA ATS.
2. Visual and Mechanical Inspection:
 - a. Compare equipment nameplate data with Drawings and Specifications.
 - b. Inspect physical and mechanical condition.
 - c. Inspect anchorage, alignment, grounding, and required clearances.
 - d. Verify that the unit is clean.
 - e. Verify appropriate lubrication on moving current-carrying parts and on moving and sliding surfaces.
 - f. Verify that manual transfer warnings are attached and visible.
 - g. Verify tightness of all control connections.
 - h. Inspect bolted electrical connections for high resistance using one of the following methods, or both:
 - 1) Use of low-resistance ohmmeter.
 - 2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method according to manufacturer's published data.
 - i. Perform manual transfer operation.
 - j. Verify positive mechanical interlocking between normal and alternate sources.
 - k. Perform visual and mechanical inspection of surge arresters.
 - l. Inspect control power transformers.
 - 1) Inspect for physical damage, cracked insulation, broken leads, tightness of connections, defective wiring, and overall general condition.
 - 2) Verify that primary and secondary fuse or circuit-breaker ratings match Drawings.
 - 3) Verify correct functioning of drawout disconnecting contacts, grounding contacts, and interlocks.
3. Electrical Tests:
 - a. Perform insulation-resistance tests on all control wiring with respect to ground.
 - b. Perform a contact/pole-resistance test. Compare measured values with manufacturer's acceptable values.
 - c. Verify settings and operation of control devices.
 - d. Calibrate and set all relays and timers.
 - e. Verify phase rotation, phasing, and synchronized operation.
 - f. Perform automatic transfer tests.
 - g. Verify correct operation and timing of the following functions:
 - 1) Normal source voltage-sensing and frequency-sensing relays.
 - 2) Engine start sequence.
 - 3) Time delay on transfer.
 - 4) Alternative source voltage-sensing and frequency-sensing relays.
 - 5) Automatic transfer operation.
 - 6) Interlocks and limit switch function.
 - 7) Time delay and retransfer on normal power restoration.
 - 8) Engine cool-down and shutdown feature.
4. Measure insulation resistance phase-to-phase and phase-to-ground with insulation-resistance tester. Include external annunciation and control circuits. Use test voltages and procedure recommended by manufacturer. Comply with manufacturer's specified minimum resistance.

- a. Check for electrical continuity of circuits and for short circuits.
 - b. Inspect for physical damage, proper installation and connection, and integrity of barriers, covers, and safety features.
 - c. Verify that manual transfer warnings are properly placed.
 - d. Perform manual transfer operation.
5. After energizing circuits, perform each electrical test for transfer switches stated in NETA ATS and demonstrate interlocking sequence and operational function for each switch at least three times.
 - a. Simulate power failures of normal source to automatic transfer switches and retransfer from emergency source with normal source available.
 - b. Simulate loss of phase-to-ground voltage for each phase of normal source.
 - c. Verify time-delay settings.
 - d. Verify pickup and dropout voltages by data readout or inspection of control settings.
 - e. Test bypass/isolation unit functional modes and related automatic transfer-switch operations.
 - f. Perform contact-resistance test across main contacts and correct values exceeding 500 microhms and values for one pole deviating by more than 50 percent from other poles.
 - g. Verify proper sequence and correct timing of automatic engine starting, transfer time delay, retransfer time delay on restoration of normal power, and engine cool-down and shutdown.
 6. Ground-Fault Tests: Coordinate with testing of ground-fault protective devices for power delivery from both sources.
 - a. Verify grounding connections and locations and ratings of sensors.
- C. Coordinate tests with tests of generator and run them concurrently.
 - D. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation and contact resistances and time delays. Attach a label or tag to each tested component indicating satisfactory completion of tests.
 - E. Transfer switches will be considered defective if they do not pass tests and inspections.
 - F. Remove and replace malfunctioning units and retest as specified above.
 - G. Prepare test and inspection reports.
 - H. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each switch. Remove all access panels so joints and connections are accessible to portable scanner.
 1. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
 2. Record of Infrared Scanning: Prepare a certified report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
 3. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switch 11 months after date of Substantial Completion.

3.4 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain transfer switches and related equipment.
- B. Training shall include testing ground-fault protective devices and instructions to determine when the ground-fault system shall be retested. Include instructions on where ground-fault sensors are located and how to avoid negating the ground-fault protection scheme during testing and circuit modifications.
- C. Coordinate this training with that for generator equipment.

END OF SECTION 263600

SECTION 270528 - PATHWAYS FOR COMMUNICATIONS SYSTEMS

PART 4 - GENERAL

4.1 SUMMARY

A. Section Includes:

1. Type OFR and Type CR communications raceways and fittings.
2. Cable supports and positioning devices.

4.2 ACTION SUBMITTALS

A. Product Data:

1. For each type of product.
 - a. Product Listing: Include copy of unexpired approval letter, on letterhead of qualified electrical testing agency, certifying product's compliance with specified listing criteria.
 - 1) If listed manufacturer differs from selling manufacture, indicate relationship between entities on submittal. Clearly indicate which entity warrants product performance and fitness for purpose.
 - 2) Listing criteria identified in approval letter must match specified listing criteria. Approval of only equipment's enclosure is not considered approval of equipment for intended application.
 - 3) Product identification in approval letter must match product branding and model numbers in submittal. Approval letters for similar products are not acceptable.

B. Samples:

1. Type OFR and Type CR Raceways: For each color and texture specified, 12 inch long.

PART 5 - PRODUCTS

5.1 CABLE SUPPORTS AND POSITIONING DEVICES

A. Description: This category covers straps, hooks, and similar types of hardware for installation and use in communications cabling systems in accordance with NFPA 70 and manufacturer's installation instructions

B. 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.

C. UL DWMU - J-Hook or G-Hook Cable Support:

1. Source Limitations: Obtain products from single manufacturer.
2. Product Listing Criteria: UL CCN DWMU; including UL 2239 or UL 1565.

- 3. Product Characteristics:
 - a. Material: Galvanized steel.
- D. UL DWMU - Conduit or Cable Support Strap:
 - 1. Source Limitations: Obtain products from single manufacturer.
 - 2. Product Listing Criteria: UL CCN DWMU; including UL 2239 or UL 1565.
 - 3. Product Characteristics:
 - a. Mounting Orientation: Vertical Horizontal.
 - b. Conduit, Cable, or Tubing Bundle Capacity: .
 - 4. Required Product Options:
 - a. Suitable for use in air handling space.
- E. UL ZODZ - Cable Tie or Management System:
 - 1. Source Limitations: Obtain products from single manufacturer.
 - 2. Product Listing Criteria: UL CCN ZODZ; including UL 62275.
 - 3. Required Product Options:
 - a. UL 2043 Air-Handling Spaces Rating: AH-1 metallic components AH-2 nonmetallic or composite components.
- F. UL ZODZ - Cable Clamp, Clip, or Mount Positioning Device:
 - 1. Source Limitations: Obtain products from single manufacturer.
 - 2. Product Listing Criteria: UL CCN ZODZ; including UL 1565.
 - 3. Product Characteristics:
 - a. Materials: Metallic Nonmetallic.
 - b. Resistant to ultraviolet light.
 - c. Resistant to corrosion.
 - d. UL 2043 Air-Handling Spaces Rating: AH-1 metallic components AH-2 nonmetallic or composite components.

PART 6 - EXECUTION

6.1 SELECTION OF PATHWAYS FOR COMMUNICATIONS SYSTEMS

- A. Unless more stringent requirements are specified in Contract Documents or manufacturers' published instructions, comply with NFPA 70 for selection of duct raceways. Consult Architect for resolution of conflicting requirements.
- B. Type OFR and Type CR Communications Raceways: Comply with Table 800.154(b) of NFPA 70.
- C. Minimum Pathway Size:
 - 1. For Copper and Aluminum Cables: Metric designator 21 (trade size 3/4).
 - 2. For Optical-Fiber Cables: Metric designator 25 (trade size 1).
- D. Maximum Pathway Length Between Cable Access Points: 75 ft.

E. Temperature Limitations:

1. Type PVC, Type HDPE, Type EPEC, Type OFR, and Type CR: Do not install 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.
2. Type RTRC: Do not install where ambient temperature exceeds 230 deg F.

F. Outdoor Pathways:

1. Exposed and Subject to Severe Physical Damage: IMC.
2. Exposed and Subject to Physical Damage: IMC.
 - a. Locations less than 2.5 m (8 ft) above finished floor.
3. Exposed and Not Subject to Physical Damage: IMC Corrosion-resistant EMT.
4. Concealed Aboveground: EMT.
5. Direct Buried: PVC-40.
6. Concrete Encased Not in Trench: PVC-40.
7. Concrete Encased in Trench: PVC-40.
8. Innerducts inside Other Raceway: ENT.

G. Indoor Pathways:

1. Hazardous Classified Locations: IMC.
2. Exposed and Subject to Severe Physical Damage: IMC. Locations include the following:
 - a. Loading docks.
 - b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
 - c. Mechanical rooms.
 - d. Gymnasiums.
3. Exposed and Subject to Physical Damage: IMC. Locations include the following:
 - a. Locations less than 2.5 m (8 ft) above finished floor.
 - b. Stub-ups to above suspended ceilings.
4. Exposed and Not Subject to Physical Damage: EMT.
5. Concealed above Suspended Ceilings: EMT Hooks.
6. Concealed in Ceilings and Interior Walls and Partitions: EMT.
7. Damp or Wet Locations: IMC.
8. Innerducts inside Metal Raceway: ENT.
9. Exposed to Environmental Air: IMC EMT.
10. In Vertical Runs: IMC EMT.
11. Supported by Solid Cable Tray: ENT.
12. Supported by Open Cable Tray: OFR-P.

H. Duct Fittings: Select fittings in accordance with NEMA FB 2.10 guidelines.

1. ERMIC and IMC: Provide threaded-type fittings unless otherwise indicated.

I. Surface Raceways: Where indicated on Drawings.

J. Cable Supports and Positioning Devices:

1. Size hooks to allow minimum of 25 percent future capacity without exceeding design capacity limits.
2. Support hooks directly from building structure. Do not use ceiling grid support rods or wires.
3. Hook spacing must allow no more than 6 inch of slack. Lowest point of cables must be no closer than 6 inch to ceiling tiles, mechanical ductwork and fittings, luminaires, power conduits, power and telecommunications outlets, and other electrical and communications equipment.
4. Space hooks no more than 5 ft on center.
5. Provide hook at each change in direction.

K. Boxes and Enclosures:

1. Outdoors, Aboveground: UL 50E Type 4.
2. Indoors: UL 50E Type 1, except use Type 4 stainless steel nonmetallic units in institutional and commercial kitchens and damp or wet locations.

L. Identification of Underground Pathways, Handholes, and Structures:

1. Use "COMMUNICATIONS" for legend on warning planks, underground warning tape, and covers.

6.2 SELECTION OF GROUNDING AND BONDING PRODUCTS

A. Grounding and Bonding Conductors:

1. Communications Busbar Connections:

- a. TBC: Not smaller than 3/0 AWG and no smaller than largest TBB.
- b. TBB: Not smaller than 2 kcmil per linear ft of conductor length, but not larger than 750 kcmil, unless otherwise indicated on Drawings.
- c. BBC: Not smaller than largest TBB to which it is connected unless otherwise indicated on Drawings.
- d. TEBC: Not smaller than 2 AWG unless otherwise indicated on Drawings. Provide bolted connectors.
- e. UBC: Not smaller than 6 AWG unless otherwise indicated on Drawings. Provide bolted connectors.
- f. Bonding Conductors to Structural Steel: Not smaller than 6 AWG unless otherwise indicated on Drawings. Provide bolted clamp connectors.

2. Cable Tray Connections:

- a. Cable Tray Equipment Grounding Conductor: 6 AWG.
- b. Cable Tray Bonding Jumper: If not supplied by cable manufacturer, provide bonding jumper not smaller than 6 AWG and not longer than 12 inch. If jumper is wire, it must be terminated with lug having one hole and standard barrel for one crimp. If jumper is flexible braid, it must be terminated with one- or two-hole ferrule. Attach with bonding screw or connector provided by cable tray manufacturer.

3. Underground Connections: Not smaller than 2 AWG. Provide welded connectors, except bolted connectors may be used in handholes or manholes and as otherwise indicated on Drawings.

6.3 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 and 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 above finished floor.
- B. Pipe and Conduit Labeling: Comply with ASME A13.1 and IEEE C2.
- C. Color Coding Scheme for Communications Cable and Terminations: Comply with BICSI N1 and TIA-598.
- D. Accessible Fittings for Raceways: Identify cover of junction and pull box of the following systems with wiring system legend and system voltage. System legends must be as follows:
 - 1. "COMMUNICATIONS."
 - 2. "FIRE ALARM."
 - 3. "SECURITY."
- E. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.
- F. Locations of Underground Lines: Underground-line warning tape for communication, control wiring, and optical-fiber cable.
- G. Communications Vaults, Manholes, Handholes, and Pull and Junction Boxes: For conductors in vaults, pull and junction boxes, manholes, and handholes, use vinyl wraparound labels to identify phase.
 - 1. Locate identification at changes in direction, at penetrations of walls and floors, at 50 ft maximum intervals in straight runs, and at 25 ft maximum intervals in congested areas.
- H. Control-Circuit Conductor Identification: For conductors and cables in pull and junction boxes, manholes, and handholes, use self-adhesive labels with conductor or cable designation, origin, and destination.
- I. Control-Circuit Conductor Termination Identification: For identification at terminations, provide heat-shrink preprinted tubes with conductor designation.
- J. Conductors To Be Extended in Future: Attach marker tape to conductors and list source.
- K. Auxiliary Electrical Systems Conductor Identification: Marker tape that is uniform and consistent with system used by manufacturer for factory-installed connections.
- L. Equipment and Cabling Identification for Administrative Records and Labeling: Comply with TIA-606 requirements for Class 1 Class 2 Class 3 Class 4 network administration.
- M. Equipment Identification Labels:
 - 1. Black letters on white field.
 - 2. Indoor Equipment: Self-adhesive label.
 - 3. Outdoor Equipment: Laminated acrylic or melamine sign.

4. Equipment To Be Labeled:

- a. Racks, Frames, and Enclosures: Identify front and rear of each enclosure with self-adhesive labels containing equipment designation.
- b. Patch Panels: Label individual rows in each rack, starting at top and working down, with self-adhesive labels.
- c. Communications cabinets.
- d. Access doors and panels for concealed communications items.
- e. Emergency system boxes and enclosures.
- f. Contactors.
- g. Remote-controlled switches, dimmer modules, and control devices.
- h. Monitoring and control equipment.
- i. Fire-alarm equipment.
- j. Security equipment.
- k. Life-safety communications equipment.

N. Backbone Cables: Label each cable with a vinyl-wraparound label indicating the location of the far or other end of the backbone cable. Patch panel or punch down block where cable is terminated should be labeled identically.

O. Horizontal Cables: Label each cable with a vinyl-wraparound label.

P. Cover Plates: Label individual cover plates with self-adhesive labels. Place label at top of cover plate. Identify cover plate in accordance with TIA-606.

Q. Cable Ties: General purpose, for attaching tags, except as listed below:

1. Outdoors: UV-stabilized nylon.
2. In Spaces Handling Environmental Air: Plenum rated.

6.4 SELECTION OF SIGNS AND HAZARD MARKINGS

A. Comply with 29 CFR 1910.145 for danger, caution, warning, and safety instruction signs.

B. 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.

C. Electrical Hazard Warnings:

1. Multiple Power Sources Warning Legend: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT/RACK HAS MULTIPLE POWER SOURCES."

D. Operating Instruction Signs: Self-adhesive labels.

E. Emergency Operating Instruction Signs: Self-adhesive labels with white legend on red background with minimum 3/8 inch high letters for emergency instructions at equipment.

6.5 INSTALLATION OF PATHWAYS FOR COMMUNICATIONS SYSTEMS

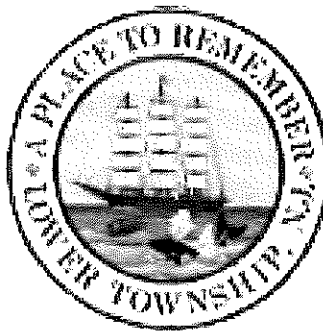
- A. Comply with manufacturers' published instructions, including limitations on distance, bends, and bend radius.
- B. Reference Standards for Installation: Unless more stringent installation requirements are specified in Contract Documents or manufacturers' published instructions, comply with the following:
 - 1. Type OFR Optical-Fiber Raceways: Article 800 of NFPA 70 and BICSI N1.
 - 2. Type CR Communications Raceways: Article 800 of NFPA 70 and BICSI N1.
 - 3. Cable Supports and Positioning Devices: Article 800 of NFPA 70 and BICSI N1.
 - 4. Consult Architect for resolution of conflicting requirements.
- C. Special Installation Techniques:
 - 1. Complete communications raceway installation before starting conductor installation.
 - 2. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies.
 - 3. Provide hangers and supports for pathways, boxes, and enclosures.
 - 4. Firestop pathway penetrations of fire-rated assemblies.
 - 5. Identification:
 - a. Provide colors and labels for pathways, boxes, enclosures, and associated communications equipment.
 - b. Provide safety warning signs.
 - c. Bury underground warning tape approximately 12 inch above direct-buried conduits, but minimum of 6 inch below grade. Align tape along centerline of conduit.
- D. Interfaces with Other Work:
 - 1. Coordinate installation of new communications pathways with existing conditions.
 - 2. Grounding and Bonding: Bond metallic communications boxes and enclosures to metallic pathways. Coordinate with Section 271100 "Communications Equipment Room Fittings" for grounding and bonding of communications pathways to communications equipment room fittings.
 - 3. Coordinate with for client.

6.6 PROTECTION

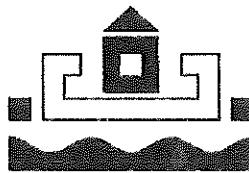
- A. Protect coatings and finishes of pathways, boxes, and enclosures from damage and deterioration.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 270528

Specifications
For
Public Works Building Replacement
Township of Lower, Cape May County, New Jersey
October 28, 2025



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PUBLIC WORKS BUILDING REPLACEMENT

TOWNSHIP of LOWER

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SECTION 024116 - STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. The Work of this Section Includes:

1. Demolition and removal of buildings or structures.
2. Demolition and removal of site improvements.
3. Removing below-grade construction.
4. Disconnecting, capping or sealing, and removing site utilities.

B. Related Requirements:

1. Section 311000 "Site Clearing" for site clearing and removal of above- and below-grade site improvements that are not part of building demolition.

1.2 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.**

1.3 COORDINATION

- A. Arrange demolition schedule so as not to interfere with Owner's on-site operations or operations of adjacent occupied buildings.**

1.4 PREINSTALLATION MEETINGS

- A. Predemolition Conference: Conduct conference at Project site.**

1.5 INFORMATIONAL SUBMITTALS

- A. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection and for dust control. Indicate proposed locations and construction of barriers.**

1. **Adjacent Buildings: Detail special measures proposed to protect adjacent buildings to remain including means of egress from those buildings.**

- B. Schedule of building demolition activities with starting and ending dates for each activity.**

- C. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician.**

1.6 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Universal certified by an EPA-approved certification program.

1.7 FIELD CONDITIONS

- A. Buildings to be demolished will be vacated and their use discontinued before start of the Work.
- B. Buildings immediately adjacent to demolition area will be occupied. Conduct building 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.
- C. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
 - 1. Before building demolition, Owner will remove the following items:
 - a. Stored materials.
 - b. Documents and records.
 - c. Furnishings and equipment intended for re-use.
 - d. Tools.
 - e. Leased equipment.
- D. Hazardous Materials:
 - 1. It is not expected that hazardous materials will be encountered in the Work.
 - a. Hazardous materials will be removed by Owner before start of the Work.
 - b. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- E. On-site sale of removed items or materials is not permitted.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- 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/ASSP A10.6 and NFPA 241.

2.2 SOIL MATERIALS

- A. Satisfactory Soils: Comply with requirements in Section 312000 "Earth Moving."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting demolition operations.
- B. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video.
 - 1. Inventory and record the condition of items to be removed and salvaged. Photograph or video conditions that might be misconstrued as damage caused by removal.
 - 2. Photograph or video existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by demolition operations or removal of items for salvage.

3.2 PREPARATION

- A. Existing Facilities: Protect adjacent walkways, loading docks, building entries, and other building facilities during demolition operations. Maintain exits from existing buildings.
- B. Temporary Protection: Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction and as indicated.
 - 1. Protect adjacent buildings and facilities from damage due to demolition activities.
 - 2. Protect existing site improvements, appurtenances, and landscaping to remain.
 - 3. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.
 - 4. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 5. Provide protection to ensure safe passage of people around building demolition area and to and from occupied portions of adjacent buildings and structures.

- C. Existing Utilities to Remain: Maintain utility services to remain and protect against damage during demolition operations.
 - 1. Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction.
- D. Existing Utilities to Be Disconnected: Locate, identify, disconnect, and seal or cap off utilities serving buildings and structures to be demolished.
 - 1. Arrange to shut off utilities with utility companies.
 - 2. If disconnection 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 (610 mm) below grade at or outside the building or structure to be demolished and cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing in accordance with requirements of authorities having jurisdiction.
 - 4. Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing by authorities having jurisdiction.
- E. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment in accordance with 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 DEMOLITION, GENERAL

- A. General: Demolish indicated buildings and 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.
- B. Site Access and Temporary Controls: Conduct building 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 Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed trafficways 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.
- C. Explosives: Use of explosives is not permitted.

3.4 DEMOLITION BY MECHANICAL MEANS

- A. Proceed with demolition of structural framing members systematically, from higher to lower level. Complete building demolition operations above each floor or tier before disturbing supporting members on the next lower level.
- B. Below-Grade Construction:
 - 1. Demolish foundation systems and other below-grade construction that are within footprint of new construction and extending 5 ft. (1.5 m) outside footprint indicated for new construction. Abandon below-grade construction outside this area.
 - a. Remove below-grade construction, including basements, foundation systems, and footings, completely.
- C. Existing Utilities:
 - 1. Demolish existing utilities and below-grade utility structures that are within 5 ft. (1.5 m) outside footprint indicated for new construction. Abandon utilities outside this area.
 - a. Fill abandoned utility structures with satisfactory soil materials in accordance with backfill requirements in Section 312000 "Earth Moving."

3.5 SITE RESTORATION

- A. Below-Grade Areas:
 - 1. Rough grade below-grade areas ready for further excavation or new construction.
- B. 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.

3.6 REPAIRS

- A. Promptly repair damage to adjacent buildings caused by demolition operations.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
 - 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.

3.8 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.

END OF SECTION 024116

SECTION 031000 - CONCRETE FORMING AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Form-facing material for cast-in-place concrete.
2. Shoring, bracing, and anchoring.

1.2 PREINSTALLATION MEETINGS

- ##### A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each of the following:

1. Concealed surface form-facing material.
2. Form ties.
3. Form-release agent.

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 (ACI 301M), 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.

2.2 FORM-FACING MATERIALS

A. As-Cast Surface Form-Facing Material:

1. Provide continuous, true, and smooth concrete surfaces.

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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 033000 "Cast-In-Place Concrete, and as follows:

a. Plywood, metal, or other approved panel materials.

- 1) APA HDO (high-density overlay).
- 2) APA MDO (medium-density overlay); mill-release agent treated and edge sealed.
- 3) APA Structural 1 Plyform, B-B or better; mill oiled and edge sealed.
- 4) APA Plyform Class I, B-B or better; mill oiled and edge sealed.

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 RELATED MATERIALS

A. 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.

PART 3 - EXECUTION

3.1 INSTALLATION OF FORMWORK

A. Comply with ACI 301 (ACI 301M).

B. Construct formwork, so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117 (ACI 117M) and to comply with the Surface Finish designations specified in Section 033000 "Cast-In-Place Concrete" for as-cast finishes.

C. Limit concrete surface irregularities as follows:

1. Surface Finish-2.0: ACI 117 Class B, 1/4 inch (6 mm).

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.
- 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. At construction joints, overlap forms onto previously placed concrete not less than 12 inches (305 mm).
- I. 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 Architect.
 - 3. Place joints perpendicular to main reinforcement.
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

END OF SECTION 031000

SECTION 032000 - CONCRETE REINFORCING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel reinforcement bars.
2. Welded-wire reinforcement.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference:** Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For the following:

1. Each type of steel reinforcement.
2. Bar supports.

B. Shop Drawings: Comply with ACI SP-066:

1. Include placing drawings that detail fabrication, bending, and placement.
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 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.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT

- A. Reinforcing Bars:** ASTM A615/A615M, Grade 60 (Grade 420), deformed.
- B. Plain-Steel Welded-Wire Reinforcement:** ASTM A1064/A1064M, plain, fabricated from as-drawn steel wire into flat sheets.

2.2 REINFORCEMENT ACCESSORIES

- A. 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.
- B. Steel Tie Wire: ASTM A1064/A1064M, annealed steel, not less than 0.0508 inch (1.2908 mm) in diameter.
 - 1. Finish: Plain.

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 (25 mm), 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 (ACI 318M).
- 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 (610 mm), whichever is greater.
 - 2. Stagger splices in accordance with ACI 318 (ACI 318M).
- 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 (305 mm).
 - 2. Lap edges and ends of adjoining sheets at least one wire spacing plus 2 inches (50 mm) for plain wire and 8 inches (200 mm) 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.

3.4 INSTALLATION TOLERANCES

- A. Comply with ACI 117 (ACI 117M).

END OF SECTION 032000

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Concrete standards.
2. Concrete materials.
3. Admixtures.
4. Vapor retarders.
5. Floor and slab treatments.
6. Liquid floor treatments.
7. Curing materials.
8. Accessories.
9. Repair materials.
10. Concrete mixture materials.
11. Concrete mixture class types.
12. Concrete mixing.

B. Related Requirements:

1. Section 031000 "Concrete Forming and Accessories" for form-facing materials, form liners, insulating concrete forms, and waterstops.
2. Section 032000 "Concrete Reinforcing" for steel reinforcing bars and welded-wire reinforcement.
3. Section 312000 "Earth Moving" for drainage fill under slabs-on-ground.

1.2 PREINSTALLATION MEETINGS

- ##### A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- ##### A. Product data.

- ##### B. Design Mixtures: For each concrete mixture, include the following:

1. Mixture identification.
2. Compressive strength at 28 days or other age as specified.
3. Durability exposure classes for Exposure Categories F, S, W, and C.
4. Maximum w/cm ratio.
5. Slump or slump flow limit.

6. Air content.
7. Nominal maximum aggregate size.
8. Intended placement method.
9. Submit adjustments to design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant changes.

1.4 INFORMATIONAL SUBMITTALS

- A. Material certificates.
- B. Material test reports.
- C. Floor surface flatness and levelness measurements report, indicating compliance with specified tolerances in accordance with ACI 117 and in compliance with ASTM E1155 (ASTM E1155M).
- D. Minutes of preinstallation conference.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified Installer who employs Project personnel qualified as an ACI-certified Concrete Flatwork Associate and Concrete Flatwork Finisher and a supervisor who is a certified ACI Advanced Concrete Flatwork Finisher/Technician or an ACI Concrete Flatwork Finisher with experience installing and finishing concrete.
- B. Laboratory Testing Agency Qualifications: A testing agency qualified in accordance with ASTM C1077 and ASTM E329 for testing that performs duties on behalf of the Architect/Engineer.

PART 2 - PRODUCTS

2.1 CONCRETE STANDARDS

- A. ACI Publications: Comply with ACI 301 (ACI 301M) unless modified by requirements in the Contract Documents.

2.2 CONCRETE MATERIALS

A. Cementitious Materials:

1. Portland Cement: ASTM C150/C150M, Type I, gray.
2. Pozzolans: ASTM C618, Class C, F, or N.
3. Slag Cement: ASTM C989/C989M, Grade 100 or 120.
4. Ground Glass Pozzolan: ASTM C1866/C1866M, Type GS or GE.

B. Normal-Weight Aggregates:

1. Coarse Aggregate: ASTM C33/C33M, Class 3M.
2. Maximum Coarse-Aggregate Size: 3/4 inch (19 mm) nominal.
3. Fine Aggregate: ASTM C33/C33M.

2.3 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C260/C260M.
- B. Chemical Admixtures: 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. Admixtures with special properties, with documentation of claimed performance enhancement, ASTM C494/C494M, Type S.
- C. Mixing Water for Concrete Mixtures and Water Used to Make Ice: ASTM C1602/C1602M. Include documentation of compliance with limits for alkalis, sulfates, chlorides, or solids content of mixing water from Table 2 in ASTM C1602/C1602M.

2.4 VAPOR RETARDERS

- A. Sheet Gas/Vapor Retarder, Class A: ASTM E1745, Class A, except with maximum water-vapor permeance of 0.01 perms; not less than 20 mils (0.50 mm) thick. Include manufacturer's recommended adhesive or pressure-sensitive tape.
 1. Basis-of-Design Product: Subject to compliance with requirements, provide W.R. Meadows, Inc. Perminator EVOH underslab gas vapor barrier; or comparable product by one of the following:
 - a. ISI Building Products.
 - b. Reef Industries, Inc.
 - c. Stego Industries, LLC.
 - d. Strong Man Safety Products.

2.5 LIQUID FLOOR TREATMENTS

- A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.
 1. Basis-of-Design Product: Subject to compliance with requirements, provide Euclid Chemical Company (The); EUCO DIAMOND HARD or comparable product by one of the following:

- a. TK Products.

2.6 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.
- C. Moisture-Retaining Cover: ASTM C171, polyethylene film burlap-polyethylene sheet.
 - 1. Color:
 - a. Ambient Temperature Below 50 deg F (10 deg C): Black.
 - b. Ambient Temperature between 50 and 85 deg F (10 and 29 deg C): Any color.
 - c. Ambient Temperature Above 85 deg F (29 deg C): White.
- D. Curing Paper: 8 ft. (2438 mm) wide paper, consisting of two layers of fibered kraft paper laminated with double coating of asphalt.
- E. Water: Potable water that does not cause staining of the surface.

2.7 ACCESSORIES

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber.
- B. Bonding Agent: ASTM C1059/C1059M, Type II, nonredispersible, acrylic emulsion or styrene butadiene.
- C. Epoxy Bonding Adhesive: ASTM C881/C881M, 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.

2.8 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3 mm) and that can be feathered at edges to match adjacent floor elevations.
- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch (6 mm) and that can be filled in over a scarified surface to match adjacent floor elevations.

2.9 CONCRETE MIXTURE MATERIALS

- 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 (ACI 301M).
 - 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 or hydraulic cement in concrete assigned to Exposure Class F3 as follows:
 - 1. Fly Ash or Other Pozzolans: 25 percent by mass.
 - 2. Slag Cement: 50 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.

2.10 CONCRETE MIXTURE CLASS TYPES

- A. Class A: Normal-weight concrete used for footings.
 - 1. Exposure Class: ACI 318 (ACI 318M) Class F0, C1.
 - 2. Minimum Compressive Strength: 4000 psi (27.6 MPa) at 28 days.
 - 3. Maximum w/cm Ratio: 0.50.
 - 4. Air Content:
 - a. 0.0 percent, plus or minus 1.5 percent at point of delivery for concrete containing 3/4-inch (19-mm) nominal maximum aggregate size.
 - 5. Limit water-soluble, chloride-ion content in hardened concrete to 0.30 percent by weight of cementitious materials.
- B. Class C: Normal-weight concrete used for interior slabs-on-ground.
 - 1. Exposure Class: ACI 318 (ACI 318M) Class F0, C0.
 - 2. Minimum Compressive Strength: 4000 psi (27.6 MPa) at 28 days.
 - 3. Maximum w/cm Ratio: 0.50.
 - 4. 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.
 - 5. Limit water-soluble, chloride-ion content in hardened concrete to 1.00 percent by weight of cement.

2.11 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94/C94M and furnish delivery ticket.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Before placing concrete, verify that installation of concrete forms, accessories, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Do not proceed until unsatisfactory conditions have been corrected.

3.2 TOLERANCES

- A. Comply with ACI 117 (ACI 117M).

3.3 INSTALLATION OF VAPOR RETARDERS

- A. Sheet Gas/Vapor Retarders: Place, protect, and repair sheet gas/vapor retarder in accordance with ASTM E1643 and manufacturer's written instructions.

3.4 INSTALLATION OF CAST-IN-PLACE CONCRETE

- A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and vapor retarder is complete and that required inspections are completed.
- B. Notify Architect and testing and inspection agencies 24 hours prior to commencement of concrete placement.
- C. Water addition in transit or at the Project site must be in accordance with ASTM C94/C94M and must not exceed the permitted amount indicated on the concrete delivery ticket.
- 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.
- 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.

3.5 INSTALLATION OF 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 Architect.
 - 2. Place joints perpendicular to main reinforcement.
 - a. Continue reinforcement across construction joints unless otherwise indicated.
 - 3. 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 (contractor's option):
 - 1. Grooved Joints: Form control joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch (3 mm). 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 (3-mm-) wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random cracks.

3.6 APPLICATION OF FINISHING FLOORS AND SLABS

- A. 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 (ACI A117M) tolerances for conventional concrete.
 - 3. Apply float finish to surfaces to receive trowel finish.
- B. 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. Use of an approved finishing aid is acceptable.
 - 5. Do not apply 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.

7. Finish surfaces to the following tolerances, in accordance with ASTM E1155 (ASTM E1155M), for a randomly trafficked floor surface:
 - a. Slabs on Ground:
 - 1) Specified overall values of flatness, F_F 35; and of levelness, F_L 25; with minimum local values of flatness, F_F 24; and of levelness, F_L 17.
 - C. Trowel and Fine-Broom Finish: First apply a trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thinset method. While concrete is still plastic, slightly scarify surface with a fine broom perpendicular to main traffic route.
 1. Coordinate required final finish with Architect before application.
 2. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.
 - D. 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 a fiber-bristle broom perpendicular to main traffic route.
 2. Coordinate required final finish with Architect before application.
- 3.7 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 match color and texture with in-place construction exposed to view.
 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 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 (100 mm) high unless otherwise indicated on Drawings, and extend base not less than 6 inches (150 mm) 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 (27.6 MPa) at 28 days.
 4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around the full perimeter of concrete base.

3.8 APPLICATION OF CONCRETE CURING

- A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
 - 1. Comply with ACI 301 (ACI 301M) for cold weather protection during curing.
 - 2. Comply with ACI 301 (ACI 301M) and ACI 305.1 (ACI 305.1M) for hot-weather protection during curing.
 - 3. Maintain moisture loss no more than 0.2 lb/sq. ft. x h (1 kg/sq. m x h), calculated in accordance with ACI 305R, before and during finishing operations.
- B. Curing Unformed Surfaces: Comply with ACI 308.1 (ACI 308.1M) as follows:
 - 1. Begin curing 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 (300 mm).
 - 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 (300 mm), 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 not in cold weather:
 - 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 (300 mm).
 - 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 (300 mm), 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.

3.9 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 has received a float finish or abrasive surface preparation.

3.10 INSTALLATION OF CONCRETE SURFACE REPAIRS

- A. Defective Concrete:
 - 1. Repair and patch defective areas when approved by Architect.
 - 2. Remove and replace concrete that cannot be repaired and patched to meet specification requirements.
- 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 (1.18-mm) sieve, using only enough water for handling and placing.

C. 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 (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width.
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 adding 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 (6 mm) 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 (25 mm) 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 (19-mm) 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 (25 mm) 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.
- D. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- E. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.11 FIELD QUALITY CONTROL

- A. Engage a special inspector to perform field tests and inspections and prepare testing and inspection reports.
- B. Delivery Tickets: Comply with ASTM C94/C94M.
- C. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172/C 172M to 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. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 150 cu. yd. (114 cu. m) or fraction thereof.
 - a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing is to 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 delivery for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - b. Perform additional tests as needed.
 - 3. Air Content: ASTM C231/C231M pressure method, for normal-weight concrete.
 - a. One test for each composite sample when strength test specimens are cast, but not less than one test for each day's pour of each concrete mixture.
 - 4. Concrete Density: ASTM C138/C138M:
 - a. One test for each composite sample when strength test specimens are cast.
 - 5. Compression Test Specimens: ASTM C31/C31M:

- a. Cast and standard cure two sets of three 6 inches (150 mm) by 12-inches (300 mm) or 4-inch (100-mm) by 8-inch (200-mm) cylindrical specimens for each composite sample.
 6. Compressive-Strength Tests: ASTM C39/C39M.
 - a. Test one set of three standard cured specimens at seven days and one set of two specimens at 28 days.
 - b. A compressive-strength test to be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
 7. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests of standard cured cylinders equals or exceeds specified compressive strength.
 8. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
 9. Additional Tests:
 - a. Testing and inspecting agency to 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 Architect.
 - 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 Architect.
 - 1) Acceptance criteria for concrete strength to be in accordance with ACI 301 (ACI 301M), Section 1.7.6.3.
 10. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
 11. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.
 - D. Measure floor and slab flatness and levelness in accordance with ASTM E1155 (ASTM E1155M) within 24 hours of completion of floor finishing and promptly report test results to Architect.
- 3.12 PROTECTION
- A. Protect concrete surfaces.
 - B. Protect from petroleum stains.
 - C. Prohibit vehicles from interior concrete slabs.
 - D. Prohibit placement of steel items on concrete surfaces.

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END OF SECTION 033000

CAST-IN-PLACE CONCRETE

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SECTION 040110 - MASONRY CLEANING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes cleaning the following:

1. Unit masonry surfaces.

1.2 DEFINITIONS

- A. Low-Pressure Spray: 100 to 400 psi (690 to 2750 kPa); 4 to 6 gpm (0.25 to 0.4 L/s).
- B. Medium-Pressure Spray: 400 to 800 psi (2750 to 5510 kPa); 4 to 6 gpm (0.25 to 0.4 L/s).
- C. High-Pressure Spray: 800 to 1200 psi (5510 to 8250 kPa); 4 to 6 gpm (0.25 to 0.4 L/s).

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 CLEANING MATERIALS

- A. Water: Potable.
- B. Detergent Solution, Job Mixed: Solution prepared by mixing 2 cups (0.5 L) of tetrasodium pyrophosphate (TSPP), 1/2 cup (125 mL) of laundry detergent, and 20 quarts (20 L) of hot water for every 5 gal. (20 L) of solution required.
- C. Mold, Mildew, and Algae Remover, Job Mixed: Solution prepared by mixing 2 cups (0.5 L) of tetrasodium pyrophosphate (TSPP), 5 quarts (5 L) of 5 percent sodium hypochlorite (bleach), and 15 quarts (15 L) of hot water for every 5 gal. (20 L) of solution required.

PART 3 - EXECUTION

3.1 CLEANING MASONRY, GENERAL

- A. Cleaning Appearance Standard: Cleaned surfaces are to have a uniform appearance as viewed from 20 feet (6 m) away by Architect.
- B. Proceed with cleaning in an orderly manner; work from top to bottom of each scaffold width and from one end of each elevation to the other. Ensure that dirty residues and rinse water do not wash over dry, cleaned surfaces.
- C. Use only those cleaning methods indicated for each masonry material and location.
 - 1. Brushes: Do not use wire brushes or brushes that are not resistant to cleaner being used.
 - 2. Spray Equipment: Use spray equipment that provides controlled application at volume and pressure indicated, measured at nozzle. Adjust pressure and volume to ensure that cleaning methods do not damage surfaces, including joints.
 - a. Equip units with pressure gages.
 - b. For water-spray application, use fan-shaped spray that disperses water at an angle of 25 to 50 degrees.
- D. Perform each cleaning method indicated in a manner that results in uniform coverage of all surfaces, including corners, moldings, and interstices, and that produces an even effect without streaking or damaging masonry surfaces. Keep wall wet below area being cleaned to prevent streaking from runoff.
- E. Perform additional general cleaning, paint and stain removal, and spot cleaning of small areas that are noticeably different when viewed according to the "Cleaning Appearance Standard" Paragraph, so that cleaned surfaces blend smoothly into surrounding areas.
- F. Water-Spray Application Method: Unless otherwise indicated, hold spray nozzle at least 6 inches (150 mm) from masonry surface and apply water in horizontal back-and-forth sweeping motion, overlapping previous strokes to produce uniform coverage.

3.2 PRELIMINARY CLEANING

- A. Preliminary Cleaning: Before beginning general cleaning, remove extraneous substances that are resistant to planned cleaning methods. Extraneous substances include paint, calking, asphalt, and tar.
 - 1. Carefully remove heavy accumulations of rigid materials from masonry surface with sharp chisel. Do not scratch or chip masonry surface.
 - 2. Remove paint and calking with alkaline paint remover.
 - a. Comply with requirements in "Paint Removal" Article.
 - b. Repeat application up to two times if needed.

3. Remove asphalt and tar with solvent-type paste paint remover.
 - a. Comply with requirements in "Paint Removal" Article.
 - b. Apply paint remover only to asphalt and tar by brush without prewetting.
 - c. Allow paint remover to remain on surface for 10 to 30 minutes.
 - d. Repeat application if needed.

3.3 PAINT REMOVAL

- A. Paint-Remover Application, General: Apply paint removers according to paint-remover manufacturer's written instructions. Do not allow paint removers to remain on surface for periods longer than those indicated or recommended in writing by manufacturer.
- B. Paint Removal with Covered or Skin-Forming Alkaline Paint Remover:
 1. Apply paint remover to dry, painted surface with trowel, spatula, or as recommended in writing by manufacturer.
 2. Apply cover according to manufacturer's written instructions.
 3. Allow paint remover to remain on surface for period recommended in writing by manufacturer or as determined by preconstruction testing.
 4. Scrape off paint and remover.
 5. Rinse with cold water applied by low-pressure spray to remove chemicals and paint residue.
 6. Rinse with cold water applied by low-pressure spray to remove chemicals and soil.
 7. Retreat spots of remaining paint.
- C. Paint Removal with Solvent-Type Paste Paint Remover:
 1. Apply thick coating of paint remover to painted surface with natural-fiber cleaning brush, deep-nap roller, or large paint brush. Apply in one or two coats according to manufacturer's written instructions.
 2. Allow paint remover to remain on surface for period recommended in writing by manufacturer or as determined by preconstruction testing.
 3. Rinse with cold water applied by low-pressure spray to remove chemicals and paint residue.

3.4 CLEANING MASONRY

- A. Detergent Cleaning:
 1. Wet surface with cold water applied by low-pressure spray.
 2. Scrub surface with detergent solution using medium-soft brushes until soil is thoroughly dislodged and can be removed by rinsing. Use small brushes to remove soil from mortar joints and crevices. Dip brush in solution often to ensure that adequate fresh detergent is used and that surface remains wet.
 3. Rinse with cold water applied by low-pressure spray to remove detergent solution and soil.

B. Mold, Mildew, and Algae Removal:

1. Wet surface with cold water applied by low-pressure spray.
2. Apply mold, mildew, and algae remover by brush or low-pressure spray.
3. Scrub surface with medium-soft brushes until mold, mildew, and algae are thoroughly dislodged and can be removed by rinsing. Use small brushes for mortar joints and crevices. Dip brush in mold, mildew, and algae remover often to ensure that adequate fresh cleaner is used and that surface remains wet.
4. Rinse with cold water applied by low-pressure spray to remove mold, mildew, and algae remover and soil.

END OF SECTION 040110

SECTION 042200 - CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Concrete masonry units.
2. Decorative concrete masonry units.
3. Steel reinforcing bars.

1.2 DEFINITIONS

- A. CMU(s):** Concrete masonry unit(s).
- B. Reinforced Masonry:** Masonry containing reinforcing steel in grouted cells.

1.3 ACTION SUBMITTALS

- A. Product Data:** For each type of product.
- B. Shop Drawings:** For reinforcing steel. Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315.
- C. Samples:** For each type and color of the following:
1. Decorative CMUs.
 2. Pigmented mortar.

1.4 INFORMATIONAL SUBMITTALS

- A. Material Certificates:** For each type and size of product. For masonry units, include material test reports substantiating compliance with requirements.
- B. Mix Designs:** For each type of mortar and grout. Include description of type and proportions of ingredients.
1. Include test reports, in accordance with ASTM C1019, for grout mixes required to comply with compressive strength requirement.

1.5 QUALITY ASSURANCE

- A. Sample Panels: Build sample panels to verify selections made under Sample submittals and to demonstrate aesthetic effects.
 - 1. Build sample panels for each type of exposed unit masonry construction in sizes approximately 60 inches (1500 mm) long by 48 inches (1200 mm) high by full thickness.

1.6 FIELD CONDITIONS

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

PART 2 - PRODUCTS

2.1 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.

2.2 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.
- B. Integral Water Repellent: Provide units made with integral water repellent for exposed units.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Euclid Chemical Company (The); BLOCKTITE or HYDRAPEL System or comparable product by one of the following:
 - a) GCP Applied Technologies Inc.
 - b) Master Builders Solutions.

C. CMUs: ASTM C90.

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi (13.1 MPa).
2. Density Classification: Normal weight.

D. Decorative CMUs: ASTM C90.

3. Basis-of-Design Product: Subject to compliance with requirements, provide Westbrook Concrete Block, Ground Face, Color #SF302; or comparable product by one of the following:
 - a. Echelon Masonry.
 - b. Fizzano Brothers Concrete Products, Inc.
2. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi (13.1 MPa).
3. Density Classification: Normal weight.
4. Pattern and Texture:
 - a. Standard pattern, split-face finish. Match Architect's samples.

2.3 CONCRETE LINTELS

- A. Concrete Lintels: ASTM C1623, matching CMUs in color, texture, and density classification; and with reinforcing bars indicated. Provide lintels with net-area compressive strength not less than that of CMUs.

2.4 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.
- 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. Colored Cement Products: Packaged blend made from portland cement and hydrated lime and mortar pigments, all complying with specified requirements, and containing no other ingredients.
 1. Colored Portland Cement-Lime Mix:
 2. Basis-of-Design Product: Subject to compliance with requirements, provide Custom Colored Portland Lime Cement by Heidelberg Materials; or comparable product by one of the following:

- a. Amerimix.
 - b. Spectrum Colored Cements.
 - c. Workrite Cements.
- E. Aggregate for Mortar: ASTM C144.
- 1. White-Mortar Aggregates: Natural white sand or crushed white stone.
- F. Aggregate for Grout: ASTM C404.
- G. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C494/C494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
- H. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing integral water repellent from same manufacturer.
- I. Water: Potable.

2.5 REINFORCEMENT

- A. Uncoated-Steel Reinforcing Bars: ASTM A615/A615M or ASTM A996/A996M, Grade 60 (Grade 420).
- 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 (3.77-mm) steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.
- C. Masonry-Joint Reinforcement, General: ASTM A951/A951M.
- 1. Interior Walls: Hot-dip galvanized, carbon steel.
 - 2. Exterior Walls: Hot-dip galvanized carbon steel.
 - 3. Wire Size for Side Rods: 0.187-inch (4.76-mm) diameter.
 - 4. Wire Size for Cross Rods: 0.187-inch (4.76-mm) diameter.
 - 5. Spacing of Cross Rods: Not more than 16 inches (407 mm) o.c.
 - 6. Provide in lengths of not less than 10 feet (3 m), with prefabricated corner and tee units.

2.6 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:
- 1. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304, 0.016 inch (0.40 mm) thick.
 - 2. Fabricate continuous flashings in sections 96 inches (2400 mm) long minimum, but not exceeding 12 feet (3.7 m). Provide splice plates at joints of formed, smooth metal flashing.

3. Fabricate metal drip edges from stainless steel. Extend at least 3 inches (76 mm) into wall and 1/2 inch (13 mm) out from wall, with outer edge bent down 30 degrees and hemmed.
- B. Flexible Flashing: Use the following unless otherwise indicated:
1. Copper-Laminated Flashing: 5-oz./sq. ft. (1.5-kg/sq. m) copper sheet bonded between two layers of glass-fiber cloth. Use only where flashing is fully concealed in masonry.
 2. Basis-of-Design Product: Subject to compliance with requirements, provide York Manufacturing, Inc.; Multi-Flash 500 Copper Fabric Flashing; or comparable product by one of the following:
 - a) Hohmann & Barnard, Inc.
 - b) Wire-Bond.
- C. Solder and Sealants for Sheet Metal Flashings: As specified in Section 076200 "Sheet Metal Flashing and Trim."
- D. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.7 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene.
- B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D2000, Designation M2AA-805 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- C. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D226/D226M, Type I (No. 15 asphalt felt).

2.8 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
 1. Do not use calcium chloride in mortar or grout.
 2. Use portland cement-lime mortar unless otherwise indicated.
 3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated.
 - 1. For masonry below grade or in contact with earth, use Type S.
 - 2. For reinforced masonry, use Type N.
 - 3. For mortar parge coats, use Type N.
 - 4. For exterior, above-grade, load-bearing and nonload-bearing walls and parapet walls; for interior load-bearing walls; for interior nonload-bearing partitions; and for other applications where another type is not indicated, use Type N.
- D. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.
 - 1. Pigments do not exceed 10 percent of portland cement by weight.
 - 2. Application: Use pigmented mortar for exposed mortar joints with the following units:
 - a. Decorative CMUs.
- E. 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, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi (14 MPa).
 - 3. Provide grout with a slump of 8 to 11 inches (200 to 280 mm) as measured in accordance with ASTM C143/C143M.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. 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.

3.2 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 (12 mm) or minus 1/4 inch (6 mm).

2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch (12 mm).
3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch (6 mm) in a story height or 1/2 inch (12 mm) 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 (6 mm in 3 m), or 1/2-inch (12-mm) 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 (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2-inch (12-mm) maximum.
3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2-inch (12-mm) 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 (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2-inch (12-mm) maximum.
5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2-inch (12-mm) maximum.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm).
2. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch (9 mm) or minus 1/4 inch (6 mm).
3. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm).

3.3 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less-than-nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
- C. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- D. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- E. 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.

- F. Fill cores in hollow CMUs with grout 24 inches (600 mm) under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

3.4 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. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

3.5 MASONRY-JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch (16 mm) on exterior side of walls, 1/2 inch (13 mm) elsewhere. Lap reinforcement a minimum of 6 inches (150 mm).
 - 1. Space reinforcement not more than 16 inches (406 mm) o.c.
 - 2. Space reinforcement not more than 8 inches (203 mm) o.c. in foundation walls.
 - 3. Provide reinforcement not more than 8 inches (203 mm) above and below wall openings and extending 12 inches (305 mm) 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.

3.6 FLASHING

- A. General: Install embedded flashing at ledges and other obstructions to downward flow of water in wall where indicated.
- B. Install flashing as follows unless otherwise indicated:

1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
2. At lintels, extend flashing a minimum of 6 inches (150 mm) into masonry at each end. At heads and sills, extend flashing 6 inches (150 mm) at ends and turn up not less than 2 inches (50 mm) to form end dams.
3. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch (13 mm) back from outside face of wall, and adhere flexible flashing to top of metal drip edge.

3.7 REINFORCED UNIT MASONRY

- A. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.
- B. 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 (1520 mm).

3.8 PARGING

- A. Use a steel-trowel finish to produce a smooth, flat, dense surface with a maximum surface variation of 1/8 inch per foot (3 mm per 300 mm). Form a wash at top of parging and a cove at bottom.
- B. Damp-cure parging for at least 24 hours and protect parging until cured.

3.9 REPAIRING, POINTING, AND CLEANING

- A. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- B. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
 1. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes.
 2. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

3.10 MASONRY WASTE DISPOSAL

- A. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.

- B. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042200

SECTION 047200 - CAST STONE MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Trim units.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show fabrication and installation details for cast stone units. Include dimensions, details of reinforcement and anchorages if any, and indication of finished faces.
- C. Samples:
 - 1. For each color and texture of cast stone required, 4 inches (100 mm) square in size.

1.4 INFORMATIONAL SUBMITTALS

- A. Material test reports.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer of cast stone units similar to those indicated for this Project, that has sufficient production capacity to manufacture required units, and is a plant certified by CSI.

PART 2 - PRODUCTS

2.1 CAST STONE UNITS

- A. Cast Stone Units: Comply with ASTM C1364.

1. Units are manufactured using the vibrant dry tamp method.
 2. Trim units including window sills as indicated on Drawings.
 - B. Fabricate units with sharp arris and accurately reproduced details, with indicated texture on all exposed surfaces unless otherwise indicated.
 1. Slope exposed horizontal surfaces 1:12 to drain unless otherwise indicated.
 2. Provide raised fillets at backs of sills and at ends indicated to be built into jambs.
 3. Provide drips on projecting elements unless otherwise indicated.
 - C. Cure Units as Follows:
 1. Cure units in enclosed, moist curing room at 95 percent relative humidity and temperature of 100 deg F (38 deg C) for 12 hours or 70 deg F (21 deg C) for 16 hours.
 2. Keep units damp and continue curing to comply with one of the following:
 - a. No fewer than five days at mean daily temperature of 70 deg F (21 deg C) or above.
 - b. No fewer than seven days at mean daily temperature of 50 deg F (10 deg C) or above.
 - D. Acid etch units after curing to remove cement film from surfaces to be exposed to view.
 - E. Colors and Textures: As selected by Architect from manufacturer's full range.
- 2.2 MORTAR MIXES
- A. Comply with requirements in Section 042200 "Concrete Unit Masonry" for mortar mixes.
 - B. Comply with ASTM C270, Proportion Specification.
 1. For setting mortar, use Type N.
 2. For pointing mortar, use Type N.
 - C. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.

PART 3 - EXECUTION

3.1 SETTING CAST STONE IN MORTAR

- A. Set cast stone as indicated in TMS 604.
- B. Install cast stone units to comply with requirements in Section 042200 "Concrete Unit Masonry."
- C. Set units in full bed of mortar with full head joints unless otherwise indicated.

1. Fill collar joints solid as units are set.
 2. Build concealed flashing into mortar joints as units are set.
- D. Rake out joints for pointing with mortar to depths of not less than 3/4 inch (19 mm). Rake joints to uniform depths with square bottoms and clean sides. Scrub faces of units to remove excess mortar as joints are raked.
- E. Point mortar joints by placing and compacting mortar in layers not greater than 3/8 inch (10 mm). Compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.
- F. Tool exposed joints slightly concave when thumbprint hard. Use a smooth plastic jointer larger than joint thickness.

3.2 ADJUSTING AND CLEANING

- A. Remove and replace stained and otherwise damaged units and units not matching approved Samples. Cast stone may be repaired if methods and results are approved by Architect.
- B. Replace units in a manner that results in cast stone matching approved Samples, complying with other requirements, and showing no evidence of replacement.
- C. In-Progress Cleaning: Clean cast stone as work progresses.
1. Remove mortar fins and smears before tooling joints.
 2. Remove excess sealant immediately, including spills, smears, and spatter.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed cast stone as follows:
1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 2. Test cleaning methods on sample; leave one sample uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of cast stone.
 3. Clean cast stone by methods described in Cast Stone Institute Technical Bulletin #39.

END OF SECTION 047200

SECTION 051200 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Structural steel.
2. Shrinkage-resistant grout.

1.2 DEFINITIONS

- A. Structural Steel:** Elements of the structural frame indicated on Drawings and as described in ANSI/AISC 303.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference:** Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Shop Drawings:** Show fabrication of structural-steel components.
- B. Delegated Design Submittal:** For structural-steel connections indicated on Drawings to comply with design loads, include analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications:** A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category BU or is accredited by the IAS Fabricator Inspection Program for Structural Steel (Acceptance Criteria 172).
- B. Installer Qualifications:** A qualified Installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category CSE.
- C. Welding Qualifications:** Qualify procedures and personnel in accordance with AWS D1.1/D1.1M.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with applicable provisions of the following specifications and documents:
 - 1. ANSI/AISC 303.
 - 2. ANSI/AISC 360.
 - 3. RCSC's "Specification for Structural Joints Using High-Strength Bolts."
- B. Connection Design Information:
 - 1. Option 3 and 3B: Design connections and final configuration of member reinforcement at connections in accordance with ANSI/AISC 303 by fabricator's qualified professional engineer.
 - a. Use Allowable Stress Design; data are given at service-load level.
- C. Moment Connections: Type FR, fully restrained.
- D. Construction: Combined system of moment frame and shear walls.

2.2 STRUCTURAL-STEEL MATERIALS

- A. W-Shapes: ASTM A992/A992M.
- B. Channels, Angles, M-Shapes, S-Shapes: ASTM A36/A36M.
- C. Plate and Bar: ASTM A36/A36M.
- D. Cold-Formed Hollow Structural Sections: ASTM A500/A500M, Grade B structural tubing.
- E. Steel Pipe: ASTM A53/A53M, Type E or Type S, Grade B.
- F. Welding Electrodes: Comply with AWS requirements.

2.3 BOLTS AND CONNECTORS

- A. High-Strength A325 Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325 (Grade A325M), Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH (ASTM A563M, Class 10S), heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers; all with plain finish.
 - 1. Direct-Tension Indicators: ASTM F959/F959M, Type 325-1 (Type 8.8-1), compressible-washer type with plain finish.

- B. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F3125/F3125M, Grade F1852, Type 1, round head assemblies, consisting of steel structural bolts with splined ends; ASTM A563, Grade DH (ASTM A563M, Class 10S), heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers.

- 1. Finish: Plain.

2.4 PRIMER

- A. Steel Primer:

- 1. Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.

- B. Galvanized-Steel Primer: MPI#26.

- 1. Etching Cleaner: MPI#25, for galvanized steel.
 - 2. Galvanizing Repair Paint: ASTM A780/A780M.

2.5 SHRINKAGE-RESISTANT GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.6 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate in accordance with ANSI/AISC 303 and to ANSI/AISC 360.

2.7 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for type of bolt and type of joint specified.

- 1. Joint Type: Snug tightened.

- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

2.8 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel in accordance with ASTM A123/A123M.

1. Fill vent and drain holes that are exposed in the finished Work unless they function as weep holes, by plugging with zinc solder and filing off smooth.

2.9 SHOP PRIMING

A. Shop prime steel surfaces, except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches (50 mm).
2. Surfaces to be field welded.
3. Surfaces of high-strength bolted, slip-critical connections.
4. Galvanized surfaces.

B. Surface Preparation of Steel: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces in accordance with the following specifications and standards:

1. SSPC-SP 2.

C. Surface Preparation of Galvanized Steel: Prepare galvanized-steel surfaces for shop priming by thoroughly cleaning steel of grease, dirt, oil, flux, and other foreign matter, and treating with etching cleaner.

D. Priming: Immediately after surface preparation, apply primer in accordance with manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and in accordance with ANSI/AISC 303 and ANSI/AISC 360.

- B. Baseplates, Bearing Plates and Leveling 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. Weld plate washers to top of baseplate.
 - 3. Promptly pack shrinkage-resistant 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 grouting.
- C. Maintain erection tolerances of structural steel within ANSI/AISC 303.

3.3 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for bolt and joint type specified.
 - 1. Joint Type: Snug tightened.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
 - 1. Comply with ANSI/AISC 303 and ANSI/AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.

END OF SECTION 051200

SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Miscellaneous framing and supports.
2. Metal bollards.
3. Pipe and downspout guards.
4. Loose steel lintels.
5. Loose bearing and leveling plates.

B. Products furnished, but not installed, under this Section include the following:

1. Loose steel lintels.

1.2 ACTION SUBMITTALS

A. Product Data: For the following:

1. Slotted channel framing.
2. Metal bollards.
3. Pipe and downspout guards.

B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

PART 2 - PRODUCTS

2.1 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.**
- B. Steel Plates, Shapes, and Bars: ASTM A36/A36M.**
- C. Steel Tubing: ASTM A500/A500M, cold-formed steel tubing.**
- D. Steel Pipe: ASTM A53/A53M, Standard Weight (Schedule 40) unless otherwise indicated.**
- E. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.**

1. Size of Channels: 1-5/8 by 1-5/8 inches (41 by 41 mm).
 2. Material: Galvanized steel, ASTM A653/A653M, structural steel, Grade 33 (Grade 230), with G90 (Z275) coating; 0.108-inch (2.8-mm) nominal thickness.
- F. Cast Iron: Either gray iron, ASTM A48/A48M, or malleable iron, ASTM A47/A47M, unless otherwise indicated.
- G. Aluminum Castings: ASTM B26/B26M, Alloy 443.0-F.

2.2 FASTENERS

- A. General: Unless otherwise indicated, provide Type 316 stainless steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
1. Provide stainless steel fasteners for fastening aluminum and stainless steel.
- B. Post-Installed Anchors: Torque-controlled expansion anchors.
1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.
 2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 2 (A4) stainless steel bolts, ASTM F593 (ISO 3506-1), and nuts, ASTM F594 (ASTM F836M).

2.3 MISCELLANEOUS MATERIALS

- A. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.
- B. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.
- C. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.
- E. Shrinkage-Resistant Grout: Factory-packaged, nonmetallic, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- F. Concrete: Comply with requirements in Section 033000 "Cast-in-Place Concrete" for normal-weight, air-entrained concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa).

2.4 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, not less than 8 inches (200 mm) from ends and corners of units and 24 inches (600 mm) o.c.

2.5 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.

2.6 MISCELLANEOUS STEEL TRIM

- A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.
- B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
 - 1. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.
- C. Galvanize exterior miscellaneous steel trim.
- D. Prime exterior miscellaneous steel trim with zinc-rich primer.

2.7 METAL BOLLARDS

- A. Fabricate metal bollards from Schedule 80 steel pipe.
- B. Prime steel bollards with zinc-rich primer.

2.8 PIPE AND DOWNSPOUT GUARDS

- A. Fabricate downspout guards from 3/8-inch- (9.5-mm-) thick by 12-inch- (300-mm-) wide, steel plate, bent to fit flat against the wall or column at both ends and to fit around pipe with 2-inch (50-mm) clearance between pipe and pipe guard. Drill each end for two 3/4-inch (19-mm) anchor bolts.
- B. Galvanize and prime steel downspout guards.
- C. Prime steel downspout guards with zinc-rich primer.

2.9 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
- B. Galvanize bearing and leveling plates.
- C. Prime plates with zinc-rich primer.

2.10 LOOSE STEEL LINTELS

- A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for

each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.

- B. Galvanize and prime loose steel lintels located in exterior walls.
- C. Prime loose steel lintels located in exterior walls with zinc-rich primer.

2.11 GENERAL FINISH REQUIREMENTS

- A. Finish metal fabrications after assembly.

2.12 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products.
 - 1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
- B. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:
 - 1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 3. Galvanized-Steel Items: SSPC-SP 16, "Brush-off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals."
- C. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for

use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

3.2 INSTALLATION OF MISCELLANEOUS FRAMING AND SUPPORTS

- A. Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Support steel girders on solid grouted masonry, concrete, or steel pipe columns. Secure girders with anchor bolts embedded in grouted masonry or concrete or with bolts through top plates of pipe columns.

3.3 INSTALLATION OF MISCELLANEOUS STEEL TRIM

- A. Anchor to masonry construction to comply with manufacturer's written instructions.

3.4 INSTALLATION OF METAL BOLLARDS

- A. Anchor bollards in place with concrete footings. Center and align bollards in holes 3 inches (75 mm) above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.
- B. Fill bollards solidly with concrete, mounding top surface to shed water.

3.5 INSTALLATION OF PIPE AND DOWNSPOUT GUARDS

- A. Provide pipe guards at exposed vertical pipes at locations indicated on Drawings where not protected by curbs or other barriers. Install by bolting to wall or column with expansion anchors. Provide four 3/4-inch (19-mm) bolts at each pipe guard. Mount pipe guards with top edge 26 inches (660 mm) above driving surface.

3.6 INSTALLATION OF LOOSE BEARING AND LEVELING PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with shrinkage-resistant grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.7 REPAIRS

- A. Touchup Painting:

1. Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

END OF SECTION 055000

SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Framing with dimension lumber.
2. Wood blocking, and nailers.
3. Wood furring

1.2 ACTION SUBMITTALS

A. Product Data:

1. For each type of process and factory-fabricated product.
2. For preservative-treated wood products.

1.3 INFORMATIONAL SUBMITTALS

A. Material Certificates:

1. For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.
2. For preservative-treated wood products. Indicate type of preservative used and net amount of preservative retained.

B. Evaluation Reports: For the following, from ICC-ES:

1. Wood-preservative-treated wood.
2. Power-driven fasteners.
3. Post-installed anchors.
4. Metal framing anchors.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber:** Comply with DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Grade lumber 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.
- B. Maximum Moisture Content:
 1. Boards: 15 percent.
 2. Dimension Lumber: 19 percent unless otherwise indicated.

2.2 PRESERVATIVE TREATMENT

- A. Preservative Treatment by Pressure Process: AWP A 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.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that 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 all wood exposed to weather and/or in contact with ground, concrete, or CMU.
 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 2. Wood sills, sleepers, blocking, furring, and similar concealed members in contact with masonry or concrete.
 3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
 4. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 DIMENSION LUMBER FRAMING

- A. Non-Load-Bearing Interior Partitions by Grade: Construction or No. 2 grade.
 1. Application: Interior partitions not indicated as load bearing.
 2. Species:
 - a. Southern pine or mixed southern pine; SPIB.
 - b. Northern species; NLGA.
 - c. Eastern softwoods; NeLMA.
 - d. Western woods; WCLIB or WWPA.

- B. Framing Other Than Non-Load-Bearing Partitions by Performance: Any species and grade with a modulus of elasticity of at least 1,500,000 psi, an extreme fiber stress in bending of at least 975 psi, and shear stress perpendicular to grain of 150 psi for 2-inch nominal thickness and up to 12-inch nominal width for single-member use.

- 1. Application: Framing other than interior partitions not indicated as load bearing

2.4 MISCELLANEOUS LUMBER

- A. Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

- 1. Blocking.
 - 2. Nailers.
 - 3. Rooftop equipment bases and support curbs.
 - 4. Cants.
 - 5. Furring.
 - 6. Grounds.

- B. Dimension Lumber Items: Construction or No. 2 grade lumber of any species.

- C. Concealed Boards: 19 percent maximum moisture content and the following species and grades:

- 1. Mixed southern pine or southern pine; No. 2 grade; SPIB.
 - 2. Approved equivalent meeting the minimum modulus of elasticity, bending stress, compressive stress, and any of the following species and grades:
 - a) Mixed southern pine or southern pine; No. 2 grade; SPIB.
 - b) Eastern softwoods; No. 2 Common grade; NeLMA.
 - c) Northern species; No. 2 Common grade; NLGA.
 - d) Western woods; Construction or No. 2 Common grade; WCLIB or WWPA.

2.5 PLYWOOD BACKING PANELS

- A. Equipment Backing Panels: Plywood, DOC PS 1, Exterior, C-C Plugged, in thickness indicated or, if not indicated, not less than 3/4-inch (19-mm) nominal thickness.

2.6 FASTENERS

- A. General: Fasteners are to be of size and type indicated and comply with requirements specified in this article for material and manufacture. Provide nails or screws, in sufficient length, to penetrate not less than 1-1/2 inches into wood substrate.

1. Where rough 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. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- C. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC58, ICC-ES AC193 or ICC-ES AC308 as appropriate for the substrate.

2.7 METAL FRAMING ANCHORS

- A. All wood connections are to be made using pre-fabricated connectors. Toe-nailing will not be permitted. Submit manufacturer's data for approval.
- B. Simpson Strong Tie connections have been specified to meet the structural calculations of plan elements.
- C. All wood connectors shall be provided in manufacturer's standard finish except for applications involving pressure treated or fire-retardant lumber. For treated lumber application, all metal connectors shall be hot dip galvanized.
- D. Allowable design loads, as published by manufacturer, are to meet or exceed those of basis-of-design products indicated. Manufacturer's published values are to be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors are to be punched for fasteners adequate to withstand same loads as framing anchors.
- E. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A653/A653M, G60 coating designation.
 1. Use for interior locations unless otherwise indicated.
- F. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A653/A653M; structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thick.
 1. Use for wood-preservative-treated lumber and where indicated.

2.8 MISCELLANEOUS MATERIALS

- A. Sill-Sealer Gaskets:
 1. Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer's standard widths to suit width of sill members indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- B. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.
- C. Set work to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate furring, nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- 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. Comply with AWPAC M4 for applying field treatment to cut surfaces of preservative-treated lumber.
- G. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code (IBC).
 - 2. ICC-ES evaluation report for fastener.

3.2 PROTECTION

- A. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet enough that moisture content exceeds that specified, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061000

SECTION 061600 - SHEATHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Wall sheathing.
2. Roof sheathing.
3. Subflooring.

1.2 ACTION SUBMITTALS

- A. Product Data:** For each type of process and factory-fabricated product.

1.3 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports:** For the following, from ICC-ES:

1. Wood-preservative-treated plywood.

PART 2 - PRODUCTS

2.1 PRESERVATIVE-TREATED PLYWOOD

- A. Preservative Treatment by Pressure Process:** AWWPA 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.
- B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.**
- C. Application:** Treat items indicated on Drawings and plywood in contact with masonry or concrete or used with roofing, flashing, vapor barriers, and waterproofing.

2.2 WALL SHEATHING

- A. Plywood Sheathing, Walls:** Exposure 1, Structural I sheathing.

2.3 ROOF SHEATHING

- A. Plywood Sheathing, Roofs: Exposure 1, Structural I sheathing.

2.4 SUBFLOORING AND UNDERLAYMENT

- A. Plywood Subflooring: Either DOC PS 1 or DOC PS 2, single-floor panels or sheathing.

2.5 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 - 1. For roof and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M.

2.6 MISCELLANEOUS MATERIALS

- A. Adhesives for Field Gluing Panels to Wood Framing: Formulation complying with APA AFG-01 that is approved for use with type of construction panel indicated by manufacturers of both adhesives and panels.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
 - 1. Table 2304.10.1, "Fastening Schedule," in the ICC's International Building Code.
 - 2. ICC-ES evaluation report for fastener.
- D. Coordinate wall and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

3.2 WOOD STRUCTURAL PANEL INSTALLATION

- A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
 - 1. Subflooring:
 - a. Glue and nail to wood framing.
 - b. Screw to cold-formed metal framing.
 - c. Space panels 1/8 inch (3 mm) apart at edges and ends.
 - 2. Wall and Roof Sheathing:
 - a. Nail to wood framing. Apply a continuous bead of glue to framing members at edges of wall sheathing panels.
 - b. Screw to cold-formed metal framing.
 - c. Space panels 1/8 inch (3 mm) apart at edges and ends.

END OF SECTION 061600

SECTION 061753 - SHOP-FABRICATED WOOD TRUSSES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Wood roof trusses.
2. Wood girder trusses.

1.2 ACTION SUBMITTALS

A. Product Data: For metal-plate connectors, metal truss accessories, and fasteners.

B. Shop Drawings: Show fabrication and installation details for trusses.

1. Show location, pitch, span, camber, configuration, and spacing for each type of truss required.
2. Indicate sizes, stress grades, and species of lumber.
3. Indicate locations, sizes, and materials for permanent bracing required to prevent buckling of individual truss members due to design loads.
4. Indicate type, size, material, finish, design values, orientation, and location of metal connector plates.
5. Show splice details and bearing details.

C. Delegated-Design Submittals: For metal-plate-connected wood trusses indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation. The professional engineer shall be legally qualified to practice in jurisdiction where Project is located and shall be experienced in providing engineering services of the kind indicated.

1.3 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For the following, from ICC-ES:

1. Metal-plate connectors.
2. Metal truss accessories.

1.4 QUALITY ASSURANCE

A. Metal Connector-Plate Manufacturer Qualifications: A manufacturer that is a member of TPI and that complies with quality-control procedures in TPI 1 for manufacture of connector plates.

1. Manufacturer's responsibilities include providing professional engineering services needed to assume engineering responsibility.
 2. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.
- B. Fabricator Qualifications: Shop that participates in a recognized quality-assurance program, complies with quality-control procedures in TPI 1, and involves third-party inspection by an independent testing and inspecting agency acceptable to Architect and authorities having jurisdiction.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Handle and store trusses to comply with recommendations in SBCA BCSI, "Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer to design metal-plate-connected wood trusses. The professional engineer shall be legally qualified to practice in jurisdiction where Project is located and shall be experienced in providing engineering services of the kind indicated.
- B. Structural Performance: Metal-plate-connected wood trusses are to be capable of withstanding design loads within limits and under conditions indicated. Comply with requirements in TPI 1.
- C. Comply with applicable requirements and recommendations of TPI 1, TPI DSB, and SBCA BCSI.
- D. Wood Structural Design Standard: Comply with applicable requirements in AF&PA's "National Design Specifications for Wood Construction" and its "Supplement."

2.2 DIMENSION LUMBER

- A. Lumber: DOC PS 20 and applicable rules of any rules-writing agency certified by the American Lumber Standard Committee (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. Provide dry lumber with 15 percent maximum moisture content at time of dressing.
- B. Permanent Bracing: Provide wood bracing that complies with requirements for miscellaneous lumber in Section 061000 "Rough Carpentry."

2.3 METAL CONNECTOR PLATES

- A. Fabricate connector plates to comply with TPI 1.
- B. Hot-Dip Galvanized-Steel Sheet: ASTM A653/A653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G60 (Z180) coating designation; and not less than 0.036 inch (0.9 mm) thick.

2.4 FASTENERS

- A. Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 - 1. Provide fasteners for use with metal framing anchors that comply with written recommendations of metal framing manufacturer.
 - 2. Where trusses are exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M.
- B. Nails, Brads, and Staples: ASTM F1667.

2.5 METAL FRAMING ANCHORS AND ACCESSORIES

- A. The truss fabricator shall furnish pre-fabricated hangers as required for installation.
- B. Provide Simpson H10 Hurricane Tie, or equal, at the bearing end of all trusses unless otherwise noted.
- C. Allowable design loads, as published by manufacturer, are to comply with or exceed those indicated. Manufacturer's published values are to be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors are to be punched for fasteners adequate to withstand same loads as framing anchors.
- D. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A653/A653M, G60 (Z180) coating designation.

2.6 FABRICATION

- A. Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly, with joints closely fitted to comply with tolerances in TPI 1. Position members to produce design camber indicated.
 - 1. Fabricate wood trusses within manufacturing tolerances in TPI 1.
- B. Connect truss members by metal connector plates located and securely embedded simultaneously in both sides of wood members by air or hydraulic press.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install wood trusses only after supporting construction is in place and is braced and secured.
- B. If trusses are delivered to Project site in more than one piece, assemble trusses before installing.
- C. Hoist trusses in place by lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.
- D. Install and brace trusses according to TPI recommendations and as indicated.
- E. Anchor trusses securely at bearing points; use metal truss tie-downs or floor truss hangers as applicable. Install fasteners through each fastener hole in metal framing anchors according to manufacturer's fastening schedules and written instructions.
- F. Securely connect each truss ply required for forming built-up girder trusses.
- G. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.
 - 1. Install bracing to comply with Section 061000 "Rough Carpentry."
- H. Install wood trusses within installation tolerances in TPI 1.
- I. Do not alter trusses in field. Do not cut, drill, notch, or remove truss members.
- J. Replace wood trusses that are damaged or do not comply with requirements.

END OF SECTION 061753

SECTION 064116 - PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Plastic-laminate-clad architectural cabinets.
2. Cabinet hardware and accessories.
3. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-clad architectural cabinets that are not concealed within other construction.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference:** Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data:** For each type of product.

B. Shop Drawings:

1. Include plans, elevations, sections, and attachment details.
2. Apply AWI Quality Certification Program label to Shop Drawings.

- C. Samples:** For each exposed product and for each color and texture specified.

1.4 CLOSEOUT SUBMITTALS

- A. Quality Standard Compliance Certificates:** AWI Quality Certification Program certificates.

1.5 QUALITY ASSURANCE

- A. Manufacturer's Qualifications:** Employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

1. **Manufacturer's Certification:** Licensed participant in AWI's Quality Certification Program.

- B. Installer Qualifications:** Manufacturer of products.

1.6 FIELD CONDITIONS

- A. Environmental Limitations with Humidity Control: Do not deliver or install cabinets until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity between 43 and 70 percent during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

- A. Quality Standard: Unless otherwise indicated, comply with the Architectural Woodwork Standards for grades of cabinets indicated for construction, finishes, installation, and other requirements.
 - 1. Provide labels from AWI certification program indicating that woodwork complies with requirements of grades specified.
- B. Architectural Woodwork Standards Grade: Custom.
- C. Type of Construction: Frameless.
- D. Door and Drawer-Front Style: Flush overlay.
 - 1. Reveal Dimension: 1/2 inch (13 mm).
- E. High-Pressure Decorative Laminate: ISO 4586-3, grades as indicated or if not indicated, as required by quality standard.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Wilsonart LLC; Decorative Plastic Laminates or comparable product by one of the following:
 - a. Abet Laminati Inc.
 - b. Formica Corporation.
 - c. Lamin-Art, Inc.
 - d. Pionite; a Panolam Industries International, Inc. brand.
- F. Exposed Surfaces:
 - 1. Plastic-Laminate Grade: HGS.
 - 2. Edges: Grade HGS.
 - 3. Pattern Direction: Vertically for doors and fixed panels, horizontally for drawer fronts.
- G. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, ISO 4586-3, grade to match exposed surface.

- H. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.
 - 1. Join subfronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners.
- I. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
 - 1. As selected by Architect from laminate manufacturer's full range in the following categories:
 - a. Wood grains, matte finish.

2.2 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
 - 1. Wood Moisture Content: 5 to 10 percent.
- B. Composite Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
 - 1. Medium-Density Fiberboard (MDF): ANSI A208.2, Grade 130.
 - 2. Particleboard (Medium Density): ANSI A208.1, Grade M-2-Exterior Glue.

2.3 CABINET HARDWARE AND ACCESSORIES

- A. Butt Hinges: 2-3/4-inch (70-mm), five-knuckle steel hinges made from 0.095-inch- (2.4-mm-) thick metal, and as follows:
 - 1. Semiconcealed Hinges for Flush Doors: ANSI/BHMA A156.9, B01361.
- B. Frameless Concealed Hinges (European Type): ANSI/BHMA A156.9, B01602, 100 degrees of opening, self-closing.
- C. Back-Mounted Pulls: ANSI/BHMA A156.9, B02011.
- D. Wire Pulls: Back mounted, solid metal, 4 inches (100 mm) long, 5/16 inch (8 mm) in diameter.
- E. Catches: Magnetic catches, ANSI/BHMA A156.9, B03141.
- F. Shelf Rests: ANSI/BHMA A156.9, B04013; metal.

G. Drawer Slides: ANSI/BHMA A156.9.

1. Heavy-Duty (Grade 1HD-100 and Grade 1HD-200): Side mount.

- a. Type: Full extension.
- b. Material: Galvanized steel ball bearing slides.
- c. Motion Feature: Soft close dampener.

H. Door and Drawer Silencers: ANSI/BHMA A156.16, L03011.

I. Grommets for Cable Passage: 2-inch (51-mm) OD, molded-plastic grommets and matching plastic caps with slot for wire passage.

1. Color: Black.

J. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with ANSI/BHMA A156.18 for ANSI/BHMA finish number indicated.

1. Satin Stainless Steel: ANSI/BHMA 630.

K. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in ANSI/BHMA A156.9.

2.4 MISCELLANEOUS MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.

B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.

C. Adhesive for Bonding Plastic Laminate: Type II water-resistant type as selected by fabricator to comply with requirements.

1. Adhesive for Bonding Edges: Hot-melt adhesive.

2.5 FABRICATION

A. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

B. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to

produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Before installation, condition cabinets to humidity conditions in installation areas for not less than 72 hours.
- B. Architectural Woodwork Standards Grade: Install cabinets to comply with quality standard grade of item to be installed.
- C. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with wafer-head cabinet installation screws.
- D. Install cabinets level, plumb, and true in line to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm) using concealed shims.
 - 1. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
 - 2. Install cabinets without distortion so doors and drawers fit openings and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
 - 3. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches (400 mm) o.c. with No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish.

END OF SECTION 064116

SECTION 066400 - PLASTIC PANELING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes plastic sheet paneling.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For plastic paneling and trim accessories.

PART 2 - PRODUCTS

2.1 PLASTIC SHEET PANELING

- A. Glass-Fiber-Reinforced Plastic Paneling: Gelcoat-finished, glass-fiber-reinforced plastic panels complying with ASTM D5319. Panels are to be USDA accepted for incidental food contact.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Crane Composites, Inc.; VARIETEX Series or comparable product by one of the following:
 - a. Glasteel.
 - b. Marlite.
 - c. Newcourt, Inc.
 - d. Nudo Products, Inc.
 - e. Parkland Plastics, Inc.
 - 2. Surface-Burning Characteristics: As follows when tested by a qualified testing agency in accordance with ASTM E84. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.
 - 3. Nominal Thickness: Not less than 0.09 inch (2.3 mm).
 - 4. Surface Finish: Molded pebble texture.
 - 5. Color: As selected by Architect from manufacturer's full range.

2.2 ACCESSORIES

- A. Trim Accessories: Manufacturer's standard one-piece 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: As selected by Architect from manufacturer's full range.
- B. Sealant: Mildew-resistant, single-component, neutral-curing silicone sealant recommended by plastic paneling manufacturer and complying with requirements in Section 079200 "Joint Sealants."

PART 3 - EXECUTION

3.1 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.

3.2 INSTALLATION

- A. Install plastic paneling according to manufacturer's written instructions.
- B. Install panels in a full spread of adhesive.
- C. Install trim accessories with adhesive.
- D. Maintain uniform space between panels and wall fixtures. Fill space with sealant.
- E. 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 066400

SECTION 071900 - WATER REPELLENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Penetrating water repellents.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference:** Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product data.**

1.4 INFORMATIONAL SUBMITTALS

- A. Product certificates.**

1.5 QUALITY ASSURANCE

- A. Applicator Qualifications:** An employer of workers trained and approved by manufacturer.

1.6 FIELD CONDITIONS

- A. Limitations:** Proceed with application only when the following existing and forecasted weather and substrate conditions permit water repellents to be applied according to manufacturers' written instructions and warranty requirements:
1. Building has been closed in for not less than 30 days before treating wall assemblies.
 2. Ambient temperature is above 40 deg F (4.4 deg C) and below 100 deg F (37.8 deg C) and will remain so for 24 hours.
 3. Substrate is not frozen and substrate-surface temperature is above 40 deg F (4.4 deg C) and below 100 deg F (37.8 deg C).
 4. Rain or snow is not predicted within 24 hours.
 5. Not less than seven (7) days have passed since surfaces were last wet.
 6. Windy conditions do not exist that might cause water repellent to be blown onto vegetation or surfaces not intended to be treated.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees replace materials that fail to maintain water repellency within specified warranty period, for applications meeting manufacturer's requirements for pre-application approval.

1. Warranty Period: Five (5) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PENETRATING WATER REPELLENTS

- A. Penetrating Low-VOC Silane/Siloxane-Blend Water Repellent: Clear, containing ten percent (10.0%) or more active content of silane and siloxane blend with 400 g/L or less of VOCs.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Sure Klean Weather Seal Siloxane PD by PROSOCO, Inc.; or comparable products by one of the following:
 - a. Advanced Chemical Technologies, Inc.
 - b. BASF Corporation; Construction Systems.
 - c. Chemical Products Industries, Inc.
 - d. Conproco Corporation.
 - e. Euclid Chemical Company (The); an RPM company.
 - f. Karnak Corporation.
 - g. L&M Construction Chemicals, Inc.
 - h. Pecora Corporation.
 - i. Sika Corporation.
 - j. Symons by Dayton Superior.
 - k. Tamms; a brand of Euclid Chemical Company; an RPM Company.
 - l. Wacker Chemical Corporation.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements and conditions affecting performance of the Work.
1. Verify that surfaces are clean and dry in accordance with water-repellent manufacturer's requirements. Check moisture content in representative locations by method recommended by manufacturer.
 2. Verify that there is no efflorescence or other removable residues that would be trapped beneath the application of water repellent.
 3. Verify that required repairs are complete, cured, and dry before applying water repellent.

- B. Test pH level in accordance with water-repellent manufacturer's written instructions to ensure chemical bond to silica-containing or siliceous minerals.

3.2 PREPARATION

- A. New Construction and Repairs: Allow concrete and other cementitious materials to age before application of water repellent, in accordance with repellent manufacturer's written instructions.
- B. Cleaning: Before application of water repellent, clean substrate of substances that could impair penetration or performance of product in accordance with water-repellent manufacturer's written instructions.
- C. Coordination with Mortar Joints: Do not apply water repellent until pointing mortar for joints adjacent to surfaces receiving water-repellent treatment has been installed and cured.
- D. Coordination with Sealant Joints: Do not apply water repellent until sealants for joints adjacent to surfaces receiving water-repellent treatment have been installed and cured.
 - 1. Water-repellent work may precede sealant application only if sealant adhesion and compatibility have been tested and verified using substrate, water repellent, and sealant materials identical to those required.

3.3 APPLICATION OF WATER REPELLENTS

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect the substrate before application of water repellent and to instruct Applicator on the product and application method to be used.
- B. Apply coating of water repellent on surfaces to be treated using low-pressure spray to the point of saturation. Apply coating in dual passes of uniform, overlapping strokes. Remove excess material; do not allow material to puddle beyond saturation. Comply with manufacturer's written instructions for application procedure unless otherwise indicated.
 - 1. At Contractor's option, first application of water repellent may be completed before installing cast stone units. Mask mortar and sealant bond surfaces to prevent water repellent from migrating onto adjacent joint surfaces. Remove masking after repellent has cured.
- C. Apply a second saturation coating, repeating first application. Comply with manufacturer's written instructions for limitations on drying time between coats and after rainstorm wetting of surfaces between coats. Consult manufacturer's technical representative if written instructions are not applicable to Project conditions.

3.4 CLEANING

- A. Immediately clean water repellent from adjoining surfaces and surfaces soiled or damaged by water-repellent application, in accordance with manufacturer's written cleaning instructions, as work progresses. Correct damage to work of other trades caused by water-repellent application.

END OF SECTION 071900

SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Extruded polystyrene foam-plastic board insulation.
2. Glass-fiber blanket insulation.
3. Mineral-wool blanket insulation.

1.2 ACTION SUBMITTALS

A. Product data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Maximum flame-spread and smoke-developed indexes less than Class B, 75 and 450 when tested in accordance with ASTM E84.
- B. Fire-Resistance Ratings: Comply with ASTM E119 or UL 263; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1. Indicate design designations from UL's "Fire Resistance Directory" or from listings of another qualified testing agency.
- C. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
- D. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches (305 mm) and wider in width.
- E. Thermal-Resistance Value (R-Value): R-value as indicated on Drawings in accordance with ASTM C518.

2.2 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD INSULATION (XPS)

- A. Extruded Polystyrene Board Insulation, Type IV: ASTM C578, Type IV, 25 psi (173 kPa) minimum compressive strength; unfaced.

2.3 GLASS-FIBER BLANKET INSULATION

- A. Glass-Fiber Blanket Insulation, Polypropylene-Scrim-Kraft Faced: ASTM C665, Type II (nonreflective faced), Class A (faced surface with a flame-spread index of 25 or less); Category 1 (membrane is a vapor barrier).

2.4 MINERAL-WOOL BLANKET INSULATION

- A. Mineral-Wool Blanket Insulation, Unfaced, Sound Attenuation Batt Insulation: ASTM C665, Type I (blankets without membrane facing); consisting of fibers; complying with ASTM E136 for combustion characteristics.

2.5 ACCESSORIES

- A. Insulation for Miscellaneous Voids:
 - 1. Spray Polyurethane Foam Insulation: ASTM C1029, Type II, closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E84.
- B. Miscellaneous Application Accessories:
 - 1. 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.
 - 2. Crack Sealer: Closed-cell insulating foam in aerosol dispenser recommended in writing by insulation manufacturer for filling gaps in board insulation.
 - 3. Eave Ventilation Troughs: Preformed, rigid fiberboard or plastic sheets designed and sized to fit between roof framing members and to provide ventilation between insulated attic spaces and vented eaves.

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 those that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products, applications and applicable codes.

- 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 in accordance with manufacturer's written instructions.
 - 1. If not otherwise indicated, extend insulation a minimum of 24 inches (610 mm) below exterior grade line.
- B. On horizontal surfaces, loosely lay insulation units in accordance with manufacturer's written instructions. Stagger end joints and tightly abut insulation units.
 - 1. If not otherwise indicated, extend insulation a minimum of 24 inches (610 mm) in from exterior walls.

3.4 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

- A. Blanket Insulation: Install in cavities formed by framing members in accordance with 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 (76-mm) clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
 - 4. Attics: Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.
 - 5. For metal-framed wall cavities where cavity heights exceed 96 inches (2438 mm), support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
 - 6. Where glass-fiber blankets are indicated for sound attenuation above ceilings, install unfaced blanket insulation over ceiling area in thickness indicated. Where partitions occur, extend insulation up either side of partition.

7. Vapor-Retarder-Faced Blankets: Tape joints and ruptures in vapor-retarder facings, and seal each continuous area of insulation to ensure airtight installation.
 - 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. (40 kg/cu. m).
 2. Detailing Foam Insulation for Voids: Apply in accordance with manufacturer's written instructions.
- 3.5 INSTALLATION OF BOARD INSULATION
- A. Install board insulation in accordance with manufacturer's written instructions per project applications and conditions.
- 3.6 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 072100

SECTION 072119 - FOAMED-IN-PLACE INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Foam insulation for exterior CMU masonry walls.

1.2 ACTION SUBMITTALS

A. Product Data:

1.3 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Research reports.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized applicator who is trained and approved by the manufacturer.

PART 2 - PRODUCTS

2.1 FOAMED-IN-PLACE INSULATION

- A. Amino-Plast Polyurethane Foam for Masonry Walls: ASTM C518, minimum density of 2.5 lb/cu. ft. (40 kg/cu. m) wet and minimum aged R-value at 1-inch (25.4-mm) thickness of 4.5 deg F x h x sq. ft./Btu at 75 deg F.
 1. Basis-of-Design Product: The design for foamed-in-place insulation is based on Core-Fill 500 foamed-in-place building insulation as manufactured by Tailored Chemical Products, Inc. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:
 - a. Polymaster, Inc.; R501
 - b. Thermal Corporation of America; Thermco Foam.
 - c. CFI Foam, Inc; Core Foam

2. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.
3. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with insulation manufacturer's written instructions applicable to products and applications.
- B. Pump insulation materials under pressure to envelop entire area to be insulated and fill voids.

END OF SECTION 072119

SECTION 072715 - NONBITUMINOUS SELF-ADHERING SHEET AIR BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Self-adhering, vapor-permeable, nonbituminous sheet air barriers.
2. Drainage material for siding areas.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference:** Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data:** For each type of product.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates:** For each type of nonbituminous self-adhering sheet air barrier.
- B. Product test reports.**

1.5 QUALITY ASSURANCE

- A. Installer Qualifications:** An entity that employs installers and supervisors who are trained and approved by manufacturer.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Air-Barrier Performance:** Air-barrier assembly and seals with adjacent construction to be capable of performing as a continuous air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies to be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

- B. Air-Barrier Assembly Air Leakage: Maximum 0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft. (0.2 L/s x sq. m of surface area at 75 Pa), when tested in accordance with ASTM E2357.

2.2 NONBITUMINOUS SHEET AIR BARRIER

- A. Vapor-Permeable Nonbituminous Sheet: Minimum 20-mil- (0.5-mm-) thick, self-adhering sheet consisting of a breathable carrier film or fabric and an adhesive with release liner on adhesive side and formulated for application with primer that complies with VOC limits.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Henry® Blueskin® VP160 by Henry Company, a Carlisle Company; or comparable product by one of the following:
 - a. 3M Building and Construction
 - b. Carlisle SynTec Systems
 - c. GCP Applied Technologies
 - d. IKO Industries, Inc.
 - e. The Soprema Group
 - f. W.R. Meadows, Inc.
 - 2. Physical and Performance Properties:
 - a. Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. (0.02 L/s x sq. m of surface area at 75-Pa) pressure difference; ASTM E2178.
 - b. Puncture Resistance: Minimum 40 lbf (180 N); ASTM E154/E154M.
 - c. Vapor Permeance: Minimum 15 perms (860 ng/Pa x s x sq. m); ASTM E96/E96M, Desiccant Method, Procedure A.
 - d. Adhesion to Substrate: Minimum 16 lbf/sq. in. (110 kPa) when tested in accordance with ASTM D4541 as modified by ABAA.
 - e. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
 - f. UV Resistance: Can be exposed to sunlight for 150 days in accordance with manufacturer's written instructions.

2.3 DRAINAGE MATERIAL

- A. Drainage Material: Product shall maintain a continuous open space between water-resistive barrier and exterior cladding to create a drainage plane and shall be used under siding.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide CavClear/Archovations, Inc.; CavClear Rainscreen Mat, or a comparable product by one of the following:
 - a. DuPont Safety & Construction.
 - b. Insulfoam - a division of Carlisle Construction Materials Inc.
 - c. Keene Building Products.

- d. Stuc-O-Flex International, Inc.
- e. Typar.

- 2. Flame Propagation Test: Materials and construction shall be as tested according to NFPA 285.

2.4 ACCESSORY MATERIALS

- A. Requirement: Provide primers, transition strips, termination strips, joint sealants, counterflashing strips, flashing sheets and metal termination bars, termination mastic, substrate patching materials, adhesives, tapes, foam sealants, lap sealants, and other accessory materials that are recommended in writing by air-barrier manufacturer to produce a complete air-barrier assembly and that are compatible with primary air-barrier material and adjacent construction to which they may seal.
- B. Primer: Liquid waterborne primer recommended for substrate by air-barrier material manufacturer.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

- A. Clean, prepare, treat, fill, and seal substrate and joints and cracks in substrate in accordance with manufacturer's written instructions and details. Provide clean, dust-free, and dry substrate for air-barrier application.
- B. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.
- C. Bridge isolation joints, expansion joints and discontinuous wall-to-wall, deck-to-wall, and deck-to-deck joints with air-barrier accessory material that accommodates joint movement in accordance with manufacturer's written instructions and details.

3.2 INSTALLATION

- A. Install materials in accordance with air-barrier manufacturer's written instructions and details to form a seal with adjacent construction and ensure continuity of air and water barrier.
 - 1. Unless manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.
- B. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by air-barrier sheet on same day. Reprime areas exposed for more than 24 hours.

- C. Apply and firmly adhere air-barrier sheets over area to receive air barrier. Accurately align sheets and maintain uniform 2-1/2-inch- (64-mm-) minimum lap widths and end laps. Overlap and seal seams, and stagger end laps to ensure airtight installation.
 - 1. Apply sheets in a shingled manner to shed water.
 - 2. Roll sheets firmly to enhance adhesion to substrate.
- D. Install air-barrier sheet and accessory materials to form a seal with adjacent construction and to maintain a continuous air barrier.
- E. Connect and seal exterior wall air-barrier sheet continuously to roofing-membrane air barrier, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.
- F. Wall Openings: Prime concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition strip so that a minimum of 3 inches (75 mm) of coverage is achieved over each substrate. Maintain 3 inches (75 mm) of contact over firm bearing to perimeter frames, with not less than 1 inch (25 mm) of full contact.
- G. Repair punctures, voids, and deficient lapped seams in air barrier. Slit and flatten fishmouths and blisters. Patch with air-barrier sheet extending 6 inches (150 mm) beyond repaired areas in all directions.
- H. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.

3.3 DRAINAGE MATERIAL INSTALLATION

- A. Install drainage material over air barrier sheet and flashing at walls to comply with manufacturer's written instructions.

3.4 CLEANING AND PROTECTION

- A. Protect air-barrier system from damage during application and remainder of construction period, in accordance with manufacturer's written instructions.

END OF SECTION 072715

SECTION 073113 - ASPHALT SHINGLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Glass-fiber-reinforced asphalt shingles.
2. Underlayment materials.
3. Ridge vents.
4. Metal flashing and trim.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference:** Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For the following:

1. Asphalt shingles.
2. Underlayment materials.
3. Ridge vents.
4. Asphalt roofing cement.
5. Elastomeric flashing sealant.

- B. Samples:** For each exposed product and for each color and blend specified.

1.4 INFORMATIONAL SUBMITTALS

- A. Product test reports.**
- B. Research reports for synthetic underlayment.**
- C. Sample warranty.**

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.**

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized installer who is trained and approved by manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store roofing materials in a dry, well-ventilated location protected from weather, sunlight, and moisture in accordance with manufacturer's written instructions.
- B. Store underlayment rolls on end, on pallets or other raised surfaces. Do not double-stack rolls.
- C. Protect unused roofing materials from weather, sunlight, and moisture when left overnight or when roofing Work is not in progress.
- D. Handle, store, and place roofing materials in a manner to prevent damage to roof deck or structural supporting members.
- E. Handle, store, and place roofing materials on the roof prior to application in a manner to prevent deformation and/or damage to the shingle bundles or shingles.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Proceed with installation only when existing and forecasted weather conditions permit product installation and related Work to be performed in accordance with manufacturer's written instructions and warranty requirements.
 - 1. Install self-adhering, polymer-modified bitumen sheet underlayment within the range of ambient and substrate temperatures recommended in writing by manufacturer.

1.9 WARRANTY

- A. Materials Warranty: Manufacturer agrees to repair or replace asphalt shingles that fail within specified warranty period.
 - 1. Materials Warranty Period: Forty (40) years from date of Substantial Completion, prorated, with the first twenty (20) years nonprorated.
 - 2. Wind-Speed Warranty Period: Asphalt shingles will resist blow-off or damage caused by wind speeds of up to 135 mph (60 m/s) for ten (10) years from date of Substantial Completion.
 - 3. Algae-Resistance Warranty Period: Asphalt shingles will not discolor for ten (10) years from date of Substantial Completion.
 - 4. Workmanship Warranty Period: Five (5) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Exterior Fire-Test Exposure: Provide asphalt shingles and related roofing materials identical to those of assemblies tested for Class A fire resistance in accordance with ASTM E108 or UL 790 by Underwriters Laboratories or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing agency.
- B. Wind Resistance: Provide asphalt shingles that comply with requirements of ASTM D3161/D3161M, Class F, and with ASTM D7158/D7158M, Class H.
- C. Energy Performance, ENERGY STAR: Provide asphalt shingles that are listed on the DOE's "ENERGY STAR Roof Product List" for steep-slope roof products.

2.2 GLASS-FIBER-REINFORCED ASPHALT SHINGLES

- A. Impact-Resistant, Laminated-Strip Asphalt Shingles: ASTM D3462/D3462M, laminated, multi-ply overlay construction; glass-fiber reinforced, mineral-granule surfaced, and self-sealing; with impact resistance complying with UL 2218, Class 4.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Timberline Ultra HD Lifetime High Definition super heavyweight shingles by GAF Materials Corporation; or comparable product by one of the following:
 - a. CertainTeed Corporation.
 - b. Malarkey Roofing Company
 - c. Owens Corning.
 - d. PABCO Roofing Products.
 - 2. Butt Edge: Notched cut.
 - 3. Strip Size: Manufacturer's standard.
 - 4. Algae Resistance: Granules resist algae discoloration.
 - 5. Color and Blends: As selected by Architect from manufacturer's full range.
- B. Hip and Ridge Shingles: Manufacturer's standard units to match asphalt shingles.

2.3 UNDERLAYMENT MATERIALS

- A. Self-Adhering, Polymer-Modified Bitumen Sheet: ASTM D1970/D1970M, minimum 40-mil- (1.0-mm-) thick sheet; glass-fiber-mat-reinforced, polymer-modified asphalt; with slip-resistant top surface and release backing; cold applied.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Blueskin RF200 Ice and Water Barrier by the Henry Company; or comparable product by one of the following:

- a. CertainTeed Corporation
- b. GCP Applied Technologies, Inc.
- c. GAF Materials Corporation.
- d. Owens Corning.

2. Top Surface: Textured polymer film.

2.4 RIDGE VENTS

A. Rigid Ridge Vent: Manufacturer's standard, rigid-section, high-density, UV-stabilized plastic ridge vent for use under ridge shingles.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Cobra Ridge Runner Exhaust Vent by GAF Materials Corporation; or comparable product by one of the following:

- a. Air Vent, Inc.; a Gibraltar Industries company.
- b. Benjamin Obdyke, Inc.
- c. CertainTeed Corporation.
- d. Cor-A-Vent, Inc.
- e. Owens Corning.

2. Minimum Net Free Area: 12.5 square-inches per linear foot.

3. Width: 13.5-inches.

4. Thickness: 0.625-inches.

5. Features:

- a. Nonwoven geotextile filter strips.
- b. External deflector baffles.

2.5 ACCESSORIES

A. Asphalt Roofing Cement: ASTM D4586/D4586M Type II, asbestos free.

B. Elastomeric Flashing Sealant: ASTM C920, Type S, Grade NS, one-part, non-sag, elastomeric polymer sealant; of class and use classifications required to seal joints and remain watertight; recommended in writing by manufacturer for installation of flashing systems.

C. Roofing Nails: ASTM F1667, aluminum, stainless steel, copper, or hot-dip galvanized-steel wire shingle nails, minimum 0.120-inch- (3-mm-) diameter, sharp-pointed, with a 3/8- to 7/16-inch- (10- to 11-mm-) diameter flat head and of sufficient length to penetrate 3/4 inch (19 mm) into solid wood decking or extend at least 1/8 inch (3 mm) through sheathing less than 3/4 inch (19 mm) thick.

1. Where nails are in contact with metal flashing, use nails made from same metal as flashing.

- D. Underlayment Nails: Aluminum, stainless steel, or hot-dip galvanized-steel wire nails with low-profile metal or plastic caps, 1-inch- (25-mm-) minimum diameter.
 - 1. Provide with minimum 0.0134-inch- (0.34-mm-) thick metal cap, 0.010-inch- (0.25-mm-) thick power-driven metal cap, or 0.035-inch- (0.89-mm-) thick plastic cap; and with minimum 0.083-inch- (2.11-mm-) thick ring shank or 0.091-inch- (2.31-mm-) thick smooth shank of length to penetrate at least 3/4 inch (19 mm) into roof sheathing or to penetrate through roof sheathing less than 3/4 inch (19 mm) thick.
- 2.6 METAL FLASHING AND TRIM
- A. Comply with requirements in Section 076200 "Sheet Metal Flashing and Trim."
 - 1. Sheet Metal: Stainless steel.
 - B. Fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of the item unless otherwise indicated on Drawings.

PART 3 - EXECUTION

3.1 INSTALLATION OF UNDERLAYMENT MATERIALS

- A. Comply with asphalt shingle and underlayment manufacturers' written installation instructions and with recommendations in NRCA's "The NRCA Roofing Manual: Steep-Slope Roof Systems" applicable to products and applications indicated unless more stringent requirements are specified in this Section or indicated on Drawings.
- B. Self-Adhering, Polymer-Modified Bitumen Sheet: Install, wrinkle free, on roof deck in locations indicated on Drawings.
 - 1. Comply with low-temperature installation restrictions of underlayment manufacturer.
 - 2. Install lapped in direction that sheds water.
 - a. Lap sides not less than 4 inches (102 mm).
 - b. Lap ends not less than 6 inches (152 mm), staggered 24 inches (610 mm) between succeeding courses.
 - c. Roll laps with roller.
 - 3. Prime concrete, masonry, and metal surfaces to receive self-adhering sheet.
 - 4. Cover underlayment within seven days.
- C. Metal-Flashed, Open-Valley Underlayment: Install two layers of minimum 36-inch- (914-mm-) wide underlayment centered in valley.
 - 1. Use same underlayment as installed on field of roof.

2. Stagger end laps between layers at least 72 inches (1829 mm).
3. Lap ends of each layer at least 12 inches (305 mm) in direction that sheds water, and seal with asphalt roofing cement.
4. Fasten each layer to roof deck with underlayment nails located as far from valley center as possible and only to extent necessary to hold underlayment in place until installation of valley flashing.
5. Lap roof-deck underlayment over first layer of valley underlayment at least 6 inches (152 mm).

3.2 INSTALLATION OF METAL FLASHING AND TRIM

- A. Install metal flashings and trim to comply with requirements in Section 076200 "Sheet Metal Flashing and Trim."
 1. Bed flanges of metal flashings using asphalt roofing cement or elastomeric flashing sealant.
- B. Pipe Flashings: Form flashing around pipe penetrations and asphalt shingles. Fasten and seal to asphalt shingles as recommended by manufacturer.

3.3 INSTALLATION OF ASPHALT SHINGLES

- A. Install starter strip along lowest roof edge, consisting of an asphalt shingle strip at least 7 inches (178 mm) wide with self-sealing strip face up at roof edge.
 1. Extend asphalt shingles 1/2 inch (13 mm) over fasciae at eaves and rakes.
 2. Install starter strip along rake edge.
- B. Install first and remaining courses of laminated asphalt shingles stair-stepping diagonally across roof deck with manufacturer's recommended offset pattern at succeeding courses, maintaining uniform exposure.
- C. Fasten asphalt shingle strips with a minimum of six (6) roofing nails, but not less than the number indicated in manufacturer's written instructions for roof slope and design wind speed indicated on Drawings and for warranty requirements specified in this Section.
 1. Locate fasteners in accordance with manufacturer's written instructions.
 2. When ambient temperature during installation is below 50 deg F (10 deg C), hand seal self-sealing asphalt shingles by applying asphalt roofing cement spots between course overlaps after nailing the upper course.
- D. Open Valleys: Cut and fit asphalt shingles at open valleys, trimming upper concealed corners of shingle strips.
 1. Maintain uniform width of exposed open valley from highest to lowest point.
 2. Extend shingle a minimum of 4 inches (102 mm) over valley metal.

3. Set valley edge of asphalt shingles in a 3-inch- (76-mm-) wide bed of asphalt roofing cement.
 4. Do not nail asphalt shingles to metal open-valley flashings.
- E. Ridge Vents: Install continuous ridge vents over asphalt shingles in accordance with manufacturer's written instructions. Fasten with roofing nails of sufficient length to penetrate sheathing.
- F. Hip and Ridge Shingles: Maintain same exposure of cap shingles as roofing-shingle exposure. Lap cap shingles at ridges to shed water away from direction of prevailing winds.
1. Fasten with roofing nails of sufficient length to penetrate sheathing.
 2. Fasten ridge cap asphalt shingles to cover ridge vent without obstructing airflow.

END OF SECTION 073113

SECTION 074293 - SOFFIT PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

- 1. Metal soffit panels.**

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.**

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.**
- B. Shop Drawings: Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.**
- C. Samples: For each type of metal panel indicated.**

1.4 INFORMATIONAL SUBMITTALS

- A. Warranties: Samples of special warranties.**

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.**

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.**
- 1. Warranty Period: Two (2) years from date of Substantial Completion.**

- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

- 1. Finish Warranty Period: Twenty (20) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E1592:
 - 1. Wind Loads: As indicated on Drawings.
 - 2. Deflection Limits: For wind loads, no greater than 1/240 of the span.
- B. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. (0.3 L/s per sq. m) when tested according to ASTM E283 at the following test-pressure difference:
 - 1. Test-Pressure Difference: 1.57 lbf/sq. ft. (75 Pa).
- C. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E331 at the following test-pressure difference:
 - 1. Test-Pressure Difference: 2.86 lbf/sq. ft. (137 Pa).
- 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 (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 METAL SOFFIT PANELS

- A. Provide metal soffit panels designed to be installed by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps. Include accessories required for weathertight installation.
- B. Flush-Profile Metal Soffit Panels: Perforated panels formed with vertical panel edges and intermediate stiffening ribs symmetrically spaced between panel edges; with flush joint between panels.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Petersen Aluminum Corporation, Pac-Clad Flush Soffit Panels; or comparable product by one of the following:
 - a. AEP Span; A BlueScope Steel Company.
 - b. Architectural Building Components.
 - c. Atas International, Inc.
 - d. CENTRIA Architectural Systems.
 - e. Dimensional Metals, Inc.
 - f. Drexel Metals.
 - g. Englert, Inc.
 - h. Fabral.
 - i. Firestone Building Products.
 - j. Innovative Metals Company, Inc.
 - k. MBCI.
 - l. McElroy Metal, Inc.
 - m. Merchant and Evans.
 - n. Metal Sales Manufacturing Corporation.
 - o. PAC-CLAD; Petersen Aluminum Corporation.
 - p. Ultra Seam Incorporated.
2. Aluminum Sheet: Coil-coated sheet, ASTM B209 (ASTM B209M), alloy as standard with manufacturer, with temper as required to suit forming operations and structural performance required.
 - a. Thickness: 0.040 inch (1.02 mm).
 - b. Surface: Smooth, flat finish.
 - c. Exterior Finish: Two-coat fluoropolymer.
 - d. Color: As selected by Architect from manufacturer's full range.
3. Panel Coverage: 12 inches (305 mm).
4. Panel Height: 1.0 inch (25 mm).

2.3 MISCELLANEOUS MATERIALS

- A. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
 1. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

- B. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Finish flashing and trim with same finish system as adjacent metal panels.
- C. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.
- D. Panel Sealants: Provide sealant types recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
 - 1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing; 1/8 inch (3 mm) thick.

2.4 FABRICATION

- 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. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- C. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.
- D. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

2.5 FINISHES

- A. Panels and Accessories:
 - 1. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (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: White or light-colored acrylic or polyester backer finish.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C754 and metal panel manufacturer's written recommendations.

3.2 INSTALLATION

- A. Metal Soffit Panels: Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.
 - 1. Apply panels and associated items true to line for neat and weathertight enclosure.
 - 2. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal panels.
 - 3. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
 - 4. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
- B. Watertight Installation:
 - 1. Apply a continuous ribbon of sealant or tape to seal lapped joints of metal panels, using sealant or tape as recommend by manufacturer on side laps of nesting-type panels and elsewhere as needed to make panels watertight.
 - 2. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
 - 3. At panel splices, nest panels with minimum 6-inch (152-mm) end lap, sealed with sealant and fastened together by interlocking clamping plates.
- C. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
- D. 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 as indicated. Install work with laps, joints, and seams that are permanently watertight.

3.3 CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

END OF SECTION 074293

SECTION 074646 - FIBER-CEMENT SIDING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes fiber-cement siding.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For fiber-cement siding including related accessories.
- C. Manufacturer's Details: Submit drawings including plans, sections, showing installation details that demonstrate product dimensions, edge/termination conditions/treatments, compression and control joints, corners, openings, and penetrations.

1.4 INFORMATIONAL SUBMITTALS

- A. Product certificates.
- B. Product test reports.
- C. Research/evaluation reports.
- D. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized installer who is trained and approved by the manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store materials in a dry, well-ventilated location protected from weather, sunlight, and moisture in accordance with manufacturer's written instructions. Panels must be stored flat and kept dry before installation. A waterproof cover over panels and accessories should be used at all times prior to installation. Do not stack pallets more than two high. Refer to the information included on each pallet
- B. Protect unused materials from weather, sunlight, and moisture when left overnight or when Work is not in progress.
- C. If panels are exposed to water or water vapor prior to installation, allow to completely dry before installing.
- D. Handle, store, and place materials in a manner to prevent damage to surrounding, adjacent construction.
- E. Panels must be carried on edge. Do not carry or lift panels flat. Improper handling may cause cracking or panel damage.
- F. Direct contact between the panels and the ground should be avoided at all times. It is necessary to keep panels clean during installation process.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Proceed with installation only when existing and forecasted weather conditions permit product installation and related Work to be performed in accordance with manufacturer's written instructions and warranty requirements.

1.9 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace products that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Ten (10) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Fiber cement panels manufactured from a pressed, stamped, and autoclaved mix of Portland cement, fly ash, silica, recycled rejects, and wood fiber bundles.
- B. Panel surface pre-finished and machine applied.

- C. Panels profiled along long edges so that the long joints between the installed panels are ship-lapped.
- D. Factory-applied sealant gasket added to top panel edge; all long edge joints contain a factory sealant.

2.2 FIBER-CEMENT SIDING

- A. General: ASTM C 1186, Type A, Grade II, fiber-cement board, noncombustible when tested according to ASTM E 136; with a flame-spread index of 25 or less when tested according to ASTM E 84.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide James Hardie Building Products, Inc.; Hardie Plank Lap Siding, Smooth; or a comparable product by one of the following:
 - a. CertainTeed Corporation.
 - b. GAF.
- B. Labeling: Provide fiber-cement siding that is tested and labeled according to ASTM C 1186 by a qualified testing agency acceptable to authorities having jurisdiction.
- C. Nominal Thickness: Not less than 5/16 inch.
- D. Shingle Pattern: 6-1/4 inch wide, straight-edge lap siding with smooth texture.
- E. Factory Priming: Manufacturer's standard acrylic primer. Fiber-cement siding shall be field-painted.

2.3 ACCESSORIES

- A. Siding Accessories, General: Provide starter strips, edge trim, outside and inside corner caps, and other items as recommended by siding manufacturer for building configuration.
- B. Flashing: Provide stainless steel flashing complying with Section 076200 "Sheet Metal Flashing and Trim" at window and door heads and where indicated.
- C. Fasteners: Corrosion resistant fasteners, such as stainless-steel screws appropriate to local building codes and practices must be used. Use Stainless Steel fasteners in high humidity and high-moisture regions. Do not use aluminum fasteners, staples or fasteners that are not rated or designed for intended use. See manufacturer's instructions for appropriate fasteners for construction method used.
- D. Sealant: Sealant shall comply with ASTM C920, Class 35.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Allowable stud spacing: 16-inches o.c. maximum.
- B. Examine site to ensure substrate conditions are within alignment tolerances for proper installation.
- C. Do not begin installation until unacceptable conditions have been corrected.
- D. Do not install panels or components that appear to be damaged or defective. Do not install wet panels.
- E. Wall surface plane must be plumb and level within 1/4-inch in 20 feet in any direction.

3.2 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply. Install products in accordance with all applicable building codes and other laws, rules, regulations and ordinances. Review all manufacturer installation, maintenance instructions, and other applicable documents before installation.
- B. Install joint sealants as specified in Section 079200 "Joint Sealants" and to produce a weathertight installation.

3.3 ADJUSTING AND CLEANING

- A. Remove damaged, improperly installed, or otherwise defective materials and replace with new materials complying with specified requirements.
- B. Clean finished surfaces according to manufacturer's written instructions and maintain in a clean condition during construction.

END OF SECTION 074646

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Sheet metal materials.
2. Underlayment.
3. Miscellaneous materials.

1.2 ACTION SUBMITTALS

A. Product data.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications:** Entity that employs a supervisor who is an NRCA ProCertified Roofing Foreman and not less than 20 percent of installers who are NRCA ProCertified Architectural Metal Flashings and Accessories Installers.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A.** Sheet metal flashing and trim assemblies, including cleats, anchors, and fasteners, are to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim are not to rattle, leak, or loosen, and are to remain watertight.
- B.** Sheet Metal Standard for Flashing and Trim: Comply with SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C.** SPRI Wind Design Standard: Manufacture and install roof edge flashings and copings tested in accordance with ANSI/SPRI/FM 4435/ES-1 and capable of resisting the following design pressure:
1. Design Pressure: As indicated on Drawings.

- D. FM Approvals Listing: Manufacture and install roof edge flashings and copings that comply with requirements in FM Approvals 4471 as part of a roofing system and that are listed in FM Approvals' "Approval Guide" and approved for windstorm classification, Class 1A-90. Identify materials with name of fabricator and design approved by FM Approvals.
- E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 SHEET METAL MATERIALS

- A. Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.
- B. Stainless Steel Sheet: ASTM A240/A240M, Type 304, dead soft, fully annealed.
 - 1. Nominal Thickness: 0.0313 inch (0.795 mm).
 - 2. Surface: Smooth, flat.
 - 3. Exterior Finish: ASTM A480/A480M, No. 3 (coarse, polished directional satin).
 - a. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
 - b. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
 - 1) Run grain of directional finishes with long dimension of each piece.
 - 2) When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

2.3 UNDERLAYMENT

- A. Self-Adhering, Polymer-Modified Bitumen Sheet: ASTM D1970/D1970M, minimum 40-mil- (1.0-mm-) thick sheet; glass-fiber-mat-reinforced, polymer-modified asphalt; with slip-resistant top surface and release backing; cold applied.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Blueskin RF200 Ice and Water Barrier by the Henry Company; or comparable product by one of the following:
 - a. CertainTeed Corporation
 - b. GCP Applied Technologies, Inc.
 - c. GAF Materials Corporation.
 - d. Owens Corning.
 - 2. Top Surface: Textured polymer film.

- B. Felt: ASTM D226/D226M, Type II (No. 30), asphalt-saturated organic felt; nonperforated.
- C. Slip Sheet: Rosin-sized building paper, 3 lb/100 sq. ft. (0.16 kg/sq. m) minimum, of type required for application.

2.4 MISCELLANEOUS MATERIALS

- A. Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal.
 - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
 - b. Blind Fasteners: High-strength aluminum or stainless steel rivets suitable for metal being fastened.
 - 2. Fasteners for Stainless Steel Sheet: Series 300 stainless steel.
- C. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
- D. Elastomeric Sealant: ASTM C920, elastomeric silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- E. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- F. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.
- G. Bituminous Coating: Cold-applied asphalt emulsion in accordance with ASTM D1187/D1187M.
- H. Asphalt Roofing Cement: ASTM D4586/D4586M, asbestos free, of consistency required for application.

2.5 FABRICATION, GENERAL

- A. Custom fabricate sheet metal flashing and trim to comply with details indicated and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required.
 - 1. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
 - 2. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
 - 3. Verify shapes and dimensions of surfaces to be covered and obtain field measurements for accurate fit before shop fabrication.
 - 4. Form sheet metal flashing and trim to fit substrates without excessive oil-canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
 - 5. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
- B. Fabrication Tolerances:
 - 1. Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 ft. (6 mm in 6 m) on slope and location lines indicated on Drawings and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.
- C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
 - 1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.
 - 2. Use lapped expansion joints only where indicated on Drawings.
- D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal in accordance with cited sheet metal standard to provide for proper installation of elastomeric sealant.
- E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- F. Seams:
 - 1. Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.

2.6 STEEP-SLOPE ROOF SHEET METAL FABRICATIONS

- A. Valley Flashing: Fabricate from the following materials:
 - 1. Stainless Steel: 0.0313 inch (0.795 mm) thick.

- B. Drip Edges: Fabricate from the following materials:
 - 1. Stainless Steel: 0.0313 inch (0.795 mm) thick.
- C. Eave, Rake, Ridge, and Hip Flashing: Fabricate from the following materials:
 - 1. Stainless Steel: 0.0313 inch (0.795 mm) thick.

2.7 WALL SHEET METAL FABRICATIONS

- A. Opening Flashings in Frame Construction: Fabricate head, sill, and similar flashings to extend 4 inches (100 mm) beyond wall openings. Form head and sill flashing with 2-inch- (50-mm-) high, end dams. Fabricate from the following materials:
 - 1. Stainless Steel: 0.0313 inch (0.795 mm) thick.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrates, and other conditions affecting performance of the Work.
 - 1. Verify compliance with requirements for installation tolerances of substrates.
 - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
 - 3. Verify that air- or water-resistant barriers have been installed over substrate to prevent air infiltration or water penetration.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF UNDERLAYMENT

- A. Self-Adhering, High-Temperature Sheet Underlayment:
 - 1. Install self-adhering, high-temperature sheet underlayment; wrinkle free.
 - 2. Prime substrate if recommended by underlayment manufacturer.
 - 3. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures.
 - 4. Apply in shingle fashion to shed water, with end laps of not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses.
 - 5. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps and edges with roller.
 - 6. Roll laps and edges with roller.
 - 7. Cover underlayment within 14 days.

- B. Install slip sheet, wrinkle free, over underlayment before installing sheet metal flashing and trim.
 - 1. Install in shingle fashion to shed water.
 - 2. Lap joints not less than 4 inches (100 mm).

3.3 INSTALLATION OF SHEET METAL FLASHING AND TRIM, GENERAL

- A. Install sheet metal flashing and trim to comply with details indicated and recommendations of cited sheet metal standard that apply to installation characteristics required unless otherwise indicated on Drawings.
 - 1. Install fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 - 2. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of sealant.
 - 3. Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement.
 - 4. Install sheet metal flashing and trim to fit substrates and to result in watertight performance.
 - 5. Install exposed sheet metal flashing and trim with limited oil-canning, and free of buckling and tool marks.
 - 6. Do not field cut sheet metal flashing and trim by torch.
 - 7. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
 - 1. Coat concealed side of stainless steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
 - 2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim.
 - 1. Space movement joints at maximum of 10 ft. (3 m) with no joints within 24 inches (600 mm) of corner or intersection.
 - 2. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with sealant concealed within joints.
- D. Fasteners: Use fastener sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws.
- E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

- F. Seal joints as required for watertight construction.
 - 1. Use sealant-filled joints unless otherwise indicated.
 - a. Embed hooked flanges of joint members not less than 1 inch (25 mm) into sealant.
 - b. Form joints to completely conceal sealant.
 - c. When ambient temperature at time of installation is between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement each way.
 - d. Adjust setting proportionately for installation at higher ambient temperatures.
 - 1) Do not install sealant-type joints at temperatures below 40 deg F (4 deg C).
 - 2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."
- G. Rivets: Rivet joints in uncoated aluminum where necessary for strength.

3.4 INSTALLATION OF SLOPED ROOF SHEET METAL FABRICATIONS

- A. Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard.
 - 1. Provide concealed fasteners where possible, and set units true to line, levels, and slopes.
 - 2. Install work with laps, joints, and seams that are permanently watertight and weather resistant.
- B. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches (100 mm) over base flashing. Install stainless steel draw band and tighten.
- C. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.

3.5 INSTALLATION OF WALL SHEET METAL FABRICATIONS

- A. Install sheet metal wall flashing to intercept and exclude penetrating moisture in accordance with cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Opening Flashings in Frame Construction: Install continuous head, sill, and similar flashings to extend 4 inches (100 mm) beyond wall openings.

3.6 INSTALLATION TOLERANCES

- A. Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 ft. (6 mm in 6 m) on slope and location lines indicated on Drawings and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

3.7 CLEANING

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean off excess sealants.

3.8 PROTECTION

- A. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures, as determined by Architect.

END OF SECTION 076200

SECTION 077100 - ROOF SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Manufactured units for the following applications:

1. Roof-edge drainage systems.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product data.

- B. Shop Drawings: For roof specialties.

1. Plans, expansion-joint locations, keyed details, and attachments to other work. Distinguish between factory pre manufactured- and field-assembled installation.
2. Details for expansion and contraction; locations of expansion joints, including direction of expansion and contraction.
3. Indicate profile and pattern of seams and layout of fasteners, cleats, clips, and other attachments.
4. Details of termination points and assemblies, including fixed points.
5. Details of special conditions.

- C. Samples: For each type of roof specialty indicated with factory-applied color finishes.

1.4 INFORMATIONAL SUBMITTALS

- A. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.6 WARRANTY

- A. Special Warranty on Painted Finishes: Manufacturer agrees to repair finish or replace roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
 - b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: Twenty (20) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Roof specialties to withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 ROOF-EDGE DRAINAGE SYSTEMS

- A. Gutters: Manufactured in uniform section lengths not exceeding 12 ft. (3.6 m), with matching corner units, ends, outlet tubes, and other accessories. Elevate back edge at least 1 inch (25 mm) above front edge. Furnish gutter brackets, expansion joints, and expansion-joint covers fabricated from same metal as gutters.
 - 1. Formed Aluminum Sheet: 0.040 inch (1.02 mm) thick.
 - 2. Gutter Profile: Style K in accordance with SMACNA's "Architectural Sheet Metal Manual."
 - 3. Corners: Factory mitered and mechanically clinched and sealed watertight.
 - 4. Gutter Supports: Gutter brackets with finish matching the gutters.
 - 5. Gutter Accessories: Wire ball downspout strainer.

- B. Downspouts: Plain round complete with smooth-curve elbows, manufactured from the following exposed metal. Furnish with metal hangers, from same material as downspouts, and anchors.
 - 1. Extruded Aluminum: 0.125 inch (3.19 mm) thick with union sleeves and pre-fabricated elbows as required. Provide style 2 brackets. Basis-of-Design Product: Subject to compliance with requirements, provide DS-EX Designer Series Downspout Extruded Round, by SAF Perimeter Systems; or comparable product.
 - 2. Size: As indicated on Drawings.
- C. Finishes:
 - 1. Aluminum: Two-coat fluoropolymer.
 - a. Color: As selected by Architect from manufacturer's full range.

2.3 SHEET METAL MATERIALS

- A. Aluminum Sheet: ASTM B209/B209M, manufacturer's standard alloy for finish required, with temper to suit forming operations and performance required.
 - 1. Exposed Coil-Coated Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - a. Two-Coat Fluoropolymer Finish: AAMA 2605. System consisting of primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight in color coat.
 - 2. Concealed Finish: Pretreat with 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 (0.013 mm).

2.4 MISCELLANEOUS MATERIALS

- A. Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.
- B. Fasteners: Roof specialty manufacturer's recommended fasteners, designed to meet performance requirements, suitable for application and metals being fastened. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners. Furnish the following unless otherwise indicated:
 - 1. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
 - 2. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.

- C. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, PVC, or silicone or a flat design of foam rubber, sponge neoprene, or cork.
- D. Elastomeric Sealant: ASTM C920, elastomeric silicone polymer sealant of type, grade, class, and use classifications required by roofing-specialty manufacturer for each application.

2.5 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM/NOMMA AMP 500, "Metal Finishes Manual for Architectural and Metal Products," for recommendations for applying and designating finishes.
- B. Protect mechanical and painted 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 unacceptable. 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, GENERAL

- A. Install roof specialties in accordance with manufacturer's written instructions. Anchor roof specialties securely in place, with provisions for thermal and structural movement. Use fasteners, protective coatings, separators, underlayments, sealants, and other miscellaneous items as required to complete roof-specialty systems.
 - 1. Install roof specialties level, plumb, true to line and elevation; with limited oil-canning and without warping, jogs in alignment, buckling, or tool marks.
 - 2. Provide uniform, neat seams with minimum exposure of solder and sealant.
 - 3. Install roof specialties to fit substrates and to result in weathertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.
 - 4. Torch cutting of roof specialties is not permitted.
 - 5. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer's written installation instructions.
 - 1. Coat concealed side of uncoated aluminum roof specialties with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
- C. Expansion Provisions: Allow for thermal expansion of exposed roof specialties.

1. Space movement joints at a maximum of 12 ft. (3.6 m) with no joints within 18 inches (450 mm) of corners or intersections unless otherwise indicated on Drawings.
 2. When ambient temperature at time of installation is between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures.
- D. Fastener Sizes: Use fasteners of sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws.
- E. Seal joints as required for weathertight construction. Place sealant to be completely concealed in joint. Do not install sealants at temperatures below 40 deg F (4 deg C).

3.2 INSTALLATION OF ROOF-EDGE DRAINAGE SYSTEMS

- A. Install components to produce a complete roof-edge drainage system in accordance with manufacturer's written instructions. Coordinate installation of roof perimeter flashing with installation of roof-edge drainage system.
- B. Gutters: Join and seal gutter lengths. Allow for thermal expansion. Attach gutters to firmly anchored gutter supports spaced not more than 30 inches (762 mm) apart. Attach ends with rivets and seal with sealant to make watertight. Slope to downspouts.
1. Install gutter with expansion joints at locations indicated but not exceeding 50 ft. (15.2 m) apart. Install expansion-joint caps.
- C. Downspouts: Join sections with manufacturer's standard joints. Provide hangers with fasteners designed to hold downspouts securely to walls and 1 inch (25 mm) away from walls; locate fasteners at top and bottom and at approximately 60 inches (1500 mm) o.c.
1. Connect downspouts to underground drainage system indicated.

3.3 CLEANING AND PROTECTION

- A. Clean off excess sealants.
- B. Remove temporary protective coverings and strippable films as roof specialties are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain roof specialties in a clean condition during construction.
- C. Replace roof specialties that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures, as determined by Architect.

END OF SECTION 077100

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Non-staining silicone joint sealants.
2. Urethane joint sealants.
3. Mildew-resistant joint sealants.
4. Acoustical latex joint sealants.
5. Latex joint sealants.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference:** Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product data.**
- B. Samples:** Manufacturer's standard color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Joint-sealant schedule.**

1.4 INFORMATIONAL SUBMITTALS

- A. Sample warranties.**

1.5 CLOSEOUT SUBMITTALS

- A. Warranty Documentation:**
1. Manufacturers' special warranties.
 2. Installer's special warranties.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications:** Authorized representative who is trained and approved by manufacturer.

1.7 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Two (2) years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Seven (7) years from date of Substantial Completion.
 - 2. Warranty Period: Twenty (20) years from date of Substantial Completion against staining for non-staining silicone joint sealants.
- C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
 - 1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
 - 2. Disintegration of joint substrates from causes exceeding design specifications.
 - 3. Mechanical damage caused by individuals, tools, or other outside agents.
 - 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 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. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 NONSTAINING SILICONE JOINT SEALANTS

- A. Nonstaining Joint Sealants: No staining of substrates when tested in accordance with ASTM C1248.
- B. Silicone, S, NS, 50, NT: 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. Basis-of-Design Product: Subject to compliance with requirements, provide Spectrum 3 by Tremco Sealants, Tremco Construction Products Group; or comparable product by one of the following:
 - a. Adfast.
 - b. GE Construction Sealants; Momentive Performance Materials Inc.
 - c. Pecora Corporation.
 - d. Sika Corporation - Building Components.
 - e. The Dow Chemical Company.

2.3 URETHANE JOINT SEALANTS

- A. Urethane, S, NS, 100/50, T, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type S, Grade NS, Class 100/50, Uses T and NT.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Dymonic 100 by Tremco Sealants, Tremco Construction Products Group; or comparable product by one of the following:
 - a. Bostik; Arkema.
 - b. LymTal International, Inc.
 - c. Pecora Corporation.

2.4 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. Basis-of-Design Product: Subject to compliance with requirements, provide Tremsil 200 by Tremco Sealants, Tremco Construction Products Group; or comparable product by one of the following:
 - a. Adfast.
 - b. GE Construction Sealants; Momentive Performance Materials Inc.
 - c. Pecora Corporation.
 - d. PPG Paints; PPG Industries, Inc.
 - e. Sika Corporation - Building Components.
 - f. Soudal USA.
 - g. The Dow Chemical Company.

2.5 LATEX JOINT SEALANTS

- A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C834, Type OP, Grade NF.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Tremflex 834 by Tremco Sealants, Tremco Construction Products Group; or comparable product by one of the following:
 - a. Adfast.
 - b. Everkem Diversified Products, Inc.
 - c. Franklin International.
 - d. Pecora Corporation.
 - e. PPG Paints; PPG Industries, Inc.
 - f. Sherwin-Williams Company (The).
- B. Acrylic Latex, Acoustical: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Provide acoustical joint sealants that effectively reduce airborne sound transmission through perimeter joints and openings in building construction as determined by testing representative assemblies in accordance with ASTM E 90, based on installation per ASTM C 919.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Pecora Corporation; AC-20 FTR; or a comparable product by one of the following:
 - a. Specified Technologies, Inc.
 - b. Tremco Incorporated.
 2. Surface Burning Characteristics: Flame spread and smoke developed indexes not greater than 25 and 450, respectively.

2.6 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. Backer Rod Mfg., Inc.
 - d. Construction Foam Products; a division of Nomaco, Inc.
 - e. Master Builders Solutions.
- B. Cylindrical Sealant Backings: ASTM C1330, Type C (closed-cell material with a surface skin), 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.

2.7 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 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.
 - c. Unglazed surfaces of ceramic tile.
 - d. Fiber cement siding.
 - 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.
 - c. Porcelain enamel.
 - d. Glazed surfaces of ceramic tile.
 - e. Solid surfacing materials.
- 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.

3.2 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 in accordance with 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.
- G. 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.
- H. 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.

3.3 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal non-traffic surfaces JS-1.
1. Joint Locations:
 - a. Control and expansion joints in unit masonry.
 - b. Perimeter of storefronts, windows and doors at exterior locations.
 - c. Other joints as indicated on Drawings.
 2. Joint Sealant: Silicone, non-staining, S, NS, 50, NT.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- B. Joint-Sealant Application: Interior joints in horizontal traffic surfaces JS-2.
1. Joint Locations:
 - a. Isolation joints in cast-in-place concrete slabs.
 - b. Control and expansion joints in tile flooring.
 - c. Other joints as indicated on Drawings.
 2. Joint Sealant: Urethane, S, NS, 100/50, T, NT.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- C. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces JS-3.
1. Joint Locations:
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.

- b. Tile control and expansion joints.
 - c. Vertical joints on exposed surfaces of unit masonry walls.
 - d. Other joints as indicated on Drawings.
 - 2. Joint Sealant: Silicone, non-staining, S, NS, 50, NT.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- D. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement JS-4.
 - 1. Joint Locations:
 - a. Control joints on exposed interior surfaces of interior walls.
 - b. Perimeter joints between interior wall surfaces and frames of interior doors, windows and storefront entrances.
 - c. Other joints as indicated on Drawings.
 - 2. Joint Sealant: Acrylic latex and acoustical acrylic latex.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- E. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces JS-5.
 - 1. Joint Locations:
 - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - b. Other joints as indicated on Drawings.
 - 2. Joint Sealant: Silicone, mildew resistant, acid curing, S, NS, 25, NT.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- F. Joint-Sealant Application: Concealed mastics JS-6.
 - 1. Joint Locations:
 - a. Aluminum thresholds.
 - b. Other joints as indicated on Drawings.
 - 2. Joint Sealant: Butyl-rubber based.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION 079200

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior standard steel doors and frames.
2. Exterior standard steel doors and frames.

B. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.
3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
6. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
7. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed).
8. ANSI/BHMA A156.115 - Hardware Preparation in Steel Doors and Frames.
9. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
10. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

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.

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.

1.3 INFORMATIONAL SUBMITTALS

- A. Product test reports.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever possible.
- B. Quality Standard: In addition to requirements specified, comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch high wood blocking. Do not store in a manner that traps excess humidity.
 - 1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.7 COORDINATION

- A. Coordinate installation of anchorages 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.

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:

- a. Warping (bow, cup, or twist) more than 1/4 inch (6.4 mm) in a 42-by-84-inch (1067-by-2134-mm) section of a 1.75 inch (44.5 mm) thick door.
 - b. Telegraphing of core construction in faces exceeding 0.01 inch in a 3-inch (0.25 mm in a 76.2-mm) span.
2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
 3. Warranty Period for Doors: Ten (10) years from date of substantial completion of the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product; Subject to compliance with requirements, provide Steelcraft, Allegion, plc; or comparable product by one of the following:
 1. CECO Door Products.
 2. Curries Company.
 3. Dayton Industries, Inc.
 4. Gensteel Doors USA, LLC
 5. Overly Door Company
 6. Republic Doors and Frames, Allegion, plc

2.2 PERFORMANCE REQUIREMENTS

- A. Thermally Rated Door Assemblies: Provide door assemblies with U-factor of not more than 0.40 deg Btu/F x h x sq. ft. (2.27 W/K x sq. m) when tested in accordance with ASTM C1363 or ASTM E1423.

2.3 INTERIOR 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. Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 2; ANSI/SDI A250.4, Level B.
 1. Doors:
 - a. Type: As indicated in the Door and Frame Schedule on Drawings.
 - b. Thickness: 1-3/4 inches (44.5 mm).
 - c. Face: Uncoated steel sheet, minimum thickness of 0.042 inch (1.0 mm).
 - d. Edge Construction: Model 1, Full Flush.

- e. Core: Manufacturer's standard.

2. Frames:

- a. Materials: Uncoated steel sheet, minimum thickness of 0.053 inch (1.3 mm).
- b. Sidelite Frames: Fabricated from same thickness material as adjacent door frame.
- c. Construction: Knocked down.

2.4 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.

1. Doors:

- a. Type: As indicated in the Door and Frame Schedule on Drawings.
- b. Thickness: 1-3/4 inches (44.5 mm).
- c. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch (1.3 mm), with minimum A60 (ZF180) coating.
- d. Edge Construction: Model 2, Seamless.
- e. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets. Seal joints against water penetration.
- f. 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.
- g. Core: Polystyrene.

2. Frames:

- a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch (1.3 mm), with minimum A60 (ZF180) coating.
- b. Construction: Full profile welded.

2.5 BORROWED LITES

- A. Fabricate of uncoated steel sheet, minimum thickness of 0.053 inch (1.3 mm).
- B. Construction: Knocked down.
- C. Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as metal as frames.

- D. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

2.6 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 (610 mm) of frame height above 7 feet (2.1 m).
3. Postinstalled Expansion Anchor: Minimum 3/8-inch- (9.5-mm-) 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 (12G) 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.

2.7 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B.

D. Inserts, Bolts, and Fasteners: Hot-dip galvanized in accordance with ASTM A153/A153M.

E. 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.

F. 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.

G. Glazing: Comply with requirements in Section 088000 "Glazing."

2.8 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. Sidelite Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding.
 - 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 - 3. 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 on Drawings, 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.
- C. Glazed Lites: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with mitered hairline joints.
 - 1. Provide stops and moldings flush with face of door, and with square stops unless otherwise indicated.
 - 2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
 - 3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames. Provide loose stops and moldings on inside of hollow-metal doors and frames.
 - 4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.
 - 5. Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (51 mm) o.c. from each corner.

2.9 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. 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. Floor Anchors: Secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
 3. Solidly pack mineral-fiber insulation inside frames.
 4. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors.
 5. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.

- B. 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.
- C. Glazing: Comply with installation requirements in Section 088000 "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. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint in accordance with manufacturer's written instructions.
- C. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION 081113

SECTION 081416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Five-ply flush wood veneer-faced doors for transparent finish.
2. Factory finishing flush wood doors.
3. Factory fitting flush wood doors to frames and factory machining for hardware.

B. Related Requirements:

1. Section 088000 "Glazing" for glass view panels in flush wood doors for field installation.

C. Standards and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ANSI A208.1 - Wood Particleboard.
3. Window and Door Manufacturers Association - WDMA I.S.1-A Architectural Wood Flush Doors.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product, including the following:

1. Door core materials and construction.
2. Door edge construction
3. Door face type and characteristics.
4. Door trim for openings.
5. Factory-machining criteria.
6. Factory-finishing specifications.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each type of door; construction details not covered in Product Data; and the following:

1. Door schedule indicating door location, type, size and swing.

2. Door elevations, dimension and locations of hardware, lite and louver cutouts, and glazing thicknesses.
3. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
4. Dimensions and locations of blocking for hardware attachment.
5. Clearances and undercuts.
6. Requirements for veneer matching.
7. Apply AWI Quality Certification Program label to Shop Drawings.

- C. Samples: For factory-finished doors.

1.4 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

1.6 QUALITY ASSURANCE

- A. Source Limitations: Obtain flush wood doors through one source from a single manufacturer wherever possible.
- B. Manufacturer's Certification: Licensed participant in AWI's Quality Certification Program.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package factory finished wood veneer doors individually in plastic bags or cardboard cartons.
- C. Mark each door on the top rail with the opening number, door handling, and door construction, including face veneer type used on Shop Drawings. Do not apply any information to the bottom rail.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weather tight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity between 25 and 55 percent during remainder of construction period.

1.9 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Warping (bow, cup, or twist) more than 1/4 inch (6.4 mm) in a 42-by-84-inch (1067-by-2134-mm) section of a 1.75 inch (44.5 mm) thick door.
 - b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch (0.25 mm in a 76.2-mm) span.
 - 2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
 - 3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 FLUSH WOOD DOORS AND FRAMES, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with ANSI/WDMA I.S. 1A.
 - 1. Provide labels from AWI certification program indicating that doors comply with requirements of grades specified.

2.2 MANUFACTURERS

- A. Basis-of-Design Product; Subject to compliance with requirements, provide Eggers Industries solid core wood doors; or comparable product by one of the following:
 - 1. Graham Wood Doors; an Assa Abloy Group company.
 - 2. Haley Brothers, Inc.
 - 3. Masonite Architectural.
 - 4. Oregon Doors.
 - 5. Oshkosh Door Company.
 - 6. Vancouver Door Company.
 - 7. VT Industries, Inc.
- B. Source Limitations: Obtain flush wood doors from single manufacturer.

2.3 SOLID-CORE, FIVE-PLY FLUSH WOOD VENEER-FACED DOORS FOR TRANSPARENT FINISH

- A. Interior Doors, Solid-Core Five-Ply Veneer-Faced:
 - 1. Performance Grade: ANSI/WDMA I.S. 1A Heavy Duty.

2. ANSI/WDMA I.S. 1A Grade: Custom.
3. Faces: Single-ply wood veneer not less than 1/50 inch (0.508 mm) thick.
 - a. Species: Select white birch.
 - b. Cut: Plain sliced (flat sliced).
 - c. Match between Veneer Leaves: Book match.
 - d. Assembly of Veneer Leaves on Door Faces: Running match.
 - e. Pair and Set Match: Provide for doors hung in same opening.
4. Exposed Vertical Edges: Same species as faces - Architectural Woodwork Standards edge Type A.
5. Core for Non-Fire-Rated Doors:
 - a. ANSI A208.1, Grade LD-1 particleboard.
 - 1) Blocking: Provide wood blocking in particleboard-core doors as needed to eliminate through-bolting hardware and as follows:
 - a) 5-inch (125-mm) top-rail blocking, in doors indicated to have closers.
 - b) 5-inch (125-mm) bottom-rail blocking, in exterior doors and doors indicated to have kick, mop, or armor plates.
 - c) 5-inch (125-mm) midrail blocking, in doors indicated to have exit devices.
 - 2) Provide doors with glued-wood-stave or WDMA I.S. 10 structural-composite-lumber cores instead of particleboard cores for doors scheduled to receive exit devices in Section 087100 "Door Hardware."
6. Construction: Five plies, hot-pressed bonded (vertical and horizontal edging is bonded to core), with entire unit abrasive planed before veneering.

2.4 LIGHT FRAMES AND LOUVERS

- A. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads unless otherwise indicated.
 1. Wood Species: Same species as door faces.
 2. Profile: Flush rectangular beads.

2.5 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated.
 1. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

- B. Factory machine doors for hardware that is not surface applied.
 - 1. Locate hardware to comply with DHI-WDHS-3.
 - 2. Comply with final hardware schedules, door frame Shop Drawings, ANSI/BHMA-156.115-W, and hardware templates.
 - 3. Coordinate with hardware mortises in metal frames, to verify dimensions and alignment before factory machining.
 - 4. For doors scheduled to receive electrified locksets, provide factory-installed raceway and wiring to accommodate specified hardware.
- C. Openings: Factory cut and trim openings through doors.
 - 1. Light Openings: Trim openings with moldings of material and profile indicated.
 - 2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."

2.6 FACTORY FINISHING

- A. Comply with referenced quality standard for factory finishing.
 - 1. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
 - 2. Finish faces, all four edges, edges of cutouts, and mortises.
 - 3. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.
- B. Factory finish doors.
- C. Transparent Finish:
 - 1. ANSI/WDMA I.S. 1A Grade: Custom.
 - 2. ANSI/WDMA I.S. 1A TR-8 UV Cured Acrylated Polyester/Urethane.
 - 3. Staining: As selected by Architect from manufacturer's full range.
 - 4. Sheen: Satin.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Hardware: For installation, see Section 087100 "Door Hardware."
- B. Install doors to comply with manufacturer's written instructions and referenced quality standard,
- C. Job-Fitted Doors:

1. Align and fit doors in frames with uniform clearances and bevels as indicated below.
 - a. Do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors.
 2. Machine doors for hardware.
 3. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
 4. Clearances:
 - a. Provide 1/8 inch (3.2 mm) at heads, jambs, and between pairs of doors.
 - b. Provide 1/8 inch (3.2 mm) from bottom of door to top of decorative floor finish or covering unless otherwise indicated on Drawings.
 - c. Where threshold is shown or scheduled, provide 1/4 inch (6.4 mm) from bottom of door to top of threshold unless otherwise indicated.
 5. Bevel non-fire-rated doors 1/8 inch in 2 inches (3-1/2 degrees) at lock and hinge edges.
- D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.2 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416

SECTION 083613 - SECTIONAL DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Sectional-door assemblies (Door Type D).

1.2 ACTION SUBMITTALS

- A. Product Data:** For each type and size of sectional door and accessory.
- B. Shop Drawings:** For each installation and for components not dimensioned or detailed in manufacturer's product data.

1.3 INFORMATIONAL SUBMITTALS

- A. Sample warranties.**

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.**

1.5 QUALITY ASSURANCE

- A. Installer Qualifications:** An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.
- B. Regulatory Requirements:** Comply with provisions in the ICC A117.1 applicable to sectional doors.

1.6 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. Warranty Period: Five (5) years 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: Ten (10) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Provide sectional doors that comply with performance requirements specified without failure from defective manufacture, fabrication, installation, or other defects in construction and without requiring temporary installation of reinforcing components.
- B. Structural Performance, Exterior Doors: Capable of withstanding the design wind loads.
 - 1. Design Wind Load: Uniform pressure (velocity pressure) of 20 lbf/sq. ft. (960 Pa), acting inward and outward.
 - 2. Testing: In accordance with ASTM E330/E330M or DASMA 108 for garage doors and complying with DASMA 108 acceptance criteria.

2.2 SECTIONAL-DOOR ASSEMBLY (Door Type D)

- 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. Basis-of-Design Product: Subject to compliance with requirements, provide Model 418 Sectional Steel Door by Overhead Door Corporation; or comparable product by one of the following:
 - a. C.H.I. Overhead Doors, Inc.
 - b. Clopay Building Products.
 - c. Raynor Garage Doors.
 - d. Wayne Dalton
- 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. (2.03 L/s per sq. m) when tested in accordance with ASTM E283 or DASMA 105.
- D. U-Value: 0.130 Btu/sq. ft. x h x deg F (0.738 W/sq. m x K).
- E. Steel Door Sections: ASTM A653/A653M, zinc-coated (galvanized), cold-rolled, commercial steel sheet with G90 (Z275) zinc coating.

1. Door-Section Thickness: 2 inches (51 mm).
 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 (610 mm) 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) Steel Sheet Thickness: 0.064-inch (1.63-mm) nominal coated thickness.
 - 2) Surface: Manufacturer's standard, grooved.
 - 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 0.019 inch (0.48 mm).
 3. End Stiles: Enclose open ends of sections with channel end stiles formed from galvanized-steel sheet not less than 0.064-inch (1.63-mm) nominal coated thickness and welded to door section.
 4. Intermediate Stiles: Provide intermediate stiles formed from not less than 0.064-inch (1.63-mm-) thick galvanized-steel sheet, cut to door section profile, and welded in place. Space stiles not more than 48 inches (1219 mm) 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.
 - 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. Board Insulation: Polystyrene, secured to exterior face sheet.
 - b. 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.
 - c. 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-lift track system. Provide complete system including brackets, bracing, and reinforcement to ensure rigid support of ball-bearing roller guides.
1. Material: Galvanized steel, ASTM A653/A653M, minimum G60 (Z180) zinc coating.

2. Size: 3 inches (76 mm) wide.
3. 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 (51 mm) apart for door-drop safety device.
 - a. Vertical Track: Incline vertical track to ensure weathertight closure at jambs. Provide continuous angle attached 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. Hardware: Heavy-duty, corrosion-resistant hardware, with hot-dip galvanized, stainless steel, or other corrosion-resistant fasteners, to suit door type.
 1. Hinges: Heavy-duty, galvanized-steel hinges of not less than 0.079-inch (2.01-mm) nominal coated thickness at each end stile and at each intermediate stile, in accordance with manufacturer's written recommendations for door size.
 - a. Attach hinges to door sections through stiles and rails with bolts and lock nuts or lock washers and nuts. Use rivets or self-tapping fasteners where access to nuts is impossible.
 2. Rollers: Heavy-duty rollers with steel ball bearings in case-hardened steel races, mounted to suit slope of track. Extend roller shaft through both hinges where double hinges are required. Match roller-tire diameter to track width.
 - a. Roller-Tire Material: Case-hardened steel.
- I. Locking Device:
 1. Slide Bolt: Fabricate with side-locking bolts to engage through slots in tracks for locking by padlock, located on single-jamb side, operable from inside only.
- J. Counterbalance Mechanism:
 1. Torsion Spring: Adjustable-tension torsion springs complying with requirements of DASMA 102 for number of operation cycles indicated, mounted on torsion shaft.
 2. Cable Drums and Shaft for Doors: Cast-aluminum cable drums mounted on torsion shaft and grooved to receive door-lifting cables as door is raised.
 - a. Mount counterbalance mechanism with manufacturer's standard ball-bearing brackets at each end of torsion shaft.
 3. Cables: Galvanized-steel, multistrand, lifting cables.

4. Cable Safety Device: Include a spring-loaded steel or bronze cam mounted to bottom door roller assembly on each side and designed to automatically stop door if lifting cable breaks.
 5. Bracket: Provide anchor support bracket as required to connect stationary end of spring to the wall and to level the shaft and prevent sag.
 6. Bumper: Provide spring bumper at each horizontal track to cushion door at end of opening operation.
- K. Manual Door Operator:
1. Chain-Hoist Operator: Consisting of endless steel hand chain, chain-pocket wheel and guard, and gear-reduction unit with a maximum 25 lbf (111 N) force for door operation. Provide alloy-steel hand chain with chain holder secured to operator guide.
- L. Metal Finish:
1. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat.
 - a. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 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 (610 mm) 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.

3.2 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain sectional doors.

END OF SECTION 083613

SECTION 084113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Aluminum-framed entrance and storefront systems.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference:** Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product data.

B. Shop Drawings:

1. Plans, elevations, sections, full-size details, and attachments to other work.
2. Connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
3. Point-to-point wiring diagrams.

- C. Samples:** Manufacturer's standard color sheets, showing full range of available colors for each type of exposed finish.

- D. Entrance Door Hardware Schedule:** Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams.

1.4 INFORMATIONAL SUBMITTALS

- A. Energy Performance Certificates:** NFRC-certified energy performance values from manufacturer.

- B. Product test reports.**

- C. Sample warranties.**

1.5 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.**

1.6 QUALITY ASSURANCE

A. Installer Qualifications:

1. Entity that is certified under the North American Contractor Certification Program (NACC) and that employs installers and supervisors who are trained and approved by manufacturer and who are certified under the Architectural Glass and Metal Technician (AGMT) certification program.

B. Testing Agency Qualifications: Qualified in accordance with ASTM E699 for testing indicated and accredited by IAS or ILAC Mutual Recognition Arrangement as complying with ISO/IEC 17025 and acceptable to Owner and Architect.

C. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

1.7 WARRANTY

A. Special Warranty: Manufacturer and Installer agree to repair or replace components of aluminum-framed entrances and storefronts that fail in materials or workmanship within specified warranty period. This includes the glass (including insulated units), glazing, anchorage and setting system, sealing, and flashing as it relates to air, water, and structural adequacy, and the Specifications and reviewed Shop Drawings.

1. Warranty Period: Two (2) years from date of Substantial Completion.

B. Special Finish Warranty, Anodized Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of anodized finishes within specified warranty period.

1. Warranty Period: Ten (10) years from date of Substantial Completion.

C. Glass:

1. Provide written warranty for insulated glass units per glass manufacturer, that they will be free from obstruction of vision because of dust or film formation on the internal glass surfaces caused by failure of the hermetic seal due to defects in material and workmanship.

2. Warranty Period: Ten (10) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrance and storefront systems representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
1. Aluminum-framed entrance and storefront systems to withstand movements of supporting structure, including, but not limited to, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
 2. Failure also includes the following:
 - a. Thermal stresses transferring to building structure.
 - b. Glass breakage.
 - c. Noise or vibration created by wind and thermal and structural movements.
 - d. Loosening or weakening of fasteners, attachments, and other components.
 - e. Failure of operating units.
- B. Deflection of Framing Members Supporting Glass: At design wind load of 125-mph, as follows:
1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans of up to 13 feet 6 inches (4.1 m) and to 1/240 of clear span plus 1/4 inch (6.35 mm) for spans greater than 13 feet 6 inches (4.1 m).
 2. Deflection Parallel to Glazing Plane: Limited to amount not exceeding that which reduces glazing bite to less than 75 percent of design dimension and that which reduces edge clearance between framing members and glazing or other fixed components to less than 1/8 inch (3.2 mm).
 - a. Operable Units: Provide a minimum 1/16-inch (1.6-mm) clearance between framing members and operable units.
 3. Cantilever Deflection: Limited to 2L/175 at unsupported cantilevers.
- C. Structural: Test in accordance with ASTM E330/E330M as follows:
1. When tested at positive and negative wind-load design pressures, storefront assemblies, including entrance doors, do not evidence deflection exceeding specified limits.
 2. When tested at 150 percent of positive and negative wind-load design pressures, storefront assemblies, including entrance doors and anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
 3. Test Durations: As required by design wind velocity, but not less than 10 seconds.
- D. Water Penetration under Static Pressure: Test in accordance with ASTM E331 as follows:

1. No evidence of water penetration through fixed glazing and framing areas, including entrance doors, when tested in accordance with a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft. (300 Pa).
- E. Energy Performance: Certified and labeled by manufacturer for energy performance as follows:
 1. Thermal Transmittance (U-factor):
 - a. Fixed Glazing and Framing Areas: U-factor for the system of not more than 0.36 Btu/sq. ft. x h x deg F (2.04 W/sq. m x K) as determined in accordance with NFRC 100.
 - b. Entrance Doors: U-factor of not more than 0.77 Btu/sq. ft. x h x deg F (4.37 W/sq. m x K) as determined in accordance with NFRC 100.
 2. Solar Heat-Gain Coefficient (SHGC):
 - a. Fixed Glazing and Framing Areas: SHGC for the system of not more than 0.23 as determined in accordance with NFRC 200.
 - b. Entrance Doors: SHGC of not more than 0.35 as determined in accordance with NFRC 200.
 3. Air Leakage:
 - a. Fixed Glazing and Framing Areas: Air leakage for the system of not more than 0.06 cfm/sq. ft. (0.30 L/s per sq. m) at a static-air-pressure differential of 6.24 lbf/sq. ft. (300 Pa) when tested in accordance with ASTM E283.
 - b. Entrance Doors: Air leakage of not more than 1.0 cfm/sq. ft. (5.08 L/s per sq. m) at a static-air-pressure differential of 1.57 lbf/sq. ft. (75 Pa).
 4. Condensation Resistance Factor (CRF):
 - a. Fixed Glazing and Framing Areas: CRF for the system of not less than 70 as determined in accordance with AAMA 1503.
 - b. Entrance Doors: CRF of not less than 68 as determined in accordance with AAMA 1503.
- F. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes.
 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 ALUMINUM-FRAMED ENTRANCE AND STOREFRONT SYSTEMS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide YES 45 TU Center Set Storefront System by YKK AP America, Inc.; or comparable product by one of the following:

1. Boyd Aluminum Manufacturing Company.
 2. EFCO Corporation
 3. Kawneer North America, an Alcoa Company.
 4. Trulite Glass & Aluminum Solutions, LLC.
 5. Tubelite, Inc.
- B. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
1. Exterior Framing Construction: Thermally broken.
 2. Interior Vestibule Framing Construction: Nonthermal.
 3. Glazing System: Retained mechanically with gaskets on four sides.
 4. Finish: Color anodic finish.
 5. Fabrication Method: Field-fabricated stick system.
 6. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 7. Steel Reinforcement: As required by manufacturer.
- C. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.
- D. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- E. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing or automatic operation.
1. Door Construction: 1-3/4-inch (44.5-mm) overall thickness, with minimum 0.125-inch- (3.2-mm-) thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
 - a. Thermal Construction: High-performance plastic connectors separate aluminum members exposed to the exterior from members exposed to the interior.
 2. Door Design: Medium stile; 3-1/2-inch (88.9-mm) nominal width.
 3. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.
 - a. Provide nonremovable glazing stops on outside of door.

2.3 ENTRANCE DOOR HARDWARE

- A. Entrance Door Hardware: Hardware not specified in this Section is specified in Section 087100 "Door Hardware."

- B. General: Provide entrance door hardware and entrance door hardware sets indicated in "Entrance Door Hardware Sets" Article for each entrance door, to comply with requirements in this Section.
 - 1. Entrance Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and products equivalent in function and comparable in quality to named products.
 - 2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.
 - 3. Opening-Force Requirements:
 - a. Egress Doors: Not more than 15 lbf (67 N) to release the latch and not more than 30 lbf (133 N) to set the door in motion and not more than 15 lbf (67 N) to open the door to its minimum required width.
 - b. Accessible Interior Doors: Not more than 5 lbf (22.2 N) to fully open door.
- C. Designations: Requirements for design, grade, function, finish, quantity, size, and other distinctive qualities of each type of entrance door hardware are indicated in "Entrance Door Hardware Sets" Article. Products are identified by using entrance door hardware designations as follows:
 - 1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in "Entrance Door Hardware Sets" Article.
- D. Continuous-Gear Hinges: BHMA A156.26.
- E. Panic Exit Devices: BHMA A156.3, Grade 1, listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing in accordance with UL 305.
- F. Cylinders:
 - 1. As specified in Section 087100 "Door Hardware."
 - 2. BHMA A156.5, Grade 1.
 - a. Keying: Master key system. Permanently inscribe each key with a visual key control number and include notation "DO NOT DUPLICATE".
- G. Strikes: Provide strike with black-plastic dust box for each latch or lock bolt; fabricated for aluminum framing.
- H. Operating Trim: BHMA A156.6.
- I. Closers: BHMA A156.4, Grade 1, with accessories required for a complete installation, sized as required by door size, exposure to weather, and anticipated frequency of use; adjustable to comply with field conditions and requirements for opening force.
- J. Concealed Overhead Holders and Stops: BHMA A156.8, Grade 1.

- K. Door Stops: BHMA A156.16, Grade 1, floor or wall mounted, as appropriate for door location indicated, with integral rubber bumper.
- L. Weather Stripping: Manufacturer's standard replaceable components.
 - 1. Compression Type: Made of ASTM D2000 molded neoprene or ASTM D2287 molded PVC.
 - 2. Sliding Type: AAMA 701/702, made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.
- M. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.
- N. Thresholds: BHMA A156.21 raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch (12.7 mm).

2.4 GLAZING

- A. Glazing: Comply with Section 088000 "Glazing."
- B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.
- C. Glazing Sealants: As recommended by manufacturer.

2.5 MATERIALS

- A. Sheet and Plate: ASTM B209 (ASTM B209M).
- B. Extruded Bars, Rods, Profiles, and Tubes: ASTM B221 (ASTM B221M).
- C. Structural Profiles: ASTM B308/B308M.
- D. Steel Reinforcement:
 - 1. Structural Shapes, Plates, and Bars: ASTM A36/A36M.
 - 2. Cold-Rolled Sheet and Strip: ASTM A1008/A1008M.
 - 3. Hot-Rolled Sheet and Strip: ASTM A1011/A1011M.
- E. Steel Reinforcement Primer: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods in accordance with recommendations in SSPC-SP COM, and prepare surfaces in accordance with applicable SSPC standard.

2.6 FABRICATION

- A. Form or extrude aluminum shapes before finishing.

- B. Fabricate components that, when assembled, have the following characteristics:
 - 1. Profiles that are sharp, straight, and free of defects or deformations.
 - 2. Accurately fitted joints with ends coped or mitered.
 - 3. Physical and thermal isolation of glazing from framing members.
 - 4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 - 5. Provisions for field replacement of glazing from interior.
 - 6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- C. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
- D. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.
- E. Entrance Doors: Reinforce doors as required for installing entrance door hardware.
- F. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.
- G. After fabrication, clearly mark components to identify their locations in Project in accordance with Shop Drawings.

2.7 ALUMINUM FINISHES

- A. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.
 - 1. Color: Medium bronze.

PART 3 - EXECUTION

3.1 INSTALLATION OF ALUMINUM-FRAMED ENTRANCE AND STOREFRONT SYSTEMS

- A. Comply with manufacturer's written instructions.
- B. Do not install damaged components.
- C. Fit joints to produce hairline joints free of burrs and distortion.
- D. Rigidly secure nonmovement joints.
- E. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
- F. Seal perimeter and other joints watertight unless otherwise indicated.

G. Metal Protection:

1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

H. Set continuous sill members and flashing in full sealant bed, as specified in Section 079200 "Joint Sealants," to produce weathertight installation.

I. Install joint filler behind sealant as recommended by sealant manufacturer.

J. Install components plumb and true in alignment with established lines and grades.

K. Install entrance doors to produce smooth operation and tight fit at contact points.

1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware in accordance with entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

L. Install glazing as specified in Section 088000 "Glazing."

3.2 ENTRANCE DOOR HARDWARE SETS

A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to completion of the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

B. Manufacturer's Abbreviations:

1. BE – Best Cylinder
2. CO – Corbin Russwin
3. CR – C.R. Laurence-Blumcraft
4. DO – Dormakaba
5. HA - Hager
6. IN - Inox
7. IV - Ives
8. MK – McKinney
9. NG – National Guard Products
10. NO - Norton Rixson
11. PE - Pemko
12. RO – Rockwood

- 13. SA - Sargent
- 14. SC - Schlage
- 15. VD - Von Duprin
- 16. ZE - Zero International

C. Hardware Sets: Each door to have the following:

Set 1.0: Doors 101, 102, 114a (Alum Door x Alum Frame)

1	Continuous Hinge	FM300-WEP	US32D	PE
1	Rim Exit Device	55-379L-03SS-3'	US32D	VD
1	Cylinder Core, SFIC	1E74	US32D	BE
1	Concealed Overhead Closer	PH93-N	689x600	NO
1	Threshold	171A	Alum	PE
1	Door Bottom	2343AVxBL	Alum	PE
1	Gasketing (head/jamb)	S88BL	Black	PE

END OF SECTION 084113

SECTION 085113 - ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Operable aluminum windows W1.

1.2 COORDINATION

- ##### **A. Finish Matching:** Coordinate all exposed exterior aluminum components and trim to ensure uniform and consistent color and appearance. Use products specified in this Section as a benchmark. Architect's decision will be final as to whether a proposed product matches.

1.3 PREINSTALLATION MEETINGS

- ##### **A. Preinstallation Conference:** Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product data.

B. Shop Drawings:

1. Plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.

- ##### **C. Samples:** Manufacturer's standard color sheets, showing full range of available colors for each type of exposed finish.

- ##### **D. Product Schedule:** For aluminum windows. Use same designations indicated on Drawings.

1.5 INFORMATIONAL SUBMITTALS

A. Product test reports.

B. Sample warranties.

1.6 CLOSEOUT SUBMITTALS

- A. Warranty documentation.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications:

1. Entity that is certified under the North American Contractor Certification Program (NACC) and that employs installers and supervisors who are trained and approved by manufacturer and who are certified under the Architectural Glass and Metal Technician (AGMT) certification program.

- B. Testing Agency Qualifications: Qualified in accordance with ASTM E699 for testing indicated and accredited by IAS or ILAC Mutual Recognition Arrangement as complying with ISO/IEC 17025 and acceptable to Owner and Architect.

- C. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

1.8 WARRANTY

- A. Special Warranty: Manufacturer and Installer agree to repair or replace components of aluminum windows that fail in materials or workmanship within specified warranty period. This includes the glass (including insulated units), glazing, anchorage and setting system, sealing, and flashing as it relates to air, water, and structural adequacy, and the Specifications and reviewed Shop Drawings.

1. Warranty Period: Two (2) years from date of Substantial Completion.

- B. Special Finish Warranty, Anodized Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of anodized finishes within specified warranty period.

1. Warranty Period: Ten (10) years from date of Substantial Completion.

- C. Glass:

1. Provide written warranty for insulated glass units per glass manufacturer, that they will be free from obstruction of vision because of dust or film formation on the internal glass

surfaces caused by failure of the hermetic seal due to defects in material and workmanship.

2. Warranty Period: Ten (10) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 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: FGIA 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 minimum.
 2. Minimum Performance Grade: 40 minimum.
 3. Mull Window Systems: Evaluate and rate combination assemblies as single systems as determined by AAMA 450 in accordance with AAMA/WDMA/CSA 101/I.S.2/A440 requirements.
- C. Energy Performance: Certified and labeled by manufacturer for energy performance as follows:
 1. Thermal Transmittance (U-factor): As determined in accordance with NFRC 100:
 - a. Operable Windows: Not more than 0.54 Btu/sq. ft. x h x deg F (3.07 W/sq. m x K).
 2. Solar Heat-Gain Coefficient (SHGC): As determined in accordance with NFRC 200:
 - a. Operable Windows: Not more than 0.36 as determined in accordance with NFRC 200.
 3. Condensation-Resistance Factor (CRF): Provide aluminum windows tested for thermal performance in accordance with AAMA 1503, showing a CRF of 58 or better.
- D. Thermal Movements: Provide aluminum windows, including anchorage, which allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 1. Temperature Change: 120 deg F (67 deg C) ambient; 180 deg F (100 deg C) material surfaces.

- E. Outdoor-Indoor Transmission Class (OITC): Rated for not less than 30 OITC when tested for laboratory sound transmission loss in accordance with ASTM E90 and determined by ASTM E1332.

2.2 ALUMINUM WINDOWS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Winco Window Company, Series 4500; or a comparable product by one of the following:
 - 1. Arcadia Architectural Products, Inc.
 - 2. Graham Architectural Products Corporation.
 - 3. Wausau Window and Wall Systems; Apogee Wausau Group, Inc.
- B. Provide manufacturer's standard aluminum window assemblies consisting of frames, sashes, glass, hardware, fasteners, and all components and accessories as required for a complete installation.
- C. Operating Types: Provide the following operating types in locations indicated on Drawings:
 - 1. Double hung.
- D. Frames and Sashes: Aluminum extrusions of alloy, temper, and strength complying with AAMA/WDMA/CSA 101/I.S.2/A440.
 - 1. Thermally Broken 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.
- E. 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 air.
 - 4. Low-E Coating: Sputtered on third surface.
- F. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.
- G. Hardware, General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with adjacent materials; designed to smoothly operate, tightly close, and securely lock windows, and sized to accommodate sash weight and dimensions.

1. Exposed Hardware Color and Finish: As selected by Architect from manufacturer's full range.
- H. Hung Window Hardware:
1. Counterbalancing Mechanism: Complying with AAMA 902, concealed, of size and capacity to hold sash stationary at any open position.
 2. Locks and Latches: Allow unobstructed movement of the sash across adjacent sash in direction indicated and operated from the inside only.
 3. Tilt Latch: Releasing latch allows sash to pivot about horizontal axis to facilitate cleaning exterior surfaces from the interior.
- I. Weather Stripping: Provide manufacturer's standard full-perimeter weather stripping for each operable sash unless otherwise indicated.
- J. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.
- K. Mullions: Provide manufacturer's standard combination and reinforcing mullions and cover plates matching window units, complete with anchors for support to structure. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections. Provide reinforcing mullions and cover plates capable of withstanding design wind loads of window units.

2.3 ACCESSORIES

- A. Dividers (False Muntins): Provide manufacturer's standard extruded-aluminum divider grilles in designs indicated for each sash lite.
1. Type: Permanently located at exterior lite.
 2. Pattern: As indicated on Drawings.
 3. Profile: As selected by Architect from manufacturer's full range.
- B. Subsills: Thermally broken, extruded-aluminum subsills in configurations indicated on Drawings.
- C. Interior Trim: Extruded-aluminum profiles in sizes and configurations indicated on Drawings.
- D. Panning Trim: Profiles in sizes and configurations indicated on Drawings.

2.4 INSECT SCREENS

- A. General: Fabricate insect screens to integrate with window frame. Provide screen for each operable exterior sash. Screen wickets are not permitted.
1. Type and Location: Full, outside for double-hung sashes.

- B. Aluminum Frames: Manufacturer's standard aluminum alloy complying with SMA 1201. Fabricate frames with mitered or coped joints or corner extrusions, concealed fasteners, and removable PVC spline/anchor concealing edge of frame.

- 1. Tubular Framing Sections and Cross Braces: Roll formed from aluminum sheet.

- C. Glass-Fiber Mesh Fabric: 20-by-20 (0.85-by-0.85-mm) or 20-by-30 (0.85-by-0.42-mm) mesh of PVC-coated, glass-fiber threads; woven and fused to form a fabric mesh resistant to corrosion, shrinkage, stretch, impact damage, and weather deterioration. Comply with ASTM D3656/D3656M.

- 1. Mesh Color: Manufacturer's standard.

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. Window Assemblies: Combination. Provide window units in configuration indicated on Drawings. Provide window frames, sashes, hardware, and other trim and components necessary for a complete, secure, and weathertight installation, including the following:
 - 1. Combination and reinforcing mullions with interior and exterior trim.
 - 2. Interior and exterior extension and trim.
 - 3. Exterior head and sill casings and trim.
- 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 ALUMINUM FINISHES

- A. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.
 - 1. Color: Medium bronze.

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, air 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 water passing joints and condensation to the exterior.
- D. Separate aluminum from sources of corrosion or electrolytic action at points of contact with other materials.
- E. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.

3.3 CLEANING AND PROTECTION

- A. Clean exposed surfaces immediately after installing windows using manufacturer's written instructions. Avoid damaging finishes. Remove excess sealants, glazing materials, dirt, and other substances.
- B. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.
- C. Protect window surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances do contact window surfaces, remove contaminants immediately in accordance with manufacturer's written instructions.

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END OF SECTION 085113

ALUMINUM WINDOWS

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SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes commercial door hardware for the following:
 - 1. Swinging Doors.
- B. Section Includes:
 - 1. Hinges.
 - 2. Continuous, pin-and-barrel-type hinges.
 - 3. Bored locks.
 - 4. Mortise locks.
 - 5. Bored auxiliary locks.
 - 6. Electromechanical locks.
 - 7. Exit devices and auxiliary items.
 - 8. Lock cylinders.
 - 9. Key control cabinet.
 - 10. Operating trim.
 - 11. Surface closers.
 - 12. Wall- and floor-mounted stops.
 - 13. Overhead stops and holders.
 - 14. Door gasketing.
 - 15. Thresholds.
 - 16. Metal protective trim units.
 - 17. Auxiliary door hardware.
 - 18. Auxiliary electrified door hardware.
- C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
 - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
 - 2. ICC/IBC - International Building Code.
 - 3. NFPA 70 - National Electrical Code.
 - 4. NFPA 80 - Fire Doors and Windows.
 - 5. NFPA 101 - Life Safety Code.
 - 6. NFPA 105 - Installation of Smoke Door Assemblies.
- D. Standards: All hardware specified herein shall comply with the following industry standards:
 - 1. ANSI/BHMA Certified Product Standards - A156 Series
 - 2. UL10C – Positive Pressure Fire Tests of Door Assemblies

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
- B. Keying Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product data.
- B. Shop Drawings: For electrified door hardware.
 - 1. Diagrams for power, signal, and control wiring.
 - 2. Details of interface of electrified door hardware and building safety and security systems.
- C. Samples: For each exposed product in each finish specified.
- D. Door hardware schedule.
- E. Keying schedule.

1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.
- B. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and of an Architectural Hardware Consultant who is available during the course of the Work to consult Contractor, Architect, and Owner about door hardware and keying.
 - 1. Scheduling Responsibility: Preparation of door hardware and keying schedule.
 - 2. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
- B. Architectural Hardware Consultant Qualifications: A person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and

extent to that indicated for this Project and who is currently certified by DHI as an Architectural Opening Consultant (AOC).

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.8 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.
- C. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.9 WARRANTY

- A. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of the hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 4. Electrical component defects and failures within the systems operation.

- B. Special Warranty: Manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Three (3) years from date of Substantial Completion unless otherwise indicated below:
 - a. Electromagnetic Locks: Five (5) years from date of Substantial Completion.
 - b. Mortise Locks and Latches: Ten (10) years from date of Substantial Completion.
 - c. Exit Hardware: Five (5) years from date of Substantial Completion.
 - d. Manual Closers: Ten (10) years from date of Substantial Completion.
 - e. Concealed Floor Closers: Ten (10) years from date of Substantial Completion.

1.10 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Means of Egress Doors: Latches do not require more than 15 lbf (67 N) to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
- C. Accessibility Requirements: For door hardware on doors in an accessible route, comply with ICC A117.1.

2.2 HINGES

- A. Hinges: ANSI/BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide McKinney Hinges, a brand of Assa Abloy; or comparable product by one of the following:
 - a. Hager Companies.
 - b. PBB Architectural.

2.3 CONTINUOUS HINGES

- A. Continuous, Pin-and-Barrel-Type Hinges: ANSI/BHMA A156.26; minimum 0.120-inch- (3.0-mm-) thick, hinge leaves with minimum overall width of 4 inches (102 mm); fabricated to full height of door and frame and to template screw locations; with components finished after milling and drilling are complete.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Pemko Manufacturing; or comparable product by one of the following:
 - a. Hager Companies.
 - b. PBB Architectural.
 - c. McKinney Hinges, a brand of Assa Abloy.

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 (13-mm) latchbolt throw.
 - 2. Mortise Locks: Minimum 3/4-inch (19-mm) latchbolt throw.
 - 3. Deadbolts: Minimum 1.25-inch (32-mm) bolt throw.
- C. Lock Backset: 2-3/4 inches (70 mm) unless otherwise indicated.
- D. Lock Trim:
 - 1. Description: As indicated in Door Hardware Sets.
 - 2. Levers: Cast.
 - 3. Escutcheons (Roses): Cast.
 - 4. Dummy Trim: Match lever lock trim and escutcheons.
- E. 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. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
 - 2. Aluminum-Frame Strike Box: Manufacturer's special strike box fabricated for aluminum framing.
- F. Bored Locks: ANSI/BHMA A156.2, Grade 1, Series 4000.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Schlage, a brand of Allegion; or comparable product by one of the following:

- a. Sargent Manufacturing, a part of Assa Abloy Group.
 - b. Best Lock Company, a part of Dormakaba Group.
- G. Mortise Locks: ANSI/BHMA A156.13, Security Grade 1; stamped steel case with steel or brass parts; Series 1000.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Schlage, a brand of Allegion; or comparable product by one of the following:
 - a. Sargent Manufacturing, a part of Assa Abloy Group.
 - b. Best Lock Company, a part of Dormakaba Group.

2.5 AUXILIARY LOCKS

- A. Bored Auxiliary Locks: ANSI/BHMA A156.36, Grade 1, with strike that suits frame.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Schlage, a brand of Allegion; or comparable product by one of the following:
 - a. Sargent Manufacturing, a part of Assa Abloy Group.
 - b. Best Lock Company, a part of Dormakaba Group.
- B. Mortise Auxiliary Locks: ANSI/BHMA A156.36, Grade 1; with strike that suits frame.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Schlage, a brand of Allegion; or comparable product by one of the following:
 - a. Sargent Manufacturing, a part of Assa Abloy Group.
 - b. Best Lock Company, a part of Dormakaba Group.

2.6 ELECTROMECHANICAL LOCKS

- A. Electromechanical Locks: ANSI/BHMA A156.25, Grade 1; motor driven; with strike that suits frame.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Schlage, a brand of Allegion; or comparable product by one of the following:
 - a. Sargent Manufacturing, a part of Assa Abloy Group.
 - b. Best Lock Company, a part of Dormakaba Group.
 - 2. Type: Bored and Mortise deadlocking latchbolt.

2.7 EXIT DEVICES AND AUXILIARY ITEMS

- A. Exit Devices and Auxiliary Items: ANSI/BHMA A156.3.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Von Duprin, an Allegion Company; or comparable product by one of the following:
 - a. Corbin Russwin, a brand of Assa Abloy.
 - b. Sargent, a brand of Assa Abloy.

2.8 LOCK CYLINDERS

- A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver
 1. Basis-of-Design Product: Subject to compliance with requirements, provide Best Cylinder; Series 1E; or comparable product by one of the following:
 - a. Sargent, a brand of Assa Abloy.
 - b. Schlage, an Allegion Company.
- B. Standard Lock Cylinders: ANSI/BHMA A156.5, Grade 1 permanent cores; face finished to match lockset.
 1. Core Type: Interchangeable.
- C. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.
- D. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.

2.9 KEYING

- A. Keying System: Factory registered, complying with guidelines in ANSI/BHMA A156.28, appendix. Provide one extra key blank for each lock. Incorporate decisions made in keying conference.
 1. Existing System:
 - a. Master key or grand master key locks to Owner's existing system.
 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."

2.10 KEY CONTROL SYSTEM

- A. Key Control Cabinet: ANSI/BHMA A156.28; metal cabinet with baked-enamel finish, containing key-holding hooks, labels, two sets of key tags with self-locking key holders, key-gathering envelopes, and temporary and permanent markers; with key capacity of 150 percent of the number of locks.
 - 1. Wall-Mounted Cabinet: Grade 1 cabinet with hinged-panel door equipped with key-holding panels and pin-tumbler cylinder door lock.
 - 2. Acceptable Manufacturers:
 - a. Lund Equipment (LU).
 - b. MMF Industries (MM).
 - c. Telkee (TK).

2.11 OPERATING TRIM

- A. Operating Trim: ANSI/BHMA A156.6; stainless steel unless otherwise indicated.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Rockwood Manufacturing; or comparable product by one of the following:
 - a. Inox Products.
 - b. Ives, an Allegion company.

2.12 SURFACE CLOSERS

- A. Surface Closers: ANSI/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. Basis-of-Design Product: Subject to compliance with requirements, provide Norton Rixson, a brand of Assa Abloy; or comparable product by one of the following:
 - a. Dormakaba Group.
 - b. LCN, an Allegion Company.

2.13 MECHANICAL STOPS AND HOLDERS

- A. Wall- and Floor-Mounted Stops: ANSI/BHMA A156.16.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Rockwood Manufacturing; or comparable product by one of the following:
 - a. Inox Products.

- b. Ives, an Allegion company.

2.14 OVERHEAD STOPS AND HOLDERS

- A. Overhead Stops and Holders: ANSI/BHMA A156.8.

- 1. Basis-of-Design Product: Subject to compliance with requirements, provide Norton Rixson, a brand of Assa Abloy; or comparable product by one of the following:
 - a. Dormakaba Group.
 - b. Rockwood Manufacturing.

2.15 DOOR GASKETING

- A. Door Gasketing: ANSI/BHMA A156.22; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Pemko, a brand of Assa Abloy; or comparable product by one of the following:
 - a. National Guard Products.
 - b. Zero International, an Allegion company.
- B. Maximum Air Leakage: When tested in accordance with ASTM E283/E283M with tested pressure differential of 0.3 inch wg (75 Pa), as follows:
 - 1. Smoke-Rated Gasketing: 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) of door opening.
 - 2. Gasketing on Single Doors: 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) of door opening.
 - 3. Gasketing on Double Doors: 0.50 cfm per ft. (0.000774 cu. m/s per m) of door opening.

2.16 THRESHOLDS

- A. Thresholds: ANSI/BHMA A156.21; fabricated to full width of opening indicated.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Pemko, a brand of Assa Abloy; or comparable product by one of the following:
 - a. National Guard Products.
 - b. Zero International, an Allegion company.

2.17 METAL PROTECTIVE TRIM UNITS

- A. Metal Protective Trim Units: ANSI/BHMA A156.6; fabricated from 0.050-inch- (1.3-mm-) thick stainless steel; with manufacturer's standard machine or self-tapping screw fasteners.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Rockwood Manufacturing; or comparable product by one of the following:
 - a. Inox Products.
 - b. Ives, an Allegion company.

2.18 AUXILIARY DOOR HARDWARE

A. Auxiliary Door Hardware: ANSI/BHMA A156.16.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Rockwood Manufacturing; or comparable product by one of the following:
 - a. Inox Products.
 - b. Ives, an Allegion company.

2.19 FINISHES

A. Provide finishes complying with ANSI/BHMA A156.18 as indicated in door hardware schedule.

PART 3 - EXECUTION

3.1 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. Wood Doors: DHI's "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- 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.
- 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 (760 mm) 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 indicated in keying schedule.
- E. Key Control System:
 - 1. Key Control Cabinet: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
- F. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, in equipment room. Verify location with Architect.
 - 1. Configuration: Provide least number of power supplies required to adequately serve doors with electrified door hardware.
- G. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 079200 "Joint Sealants."
- H. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.
- I. 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.
- J. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.2 FIELD QUALITY CONTROL

- A. Independent Architectural Hardware Consultant: Engage a qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.
 - 1. Independent Architectural Hardware Consultant will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

3.3 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.4 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.5 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.6 DOOR HARDWARE SCHEDULE

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to completion of the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

- B. Manufacturer's Abbreviations:

- 1. BE – Best Cylinder
- 2. CO – Corbin Russwin
- 3. CR – C.R. Laurence-Blumcraft
- 4. DO – Dormakaba
- 5. HA - Hager
- 6. IN - Inox
- 7. IV - Ives
- 8. MK – McKinney
- 9. NG – National Guard Products
- 10. NO - Norton Rixson
- 11. PE - Pemko
- 12. RO – Rockwood
- 13. SA - Sargent
- 14. SC – Schlage
- 15. VD – Von Duprin
- 16. ZE – Zero International

PART 4 - HARDWARE SCHEDULE

Set 1.0: Doors 101, 102 and 114a (Refer to Section 084113 "Aluminum-Framed Entrances and Storefronts")

Set 2.0: Door 114 (WD Door x HM Frame)

2 Hinge	TA2714-TB	US26D	MK
1 Electric Hinge	TA2714-TB-QC12	US26D	MK
1 Fail Secure Electric Lock	ND96ELxATH	US26D	SC
1 Cylinder Core, SFIC	IC 7-Pin	US26D	BE
1 Door Stop	RM861	US26D	RO
1 Door Closer	8501-M	689	NO
2 Kick Plate	K1050 8" 4BE	US32D	RO
3 Door Silencer	608 (or) 609	GRY	RO
1 Frame Harness	QC-C1500P		MK
1 Door Harness	QC-C___ - LENGTH TO SUIT		MK
1 Door Position Switch	679-05 WD		SC
1 Power Supply	PS906, 6 Amps		SC
1 Card Reader, Single-Gang, Wall Mount			

Notes: Card reader by security integrator. Electronic operation; valid card or key retracts latch bolt. Free egress at all times. In case of power loss, door remains locked and latched. Power supply units shall be provided by grouping doors as follows; 101a, 102a, 113a, 114 and 120.

Set 3.0: Door 120 (HM Door x HM Frame)

2 Hinge	TA2714-TB	US26D	MK
1 Electric Hinge	TA2714-TB-QC12	US26D	MK
1 Fail Secure Electric Lock	ND96ELxATH	US26D	SC
1 Cylinder Core, SFIC	IC 7-Pin	US26D	BE
1 Door Stop	RM861	US26D	RO
1 Door Closer	8501-M	689	NO
2 Kick Plate	K1050 8" 4BE	US32D	RO
1 Threshold	171A	Alum	PE
1 Door Bottom	3151SSN	US32D	PE
1 Gasketing (head/jamb)	S88BL		PE
1 Frame Harness	QC-C1500P		MK
1 Door Harness	QC-C___ - LENGTH TO SUIT		MK

1 Door Position Switch	679-05 WD	SC
1 Power Supply	PS906, 6 Amps	SC
1 Card Reader, Single-Gang, Wall Mount		

Notes: Card reader by security integrator. Electronic operation; valid card or key retracts latch bolt. Free egress at all times. In case of power loss, door remains locked and latched. Power supply units shall be provided by grouping doors as follows; 101a, 102a, 113a, 114 and 120.

Set 4.0: Doors 101a and 102a (WD Door x HM Frame)

1 Continuous Electric Hinge	FM300-WEP-EL12	US26D	PE
1 Fail Secure, Electric Exit Device	E5575-FSE-L-BE-07	US26D	VD
1 Cylinder Core, SFIC	IE74	US26D	BE
1 Door Stop	RM861	US26D	RO
1 Door Closer	CPS-8501-M	689	NO
2 Kick Plate	K1050 8" 4BE	US32D	RO
1 Threshold	171A	Alum	PE
1 Door Bottom	3151SSN	US32D	PE
1 Gasketing (head/jamb)	S88BL		PE
1 Frame Harness	QC-C1500P		MK
1 Door Harness	QC-C___ - LENGTH TO SUIT		MK
1 Door Position Switch	679-05 WD		SC
1 Power Supply	PS906, 6 Amps		SC
1 Card Reader, Narrow Stile Mount			SC

Notes: Card reader by security integrator. Electronic operation; valid card or key retracts latch bolt. Free egress at all times. In case of power loss, door remains locked and latched. Power supply units shall be provided by grouping doors as follows; 101a, 102a, 113a, 114 and 120.

Set 5.0: Doors 121 (HM Door x HM Frame)

6 Hinge	TA2714-TB	US26D	MK
1 Passage Set	ND10xATH	US26D	SC
1 Dummy Trim	ND170xATH	US26D	SC
1 Magnetic Catch	901	ALUM	RO
2 Kick Plate	K1050 8" 4BE	US32D	RO
2 Overhead Door Stop	OH 1000	US32D	RO
2 Silencer	608 (or) 609	GRY	RO

Set 6.0: Doors 109, 110 and 113 (WD Door x HM Frame)

3 Hinge	TA2714-TB	US26D	MK
1 Office Lock	ND50xATH	US26D	SC
1 Cylinder Core, SFIC	IC 7-Pin	US26D	BE
2 Kick Plate	K1050 8" 4BE	US32D	RO
1 Door Stop	RM861	US26D	RO
3 Silencer	608 (or) 609	GRY	RO

Set 6.1: Doors 103, 107, 111, 112 and 115 (WD Door x HM Frame)

3 Hinge	TA2714-TB	US26D	MK
1 Office Lock	ND50xATH	US26D	SC
1 Cylinder Core, SFIC	IC 7-Pin	US26D	BE
1 Door Closer	8501-M	689	NO
2 Kick Plate	K1050 8" 4BE	US32D	RO
1 Door Stop	RM861	US26D	RO
3 Silencer	608 (or) 609	GRY	RO

Set 7.0: Door 109a (WD Door x HM Frame)

3 Hinge	TA2714-TB	US26D	MK
1 Passage Set	ND10xATH	US26D	SC
1 Door Stop	RM861	US26D	RO
3 Silencer	608 (or) 609	GRY	RO

Set 8.0: Doors 105 and 106 (WD Door x HM Frame)

3 Hinge	TA2714-TB	US26D	MK
1 Privacy Set	ND40xATH	US26D	SC
1 Door Closer	8501M	689	NO
2 Kick Plate	K1050 8" 4BE	US32D	RO
1 Door Stop	RM861	US32D	RO
3 Silencer	608 (or) 609	GRY	RO

Set 8.1: Door 117a (WD Door x HM Frame)

3 Hinge	TA2714-TB	US26D	MK
1 Privacy Set	ND40xATH	US26D	SC
1 Door Stop	RM861	US26D	RO
3 Silencer	608 (or) 609	GRY	RO

Set 9.0: Doors 117 and 118 (WD Door x HM Frame)

3 Hinge (Heavy Weight)	T4A3386-TB	US32D	MK
1 Push Plate	70C-RKW (4 x 16)	US32D	RO
1 Door Pull	BF 110 x 70C (4 x 16)	US32D	RO
1 Door Closer	8501M	689	NO
2 Kick Plate	K1050 8" 4BE	US32D	RO
1 Door Stop	RM861	US32D	RO
3 Silencer	608 (or) 609	GRY	RO

Set 10.0: Doors 114c and 119a (HM Door x HM Frame)

1 Continuous Hinge	FM300-WEP	US32D	MK
1 Exit Device	RCB-8875L-373L-07	US32D	VD
1 Cylinder Core, SFIC	IE74	US32D	BE
1 Door Closer	CPS-8501-M	689	NO
1 Threshold	171A	Alum	PE
1 Door Bottom	3151SSN	US32D	PE
1 Gasketing (head/jamb)	S88BL		PE

Set 11.0: Doors 113a (HM Door x HM Frame)

1 Continuous Electric Hinge	FM300-WEP-EL12	US32D	PE
1 Fail Secure Electric Exit Device	E5575-FSE-L-BE-07	US32D	VD
1 Cylinder Core, SFIC	IE74	US32D	BE
1 Door Stop	RM861	US32D	RO
1 Door Closer	CPS-8501-M	689	NO
1 Threshold	171A	Alum	PE
1 Door Bottom	3151SSN	US32D	PE
1 Gasketing (head/jamb)	S88BL		PE
1 Frame Harness	QC-C1500P		MK
1 Door Harness	QC-C___ - LENGTH TO SUIT		MK

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1 Door Position Switch	679-05 WD	SC
1 Power Supply	PS906, 6 Amps	SC
1 Card Reader, Narrow Stile Mount		

Notes: Card reader by security integrator. Electronic operation; valid card or key retracts latch bolt of exit device when unlocked. Free egress at all times. In case of power loss, door remains locked and latched. In case of fire alarm signal, free egress. Power supply units shall be provided by grouping doors as follows; 101a, 102a, 113a, 114 and 120.

END OF SECTION 087100

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Glass products.
2. Insulating glass.
3. Glazing sealants.
4. Glazing tapes.
5. Miscellaneous glazing materials.

1.2 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.

1.3 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.**

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference:** Conduct conference at Project site.
1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 2. Review temporary protection requirements for glazing during and after installation.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.6 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For glass.
- B. Product test reports.
- C. Sample warranties.

1.7 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.

1.8 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 (4.4 deg C).

1.9 WARRANTY

- A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
 - 1. Warranty Period: Ten (10) years from date of Substantial Completion.
- B. 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: Ten (10) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined in accordance with the IBC and ASTM E1300:
 1. Design Wind Pressures: As calculated from a 125-mph design wind speed.
 2. Thermal Loads: Design glazing to resist thermal stress breakage induced by differential temperature conditions and limited air circulation within individual glass lites and insulated glazing units.
 3. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch (25 mm), whichever is less and keeps glazing retained in place with a suitable margin of safety under design conditions.
 4. Thermal Loads: Design glazing to resist thermal stress breakage induced by conditions including differential temperatures and limited air circulation.
- B. General: Installed glazing systems to withstand each applicable condition including the following:
 1. Movements in all directions, temperature-related scenarios, and other load situations including design load cases and load case combinations without failure, which include the following:
 - a. Loss or glass breakage attributable to defective manufacture, fabrication, or installation.
 - b. Failure of sealants or gaskets to remain watertight and airtight, deterioration of glazing materials, or other defects in construction.
- C. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
- D. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
 1. U-Factors: Center-of-glazing values, in accordance with NFRC 100 and based on most current non-beta version of LBL's WINDOW computer program, expressed as Btu/sq. ft. x h x deg F (W/sq. m x K).
 2. SHGC and Visible Transmittance: Center-of-glazing values, in accordance with NFRC 200 and based on most current non-beta version of LBL's WINDOW computer program.
 3. Visible Reflectance: Center-of-glazing values, in accordance with NFRC 300.

2.2 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. NGA Publications: "Glazing Manual."
 - 2. 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. 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. Provide glass that complies with performance requirements and is not less than thickness indicated.
- E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.3 SOURCE LIMITATIONS

- A. Source Limitations for Glass: Obtain insulating glass from single source from single manufacturer.
- B. Source Limitations for Low-E-Coated Glass: Where low-E-coated glass of primary glass manufacturer with a certified fabricator program is specified, obtain glass in fabricated units from manufacturer certified by coated-glass manufacturer.
- C. Source Limitations for Glazing Accessories: For each product and installation method, obtain from single source from single manufacturer.

2.4 GLASS PRODUCTS

- A. Clear Annealed Float Glass: ASTM C1036, Type I, Class 1 (clear), Quality-Q3.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Guardian Glass LLC; see Schedule at end of Part 3 or comparable product by one of the following:

- a. AGC Glass Company North America, Inc.
 - b. Oldcastle BuildingEnvelope®
 - c. Pilkington North America.
 - d. Viracon, Inc.
 - e. Vitro Architectural Glass.
- B. 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.
- C. Heat-Strengthened Float Glass: ASTM C1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
- D. Low-E-Coated Vision Glass: ASTM C1376, coated by vacuum deposition (sputter-coating) process, and complying with other requirements specified.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Guardian Glass LLC, SunGuard SNR 43; or comparable product by one of the following:
- a. AGC Glass Company of North America, Inc.
 - b. Oldcastle BuildingEnvelope®
 - c. Pilkington North America.
 - d. Viracon, Inc.
 - e. Vitro Architectural Glass.

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: Thermally broken aluminum.
- a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- 1) Technoform.
 - 2) Thermix; a brand of Ensinger USA.
3. Desiccant: Molecular sieve or silica gel, or a blend of both.

2.6 GLAZING SEALANTS

- A. General:
1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates,

- under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
 3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range of industry colors.
- B. Neutral-Curing Silicone Glazing Sealant, Class 100/50: Complying with ASTM C920, Type S, Grade NS, Use NT.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. GE Construction Sealants; Momentive Performance Materials Inc.
 - b. May National Associates, Inc.; a subsidiary of Sika Corporation.
 - c. Pecora Corporation.
 - d. Sika Corporation.
 - e. Dow Chemical Company (The).
 - f. Tremco Incorporated.

2.7 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 804.3 tape, where indicated.
 2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
 3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
1. AAMA 810.1, Type 1, for glazing applications in which tape acts as primary sealant.
 2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.8 MISCELLANEOUS GLAZING MATERIALS

- A. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- B. Setting Blocks:

1. Silicone with Shore A durometer hardness of 85, plus or minus 5.
 2. Type recommended in writing by sealant or glass manufacturer.
- C. 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.
- D. Edge Blocks:
1. Silicone with Shore A durometer hardness per manufacturer's written instructions.
 2. Type recommended in writing by sealant or glass manufacturer.
- E. Cylindrical Glazing Sealant Backing: ASTM C1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

PART 3 - EXECUTION

3.1 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 (1270 mm).
- 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.

3.2 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. Apply heel bead of elastomeric sealant.
- 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.

3.3 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.

3.4 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.5 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.

3.6 MONOLITHIC GLASS SCHEDULE

- A. Clear Glass Type GL-2: Fully tempered float glass.
 - 1. Minimum Thickness: 6 mm.
 - 2. Safety glazing required.

3.7 INSULATING GLASS SCHEDULE

- A. Low-E-Coated, Clear Insulating Glass Type GL-1:
 - 1. Basis-of-Design Product: Guardian Glass LLC, SunGuard SNR 43.
 - 2. Overall Unit Thickness: 1 inch (25 mm).
 - 3. Minimum Thickness of Each Glass Lite: 6 mm.
 - 4. Outdoor Lite: Heat-strengthened float glass.
 - 5. Interspace Content: Air.
 - 6. Indoor Lite: Heat-strengthened float glass.
 - 7. Low-E Coating: Pyrolytic on third surface.

8. Safety glazing required where indicated on Drawings.

END OF SECTION 088000

SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Framing systems.

1.2 ACTION SUBMITTALS

- A. Product Data: For each product.

1.3 QUALITY ASSURANCE

- A. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Certified Steel Stud Association.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, in accordance with ASTM E90 and classified in accordance with ASTM E413 by an independent testing agency.

2.2 FRAMING SYSTEMS

- A. Framing Members, General: Comply with AISI S220 and ASTM C645, Section 10 for conditions indicated.
 - 1. Steel Sheet Components: Comply with AISI S220 requirements for metal unless otherwise indicated.
 - 2. Protective Coating: Comply with AISI S220; ASTM A653/A653M, G40 (Z120); or coating with equivalent corrosion resistance. Galvannealed products are unacceptable.
 - a. Coating demonstrates equivalent corrosion resistance with an evaluation report acceptable to authorities having jurisdiction.
- B. Studs and Track: AISI S220.

1. Basis-of-Design Product: Subject to compliance with requirements, provide ClarkDietrich; ProSTUD Drywall Framing System with Smart Edge technology or comparable product by one of the following current members of the SFIA:
 - a. CEMCO; California Expanded Metal Products Co.
 - b. Marino/WARE.
 - c. Mill Steel Framing.
 - d. MRI Steel Framing, LLC.
 - e. SCAFCO, Steel Stud Company.
 - f. Steel-Con Systems.
 - g. Telling Industries.
 2. Minimum Base-Steel Thickness: 0.0329 inch (0.836 mm).
 3. Depth: As indicated on Drawings.
- C. Slip-Type Head Joints: Where indicated, provide the following:
1. Single Long-Leg Track System: Top track with 2-inch- (51-mm-) deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top track and with continuous bridging located within 12 inches (305 mm) of the top of studs to provide lateral bracing.
- D. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
1. Minimum Base-Steel Thickness: 0.0329 inch (0.836 mm).
- E. Cold-Rolled Channel Bridging: Steel, 0.0538-inch (1.367-mm) minimum base-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges.
1. Depth: 1-1/2 inches (38 mm).
 2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches (38 by 38 mm), 0.068-inch- (1.72-mm-) thick, galvanized steel.
- F. Hat-Shaped, Rigid Furring Channels:
1. Minimum Base-Steel Thickness: 0.0329 inch (0.836 mm).
 2. Depth: 7/8 inch (22.2 mm).
- G. Resilient Furring Channels: 1/2-inch- (13-mm-) deep, steel sheet members designed to reduce sound transmission.
1. Configuration: Asymmetrical.
- H. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches (32 mm), wall attachment flange of 3/4 inch (19 mm), minimum uncoated-steel thickness of 0.0179 inch (0.455 mm), and depth required to fit insulation thickness indicated.

2.3 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
 - 1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide the following:
 - 1. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch (3.2 mm) thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C754.
 - 1. Gypsum Board Assemblies: Also comply with requirements in ASTM C840 that apply to framing installation.
- B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.
- C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- D. Install bracing at terminations in assemblies.
- E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.2 INSTALLATION OF FRAMING SYSTEMS

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
- B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C. Install studs so flanges within framing system point in same direction.
- D. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.
 - a. Install two studs at each jamb unless otherwise indicated.
 - b. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
 3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
 4. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
- E. Direct Furring:
1. Screw to wood framing.
 2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.
- F. Z-Shaped Furring Members:
1. Erect insulation, specified in Section 072100 "Thermal Insulation," vertically and hold in place with Z-shaped furring members spaced 24 inches (610 mm) o.c.
 2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.
 3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches (305 mm) from corner and cut insulation to fit.
- G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

END OF SECTION 092216

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior gypsum board.

1.2 ACTION SUBMITTALS

A. Product data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. STC-Rated Assemblies:** For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated in accordance with ASTM E90 and classified in accordance with ASTM E413 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

- A. 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 Ceiling Board: ASTM C1396/C1396M.

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. American Gypsum
 - b. CertainTeed; SAINT-GOBAIN
 - c. Georgia-Pacific Gypsum LLC
 - d. Gold Bond Building Products, LLC provided by National Gypsum Company
 - e. PABCO Gypsum
 - f. USG Corporation

2. Thickness: 1/2 inch (12.7 mm).
 3. Long Edges: Tapered.
- B. Mold-Resistant Gypsum Board: ASTM C1396/C1396M. With moisture- and mold-resistant core and paper surfaces.
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. American Gypsum
 - b. CertainTeed; SAINT-GOBAIN
 - c. Georgia-Pacific Gypsum LLC
 - d. Gold Bond Building Products, LLC provided by National Gypsum Company
 - e. PABCO Gypsum
 - f. USG Corporation
 2. Core: 5/8 inch (15.9 mm), Type X.
 3. Long Edges: Tapered.
 4. Mold Resistance: ASTM D3273, score of 10 as rated in accordance with ASTM D3274.

2.4 TRIM ACCESSORIES

- A. Interior Trim: ASTM C1047.
1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
 2. Shapes:
 - a. Cornerbead.
 - b. Expansion (control) joint.

2.5 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C475/C475M.
- B. Joint Tape:
1. Interior Gypsum Board: Paper.
- 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 drying-type, all-purpose compound.

3. Fill Coat: For second coat, use drying-type, all-purpose compound.
4. Finish Coat: For third coat, use drying-type, all-purpose compound.

2.6 AUXILIARY MATERIALS

- A. Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
- C. Steel Drill Screws: ASTM C1002 unless otherwise indicated.
 1. Use screws complying with ASTM C954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
- D. Sound-Attenuation Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
- E. Thermal Insulation: As specified in Section 072100 "Thermal Insulation."

PART 3 - EXECUTION

3.1 INSTALLATION OF PANELS

- A. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- B. Comply with ASTM C840.
- C. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) 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.
- D. 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.

3.2 FINISHING OF GYPSUM BOARD

- A. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- B. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

- C. Gypsum Board Finish Levels: Finish panels to levels indicated below and in accordance with ASTM C840:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 2. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
 - a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."

3.3 PROTECTION

- A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- B. Remove and replace panels that are wet, moisture damaged, and mold damaged.

END OF SECTION 092900

SECTION 093013 - CERAMIC TILING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Porcelain floor tile.
2. Glazed wall tile.
3. Thresholds.
4. Tile backing panels.
5. Waterproof membranes.
6. Crack isolation membranes.
7. Setting material.
8. Grout materials.

1.2 ACTION SUBMITTALS

A. Product data.

B. Samples:

1. Full-size units of each type and composition of tile and for each color and finish required. For ceramic mosaic tile in color blend patterns, provide full sheets of each color blend.
2. Full-size units of each type of trim and accessory for each color and finish required.
3. Stone thresholds in 6-inch (152-mm) lengths.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

1.4 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installer is a Five-Star member of the National Tile Contractors Association or a Trowel of Excellence member of the Tile Contractors' Association of America.
2. Installer's supervisor for Project holds the International Masonry Institute's Supervisor Certification.
3. Installer employs only Ceramic Tile Education Foundation Certified Installers or installers recognized by the U.S. Department of Labor as Journeyman Tile Layers for Project.

1.5 WARRANTY

- A. Special Warranty: Manufacturer agrees to replace tile units that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five (5) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.

2.2 CERAMIC MOSAIC TILE

- A. Ceramic Mosaic Tile Type CT-1: Unglazed.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Keystones Colorbody Porcelain Mosaic Tile by Daltile; or comparable product by one of the following:
- a. American Olean.
 - b. Crossville, Inc.
 - c. Florida Tile, Inc.
2. Certification: Porcelain tile certified by the Porcelain Tile Certification Agency.
3. Module Size: 2 by 2 inches (50.8 by 50.8 mm), Hexagon.
4. Thickness: 1/4 inch (6.4 mm).
5. Face: Plain with cushion edges.
6. Surface: Smooth, without abrasive admixture.
7. Product Use Classification: Interior, Dry (ID), Interior, Wet (IW), Interior, Wet Plus (IW+).
8. Tile Color and Pattern: As selected by Architect from manufacturer's full range including Group 1 and Group 2 with Group 3 accent (10.0% of floor area), hexagon mosaic, 12 by 24-inch sheets.
9. Grout Color: As selected by Architect from manufacturer's full range.
10. Locations: Floors for rooms 105, 106, 116, 117 and 118.
11. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
- a. Base: Straight, flat-topped cove base, module size 4 by 4 inches (102 by 102 mm).

- b. External Corners: Surface bullnose; same size as adjoining flat tile.
- c. Internal Corners: Field-buttet square corners. For coved base and cap, use angle pieces designed to fit with stretcher shapes.

2.3 GLAZED WALL TILE

A. Glazed Wall Tile Type CT-2: Glazed

1. Basis-of-Design Product: Subject to compliance with requirements, provide Linear, Color Wheel Collection glazed ceramic wall tile by Daltile; or comparable product by one of the following:
 - a. American Olean.
 - b. Crossville, Inc.
 - c. Florida Tile, Inc.
2. Locations: Rooms 108 (backsplash), 116 (shower walls) and 117 (shower walls).
3. Module Size: 4 by 8 inches (102 by 204 mm).
4. Face Size Variation: Rectified.
5. Thickness: 5/16 inch (8 mm).
6. Tile Color and Pattern: As selected by Architect from manufacturer's full range, staggered brick joint pattern.
7. Grout Color: As selected by Architect from manufacturer's full range.
8. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
 - a. Base: Straight, flat-topped cove base, module size 4 by 12 inches (102 by 304 mm).
 - b. External Corners: Surface bullnose; same size as adjoining flat tile.
 - c. Internal Corners: Field-buttet square corners. For coved base and cap, use angle pieces designed to fit with stretcher shapes.

2.4 THRESHOLDS

- A. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.
 1. Bevel edges at 1:2 slope, with lower edge of bevel aligned with or up to 1/16 inch (1.5 mm) above adjacent floor surface. Finish bevel to match top surface of threshold. Limit height of threshold to 1/2 inch (12.7 mm) or less above adjacent floor surface.
- B. Marble Thresholds: ASTM C503/C503M, with a minimum abrasion resistance of 12 in accordance with ASTM C1353/C1353M or ASTM C241/C241M and with honed finish.
 1. Description:

- a. Uniform, fine- to medium-grained white stone with gray veining.

2.5 TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A118.9 and ASTM C1288 or ASTM C1325, with manufacturer's standard edges in maximum lengths available to minimize end-to-end butt joints.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide USG Corporation, USG Durock®; or a comparable product by one of the following:
 - a. C-Cure.
 - b. Custom Building Products.
 - c. FinPan, Inc.
 - d. Georgia-Pacific Building Products.
 - 2. Thickness: 5/8 inch (15.9 mm).
 - 3. Mold Resistance: ASTM D3273, score of 10 as rated in accordance with ASTM D3274.

2.6 WATERPROOF MEMBRANES

- A. General: Manufacturer's standard product, selected from the following, that complies with ANSI A118.10 and ANSI A118.12 and is recommended by manufacturer for application indicated. Include reinforcement and accessories recommended by manufacturer.
- B. Waterproof Membrane, Fluid Applied: Liquid-latex rubber or elastomeric polymer.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide LATICRETE International, Inc., HYDRO BARRIER Plus waterproof membrane; or comparable product by one of the following:
 - a. ARDEX Americas.
 - b. Boiardi Products Corporation; a QEP company.
 - c. Bostik; Arkema.
 - d. C-Cure.
 - e. Custom Building Products.
 - f. MAPEI Corporation.
 - g. Parex USA, Inc.
 - h. Sika Corporation.

2.7 CRACK ISOLATION MEMBRANES

- A. General: Manufacturer's standard product, selected from the following, that complies with ANSI A118.12 for standard performance and is recommended by manufacturer for application indicated. Include reinforcement and accessories recommended by manufacturer.

- B. Crack Isolation Membrane, Fluid Applied: Liquid-latex rubber or elastomeric polymer without continuous fabric reinforcement.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide LATICRETE International, Inc.; FRACTURE BAN SC Anti-Fracture Membrane; or comparable product by one of the following:
 - a. Bostik; Arkema.
 - b. C-Cure.
 - c. Custom Building Products.
 - d. MAPEI Corporation.
 - e. Parex USA, Inc.
 - f. Sika Corporation.

2.8 SETTING MATERIALS

- A. Modified Dry-Set Mortar (Thinset): ANSI A118.4.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide LATICRETE International, Inc.; 253 Gold; or comparable product by one of the following:
 - a. ARDEX Americas.
 - b. Boiardi Products Corporation; a QEP company.
 - c. Bostik; Arkema.
 - d. C-Cure.
 - e. Custom Building Products.
 - f. MAPEI Corporation.
 - g. Parex USA, Inc.
 - 2. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
 - 3. For wall applications, provide mortar that complies with requirements for non-sagging mortar in addition to other requirements in ANSI A118.4T.

2.9 GROUT MATERIALS

- A. Sand-Portland Cement Grout: ANSI A108.10, consisting of white or gray cement and white or colored aggregate as required to produce color indicated.
- B. High-Performance Tile Grout: ANSI A118.7.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide LATICRETE International, Inc.; PERMACOLOR Grout; or comparable product by one of the following:
 - a. ARDEX Americas.
 - b. Boiardi Products Corporation; a QEP company.

- c. Bostik; Arkema.
- d. C-Cure.
- e. Custom Building Products.
- f. MAPEI Corporation.
- g. Parex USA, Inc.

2.10 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting and adhesive materials for installations indicated.
- B. Temporary Protective Coating: Formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products and easily removable after grouting is completed without damaging grout or tile.
- C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- D. Grout Sealer: Grout manufacturer's standard product for sealing grout joints that does not change color or appearance of grout.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 - 1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
 - 2. Verify that concrete substrates for tile floors installed with thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove coatings, including curing compounds or other coatings, that are incompatible with tile-setting materials.

- B. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.
- D. Substrate Flatness:
 - 1. For tile shorter than 15 inches (381 mm), confirm that structure or substrate is limited to variation of 1/4 inch in 10 ft. (6.4 mm in 3 m) from the required plane, and no more than 1/16 inch in 12 inches (1.5 mm in 300 mm) when measured from tile surface high points.
 - 2. For large format tile, tile with at least one edge 15 inches (381 mm) or longer, confirm that structure or substrate is limited to 1/8 inch in 10 ft. (3 mm in 3 m) from the required plane, and no more than 1/16 inch in 24 inches (1.5 mm in 609 mm) when measured from tile surface high points.
- E. Field-Applied Temporary Protective Coating: If indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.3 INSTALLATION OF CERAMIC TILE SYSTEM

- A. Install tile backing panels and treat joints in accordance with ANSI A108.11 and manufacturer's written instructions for type of application indicated.
- B. Install waterproof membrane to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.
 - 1. Allow waterproof membrane to cure and verify by testing that it is watertight before installing tile or setting materials over it.
- C. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.
 - 1. Allow crack isolation membrane to cure before installing tile or setting materials over it.
- D. Install tile in accordance with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of ANSI A108 series that are referenced in TCNA installation methods and specified in tile installation schedules, and apply to types of setting and grouting materials used.
- E. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

- F. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- G. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.
- H. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.
- I. Jointing Pattern: Lay tile in pattern indicated on drawings. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
- J. Movement Joints: Provide movement joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated on Drawings. Form joints during installation of setting materials, mortar beds, and tile. Keep joints free of dirt, debris, and setting materials prior to filling with sealants. Do not saw-cut joints after installing tiles.
 - 1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
- K. Thresholds: Install thresholds in same type of setting bed as adjacent floor unless otherwise indicated.
 - 1. Do not extend waterproof membrane or crack isolation membrane under thresholds set in modified dry-set or improved modified dry-set mortar. Fill joints between such thresholds and adjoining tile set on waterproof membrane or crack isolation membrane with elastomeric sealant.
- L. Grout Sealer: Apply grout sealer to cementitious grout joints in tile floors in accordance with manufacturer's written instructions. As soon as sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.4 INTERIOR CERAMIC TILE INSTALLATION SCHEDULE

A. Interior Floor Installations, Concrete Subfloor:

1. TCNA F125-Full: Thinset mortar on crack isolation membrane.
 - a. Ceramic Tile Type: CT-1.
 - b. Thinset Mortar: Modified dry-set mortar.
 - c. Grout: High-performance unsanded cement grout.
 - d. Crack Isolation Membrane: Fluid-applied membrane.
 - e. Joint Width: 1/8 inch (3.2 mm).
 - f. Movement Joints: Types located on Drawings.

B. Interior Wall Installations, Wood or Metal Studs or Furring:

1. TCNA W245: Thinset mortar on glass-mat, water-resistant gypsum backer board.
 - a. Ceramic Tile Type: CT-2.
 - b. Thinset Mortar: Modified dry-set mortar.
 - c. Grout: High-performance unsanded cement grout.
 - d. Joint Width: 1/16 inch (1.6 mm) for CT-2.
 - e. Movement Joints: Types located on Drawings.

C. Bathtub/Shower Wall Installations:

1. TCNA B412: Thinset mortar over waterproof membrane on cement backer board.
 - a. Ceramic Tile Type: CT-2.
 - b. Thinset Mortar: Modified dry-set mortar.
 - c. Grout: High-performance unsanded cement grout.
 - d. Waterproof Membrane: Fluid-applied membrane. Complete water-proofing is required, including treatment at termination points.
 - e. Joint Width: 1/16 inch (1.6 mm).
 - f. Movement Joints: Types located on Drawings.

END OF SECTION 093013

SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Acoustical panels.
2. Metal suspension system.
3. Metal edge moldings and trim.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference:** Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data:** For each type of product.
- B. Samples:** For each exposed product and for each color and texture specified.

1.4 INFORMATIONAL SUBMITTALS

- A. Product test reports.**

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.**

1.6 WARRANTY

- A. Special Warranty for Acoustical Panel Ceilings:** Manufacturer agrees to repair or replace components of acoustical panel ceilings installation that fail in materials or workmanship within specified warranty period.
1. Warranty Period: Two (2) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: Class A in accordance with ASTM E1264.
 - 2. Smoke-Developed Index: 50 or less.

2.2 ACOUSTICAL PANELS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Symphony *m* High CAC #1220-80-1 by CertainTeed Corporation; or comparable product by one of the following:
 - 1. Armstrong World Industries, Inc.
 - 2. USG Corporation.
- B. Acoustical Panel Standard: Manufacturer's standard panels in accordance with ASTM E1264.
- C. Classification: Type IV, Form 2, Pattern E.
- D. Color: White.
- E. Light Reflectance (LR): 0.90.
- F. Ceiling Attenuation Class (CAC): 42.
- G. Noise Reduction Coefficient (NRC): 0.80.
- H. Edge/Joint Detail: Square.
- I. Thickness: 7/8 inch (22 mm).
- J. Modular Size: 24 by 48 inches (610 by 1220 mm).

2.3 METAL SUSPENSION SYSTEM

- A. Basis-of-Design Product: Subject to compliance with requirements, provide 15/16 EZ Stab Classic by CertainTeed Corporation; or comparable product by one of the following:
 - 1. Armstrong World Industries, Inc.
 - 2. USG Corporation.
- B. Metal Suspension-System Standard: Manufacturer's standard, direct-hung, metal suspension system and accessories in accordance with ASTM C635/C635M.

- C. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 (Z90) coating designation; with prefinished 15/16-inch- (24-mm-) wide metal caps on flanges.
 - 1. Structural Classification: Intermediate-duty system.
 - 2. End Condition of Cross Runners: Override (stepped) or butt-edge type.
 - 3. Face Design: Flat, flush.
 - 4. Cap Material: Cold-rolled steel.
 - 5. Cap Finish: Painted white.

2.4 ACCESSORIES

- A. Attachment Devices: Size for five times the design load indicated in ASTM C635/C635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
- B. Hold-Down Clips: Manufacturer's standard hold-down.

2.5 METAL EDGE MOLDINGS AND TRIM

- A. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated.
- B. Layout openings for penetrations centered on the penetrating items.

3.2 INSTALLATION

- A. Install acoustical panel ceilings in accordance with ASTM C636/C636M and manufacturer's written instructions.
- B. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
 - 1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 - 2. Do not use exposed fasteners, including pop rivets, on moldings and trim.

3. Arrange directionally patterned acoustical panels as follows:
 - a. As indicated on reflected ceiling plans.
4. Install hold-down clips in areas indicated; space in accordance with panel manufacturer's written instructions unless otherwise indicated.

END OF SECTION 095113

SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Thermoset-rubber base.
2. Rubber stair accessories.
3. Rubber molding accessories.

1.2 ACTION SUBMITTALS

- A. Product Data:** For each type of product.
- B. Samples:** For each exposed product and for each color and texture specified.

1.3 WARRANTY

- A. Special Warranty:** Manufacturer agrees to replace resilient tile units that fail in materials or workmanship within specified warranty period.
1. Warranty Period: Five (5) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 THERMOSET-RUBBER BASE RB-1

- A. Basis-of-Design Product:** Subject to compliance with requirements, provide Flexco Corporation; Wallflowers Rubber Wall Base; or comparable product by one of the following:
1. Burke Mercer Flooring Products; a division of Burke Industries Inc.
 2. Johnsonite; a Tarkett company.
 3. Roppe Corporation.
- B. Product Standard:** ASTM F1861, Type TS (rubber, vulcanized thermoset), Group I (solid, homogeneous).
1. Style and Location:
 - a. Style A, Straight: Provide in areas with carpet.
 - b. Style B, Cove: Provide in areas with resilient floor coverings.

- C. Thickness: 0.125 inch (3.2 mm).
- D. Height: 4 inches (102 mm).
- E. Lengths: Coils in manufacturer's standard length.
- F. Outside Corners: Job formed.
- G. Inside Corners: Job formed.
- H. Colors: As selected by Architect from manufacturer's full range of colors.

2.2 RUBBER STAIR ACCESSORIES RST-1

- A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
- B. Basis-of-Design Product: Subject to compliance with requirements, provide Flexco Corporation; Extra Heavy Duty Radial 575 Rubber Stair Treads; or comparable product by one of the following:
 - 1. American Biltrite.
 - 2. Burke Mercer Flooring Products; a division of Burke Industries Inc
 - 3. Johnsonite; a Tarkett North America Company.
 - 4. Mannington Mills, Inc.
 - 5. Mondo America, Inc.
 - 6. Nora Rubber Flooring, Freudenberg Building Systems, Inc.
 - 7. Roppe Corporation.
- C. Stair Treads: ASTM F2169.
 - 1. Type: TS (rubber, vulcanized thermoset).
 - 2. Class: 2 (pattern; embossed, grooved, or ribbed).
 - 3. Group: 1 (embedded abrasive strips).
 - 4. Nosing Style: Square, adjustable to cover angles between 60 and 90 degrees.
 - 5. Nosing Height: 2-3/16 inches (56 mm).
 - 6. Thickness: 1/4 inch (6 mm) and tapered to back edge.
 - 7. Size: Lengths and depths to fit each stair tread in one piece.
- D. Landing Tile: Matching treads; produced by same manufacturer as treads and recommended by manufacturer for installation with treads.
- E. Locations: Provide rubber stair accessories for interior mezzanine stairs.
- F. Colors and Patterns: As selected by Architect from manufacturer's full range of colors and patterns.

2.3 RUBBER MOLDING ACCESSORY

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Roppe Corporation Rubber Accessories; or comparable product by one of the following:
 - 1. American Biltrite.
 - 2. Burke Mercer Flooring Products; a division of Burke Industries Inc
 - 3. Johnsonite; a Tarkett North America Company.
 - 4. Mannington Mills, Inc.
 - 5. Mondo America, Inc.
 - 6. Nora Rubber Flooring, Freudenberg Building Systems, Inc.
- B. Description: Rubber nosing for carpet, nosing for resilient floor covering, reducer strip for resilient floor covering, joiner for tile and carpet, transition strips and similar.
- C. Profile and Dimensions: Roppe Corporation Rubber Accessories; #67 transition for tile carpet CPT-1 to VCT-1; #42 edge guard for tile carpet CPT-1 to concrete; #45 transition for VCT-1 to concrete; or a comparable product by one of the manufacturers listed in 2.3.A.
- D. Locations: Provide rubber molding accessories in areas indicated on Drawings.
- E. Colors and Patterns: As selected by Architect from manufacturer's full range of colors and patterns.

2.4 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.
- C. Stair-Tread Nose Filler: Two-part epoxy compound recommended by resilient stair-tread manufacturer to fill nosing substrates that do not conform to tread contours.
- D. Floor Polish: Provide protective, liquid floor-polish products recommended by resilient stair-tread manufacturer.

PART 3 - EXECUTION

3.1 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 F710.
 - 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 200 sq. ft. (18.6 sq. m), and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
 - b. Relative Humidity Test: Using in-situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install resilient products until materials are the same temperature as space where they are to be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.2 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. Job-Formed Corners:

1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 6 inches (152 mm) 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 6 inches (152 mm) in length.
 - a. Miter or cope corners to minimize open joints.

3.3 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Stair Accessories:
 1. Use stair-tread-nose filler to fill nosing substrates that do not conform to tread contours.
 2. Tightly adhere to substrates throughout length of each piece.
 3. 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.

3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Floor Polish: Remove soil, adhesive, and blemishes from resilient stair treads before applying liquid floor polish.
 1. Apply one coat.
- C. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 096513

SECTION 096519 - RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Vinyl composition floor tile.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and pattern specified.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for floor tile installation.

1.5 WARRANTY

- A. Special Warranty: Manufacturer agrees to replace resilient tile units that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Five (5) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For resilient floor tile, as determined by testing identical products according to ASTM E648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.2 VINYL COMPOSITION FLOOR TILE VCT-1

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong World Industries, Inc., Standard Excelon Imperial Texture; or comparable product by one of the following:
 - 1. American Biltrite.
 - 2. Congoleum Corporation.
 - 3. Mannington Mills, Inc.
- B. Tile Standard: ASTM F1066, Class 2, through pattern.
- C. Wearing Surface: Smooth.
- D. Thickness: 0.125 inch (3.2 mm).
- E. Size: 12 by 12 inches (305 by 305 mm).
- F. Colors and Patterns: As selected by Architect from manufacturer's full range of colors and patterns.

2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.
- C. Floor Polish: Provide protective, liquid floor-polish products recommended by floor tile manufacturer.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F710.
 - 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 floor tile manufacturer. Do not use solvents.

3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile 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 200 sq. ft. (18.6 sq. m) , and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
 - b. Relative Humidity Test: Using in-situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install floor tiles 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 floor tile and installation materials into spaces where they will be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.2 FLOOR TILE INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile.
- B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
 1. Lay tiles square with room axis.
- C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
 1. Lay tiles with grain direction alternating in adjacent tiles (basket-weave pattern).
- D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.
- G. Adhere floor tiles to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.
- H. Floor Polish: Remove soil, adhesive, and blemishes from floor tile surfaces before applying liquid floor polish.
 - 1. Apply one (1) coat.

END OF SECTION 096519

SECTION 096813 - TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

- 1. Carpet tile.**

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.**

1.3 ACTION SUBMITTALS

- A. Product data.**
- B. Samples: Manufacturer's standard color sheets, showing full range of available colors for each type of carpet tile.**

1.4 INFORMATIONAL SUBMITTALS

- A. Product test reports.**
- B. Sample warranties.**

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.**

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.**

1.7 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.**

1. Warranty Period:
2. Lifetime from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE (CPT-1)

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Shaw Contract Group; Construct Tile, Cut & Compose Collection, #5T104, carpet tile or comparable product by one of the following:
 1. Milliken & Company.
 2. Mohawk Industries, Inc.
 3. Van Gelder, Inc.
- B. Color: As selected by Architect from manufacturer's full range.
- C. Fiber Content: 100 percent nylon 6.
- D. Fiber Type: Solution Q Extreme Nylon.
- E. Pile Characteristic: Multi-Level pattern loop pile.
- F. Density: 7,121 oz./cu. yd. (0.263 g/cu. cm).
- G. Pile Thickness: 0.225 inches (5.72 mm) for finished carpet tile in accordance with ASTM D6859.
- H. Stitches: 9.5 stitches per inch (38.0 per 10 cm).
- I. Gage: 1/12 ends per inch (47.2 per 10 cm).
- J. Surface Pile Weight: 18.0 oz./sq. yd. (610.3 g/sq. m).
- K. Total Weight: 80 oz./sq. yd. (2,710 g/sq. m) for finished carpet tile or better
- L. Primary Backing/Backcoating: Manufacturer's standard composite materials.
- M. Secondary Backing: Manufacturer's standard material.
- N. Backing System: Ecoworx Tile.
- O. Size: 24 by 24 inches (610 by 610 mm).
- P. Applied Treatments:
 1. Soil-Resistance Treatment: Manufacturer's standard treatment, SSP Shaw Soil Protection.

2. Antimicrobial Treatment: Manufacturer's standard treatment that protects carpet tiles as follows:
 - a. Antimicrobial Activity: Not less than 2 mm halo of inhibition for gram-positive bacteria, not less than 1 mm halo of inhibition for gram-negative bacteria, and no fungal growth, in accordance with AATCC 174.

Q. Performance Characteristics:

1. Texture Appearance Retention Rating (TARR): Heavy traffic, 3.0 minimum in accordance with ASTM D7330.
2. Critical Radiant Flux Classification: Not less than 0.45 W/sq. cm in accordance with NFPA 253.
3. Dry Breaking Strength: Not less than 100 lbf (445 N) in accordance with ASTM D2646.
4. Tuft Bind: Not less than 8 lbf (36 N) in accordance with ASTM D1335.
5. Delamination: Not less than 3.5 lbf/in. (0.6 N/mm) in accordance with ASTM D3936.
6. Dimensional Tolerance: Within 1/32 inch (0.8 mm) of specified size dimensions, as determined by physical measurement.
7. Noise Reduction Coefficient (NRC): 0.20 or better in accordance with ASTM C423.
8. Colorfastness to Crocking: Not less than 4, wet and dry, in accordance with AATCC 165.
9. Colorfastness to Light: Not less than 4 after 40 AFU (AATCC fading units) in accordance with AATCC 16.3 Option 3.
10. Electrostatic Propensity: Less than 3.5 kV in accordance with AATCC 134.

2.2 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended in writing by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive types to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and that are recommended in writing by carpet tile manufacturer for releasable installation.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance.
- B. Examine carpet tile for type, color, pattern, and potential defects.

- C. Concrete Slabs: Verify that finishes comply with requirements specified in Section 033000 "Cast-in-Place Concrete" and that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.
 - 1. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft. (20 sq. m), and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/100 sq. m) in 24 hours.
 - b. Relative Humidity Test: Using in situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
 - c. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with CRI 104 and with carpet tile manufacturer's written installation instructions for preparing substrates.
- B. Use trowelable leveling and patching compounds, in accordance with manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch (3 mm) wide or wider, and protrusions more than 1/32 inch (0.8 mm) unless more stringent requirements are required by manufacturer's written instructions.
- C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.
- D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

- A. General: Comply with CRI 104, Section 10, "Carpet Tile," and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: Glue down; install every tile with full-spread, releasable, pressure-sensitive adhesive.
- C. Maintain dye-lot integrity. Do not mix dye lots in same area.

- D. Maintain pile-direction patterns recommended in writing by carpet tile manufacturer.
- E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended in writing by carpet tile manufacturer.
- F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.
- H. Install pattern parallel to walls and borders.

3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet tile:
 - 1. Remove excess adhesive and other surface blemishes using cleaner recommended by carpet tile manufacturer.
 - 2. Remove yarns that protrude from carpet tile surface.
 - 3. Vacuum carpet tile using commercial machine with face-beater element.
- B. Protect installed carpet tile to comply with CRI 104, Section 13.7.
- C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 096813

SECTION 099114 - EXTERIOR PAINTING (MPI STANDARDS)

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Surface preparation and application of paint systems on the following exterior substrates:
 - a. Galvanized metal.
 - b. Plastic.

1.2 DEFINITIONS

- A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, in accordance with ASTM D523.
- B. MPI Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, in accordance with ASTM D523.
- C. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, in accordance with ASTM D523.
- D. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, in accordance with ASTM D523.
- E. MPI Gloss Level 5: 35 to 70 units at 60 degrees, in accordance with ASTM D523.
- F. MPI Gloss Level 6: 70 to 85 units at 60 degrees, in accordance with ASTM D523.
- G. MPI Gloss Level 7: More than 85 units at 60 degrees, in accordance with ASTM D523.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
- B. Samples: For each type of topcoat product.
- C. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in the Exterior Painting Schedule to cross-reference paint systems specified in this Section. Include color designations.

1.4 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Architect will select one surface to represent surfaces and conditions for application of each paint system.
 - a. Vertical Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
 - b. Other Items: Architect will designate items or areas required.
 - 2. Final approval of color selections will be based on mockups.
 - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Handling: Deliver products to Project site in undamaged condition in manufacturer's original sealed containers, complete with labels and instructions for handling, storing, unpacking, protecting, and installing. Packaging to bear the manufacturer's label with the following information:
 - 1. Product name and type (description).
 - 2. Batch date.
 - 3. Color number.
 - 4. VOC content.
 - 5. Environmental handling requirements.
 - 6. Surface preparation requirements.
 - 7. Application instructions.
- B. 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 (7 deg C).
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures of less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin-Williams Company (The); products indicated in Interior Painting Schedule below or comparable product by one of the following:
 - 1. Benjamin Moore & Co.
 - 2. PPG Paints.
 - 3. Pratt & Lambert.
- B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to products listed in the Exterior Painting Schedule for the paint category indicated.

2.2 PAINT PRODUCTS

- A. MPI Standards: Provide products complying with MPI standards indicated and listed in its "MPI Approved Products List."
- B. Material Compatibility:
 - 1. Provide materials for use within each paint system that are 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, provide products recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- C. Colors: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- B. 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 Manual" 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.

3.3 INSTALLATION

- A. Apply paints in accordance with manufacturer's written instructions and recommendations in "MPI Manual."
- B. 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.

3.4 CLEANING AND PROTECTION

- A. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- B. 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 Architect, and leave in an undamaged condition.
- C. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 EXTERIOR PAINTING SCHEDULE

- A. Galvanized-Metal Substrates:
 - 1. Water-Based Light Industrial Coating System MPI EXT 5.3K:
 - a. Epoxy Prime Coat: Primer, epoxy, anti-corrosive, MPI #101.
 - 1) The Sherwin-Williams Company; Dura-Plate 235 Multi-Purpose Epoxy, B67W235/B67V235.
 - b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.

- c. Semigloss Topcoat: Light industrial coating, exterior, water based, semigloss (MPI Gloss Level 5), MPI #163.

- 1) The Sherwin-Williams Company; Pro Industrial DTM Semi-Gloss, B66W01151.

B. Plastic Trim Fabrication Substrates:

1. Latex System MPI EXT 6.8A:

- a. Water-Based Prime Coat: Primer, bonding, water based, MPI #17.

- 1) The Sherwin-Williams Company; PrepRite ProBlock, B51W00620.

- b. Intermediate Coat: Latex, exterior, matching topcoat.

- c. Low-Sheen Topcoat: Latex, exterior, low sheen (MPI Gloss Level 3-4), MPI #15.

- 1) The Sherwin-Williams Company; Emerald, K48W00051.

END OF SECTION 099114

SECTION 099124 - INTERIOR PAINTING (MPI STANDARDS)

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and the application of paint systems on the following interior substrates:
 - 1. Concrete.
 - 2. Concrete masonry units (CMUs).
 - 3. Galvanized metal.
 - 4. Wood trim.
 - 5. Gypsum board.
 - 6. Cotton or Canvas and ASJ Insulation-Covering Substrates.

1.2 DEFINITIONS

- A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, in accordance with ASTM D523.
- B. MPI Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, in accordance with ASTM D523.
- C. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, in accordance with ASTM D523.
- D. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, in accordance with ASTM D523.
- E. MPI Gloss Level 5: 35 to 70 units at 60 degrees, in accordance with ASTM D523.
- F. MPI Gloss Level 6: 70 to 85 units at 60 degrees, in accordance with ASTM D523.
- G. MPI Gloss Level 7: More than 85 units at 60 degrees, in accordance with ASTM D523.

1.3 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.
- B. Samples: For each type of topcoat product.

- C. Product List: Use same designations indicated on Drawings and in the Interior Painting Schedule to cross-reference paint systems specified in this Section. Include color designations.

1.4 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Architect will select one surface to represent surfaces and conditions for application of each paint system.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
 - b. Other Items: Architect will designate items or areas required.
 - 2. Final approval of color selections will be based on mockups.
 - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Handling: Deliver products to Project site in undamaged condition in manufacturer's original sealed containers, complete with labels and instructions for handling, storing, unpacking, protecting, and installing. Packaging to bear the manufacturer's label with the following information:
 - 1. Product name and type (description).
 - 2. Batch date.
 - 3. Color number.
 - 4. VOC content.
 - 5. Environmental handling requirements.
 - 6. Surface preparation requirements.
 - 7. Application instructions.
- B. 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 (7 deg C).
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).

- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures of less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin-Williams Company (The); products indicated in Interior Painting Schedule below or comparable product by one of the following:
 - 1. Benjamin Moore & Co.
 - 2. PPG Paints.
 - 3. Pratt & Lambert.
- B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to products listed in the Interior Painting Schedule for the paint category indicated.

2.2 PAINT, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products List."
- 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.
- C. VOC Content: For field applications that are inside the weatherproofing system, paints and coatings to comply with VOC content limits of authorities having jurisdiction and the following VOC content limits exclusive of colorants added to a tint base, when calculated in accordance with 40 CFR 59, Subpart D (EPA Method 24):
 - 1. Flat Paints and Coatings: 50 g/L.
 - 2. Nonflat Paints and Coatings: 150 g/L.
 - 3. Dry-Fall Coatings: 400 g/L.
 - 4. Primers, Sealers, and Undercoaters: 200 g/L.
 - 5. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
 - 6. Shellacs, Clear: 730 g/L.
 - 7. Shellacs, Pigmented: 550 g/L.
- D. Colors: As selected by Architect from manufacturer's full range.

1. Twenty-five percent (25.0%) of wall surface area will be painted with differing color accent paints. The Architect may select up to four (4) different colors for wall surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- B. 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 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.
- C. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

3.3 INSTALLATION

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
- B. 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.
- C. Painting Fire-Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
 1. Paint the following work where exposed in equipment rooms:
 - a. Uninsulated metal piping.
 - b. Uninsulated plastic piping.
 - c. Pipe hangers and supports.
 - d. Metal conduit.
 - e. Plastic conduit.

- f. Tanks that do not have factory-applied final finishes.
 - g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
- 2. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 FIELD QUALITY CONTROL

- A. Dry-Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry-film thickness.
 - 1. Contractor shall touch up and restore painted surfaces damaged by testing.
 - 2. If test results show that dry-film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry-film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- 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 Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

- A. Concrete Substrates, Traffic Surfaces:
 - 1. Solvent-Based Concrete Floor Sealer System, MPI INT 3.2F:
 - a. First Coat: Sealer, solvent based, for concrete floors, matching topcoat.
 - b. Topcoat: Sealer, solvent based, for concrete floors, MPI #104
 - 1) The Sherwin-Williams Company; H & C, Clarishield Solvent-Based Natural Look Sealer, 651201337.

B. CMU Substrates:

1. High-Performance Architectural Latex System, MPI INT 4.2D:
 - a. Block Filler: Latex, interior/exterior, MPI #4.
 - 1) The Sherwin-Williams Company; PrepRite Interior/Exterior Block Filler, B25W00025.
 - b. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
 - c. Topcoat: Latex, interior, high performance architectural (MPI Gloss Level 3), MPI #139.
 - 1) The Sherwin-Williams Company; ProMar 200 HP Zero VOC, B20W01951.

A. Galvanized-Metal Substrates:

1. Water-Based Light Industrial Coating System MPI EXT 5.3K:
 - a. Epoxy Prime Coat: Primer, epoxy, anti-corrosive, MPI #101.
 - 1) The Sherwin-Williams Company; Dura-Plate 235 Multi-Purpose Epoxy, B67W235/B67V235.
 - b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.
 - c. Semigloss Topcoat: Light industrial coating, exterior, water based, semigloss (MPI Gloss Level 5), MPI #163.
 - 1) The Sherwin-Williams Company; Pro Industrial DTM Semi-Gloss, B66W01151.

B. Wood Substrates: Wood trim.

1. High-Performance Architectural Latex System, MPI INT 6.3A:
 - a. Prime Coat: Primer, latex, for interior wood, MPI #39.
 - 1) The Sherwin-Williams Company; PrepRite ProBlock Primer Sealer, B51W00620.
 - b. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
 - c. Topcoat: Latex, interior, high performance architectural (MPI Gloss Level 3), MPI #139.

- 1) The Sherwin-Williams Company; ProMar 200 HP Zero VOC, B20W01951.

C. Gypsum Board Substrates:

1. High-Performance Architectural Latex System, MPI INT 9.2B:

- a. Prime Coat: Primer sealer, latex, interior, MPI #50.

- 1) The Sherwin-Williams Company; Harmony Interior Latex Primer, B11W01500.

- b. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.

- c. Topcoat: Latex, interior, high performance architectural (MPI Gloss Level 3), MPI #139.

- 1) The Sherwin-Williams Company; ProMar 200 HP Zero VOC, B20W01951.

D. Cotton or Canvas and ASJ Insulation-Covering Substrates: Including pipe and duct coverings.

1. Latex System, MPI INT 10.1A:

- a. Prime Coat: Primer sealer, latex, interior, MPI #50.

- 1) The Sherwin-Williams Company; Harmony Interior Latex Primer, B11W01500.

- b. Intermediate Coat: Latex, interior, matching topcoat.

- c. Topcoat: Latex, interior (MPI Gloss Level 3), MPI #52.

- 1) The Sherwin-Williams Company; ProMar 200 HP Zero VOC, B20W01951.

END OF SECTION 099124

SECTION 101419 - DIMENSIONAL LETTER SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

- 1. Dimensional characters.**
 - a. Cutout dimensional characters at exterior building wall (west side).**

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For signs.

- 1. Include fabrication and installation details and attachments to other work.**
- 2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.**
- 3. Show message list, typestyles, graphic elements, and layout for each sign at least half size.**

C. Samples: For each exposed product and for each color and texture specified.

1.3 INFORMATIONAL SUBMITTALS

A. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.5 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

- 1. Warranty Period:** Ten (10) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Signs and supporting elements shall withstand the effects of gravity and other loads within limits and under conditions indicated.
- B. Thermal Movements: For exterior characters, allow for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 DIMENSIONAL CHARACTERS

- A. Cutout Characters: Characters with uniform faces; square-cut, smooth, eased edges; 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. APCO Graphics, Inc.
 - c. ASI Sign Systems, Inc.
 - d. Gemini Signage; Gemini, Inc.
 - e. Matthews International Corporation; Bronze Division.
 - f. Metal Arts.
 - g. Metallic Arts.
 - h. Inpro Corporation.
 - 2. Character Material: Sheet or plate aluminum.
 - 3. Character Height: 14-inches.
 - 4. Thickness: 0.125 inch (3.18 mm) minimum.
 - 5. Finishes:
 - a. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard, in color as selected by Architect from manufacturer's full range.
 - b. Overcoat: Manufacturer's standard baked-on clear coating.
 - 6. Mounting: Projecting studs.

2.3 ACCESSORIES

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signs, noncorrosive and compatible with each material joined, and complying with the following:

1. Use concealed fasteners and anchors unless indicated to be exposed.
2. For exterior exposure, furnish stainless steel devices unless otherwise indicated.
3. Sign Mounting Fasteners:
 - a. Projecting Studs: Threaded studs with sleeve spacer, welded or brazed to back of sign material, screwed into back of sign assembly, or screwed into tapped lugs cast integrally into back of cast sign material, unless otherwise indicated.

2.4 FABRICATION

- A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.
 1. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
 2. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed connections of flux, and dress exposed and contact surfaces.
 3. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
 4. Internally brace dimensional characters for stability, to meet structural performance loading without oil-canning or other surface deformation, and for securing fasteners.
 5. Provide rabbets, lugs, and tabs necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.

PART 3 - EXECUTION

3.1 INSTALLATION OF DIMENSIONAL CHARACTERS

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
 1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
 2. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
 3. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
- B. Mounting Methods:
 1. Projecting 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 spacers on studs, place sign in position, and push until spacers are pinched between sign and substrate, embedding the stud ends in holes. Temporarily support sign in position until adhesive fully sets.
- C. Remove temporary protective coverings and strippable films as signs are installed.

END OF SECTION 101419

SECTION 101423.16 - ROOM-IDENTIFICATION PANEL SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes room-identification signs that are directly attached to the building.

1.2 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.
- C. Samples: For each exposed product and for each color and texture specified.

1.3 INFORMATIONAL SUBMITTALS

- A. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.5 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Five (5) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Accessibility Standard: Comply with applicable provisions in ICC A117.1.

2.2 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. Allen Industries Architectural Signage.
 - c. APCO Graphics, Inc.
 - d. ASI Sign Systems, Inc.
 - e. Best Sign Systems, Inc.
 - f. Clarke Systems.
 - g. Inpro Corporation.
 - h. Mohawk Sign Systems.
 - i. Nelson-Harkins Industries.
2. Laminated-Sheet Sign: Photopolymer face sheet with raised graphics laminated to acrylic backing sheet to produce composite sheet.
 - a. Composite-Sheet Thickness: 0.125 inch (3.18 mm).
 - b. Color(s): As selected by Architect from manufacturer's full range.
 - c. Tactile and Braille Sign: Manufacturer's standard process for producing text and symbols complying with ADA-ABA Accessibility Guidelines and with ICC/ANSI A117.1. Text shall be accompanied by Grade 2 Braille. Produce precisely formed characters with square-cut edges free from burrs and cut marks; Braille dots with domed or rounded shape.
 - d. Raised-Copy Thickness: Not less than 1/32 inch (0.8 mm).
3. Sign-Panel Perimeter: Finish edges smooth.
 - a. Edge Condition: Square cut.
 - b. Corner Condition in Elevation: Square.
4. Mounting: Surface mounted to wall with adhesive or two-face tape (contractor's option).
5. Provide one (1) room-identification sign each at doors 103, 107, 108, 109, 110, 112, 113, 114, 114b, 120 and 121. The size of room-identification signs at doors shall be 4-inches high x 8-inches wide.

6. Provide men's/ladies' pictogram signs at toilet room doors 105, 106, 117 and 118. Include the "international symbol of accessibility" for signs at toilet room doors 105, 106, 117 and 118. The size of signs indicated at these locations shall be 8-inches high x 6-inches wide. Toilet rooms 105 and 106 are unisex.
7. Provide signs stating "MAINTENANCE ACCESS ONLY" at doors 111 and 115. The size of signs indicated at these locations shall be 4-inches high x 8-inches wide. Provide signs stating "AUTHORIZED PERSONNEL ONLY" at doors 101a, 102a and 120. The size of signs indicated at these locations shall be 4-inches high x 8-inches wide.

2.3 SIGN MATERIALS

- A. Acrylic Sheet: ASTM D4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).

2.4 ACCESSORIES

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signs, noncorrosive and compatible with each material joined, and complying with the following:
 1. Use concealed fasteners and anchors unless indicated to be exposed.
 2. For exterior exposure, furnish stainless-steel devices unless otherwise indicated.
- B. Adhesive: As recommended by sign manufacturer.
- C. Two-Face Tape: Manufacturer's standard high-bond, foam-core tape, 0.045 inch (1.14 mm) thick, with adhesive on both sides.

2.5 FABRICATION

- A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.

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. Mounting Methods:

1. **Adhesive:** Clean bond-breaking materials from substrate surface and remove loose debris. Apply linear beads or spots of adhesive symmetrically to back of sign and of suitable quantity to support weight of sign after cure without slippage. Keep adhesive away from edges to prevent adhesive extrusion as sign is applied and to prevent visibility of cured adhesive at sign edges. Place sign in position, and push to engage adhesive. Temporarily support sign in position until adhesive fully sets.
2. **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.

END OF SECTION 101423.16

SECTION 102113.14 - STAINLESS STEEL TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Stainless steel toilet compartments.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for blocking.
2. Section 092216 "Non-Structural Metal Framing" for blocking.
3. Section 102800 "Toilet, Bath, and Laundry Accessories" for accessories mounted on toilet compartments.

1.2 ACTION SUBMITTALS

A. Product data.

B. Shop Drawings: Plans, elevations, sections, details, and attachment details.

1.3 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 25 or less.
2. Smoke-Developed Index: 450 or less.

B. Structural Performance: Where grab bars are mounted on toilet compartments, design panels to comply with the following requirements:

1. Panels are able to withstand a concentrated load on grab bar of at least 250 lbf (1112 N) applied at any direction and at any point, without deformation of panel.

- C. Regulatory Requirements: Comply with applicable provisions in ICC A117.1 for toilet compartments designated as accessible.

2.2 STAINLESS STEEL TOILET COMPARTMENTS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide ASI Accurate Partitions, an ASI Group company; integrated privacy, stainless steel partitions; or comparable product by one of the following:
 - 1. Ampco by AJW.
 - 2. Bradley Corporation, a Watts Brand.
 - 3. Decolam.
 - 4. Marlite.
 - 5. Scranton Products.
 - 6. Spec-Rite Designs, LLC; DesignRite Partitions.
 - 7. Weis-Robart Partitions, Inc.
- B. Toilet-Enclosure Style: Overhead braced, privacy type.
- C. Urinal-Screen Style: Floor anchored.
- D. Door, Panel, and Pilaster Construction: Seamless, metal facing sheets pressure laminated to core material; with continuous, interlocking molding strip or lapped-and-formed edge closures; corners secured by welding or clips and exposed welds ground smooth. Provide with no-sightline system consisting of a full-height continuous stop on latch side of door and full-height continuous filler strip on hinge side of door (unless continuous hinge is used). Exposed surfaces shall be free of pitting, seam marks, roller marks, stains, discolorations, telegraphing of core material, or other imperfections.
 - 1. Core Material: Manufacturer's standard sound-deadening honeycomb of resin-impregnated kraft paper in thickness required to provide finished thickness of 1 inch (25 mm) for doors and panels and 1-1/4 inches (32 mm) for pilasters.
 - 2. Grab-Bar Reinforcement: Provide concealed internal reinforcement for grab bars mounted on units of size and material adequate for panel to withstand specified structural performance requirements.
 - 3. Tapping Reinforcement: Provide concealed reinforcement for tapping (threading) at locations where machine screws are used for attaching items to units.
- E. Urinal-Screen Construction:
 - 1. Flat-Panel Urinal Screen: Matching panel construction.
- F. Facing Sheets and Closures: Stainless steel sheet of nominal thicknesses as follows:
 - 1. Pilasters, Braced at Both Ends: Manufacturer's standard thickness, but not less than 0.038 inch (0.95 mm).
 - 2. Panels: Manufacturer's standard thickness, but not less than 0.031 inch (0.79 mm).
 - 3. Doors: Manufacturer's standard thickness, but not less than 0.031 inch (0.79 mm).

4. Flat-Panel Urinal Screens: Thickness matching panels.
- G. Pilaster Shoes: Formed from stainless steel sheet, not less than 0.031-inch (0.79-mm) nominal thickness and 3 inches (76 mm) high, finished to match hardware.
- H. Pilaster Sleeves (Caps): Formed from stainless steel sheet, not less than 0.031-inch (0.79-mm) nominal thickness and 3 inches (76 mm) high, finished to match hardware.
- I. Urinal-Screen Post: Manufacturer's standard post design of 1-3/4-inch- (44-mm-) square, aluminum tube with satin finish; with shoe and sleeve (cap) matching that on the pilaster.
- J. Brackets (Fittings):
 1. Full-Height (Continuous) Type: Manufacturer's standard design; stainless steel.
- K. Stainless Steel Finish: Directional Satin Finish: ASTM A480/A480M, No. 4 on exposed faces. Protect exposed surfaces from damage by application of strippable, temporary protective covering before shipment.

2.3 HARDWARE AND ACCESSORIES

- A. Door Hardware and Accessories: Manufacturer's operating hardware and accessories.
 1. Hinges:
 - a. Manufacturer's gravity-actuated, cam-action, self-closing type that can be adjusted to hold doors open at any angle up to 90 degrees, allowing emergency access by lifting door.
 - 1) Material, Gravity-Type Hinge: Stainless steel.
 2. Latch and Keeper: Manufacturer's recessed, with occupancy indicator latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at toilet enclosures designated as accessible.
 - a. Material: Stainless steel.
 3. Coat Hook: Manufacturer's combination hook and rubber-tipped bumper, sized to prevent inswinging door from hitting compartment-mounted accessories.
 - a. Material: Stainless steel.
 4. Door Bumper: Manufacturer's rubber-tipped bumper at outswinging doors.
 - a. Material: Manufacturer's standard.

5. Door Pull: Manufacturer's unit at outswinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at toilet enclosures designated as accessible.

- a. Material: Stainless steel.

- B. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile and in manufacturer's standard finish.
- C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless steel, hot-dip galvanized-steel, or other rust-resistant, protective-coated steel anchors compatible with related materials.

2.4 MATERIALS

- A. Aluminum Castings: ASTM B26/B26M.
- B. Aluminum Extrusions: ASTM B221 (ASTM B221M).
- C. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304, stretcher-leveled standard of flatness.
- D. Stainless Steel Castings: ASTM A743/A743M.

2.5 FABRICATION

- A. Fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories and solid blocking within panel where required for attachment of toilet accessories.
- B. Overhead-Braced Units: Manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters and walls to suit floor and wall conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.
- C. Urinal-Screen Posts: Manufacturer's standard corrosion-resistant anchoring assemblies at posts and walls, with leveling adjustment nuts at tops and bottoms of posts. Provide shoes and sleeves (caps) at posts to conceal anchorage.
- D. Door Size and Swings: Unless otherwise indicated, provide 24-inch- (610-mm-) wide inswinging doors for standard toilet enclosures and 36-inch- (914-mm-) wide outswinging doors with a minimum 32-inch- (813-mm-) wide clear opening for toilet enclosures designated as accessible.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
 - 1. Maximum Clearances:
 - a. Pilasters and Panels or Screens: 1/2 inch (13 mm).
 - b. Panels or Screens and Walls: 1 inch (25 mm).
 - 2. Full-Height (Continuous) Brackets: Secure panels or screens to walls and to pilasters with full-height brackets.
 - a. Locate bracket fasteners so holes for wall anchors occur in masonry or tile joints.
 - b. Align brackets at pilasters with brackets at walls.
- B. Overhead-Braced Units: Secure pilasters to floor and level, plumb, and tighten. Set pilasters with anchors penetrating not less than 1-3/4 inches (44 mm) into structural floor unless otherwise indicated in manufacturer's written instructions. Secure continuous head rail to each pilaster with no fewer than two fasteners. Hang doors to align tops of doors with tops of panels, and adjust so tops of doors are parallel with overhead brace when doors are in closed position.
- C. Urinal Screens: Attach with anchoring devices to suit supporting structure. Set units level and plumb, rigid, and secured to resist lateral impact.

3.2 ADJUSTING

- A. Hardware Adjustment: Adjust and lubricate hardware in accordance with hardware manufacturer's written instructions for proper operation. Set hinges on inswinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on outswinging doors to return doors to fully closed position.

END OF SECTION 102113.14

SECTION 102600 - WALL AND DOOR PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Corner guards.

B. Related Requirements:

1. Section 087100 "Door Hardware" for metal protective trim units, according to BHMA A156.6, used for armor, kick, mop, and push plates.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each color and texture specified, 12 inches (300 mm) long.

1.3 INFORMATIONAL SUBMITTALS

A. Product certificates.

B. Material certificates.

C. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.5 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of wall- and door-protection units that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Two (2) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface Burning Characteristics: Comply with ASTM E84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: 25 or less.
 - 2. Smoke-Developed Index: 450 or less.
- B. Regulatory Requirements: Comply with applicable provisions in ICC A117.1.

2.2 CORNER GUARDS

- A. Surface-Mounted, Plastic-Cover Corner Guards "CG": Manufacturer's standard, PVC-free assembly consisting of snap-on, resilient plastic cover installed over retainer; including mounting hardware; fabricated with 90- or 135-degree turn to match wall condition.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide InPro Corporation (IPC) 130 and 150 Series corner guard, 8-feet high; or comparable product by one of the following:
 - a. Construction Specialties, Inc.
 - b. JL Industries, Inc., a division of Activar Construction Products Group, Inc.
 - c. Korogard Wall Protection Systems, a division of of RJF International Corporation.
 - d. Musson Rubber Co.
 - e. Nystrom, Inc.
 - f. Pawling Corporation.
 - 2. Cover: Extruded rigid plastic, minimum 0.078-inch (2.0-mm) wall thickness; in dimensions and profiles indicated on Drawings.
 - a. Color and Texture: As selected by Architect from manufacturer's full range.
 - 3. Continuous Retainer: Minimum 0.060-inch- (1.5-mm-) thick, one-piece, extruded aluminum.
 - 4. Retainer Clips: Manufacturer's standard impact-absorbing clips.
 - 5. Top and Bottom Caps: Prefabricated, injection-molded plastic; color matching cover; field adjustable for close alignment with snap-on cover.

2.3 MATERIALS

- A. Plastic Materials: Chemical- and stain-resistant, high-impact-resistant plastic with integral color throughout; extruded and sheet material as required, thickness as indicated.

- B. Fasteners: Aluminum, nonmagnetic stainless-steel, or other noncorrosive metal screws, bolts, and other fasteners compatible with items being fastened. Use security-type fasteners where exposed to view.
- C. Adhesive: As recommended by protection product manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Installation Quality: Install wall and door protection according to manufacturer's written instructions, level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.
- B. Accessories: Provide splices, mounting hardware, anchors, trim, joint moldings, and other accessories required for a complete installation.
 - 1. Provide anchoring devices and suitable locations to withstand imposed loads.
 - 2. Adjust top caps as required to ensure tight seams.

END OF SECTION 102600

SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Public-use washroom accessories.
2. Public-use shower room accessories.
3. Underlavatory guards.
4. Custodial accessories.

1.2 ACTION SUBMITTALS

A. Product data.

1.3 INFORMATIONAL SUBMITTALS

A. Sample warranties.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.5 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. Warranty Period: Ten (10) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: Design accessories and fasteners to comply with the following requirements:

1. Grab Bars: Installed units are able to resist 250 lbf (1112 N) concentrated load applied in any direction and at any point.

2. Shower Seats: Installed units are able to resist 360 lbf (1601 N) concentrated load applied in any direction and at any point.

2.2 PUBLIC-USE WASHROOM ACCESSORIES

A. Toilet Tissue (Roll) Dispenser "A":

1. Basis-of-Design Product: Subject to compliance with requirements, provide American Specialties, Inc., an ASI Group Company; recessed toilet tissue dispenser, model 20031; or comparable product by one of the following:
 - a. American Specialties, Inc., an ASI Group company.
 - b. A & J Washroom Accessories, Inc.
 - c. Bobrick Washroom Equipment, Inc.
 - d. Bradley Corporation.
 - e. GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.
 - f. Tubular Specialties Manufacturing, Inc.
2. Description: Roll-in-reserve dispenser with hinged front secured with tumbler lockset.
3. Mounting: Recessed.
4. Operation: Noncontrol delivery with theft-resistant spindle.
5. Capacity: Designed for 4-1/2- or 5-inch- (114- or 127-mm-) diameter tissue rolls.
6. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).

B. Paper Towel (Roll) Dispenser "B":

1. Basis-of-Design Product: Subject to compliance with requirements, provide American Specialties, Inc., an ASI Group Company; surface-mounted paper towel dispenser, model 8522; or comparable product by one of the following:
 - a. American Specialties, Inc., an ASI Group company.
 - b. A & J Washroom Accessories, Inc.
 - c. Bobrick Washroom Equipment, Inc.
 - d. Bradley Corporation.
 - e. GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.
 - f. Tubular Specialties Manufacturing, Inc.
2. Description: Lever-actuated mechanism that permits controlled delivery of paper rolls in preset lengths.
3. Mounting: Surface mounted.
4. Minimum Capacity: 8-inch- (203-mm-) wide, 800-foot- (244-m-) long roll.
5. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).

C. Soap Dispenser "C":

1. Basis-of-Design Product: Subject to compliance with requirements, provide American Specialties, Inc., an ASI Group Company; surface-mounted Roval liquid soap dispenser, model 20363; or comparable product by one of the following:

- a. American Specialties, Inc., an ASI Group company.
 - b. A & J Washroom Accessories, Inc.
 - c. Bobrick Washroom Equipment, Inc.
 - d. Bradley Corporation.
 - e. GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.
 - f. Tubular Specialties Manufacturing, Inc.
2. Description: Designed for manual operation and dispensing soap in liquid or lotion form.
 3. Mounting: Vertically oriented, surface mounted.
 4. Capacity: 57-oz.
 5. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).
 6. Lockset: Tumbler type.
 7. Refill Indicator: Window type.

D. Grab Bar "D":

1. Basis-of-Design Product: Subject to compliance with requirements, provide American Specialties, Inc., an ASI Group Company; snap-flange grab bars, model 3800; or comparable product by one of the following:
 - a. American Specialties, Inc., an ASI Group company.
 - b. A & J Washroom Accessories, Inc.
 - c. Bobrick Washroom Equipment, Inc.
 - d. Bradley Corporation.
 - e. GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.
 - f. Tubular Specialties Manufacturing, Inc.
2. Mounting: Flanges with concealed fasteners.
3. Material: Stainless steel, 0.05 inch (1.3 mm) thick.
 - a. Finish: Smooth, ASTM A480/A480M No. 4 finish (satin) on ends and slip-resistant texture in grip area.
4. OD: 1-1/2 inches (38 mm).
5. Configuration and Length: As indicated on Drawings.

E. Sanitary-Napkin Disposal Unit "E":

1. Basis-of-Design Product: Subject to compliance with requirements, provide American Specialties, Inc., an ASI Group Company; recessed Roval disposal, model 20470; or comparable product by one of the following:
 - a. American Specialties, Inc., an ASI Group company.
 - b. A & J Washroom Accessories, Inc.
 - c. Bobrick Washroom Equipment, Inc.
 - d. Bradley Corporation.
 - e. GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.
 - f. Tubular Specialties Manufacturing, Inc.

2. Mounting: Recessed.
3. Door or Cover: Self-closing, disposal-opening cover and hinged face panel with tumbler lockset.
4. Receptacle: Removable.
5. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).

F. Mirror Unit "F" and "F.1":

1. Basis-of-Design Product: Subject to compliance with requirements, provide American Specialties, Inc., an ASI Group Company; surface-mounted, plate glass mirror, model 0600; or comparable product by one of the following:
 - a. American Specialties, Inc., an ASI Group company.
 - b. A & J Washroom Accessories, Inc.
 - c. Bobrick Washroom Equipment, Inc.
 - d. Bradley Corporation.
 - e. GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.
 - f. Tubular Specialties Manufacturing, Inc.
2. Frame: Stainless steel angle, 0.05 inch (1.3 mm) thick.
 - a. Corners: Welded and ground smooth.
3. Size: As indicated on Drawings.
4. Hangers: Manufacturer's standard rigid, tamper and theft resistant.

2.3 PUBLIC-USE SHOWER ROOM ACCESSORIES

A. Shower Curtain Rod "H":

1. Basis-of-Design Product: Subject to compliance with requirements, provide American Specialties, Inc., an ASI Group Company; concealed mounting flanges curtain rod, model 1224-36; or comparable product by one of the following:
 - a. American Specialties, Inc., an ASI Group company.
 - b. A & J Washroom Accessories, Inc.
 - c. Bobrick Washroom Equipment, Inc.
 - d. Bradley Corporation.
 - e. GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.
 - f. Tubular Specialties Manufacturing, Inc.
2. Description: 1-inch- (25.4-mm-) OD, straight rod.
3. Configuration: Straight.
4. Mounting Flanges: Concealed fasteners; in material and finish matching rod.
5. Rod Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).

B. Shower Curtain "H":

1. Basis-of-Design Product: Subject to compliance with requirements, provide American Specialties, Inc., an ASI Group Company; curtain and hooks, model 1200-V-42 and model 1200-SHU; or comparable product by one of the following:
 - a. American Specialties, Inc., an ASI Group company.
 - b. A & J Washroom Accessories, Inc.
 - c. Bobrick Washroom Equipment, Inc.
 - d. Bradley Corporation.
 - e. GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.
 - f. Tubular Specialties Manufacturing, Inc.
2. Size: Minimum 6 inches (152 mm) wider than opening by 72 inches (1829 mm) high.
3. Material: Vinyl, minimum 0.006 inch (0.15 mm) thick, opaque, matte.
4. Color: White.
5. Grommets: Corrosion resistant at minimum 6 inches (152 mm) o.c. through top hem.
6. Shower Curtain Hooks: Chrome-plated or stainless steel, spring wire curtain hooks with snap fasteners, sized to accommodate specified curtain rod. Provide one hook per curtain grommet.

C. Folding Shower Seat "J":

1. Basis-of-Design Product: Subject to compliance with requirements, provide American Specialties, Inc., an ASI Group Company; folding, phenolic, L-shaped shower seat model 8206; or comparable product by one of the following:
 - a. American Specialties, Inc., an ASI Group company.
 - b. A & J Washroom Accessories, Inc.
 - c. Bobrick Washroom Equipment, Inc.
 - d. Bradley Corporation.
 - e. GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.
 - f. Tubular Specialties Manufacturing, Inc.
2. Configuration: L-shaped seat, designed for wheelchair access.
3. Seat: Phenolic or polymeric composite of slat-type or one-piece construction in color as selected by Architect.
4. Mounting Mechanism: Stainless steel, ASTM A480/A480M No. 4 finish (satin).
5. Dimensions: 33-inches wide.

D. Robe Hook "G":

1. Basis-of-Design Product: Subject to compliance with requirements, provide American Specialties, Inc., an ASI Group Company; robe hook model 0751; or comparable product by one of the following:
 - a. American Specialties, Inc., an ASI Group company.
 - b. A & J Washroom Accessories, Inc.

- c. Bobrick Washroom Equipment, Inc.
- d. Bradley Corporation.
- e. GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.
- f. Tubular Specialties Manufacturing, Inc.

- 2. Description: Single-prong unit.
- 3. Material and Finish: Satin chrome-plated brass.

2.4 UNDERLAVATORY GUARDS

A. Underlavatory Guard "K":

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Plumberex Specialty Products, Inc.
 - b. Truebro by 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. Custodial Mop and Broom Holder "Q":

- 1. Basis-of-Design Product: Subject to compliance with requirements, provide American Specialties, Inc., an ASI Group Company; shelf, utility hook and mop strip combination unit model 1308-3; or comparable product by one of the following:
 - a. American Specialties, Inc., an ASI Group company.
 - b. A & J Washroom Accessories, Inc.
 - c. Bobrick Washroom Equipment, Inc.
 - d. Bradley Corporation.
 - e. GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.
 - f. Tubular Specialties Manufacturing, Inc.
- 2. Description: Unit with shelf, hooks, holders beneath shelf.
- 3. Length: 36 inches (914 mm).
- 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- (1.3-mm-) thick stainless steel.
 - b. Rod: Approximately 1/4-inch- (6-mm-) diameter stainless steel.

2.6 FABRICATION

- A. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six (6) keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories in accordance with 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.

END OF SECTION 102800

SECTION 104313 – AED’s, OXYGEN CYLINDERS and CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Automated External Defibrillators (AED’s).
2. AED Cabinets

1.2 REFERENCES

A. Reference Standards:

1. American Heart Association (AHA).
 - a. American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care – Current Edition.
2. International Code Council (ICC):
 - a. International Building Code (IBC) – 2021, New Jersey Edition.
3. National Fire Protection Association (NFPA):
 - a. NFPA 70-2020, National Electrical Code
4. Underwriters Laboratories, Inc. (UL)

1.3 ACTION SUBMITTALS

A. Submit in accordance with Section 013300 “Submittal Procedures.”

1. Product Data:

- a. Automated External Defibrillator (AED): Choose from an FDA-approved model or local government approved model for schools, public spaces including sports arenas, ball fields, and parks.
- b. Cabinets: Materials description for defibrillator cabinets include roughing-in dimensions, details showing mounting methods, relationships to surrounding construction, door hardware, cabinet type and materials, trim style and door construction, door style and materials.

- c. Installation instructions for each product specified.

1.4 QUALITY ASSURANCE

- A. Comply with standards referenced in Article 1.2 - REFERENCES.
- B. Provide cabinets and accessories produced by a single manufacturer.
- C. 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.

1.5 DELIVERY, STORAGE and HANDLING

- A. Deliver, store and protect defibrillator, cabinets, AED's and related materials using means and methods that will prevent damage, deterioration, or loss.
 - 1. Deliver components in manufacturer's original packaging, properly labeled for identification.

1.6 WARRANTY

- A. Cabinets Manufacturer Warranty: Provide manufacturer's warranty. Materials shall be free of defects in material and workmanship for a period of two (2) years from the date of Substantial Completion.
- B. AED's and Oxygen Cylinders: Provide manufacturer's warranty. Materials shall be free of defects in material and workmanship for a period of two (2) years from the date of Substantial Completion.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Activar Construction Products Group, Inc. - JL Industries #1916; or comparable product by one of the following:
 - 1. Larsens Manufacturing Company
 - 2. Potter Roemer
- B. Substitutions: Manufacturers seeking approval of their products are required to comply with the Owner's Instructions to Bidders, generally contained in the Project Manual.

2.2 AUTOMATED EXTERNAL DEFIBRILLATORS (AED) and OXYGEN CYLINDERS

A. AED Model: Heartsine Samaritan Public Access Defibrillator PAD-350.

1. Components:

- a. AED.
- b. Battery and Electrodes.
- c. Storage Case

B. Oxygen Cylinder:

1. Oxygen Cylinder Components:

- a. D-size aluminum cylinder.
- b. Portable.
- c. Oxygen flow regulator, flow rate gauge, with wrench key.
- d. Soft oxygen cannula and face mask.
- e. Refillable.

2.3 1900 OLYMPUS SERIES DUAL CABINET FOR AED and EMERGENCY OXYGEN

A. Cabinet with Steel Trim and Door: 1900 Olympus Series, Model 1916-F-12-14MAG-14S.

1. Cabinet Style: Semi-recessed.

2. Components:

a. Tub: Cold-rolled steel.

- 1) Finish: Factory-applied powder coat paint finish.
- 2) Standard Color: White.
- 3) Door and Trim Construction: Cold-rolled steel; flush doors with 5/8-inch (15.88 mm) doorstop attached by continuous hinge and equipped with zinc-plated roller catch.

b. Trim Style and Depth:

- 1) Semi-recessed Cabinet.
- 2) Square Edge: 1-1/2 inch (38.10 mm).
- 3) Trim Dimensions: 1-3/4 inch (44.45 mm) face trim on door and frame.

3. Alarm: Commander (audible) cabinet-mounted alarm standard (battery operated) to protect against theft or tampering. Alarm deactivated when door is closed.

4. Alarm Contacts: Contact devices.

- a. 14MAG Magnetic Door Contact for existing alarm systems.
- 5. Oxygen: Accommodates up to "D" size cylinder.
- 6. Wall Signs and Cabinet Lettering:
 - a. AED wall signs, 14S.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine wall and partitions for suitable framing depth and blocking where recessed and semi-recessed cabinets will be installed and blocking where surface-mounted cabinets will be installed..
 - 1. Notify the Contractor in writing of conditions detrimental to proper and timely completion of the installation.
 - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install cabinets in locations and at mounting heights indicated or, if not indicated, at heights to comply with applicable regulations of authorities having jurisdiction.
 - 1. Prepare recesses in walls for defibrillator cabinets as required by type and size of cabinet and style of trim and to comply with the manufacturer's instructions.
 - 2. Securely fasten cabinets to structure, square and plumb, to comply with the manufacturer's instructions.
- B. Wall Signs:
 - 1. Location: Where shown or directed.
 - 2. Apply on walls after field painting is completed and has been accepted.
- C. Cabinet Lettering:
 - 1. Location: Face of glass surface.
 - 2. Apply lettering on factory-finished (no further painting specified) cabinets either at the factory or just prior to Substantial Completion.

3.3 ADJUSTING and CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as defibrillator cabinets are installed unless otherwise indicated in the manufacturer's written installation instructions.
- B. Adjust cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.
- C. On completion of cabinet installation, clean interior and exterior surfaces as recommended by the manufacturer.
- D. Touch up marred finishes or replace cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by cabinet manufacturer.
- E. Replace cabinets that have been damaged or have deteriorated beyond successful repair by finish touch up or similar minor repair procedures.

END OF SECTION 104313

SECTION 104413 - FIRE PROTECTION CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fire-protection cabinets for portable fire extinguishers.

1.2 PREINSTALLATION CONFERENCE

- A. Preinstallation Conference:** Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data:** For each type of product.
- B. Samples:** For each type of exposed finish required.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.**

1.5 COORDINATION

- A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.**
- B. Coordinate sizes and locations of fire-protection cabinets with wall depths.**

PART 2 - PRODUCTS

2.1 FIRE-PROTECTION CABINET FE-1

- A. Basis-of-Design Product:** Subject to compliance with requirements, provide Activar Construction Products Group, Inc. - JL Industries; Ambassador Series extinguisher #1017-V-17-PRH-LDCVRFE; or comparable product by one of the following:
1. Babcock-Davis.
 2. Larsens Manufacturing Company

3. Nystrom, Inc.
 4. Potter Roemer
- B. Fire-Protection Cabinet Type: Suitable for fire extinguisher.
- C. Cabinet Construction: Nonrated.
- D. Cabinet Material: Cold-rolled steel sheet.
- E. Semirecessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface, with exposed trim face and wall return at outer edge (backbend).
1. Rolled-Edge Trim: 3-inch (77-mm) backbend depth.
- F. Cabinet Trim Material: Same material and finish as door.
- G. Door Material: Steel sheet.
- H. Door Style: Vertical duo panel with frame.
- I. Door Glazing: Tempered float glass (clear).
- J. Pull Handle: Flush pull handle.
- K. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
- L. Accessories:
1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire-protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
 2. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated.
 - a. Identify fire extinguisher in fire-protection cabinet with the words "FIRE EXTINGUISHER."
 - 1) Location: Applied to cabinet door.
 - 2) Application Process: Pressure-sensitive vinyl letters.
 - 3) Lettering Color: Red.
 - 4) Orientation: Vertical.
- M. Materials:
1. Cold-Rolled Steel: ASTM A1008/A1008M, Commercial Steel (CS), Type B.

- a. Finish: Baked enamel, TGIC polyester powder coat, HAA polyester powder coat, epoxy powder coat, or polyester/epoxy hybrid powder coat, complying with AAMA 2603.
 - b. Color: White.
2. Tempered Float Glass: ASTM C1048, Kind FT, Condition A, Type I, Quality q3, 3 mm thick, Class 1 (clear).

2.2 FABRICATION

- A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.

PART 3 - EXECUTION

3.1 INSTALLATION OF FIRE-PROTECTION CABINETS

- A. Prepare recesses for semirecessed fire-protection cabinets as required by type and size of cabinet and trim style.
- B. Install fire-protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.
- C. Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.
- D. Identification: Apply vinyl lettering at locations indicated.
- E. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

END OF SECTION 104413

SECTION 104416 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

- A. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

1.6 COORDINATION

- A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

1.7 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. Warranty Period: Six (6) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet and mounting bracket indicated.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Activar Construction Products Group, Inc. - JL Industries product indicated; or comparable product by one of the following:
 - a. Amerex Corporation.
 - b. Ansul by Johnson Controls Company.
 - c. Babcock-Davis.
 - d. Buckeye Fire Equipment Company.
 - e. Larsens Manufacturing Company.
 - f. Nystrom, Inc.
 - g. Potter Roemer.
 - 2. 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 FE-1 and FE-2: UL-rated 4-A:80-B:C, 10-lb (4.5-kg) nominal capacity, with monoammonium phosphate-based dry chemical in manufacturer's standard enameled container.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Activar Construction Products Group, Inc. - JL Industries; Cosmic extinguisher Model FE10C; or comparable product.

2.3 MOUNTING BRACKETS FE-1 and FE-2

- 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. Basis-of-Design Product: Subject to compliance with requirements, provide Activar Construction Products Group, Inc. - JL Industries #MB846C (FE-1 and FE-2); or comparable product by one of the following:
 - a. Amerex Corporation.
 - b. Ansul by Johnson Controls Company.
 - c. Babcock-Davis.
 - d. Buckeye Fire Equipment Company.
 - e. Larsens Manufacturing Company.
 - f. Nystrom, Inc.
 - g. Potter Roemer.
- 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 INSTALLATION

- A. Examine fire extinguishers for proper charging and tagging.
 1. Remove and replace damaged, defective, or undercharged fire extinguishers.
- B. Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.
- C. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.
 1. Mounting Height: Top of fire extinguisher to be at 42 inches (1067 mm) above finished floor.

END OF SECTION 104416

SECTION 105113 - METAL LOCKERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Welded corridor lockers for room 114.
2. Locker benches for rooms 116 and 117.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference:** Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data:** For each type of product.

- B. Shop Drawings:** For metal lockers.

1. Include plans, elevations, sections, and attachment details.
2. Include locker identification system and numbering sequence.

- C. Samples:** For each color specified.

1.4 INFORMATIONAL SUBMITTALS

- A. Sample warranty.**

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.**

1.6 FIELD CONDITIONS

- A. Field Measurements:** Verify actual dimensions of recessed openings by field measurements before fabrication.

1.7 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of work specified in other Sections to ensure that metal lockers can be supported and installed as indicated.

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of metal lockers that fail in materials or workmanship, excluding finish, within specified warranty period.
 - 1. Warranty Period for Welded Metal Lockers: Ten (10) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Accessibility Standard: For lockers and locker benches indicated to be accessible, comply with applicable provisions in ICC A117.1.

2.2 WELDED CORRIDOR LOCKERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Penco Products, Inc., Gen 2, All-Welded Lockers; or a comparable product by one of the following:
 - 1. AJW Architectural Products.
 - 2. Art Metal Products.
 - 3. ASI Storage Solutions; ASI Group
 - 4. DeBourgh Manufacturing Co.
 - 5. General Storage Systems, Ltd.
 - 6. List Industries, Inc.
 - 7. Lyon Workspace Products, LLC
 - 8. Olympus Lockers and Storage Products, Inc.
 - 9. Republic Storage Systems, LLC
 - 10. WEC Manufacturing, LLC.
- B. Doors: One piece; fabricated from 0.075-inch (1.90-mm) nominal-thickness steel sheet; formed into channel shape with double bend at vertical edges and with right-angle single bend at horizontal edges.
 - 1. Reinforcement: Manufacturer's standard reinforcing angles, channels, or stiffeners for doors more than 15 inches (381 mm) wide; welded to inner face of doors.
 - 2. Door Style: Vented panel as follows:

- a. Louvered Vents: No fewer than three louver openings at top and bottom for double-tier lockers.
- C. Body: Assembled by welding body components together. Fabricate from unperforated steel sheet with thicknesses as follows:
 - 1. Tops, Bottoms, and Sides: 0.060-inch (1.52-mm) nominal thickness.
 - 2. Backs: 0.048-inch (1.21-mm) nominal thickness.
 - 3. Shelves: 0.060-inch (1.52-mm) nominal thickness, with double bend at front and single bend at sides and back.
- D. Frames: Channel formed; fabricated from 0.060-inch (1.52-mm) nominal-thickness steel sheet; lapped and factory welded at corners; with top and bottom main frames factory welded into vertical main frames. Form continuous, integral, full-height door strikes on vertical main frames.
- E. Hinges:
 - 1. Continuous Hinges: Manufacturer's standard, steel, full height.
- F. Projecting Door Handle and Latch: Finger-lift latch control designed for use with either built-in combination locks or padlocks; positive automatic latching, chromium plated; pry and vandal resistant.
 - 1. Latch Hooks: Equip doors 48 inches (1219 mm) and higher with three latch hooks and doors less than 48 inches (1219 mm) high with two latch hooks; fabricated from 0.105-inch (2.66-mm) nominal-thickness steel sheet; welded or riveted to full-height door strikes; with resilient silencer on each latch hook.
 - 2. Latching Mechanism: Manufacturer's standard, rattle-free latching mechanism and moving components isolated to prevent metal-to-metal contact and incorporating a prelocking device that allows locker door to be locked while door is open and then closed without unlocking or damaging lock or latching mechanism.
- G. Identification Plates: Manufacturer's standard, etched, embossed, or stamped aluminum plates, with numbers and letters at least 3/8 inch (9 mm) high.
- H. Hooks: Manufacturer's standard ball-pointed, aluminum or steel; zinc plated.
- I. Continuous Zee Base: Fabricated from, manufacturer's standard thickness, but not less than 0.060-inch (1.52-mm) nominal-thickness steel sheet.
 - 1. Height: 4 inches (102 mm).
- J. Continuous Sloping Tops: Fabricated from 0.048-inch (1.21-mm) nominal-thickness steel sheet, with a pitch of approximately 20 degrees.
 - 1. Closures: Vertical-end type.

- K. Finished End Panels: Fabricated from 0.024-inch (0.61-mm) nominal-thickness steel sheet to cover unused penetrations and fasteners, except for perimeter fasteners, at exposed ends of nonrecessed metal lockers; finished to match lockers.

- L. Materials:

- 1. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B, suitable for exposed applications.

- M. Finish: Baked enamel or powder coat.

- 1. Color: As selected by Architect from manufacturer's full range.

2.3 INTERIOR EQUIPMENT

- A. Welded Corridor Lockers:

- 1. Double Tier, 18-inches wide x 72-inches high (36-inch tiers) x 24-inches deep; identification plate, one (1) coat rod and two (2) single-prong wall hooks.

2.4 LOCKER BENCHES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Penco Products, Inc., Heavy Duty Bench Pedestal; or a comparable product by one of the following:

- 1. AJW Architectural Products.
 - 2. Art Metal Products.
 - 3. ASI Storage Solutions; ASI Group
 - 4. DeBourgh Manufacturing Co.
 - 5. General Storage Systems, Ltd.
 - 6. List Industries, Inc.
 - 7. Lyon Workspace Products, LLC
 - 8. Olympus Lockers and Storage Products, Inc.
 - 9. Republic Storage Systems, LLC
 - 10. WEC Manufacturing, LLC.

- B. Provide bench units with overall assembly height of 17-1/2 inches (445 mm).

- C. Bench Tops: Manufacturer's standard one-piece units, with rounded corners and edges.

- 1. Size: Minimum 9-1/2 inches wide by 1-1/4 inches thick (241 mm wide by 32 mm thick).
 - 2. Laminated clear hardwood with one coat of clear sealer on all surfaces and one coat of clear lacquer on top and sides.

- D. Fixed-Bench Pedestals: Manufacturer's standard supports, with predrilled fastener holes for attaching bench top and anchoring to floor, complete with fasteners and anchors.

1. Color: Match metal lockers.

E. Materials:

1. Steel Tube: ASTM A500/A500M, cold rolled.

2.5 FABRICATION

- A. Fabricate metal lockers square, rigid, without warp, and with metal faces flat and free of dents or distortion. Make exposed metal edges safe to touch and free of sharp edges and burrs.
- B. Fabricate each metal locker with an individual door and frame; individual top, bottom, and back; and common intermediate uprights separating compartments.
- C. Equipment: Provide each locker with an identification plate and the following equipment:
 1. Double-Tier Units: One (1) coat rod and two (2) single-prong wall hooks.
 2. Coat Rods: In lieu of ceiling hook for metal lockers 24 inches (610 mm) high or more.
- D. Welded Construction: Factory preassemble metal lockers by welding all joints, seams, and connections; with no bolts, nuts, screws, or rivets used in assembly of main locker groups. Factory weld main locker groups into one-piece structures. Grind exposed welds smooth and flush.
- E. Accessible Lockers: Fabricate as follows:
 1. Locate bottom shelf no lower than 15 inches (381 mm) above the floor.
 2. Where hooks, coat rods, or additional shelves are provided, locate no higher than 48 inches (1219 mm) above the floor.
- F. Continuous Zee Base: Fabricated in lengths as long as practical to enclose base and base ends; finished to match lockers.
- G. Continuous Sloping Tops: Fabricated in lengths as long as practical, without visible fasteners at splice locations; finished to match lockers.
- H. Finished End Panels: Fabricated to conceal unused penetrations and fasteners, except for perimeter fasteners, at exposed ends of nonrecessed metal lockers; finished to match lockers.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install lockers level, plumb, and true; shim as required, using concealed shims.

1. Anchor locker runs at ends and at intervals recommended by manufacturer, but not more than 36 inches (910 mm) o.c. Using concealed fasteners, install anchors through backup reinforcing plates, channels, or blocking as required to prevent metal distortion.
 2. Anchor single rows of metal lockers to walls near top of lockers and to floor.
- B. Welded Lockers: Connect groups together with manufacturer's standard fasteners, with no exposed fasteners on face frames.
- C. Trim: Fit exposed connections of trim, fillers, and closures accurately together to form tight, hairline joints, with concealed fasteners and splice plates.
1. Attach sloping-top units to metal lockers, with closures at exposed ends.
 2. Attach finished end panels using fasteners only at perimeter to conceal exposed ends of nonrecessed metal lockers.
- D. Fixed Benches: Provide no fewer than two pedestals for each bench, uniformly spaced not more than 72 inches (1830 mm) apart.

END OF SECTION 105113

SECTION 122413 - ROLLER WINDOW SHADES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Manually operated roller shades with single rollers.
2. Provide roller window shades for all windows in rooms 103, 109, 110, 113 and 114.

1.2 ACTION SUBMITTALS

- A. Product Data:** For each type of product.
- B. Shop Drawings:** Show fabrication and installation details for roller shades, including shadeband materials, their orientation to rollers, and their seam and batten locations.
- C. Samples:** For each exposed product and for each color and texture specified.

1.3 INFORMATIONAL SUBMITTALS

- A. Product certificates.**
- B. Product test reports.**

1.4 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.**

1.5 QUALITY ASSURANCE

- A. Installer Qualifications:** Fabricator of products.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roller shades in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.**

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not install roller shades until construction and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to replace roller shade units that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Ten (10) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUALLY OPERATED SHADES WITH SINGLE ROLLERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Draper Inc.; Manual FlexShade; or a comparable product by one of the following:
 - 1. BTX Window Automation Inc.
 - 2. CACO, Inc., Window Fashions.
 - 3. DFB Sales Inc.
 - 4. Hunter Douglas Contract.
 - 5. Insolroll Window Shading Systems.
 - 6. Lutron Electronics Co., Inc.
 - 7. MechoShade Systems, Inc.
 - 8. OEM Shades Inc.
 - 9. Qmotion Shades.
 - 10. Silent Gliss.
 - 11. SM Automatic, Inc.
 - 12. Springs Window Fashions; SWFcontract.
- B. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.
 - 1. Chain-Retainer Type: Clip, jamb mount.
 - 2. Bead Chains: Stainless steel.

3. Spring Lift-Assist Mechanisms: Provide for shadebands that weigh more than 10 lb (4.5 kg) or for shades as recommended by manufacturer, whichever criterion is more stringent.
- C. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.
 1. Roller Drive-End Location: Right side of interior face of shade.
 2. Direction of Shadeband Roll: Regular, from back (exterior face) of roller.
- D. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.
- E. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to three inline rollers into a multiband shade that is operated by one roller drive-end assembly.
- F. Shadebands:
 1. Shadeband Material: Light-filtering fabric.
 2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.
 - a. Type: Enclosed in sealed pocket of shadeband material.
 - b. Color and Finish: As selected by Architect from manufacturer's full range.
- G. Installation Accessories:
 1. Front Fascia: Aluminum extrusion that conceals front and underside of roller and operating mechanism and attaches to roller endcaps without exposed fasteners.
 2. Endcap Covers: To cover exposed endcaps.
 3. Installation Accessories Color and Finish: As selected from manufacturer's full range.

2.2 SHADEBAND MATERIALS

- A. Shadeband Material Flame-Resistance Rating: Comply with NFPA 701. Testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- B. Light-Filtering Fabric: Woven fabric, stain and fade resistant, Sheerweave Style SW2000 by Phifer.
 1. Source: Roller shade manufacturer.
 2. Type: Fiberglass and vinyl-coated fiberglass.
 3. Weave: Basketweave.
 4. Thickness: 0.021-inch (0.53 mm).
 5. Weight: 14.4 oz./sq. yd. (g/sq. m).
 6. Roll Width: 60 inches (1524 mm), unless opening requires greater roll width.

7. Orientation on Shadeband: Up the bolt but railroaded when needed.
8. Openness Factor: 5 percent.
9. Color: As selected by Architect from manufacturer's full range.

2.3 ROLLER SHADE FABRICATION

- A. Product Safety Standard: Fabricate roller shades to comply with WCMA A 100.1
- B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F (23 deg C):
 1. Between (Inside) Jamb Installation (Unless Noted Otherwise): Width equal to jamb-to-jamb dimension of opening in which shade is installed less 1/4 inch (6 mm) per side or 1/2-inch (13-mm) total, plus or minus 1/8 inch (3.1 mm). Length equal to head-to-sill or -floor dimension of opening in which shade is installed less 1/4 inch (6 mm), plus or minus 1/8 inch (3.1 mm).
- C. Shadeband Fabrication: Fabricate shadebands without battens or seams to extent possible, except as follows:
 1. Railroaded Materials: Railroad material where material roll width is less than the required width of shadeband and where indicated. Provide battens and seams as required by railroaded material to produce shadebands with full roll-width panel(s) plus, if required, one partial roll-width panel located at top of shadeband.

PART 3 - EXECUTION

3.1 ROLLER SHADE INSTALLATION

- A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.
- B. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.
- C. Clean roller shade surfaces, after installation, according to manufacturer's written instructions.
- D. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

END OF SECTION 122413

SECTION 123661.16 - SOLID SURFACING COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid surface material countertops.
2. Solid surface material backsplashes.
3. Solid surface material end splashes.
4. Solid surface material apron fronts.

1.2 ACTION SUBMITTALS

- A. Product Data: For countertop materials.
- B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.
- C. Samples: For each type of material exposed to view.

PART 2 - PRODUCTS

2.1 SOLID SURFACE COUNTERTOP MATERIALS

- A. Solid Surface Material: Homogeneous-filled plastic resin complying with ISFA 2-01.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Wilsonart LLC; 051 or a comparable product by one of the following:
 - a. Affinity Surfaces; a brand of Domain Industries, Inc.
 - b. Avonite Surfaces.
 - c. E. I. du Pont de Nemours and Company.
 - d. Formica Corporation.
 - e. LG Chemical, Ltd.
 - f. Meganite Inc.
 - g. Samsung Chemical USA, Inc.
 - h. Swan Corporation (The).
 - i. Transolid Div of Trumbull Industries.
 2. Type: Provide Standard type unless Special Purpose type is indicated.
 3. Colors and Patterns: As selected by Architect from manufacturer's full range.

- B. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.

2.2 FABRICATION

- A. Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards."
 - 1. Grade: Custom.
- B. Configuration:
 - 1. Front: Straight, slightly eased at top.
 - 2. Backsplash: Straight, slightly eased at corner.
 - 3. End Splash: Matching backsplash.
- C. Countertops:
 - 1. 3/4-inch- (19-mm-) thick, solid surface material with front edge built up with same material.
- D. Backsplashes: 1/2-inch- (12.7-mm-) thick, solid surface material.
- E. Joints:
 - 1. Fabricate countertops without joints.

2.3 INSTALLATION MATERIALS

- A. Adhesive: Product recommended by solid surface material manufacturer.
- B. Sealant for Countertops: Comply with applicable requirements in Section 079200 "Joint Sealants."

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Fasten subtops to cabinets by screwing through subtops into cornerblocks of base cabinets. Shim as needed to align subtops in a level plane.
- B. Secure countertops to subtops with adhesive according to solid surface material manufacturer's written instructions.
- C. Install backsplashes and end splashes by adhering to wall and countertops with adhesive.
- D. Install aprons to backing and countertops with adhesive.

- E. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.
- F. Apply sealant to gaps at walls; comply with Section 079200 "Joint Sealants."

END OF SECTION 123661.16

SECTION 124813 - ENTRANCE FLOOR MATS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Resilient entrance mats for rooms 101, 102, 113 and 114a.

1.2 ACTION SUBMITTALS

- A. Product Data:** For each type of product.
- B. Samples:** For each exposed product and for each color and texture specified.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance data.**

1.4 WARRANTY

- A. Special Warranty:** Manufacturer agrees to replace entrance mat units that fail in materials or workmanship within specified warranty period.
1. Warranty Period: Five (5) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 ENTRANCE FLOOR MATS AND FRAMES, GENERAL

- A. Accessibility Standard:** Comply with applicable provisions in ICC A117.1.

2.2 RESILIENT ENTRANCE MATS

- A. Carpet-Type Mats:** Polyester carpet bonded to 1/8- to 1/4-inch- (3.2- to 6.4-mm-) thick, flexible vulcanized rubber backing to form tiles 3/8 or 7/16 inch (9.5 or 11 mm) thick with non-raveling edges.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Flexco Floors Flex-Tuft rubber flooring, or a comparable product by one of the following:

- a. R.C Musson Rubber Co.
 - b. Roppe Corporation, USA.
- 2. Colors, Textures, and Patterns: As selected by Architect from full range of available colors.
 - 3. Mat Size: As indicated on Drawings arranged with 12-inch x 12-inch tiles.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install surface-type units to comply with manufacturer's written instructions; coordinate with entrance locations and traffic patterns.

END OF SECTION 124813

SECTION 311000 - SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Removing above- and below-grade site improvements.
6. Disconnecting, capping, or sealing site utilities.
7. Temporary erosion and sedimentation control.

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 Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.4 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 Owner and authorities having jurisdiction.
 2. Provide alternate routes around closed or obstructed trafficways if required by Owner or authorities having jurisdiction.
- B. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.
- C. Do not commence site clearing operations until temporary erosion- and sedimentation-control measures are in place.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 312000 "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 according to "Temporary Tree and Plant Protection" requirements on Drawings.
- C. Protect existing site improvements to remain from damage during construction.
 - 1. Restore damaged improvements to their original condition, as acceptable to Owner.

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 authorities having jurisdiction.
- 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. Remove erosion and sedimentation controls, and restore and stabilize areas disturbed during removal.

3.3 TREE AND PLANT PROTECTION

- A. Protect trees and plants remaining on-site according to "Temporary Tree and Plant Protection" requirements.

- B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations.

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. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others, unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Architect not less than two days in advance of proposed utility interruptions.
- C. Removal of underground utilities is included in earthwork sections; in applicable fire suppression, plumbing, HVAC, electrical, communications, electronic safety and security, and utilities sections; and in Section 024116 "Structure Demolition."

3.5 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.
 - 1. Grind down stumps and remove roots larger than 3 inches (75 mm) in diameter, obstructions, and debris to a depth of 18 inches (450 mm) below exposed subgrade.
 - 2. Use only hand methods or air spade for grubbing within protection zones.
- 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 (200 mm), 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 depth of 6 inches (150 mm) in a manner to prevent intermingling with underlying subsoil or 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.

3.7 SITE IMPROVEMENTS

- A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.

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 Owner's property.
- B. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials, and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION 311000

SECTION 312000 - EARTH MOVING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Excavating and filling for rough grading the Site.
2. Preparing subgrades for slabs-on-grade, walks, pavements, turf and grasses.
3. Excavating and backfilling for buildings and structures.
4. Drainage course for concrete slabs-on-grade.
5. Subbase course for concrete walks and pavements.
6. Subbase course and base course for asphalt paving.
7. Excavating and backfilling trenches for utilities and pits for buried utility structures.

1.2 DEFINITIONS

A. Backfill: Soil 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. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

F. 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 Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, will be without additional compensation.

- G. Fill: Soil materials used to raise existing grades.
- H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other fabricated 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.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct preexcavation conference at Project site.

1.4 INFORMATIONAL SUBMITTALS

- A. Material test reports.

1.5 FIELD CONDITIONS

- A. Utility Locator Service: Notify utility locator service for area where Project is located before beginning earth-moving operations.
- B. Do not commence earth-moving operations until plant-protection measures are in place.

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 (75 mm) in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
 - 1. Liquid Limit: 16.
 - 2. Plasticity Index: NP.

- 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: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.
- E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; with at least 95 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.
- F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.
- G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; except with 100 percent passing a 1-inch (25-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.
- H. Drainage Course: Narrowly graded mixture of crushed stone, or crushed or uncrushed gravel; ASTM D448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch (37.5-mm) sieve and zero to 5 percent passing a No. 8 (2.36-mm) sieve.

2.2 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 (150 mm) wide and 4 mils (0.1 mm) 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 (750 mm) deep; colored to comply with local practice or requirements of authorities having jurisdiction.

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 EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include soil materials and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for excavation and removal of obstructions.

- 1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.3 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch (25 mm). 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 (25 mm). 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.
 - 2. "Cut and protect roots according to requirements in "Temporary Tree and Plant Protection."

3.4 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.5 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.

- 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 (300 mm) higher than top of pipe or conduit unless otherwise indicated.
 - 1. Clearance: 12 inches (300 mm) each side of pipe or conduit.
- C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
 - 1. Excavate trenches 6 inches (150 mm) 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. Cut and protect roots according to requirements in "Temporary Tree and Plant Protection."

3.6 SUBGRADE INSPECTION

- A. Proof-roll subgrade below the building slabs and pavements with a pneumatic-tired dump truck to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
- B. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.7 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 (17.2 MPa), may be used when approved by Architect.
 - 1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Architect.

3.8 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.

3.9 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
 - 1. Construction below finish grade.
 - 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.

3.10 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 (450 mm) of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in Section 033000 "Cast-in-Place Concrete."
- D. Trenches under Roadways: Provide 4-inch- (100-mm-) thick, concrete-base slab support for piping or conduit less than 30 inches (750 mm) below surface of roadways. After installing and testing, completely encase piping or conduit in a minimum of 4 inches (100 mm) of concrete before backfilling or placing roadway subbase course. Concrete is specified in Section 033000 "Cast-in-Place Concrete."
- E. Initial Backfill: Place and compact initial backfill of subbase material, free of particles larger than 1 inch (25 mm) in any dimension, to a height of 12 inches (300 mm) over the pipe or conduit.
 - 1. 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.

- F. Final Backfill: Place and compact final backfill of satisfactory soil to final subgrade elevation.
- G. Warning Tape: Install warning tape directly above utilities, 12 inches (300 mm) below finished grade, except 6 inches (150 mm) below subgrade under pavements and slabs.

3.11 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 satisfactory soil material.
 - 3. Under steps and ramps, use engineered fill.
 - 4. Under building slabs, use engineered fill.

3.12 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.

3.13 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials in layers not more than 8 inches (200 mm) in loose depth for material compacted by heavy compaction equipment and not more than 4 inches (100 mm) 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 D698:
 - 1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches (300 mm) of existing subgrade and each layer of backfill or fill soil material at 95 percent.
 - 2. Under walkways, scarify and recompact top 6 inches (150 mm) below subgrade and compact each layer of backfill or fill soil material at 92 percent.

3. Under turf or unpaved areas, scarify and recompact top 6 inches (150 mm) 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 85 percent.

3.14 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.
- 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 (25 mm).
 2. Walks: Plus or minus 1 inch (25 mm).
 3. Pavements: Plus or minus 1/2 inch (13 mm).
- C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch (13 mm) when tested with a 10-foot (3-m) straightedge.

3.15 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

- A. Place subbase course and base course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place subbase course and base course under pavements and walks as follows:
 1. Shape subbase course and base course to required crown elevations and cross-slope grades.
 2. Place subbase course and base course that exceeds 6 inches (150 mm) in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches (150 mm) thick or less than 3 inches (75 mm) thick.
 3. Compact subbase course and base 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 D698.

3.16 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE

- A. Place drainage course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:

1. Place drainage course that exceeds 6 inches (150 mm) in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches (150 mm) thick or less than 3 inches (75 mm) thick.
2. Compact each layer of drainage course to required cross sections and thicknesses to not less than 95 percent of maximum dry unit weight according to ASTM D698.

3.17 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform inspections:
- B. Allow inspecting 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.
- C. 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.

3.18 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.
- 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.

3.19 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 Owner's property.

END OF SECTION 312000

SECTION 312319 - DEWATERING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Construction dewatering.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference:** Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Shop Drawings:** For dewatering system, prepared by or under the supervision of a qualified professional engineer.
- B. Delegated Design Submittals:** For dewatering system, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

- A. Field Quality-Control Submittals:**
1. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Qualifications:**
1. **Installer:** An experienced installer that has specialized in design of dewatering systems.
 2. **Delegated Design Engineer:** A professional engineer who is legally qualified to practice in the State of New Jersey and who is experienced in providing engineering services of the type indicated.
 3. **Land Surveyor:** A professional land surveyor who is legally qualified to practice in the State of New Jersey.

1.6 FIELD CONDITIONS

- A. Survey Work: Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer to design dewatering system.
- B. Dewatering Performance: Design, furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of groundwater and permit excavation and construction to proceed on dry, stable subgrades.
- C. Regulatory Requirements: Comply with governing EPA notification regulations before beginning dewatering. Comply with water- and debris-disposal regulations of authorities having jurisdiction.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Provide temporary grading to facilitate dewatering and control of surface water.
- B. Protect and maintain temporary erosion and sedimentation controls during dewatering operations.

3.2 INSTALLATION

- A. Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls.
 - 1. Space well points or wells at intervals required to provide sufficient dewatering.
 - 2. Use filters or other means to prevent pumping of fine sands or silts from the subsurface.
- B. Place dewatering system into operation to lower water to specified levels before excavating below groundwater level.
- C. Provide sumps, sedimentation tanks, and other flow-control devices as required by authorities having jurisdiction.

- D. Provide standby equipment on-site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails.

3.3 OPERATION

- A. Operate system continuously until drains, sewers, and structures have been constructed and fill materials have been placed or until dewatering is no longer required.
- B. Operate system to lower and control groundwater to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.
 - 1. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.
 - 2. Reduce hydrostatic head in water-bearing strata below subgrade elevations of foundations, drains, sewers, and other excavations.
 - 3. Maintain piezometric water level a minimum of 24 inches (600 mm) below bottom of excavation.
- C. Remove dewatering system from Project site on completion of dewatering. Plug or fill well holes with sand or cut off and cap wells a minimum of 36 inches (900 mm) below overlying construction.

3.4 FIELD QUALITY CONTROL

- A. Survey-Work Benchmarks: Resurvey benchmarks regularly during dewatering and maintain an accurate log of surveyed elevations for comparison with original elevations. Promptly notify Architect if changes in elevations occur or if cracks, sags, or other damage is evident in adjacent construction.

END OF SECTION 312319

SECTION 313116 - TERMITE CONTROL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Soil treatment.
2. Bait-station system.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference:** Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data:** For each type of product. Include the EPA-Registered Label for termiticide products.

1.4 INFORMATIONAL SUBMITTALS

- A. Product certificates.**

- B. Soil Treatment Application Report:** Include the following:

1. Date and time of application.
2. Moisture content of soil before application.
3. Termiticide brand name and manufacturer.
4. Quantity of undiluted termiticide used.
5. Dilutions, methods, volumes used, and rates of application.
6. Areas of application.
7. Water source for application.

- C. Bait-Station System Installation Report:** Include the following:

1. Location of areas and sites conducive to termite feeding and activity.
2. Plan drawing showing number and locations of bait stations.
3. Dated report for each monitoring and inspection occurrence, indicating level of termite activity, procedure, and treatment applied before time of Substantial Completion.
4. Termiticide brand name and manufacturer.
5. Quantities of termiticide and nontoxic termite bait used.
6. Schedule of inspections for one year from date of Substantial Completion.

- D. Sample Warranties: For special warranties.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A specialist who is licensed according to regulations of authorities having jurisdiction to apply termite control treatment and products in jurisdiction where Project is located and who employs workers trained and approved by manufacturer to install manufacturer's products.

1.6 WARRANTY

- A. Soil Treatment Special Warranty: Manufacturer's standard form, signed by Applicator and Contractor, certifying that termite control work consisting of applied soil termiticide treatment will prevent infestation of subterranean termites. If subterranean termite activity or damage is discovered during warranty period, re-treat soil and repair or replace damage caused by termite infestation.

- 1. Warranty Period: Five (5) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOIL TREATMENT

- A. Termiticide: EPA-Registered termiticide acceptable to authorities having jurisdiction, in an aqueous solution formulated to prevent termite infestation.

- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. BASF Corporation; Termidor SC.
 - b. Bayer Environmental Science; Premise 75 WP.
 - c. Ensysstex, Inc; Maxxthor SC.
 - d. FMC Corporation, Agricultural Products Group; Dragnet SFR.
 - e. Syngenta; Demon Max.
 - 2. Service Life of Treatment: Soil treatment termiticide that is effective for not less than five (5) years against infestation of subterranean termites.

2.2 BAIT-STATION SYSTEM

- A. Description: EPA-Registered system acceptable to authorities having jurisdiction. Provide bait stations based on the dimensions of building perimeter indicated on Drawings, according to product's EPA-Registered Label and manufacturer's written instructions.

- 1. Products: Subject to compliance with requirements, provide one of the following:

- a. BASF Corporation; Advance Termite Bait System.
- b. Ensystex, Inc; Exterra.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Remove extraneous sources of wood cellulose and other edible materials, such as wood debris, tree stumps and roots, stakes, formwork, and construction waste wood from soil within and around foundations.
- B. Soil Treatment Preparation: Remove foreign matter and impermeable soil materials that could decrease treatment effectiveness on areas to be treated.

3.2 APPLYING SOIL TREATMENT

- A. Application: Mix soil treatment termiticide solution to a uniform consistency. Distribute treatment uniformly. Apply treatment at the product's EPA-Registered Label volume and rate for maximum specified concentration of termiticide to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction.
 - 1. Slabs-on-Grade and Basement Slabs: Under ground-supported slab construction, including footings, building slabs, and attached slabs as an overall treatment. Treat soil materials before concrete footings and slabs are placed.
 - 2. Foundations: Soil adjacent to and along the entire inside perimeter of foundation walls; along both sides of interior partition walls; around plumbing pipes and electric conduit penetrating the slab; around interior column footers, piers, and chimney bases; and along the entire outside perimeter, from grade to bottom of footing.
 - 3. Masonry: Treat voids.
 - 4. Penetrations: At expansion joints, control joints, and areas where slabs and below-grade walls will be penetrated.
- B. Post warning signs in areas of application.
- C. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.

3.3 INSTALLING BAIT-STATION SYSTEM

- A. Bait-Station System: Install during construction to determine areas of termite activity and after construction, including landscaping, is completed.
- B. Place bait stations according to product's EPA-Registered Label and manufacturer's written instructions, in the following locations:

1. Conductive sites and locations indicated on Drawings.
2. In and around infested trees and stumps.
3. In mulch beds.
4. Where wood directly contacts soil.
5. Areas of high soil moisture.
6. Near irrigation sprinkler heads.
7. Each area where roof drainage system, including downspouts and scuppers, drains to soil.
8. Along driplines of roof overhangs without gutters.
9. Where condensate lines from mechanical equipment drip or drain to soil.
10. At plumbing penetrations through ground-supported slabs.
11. Other sites and locations as determined by licensed Installer.

END OF SECTION 313116

SECTION 316219 - TIMBER PILES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes round timber piles.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

- A. Round timber pile treatment data.
- B. Pile-Driving Equipment Data: Include type, make, and rated energy range; weight of striking part of hammer; weight of drive cap; and, type, size, and properties of hammer cushion.
- C. Pile-driving records.
- D. Field quality-control reports.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Handle and store piles at Project site to prevent breaks, cuts, abrasions, or other physical damage and as required by AWPA M4. Do not drill holes or drive spikes or nails into pile below cutoff elevation.

PART 2 - PRODUCTS

2.1 TIMBER PILES

- A. Round Timber Piles: ASTM D25, unused, clean peeled, one piece from butt to tip; of the following species and size basis:
 - 1. Species: Coastal Douglas fir.

2. Size Basis: Butt diameter, 10 to 12-inches minimum.
3. Capacity: Minimum capacity of each pile to be 30,000-lbs (15 Tons).

B. Pressure-treat round timber piles according to AWWPA U1 as follows:

1. Service Condition: UC4C Ground Contact, Extreme Duty
2. Treatment: Creosote or creosote solution.

2.2 PILE ACCESSORIES

- A. Driving Shoes: Fabricate from ASTM A1011/A1011M, hot-rolled carbon-steel strip to suit pile-tip diameter.

2.3 FABRICATION

- A. Pile Tips: Cut and shape pile tips to accept driving shoes. Fit and fasten driving shoes to pile tips according to manufacturer's written instructions.
- B. Pile Butt: Trim pile butt and cut perpendicular to longitudinal axis of pile. Chamfer and shape butt to fit tightly to driving cap of hammer.
- C. Field-Applied Wood Preservative: Treat field cuts, holes, and other penetrations according to AWWPA M4.
- D. Pile-Length Markings: Mark each pile with horizontal lines at 12-inch (305-mm) intervals; label the distance from pile tip at 60-inch (1524-mm) intervals. Maintain markings on piles until driven.

PART 3 - EXECUTION

3.1 DRIVING PILES

- A. General: Continuously drive piles to elevations or penetration resistance indicated. Establish and maintain axial alignment of leads and piles before and during driving.
- B. Heaved Piles: Redrive heaved piles to tip elevation at least as deep as original tip elevation with a driving resistance at least as great as original driving resistance.
- C. Driving Tolerances: Drive piles without exceeding the following tolerances, measured at pile heads:
1. Location: 4 inches (102 mm) from location indicated after initial driving, and 6 inches (152 mm) after pile driving is completed.
 2. Plumb: Maintain 1 inch (25 mm) in 48 inches (1219 mm) from vertical, or a maximum of 4 inches (102 mm), measured when pile is aboveground in leads.

3. Batter Angle: Maximum 1 inch (25 mm) in 48 inches (1219 mm) from required angle, measured when pile is aboveground in leads.
 - D. Withdraw damaged or defective piles and piles that exceed driving tolerances, and install new piles within driving tolerances. Fill holes left by withdrawn piles as directed by Architect.
 - E. Cut off butts of driven piles square with pile axis and at elevations indicated.
 1. Cover cut-off piling surfaces with minimum three coats of preservative treatment according to AWP A M4.
 - F. Pile-Driving Records: Maintain accurate driving records for each pile, compiled and attested to by a qualified professional engineer.
- 3.2 FIELD QUALITY CONTROL
- A. Special Inspections: Engage a qualified special inspector to perform the following special inspections:
 1. Pile foundations.

END OF SECTION 316219